RESEARCH ARTICLE

# Knowledge and practices concerning disaster preparedness among Rural Health Unit personnel in Aurora Province, Philippines

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**ABSTRACT**

**Background**: Public health workers play significant roles in communities in terms of disaster management. Disaster risk reduction management laws and country plans serve as the legal basis and framework in preparing for, mitigating, and responding to a disaster.

**Objective:** This study was conducted to assess the knowledge and practices of Rural Health Unit (RHU) personnel on disaster preparedness.

**Methodology:** A descriptive survey design using a self-report questionnaire developed by the researchers obtained from the Philippine Disaster Risk Reduction and Management (PDRRM) Act of 2010 and the National Disaster Risk Reduction and Management Plan (NDRRMP) 2011-2028 was employed. Via total enumeration, participants from eight RHUs in Aurora Province voluntarily consented to take part. The data were analyzed by employing descriptive statistics such as frequencies, percentages, and measure of central tendency or median by SPSS statistics.

**Results:** The majority of the participants were aged 55 years and above (25.90%), females (78.42%), and were Rural Health Midwives (RHMs) (39.57%). One hundred and thirty-eight (99%) of the RHU personnel in Aurora Province were found to be knowledgeable about disaster preparedness and 90 (65%) of the participants had practiced activities in this regard.

**Conclusion:** The Rural Health Unit (RHU) personnel of Aurora Province are knowledgeable about disaster preparedness and its practices. Public health workers with these characteristics are pillars of strength for the local government units (LGUs). They can continue to enhance comprehensive disaster preparedness education programs in their communities, and assist their LGUs during municipal disaster management planning.

**Keywords:** *disaster preparedness, knowledge, practices, Rural Health Unit*

## Introduction

The Philippines, a developing and archipelagic nation, is at high risk of natural disasters due to its geographic location, as it lies along the typhoon belt in the Pacific and the Pacific Ring of Fire, which is considered to be the earthquake belt [1,2]. On the average, the country experiences twenty tropical storms every year [1,3]. Over the past two decades, along with the rest of the world, the country has endured the effects of these inevitable calamities such as floods, droughts, and tropical storms, with the most devastating one being the super typhoon Haiyan, or "Yolanda", in the Visayas region in November of 2013 [4,5]. As the Philippines ranks third among the countries at most risk of disaster in the world, a large percentage of its population resides in disaster-prone areas such as low-lying coastal areas [6,7].

The country is highly exposed to the risk of floods, landslides, and storm damage caused by the numerous typhoons that strike the country [5]. Aurora Province, in North Luzon, is a third-class province on the eastern seaboard; it has eight municipalities, seven of which are along the coastline facing the Pacific Ocean. This province has frequently been in the path of typhoons for some years.

It is highly vulnerable to tropical cyclones or typhoons, accompanied by flash flooding, rain-induced landslides, storm surges, and earthquakes or earthquake-induced landslides and tsunamis [8]. Disasters like these may cause physical injury and imminent death. Also, they may result to a loss of one's home, possessions, and community, thus causing stress, which leads to physical and emotional health problems as one's coping strategies are disrupted [9].

The Philippines is facing risks related to natural disasters, and was considered by the recent Climate Risk Index as being among the top ten countries worldwide that were most affected by extreme weather conditions [10]. It is imperative that disaster preparedness should be learned and practiced before disasters occur, and that this includes key strategic actions revolving around the formulation of disaster plans, community awareness and understanding, and practicing of local drills [11]. In addition, individual preparedness measures are important because it takes time for local government and disaster relief organizations to mobilize resources to affected areas. Preparations include the stockpiling of food and water, and having a first aid kit and evacuation plan. These are all essential for mitigating the damaging effects of disasters and for delivering effective and immediate responses. This also reflects the health needs of the affected people in the phases before, during, and after the disaster [11,12].

As the country is at high risk of natural disasters [13], it has established strong sets of laws and policies such as the Republic Act (RA) 10174 or Climate Change Act of 2009 [14], and RA 10121 of 2010, a law that strengthens the Philippine's disaster risk reduction and management [15]. The National Disaster Risk Reduction and Management (NDRRMP) Plan 2011-2028 fulfills the requirements of RA 10121. These laws and plans serve as the legal basis and framework that guide the decision-making processes for disaster management such as prevention, mitigation, preparedness, emergency response, and recovery or rehabilitation. The Office of Civil Defense of the country formulates and implements the plan as mandated and ensures that the physical frameworks and the social, economic, and environmental plans of provinces and municipalities are consistent with the NDRRMP. The NDRRMP has four thematic areas, namely, Disaster Prevention and Mitigation, Preparedness, Response, and Rehabilitation and Recovery [16].

The Philippine government designated the Department of Interior and Local Government (DILG) as the leading agency in charge of disaster programs, while other professionals from different government and private agencies play corresponding roles in responding to disasters with the main goal of preventing the loss of life and assets. The overall vision of the NDRRMP is "a safer, adaptive, and disaster-resilient Filipino communities toward sustainable development" [16]. The Local Government Code of 1991 mandates that in disaster-prone areas, the LGU is at the forefront in DRRM, and is the core of the community that remains integral before, during, and after disasters [17] because it has jurisdiction over its constituents and has knowledge of their needs [2].

In the Philippine healthcare delivery system, the primary level health care facility is the Rural Health Unit (RHU) which is managed by the LGU and headed by the Municipal Health Officer (MHO). The MHO or physician is a member of the Local Disaster Risk Reduction Management Council, as mandated by RA 10121. The RHU personnel consist of a combination of health professionals who work as a team for health promotion and disease prevention, including disaster management. Their roles in disaster management include identifying community resources and groups at risk, providing disaster awareness education to the community, and cooperating and collaborating with other agencies to ensure that primary health care, public health, and mental health needs are addressed in disaster planning [18,19].

Gowing *et al.* reported that most of the disaster preparedness studies are focused on external disasters and the preparedness of medical, nursing, and paramedic professionals. They recommended that studies focusing on the entire healthcare team, including the allied health professionals and support staff, be conducted [20]. Other studies on disaster preparedness are focused on nurses [19,21-23], personnel in the emergency areas of hospitals [24,25], medical internship students in tertiary hospitals [26], and inhabitants of areas at risk of disaster [27-29]. As one of the most disaster-prone countries in the world, the Philippines has a significant amount of experience with disasters and has invested highly in disaster preparedness and response capacity. However, while a large amount of research related to preparedness and resilience has been conducted by many local and foreign institutions, these studies did not focus on the RHU personnel or on public health in the Philippines [2,5,30-35]. As these related studies reveal, the researchers were motivated to conduct this study due to the gap in research. The question posed was, "Are the public health workers knowledgeable and have they practiced the disaster preparedness themes as

embodied in RA 10121 and NDRRMP 2011-2028?" This study was conducted to assess the knowledge and practices concerning disaster preparedness and review, the socio-demographic profile of the Rural Health Unit personnel.

The result of this study was envisioned to contribute significant information to the literature on disaster preparedness for public health professionals, to serve as a guide during disaster management planning of municipalities, as well as when conducting education programs pertaining to disaster and disaster preparedness.

## Methodology

A descriptive survey design was utilized. The data were gathered during the months of February and March 2018 in the eight municipalities of the province of Aurora, Philippines. This location was chosen because it is frequently struck by tropical cyclones, averaging three to four per year, or 17% of all the cyclones that enter the Philippine's area of responsibility (PAR); these cyclones make landfall in the province, thus affecting the seven coastal communities greatly because of storm surges or flooding related to the heavy rainfall brought about by the typhoon. Furthermore, Aurora Province has been in the typhoon path for the past few years [36].

Total enumeration was used as a sampling method; a total of 177 personnel were the target participants but only 139 (79%) RHU personnel from the eight municipalities participated in the final survey. The inclusion criteria were as follows: the participant was employed either permanently or contractually by the LGU, was available during the time of the survey, and had consented to participate in the study voluntarily. Participants who were absent at the time of the survey and those deployed by the Department of Health (DOH) to the LGU were excluded. An RHU team consists of a doctor, a dentist, nurses, midwives, a medical technologist, a sanitary inspector, a pharmacist, a nutritionist, and other support staff.

The self-reporting questionnaire in English, focusing only on disaster preparedness, was developed by the researchers based on RA 10121 and NDRRMP 2011-2028, and became the tool used in the study after being pilot tested and examined by experts for validity and reliability. Two PDRRMC personnel were consulted during the development of the tool, particularly with regard to the content focusing on disaster preparedness [8]. The PDRRMC personnel suggested that the RA 10121 and NDRRMP 2011-2028 should be the main references, as these were more accurate. The personnel evaluated the tool with regard to content and comprehensibility, and revisions were made. This was followed by a pilot test involving 20 RHU personnel in a municipality of Nueva Vizcaya Province a month prior to the actual data gathering. The participants provided feedback and, after evaluating each questionnaire, some questions were revised due to grammatical, sentence construction, and rephrasing errors in accordance with the participants' comments. The tool consisted of four parts: part one inquired about the socio-demographic profile, while part two consisted of 16 questions concerning knowledge of disaster preparedness with true or false responses. The participants received a score of one for a correct answer and zero for an incorrect one. The sum of the scores for the items was used as the knowledge score. The passing score set by the researchers was 50% (median score) and above for the total items, which was interpreted as adequate knowledge, and scores below the median score were regarded as poor knowledge. Part three contained questions about practices regarding disaster preparedness, which was scored using a three-point Likert scale (always, sometimes, and never). A response of "always" meant that, if an activity required daily, weekly, or monthly participation, the participant was always present, while "sometimes" meant that there were times when the participant was absent, and "never" meant no participation at all in a particular activity.

Administrative approval was sought from the provincial and municipal government offices before conducting the study. As there is no ethics review board in the province or nearby locality, no ethical clearance was obtained. However, the ethical process in conducting research, particularly the Declaration of Helsinki, was followed strictly. The confidentiality, privacy, and anonymity of the participants were maintained throughout the study. The participants were informed about the purpose of the study, the data collection procedure, and the possible benefits, risks, and harm before the data were gathered. The participants were not paid for their participation in the study; they were made aware that their participation was voluntary and that, if they decide to withdraw from participation during the data gathering, their data would be discarded. Data collectors went to each RHU with the revised questionnaire and informed consent for the study placed inside an envelope. Answered questionnaires were returned after 15-20 minutes; these were placed in an envelope, which was then sealed and stored in a safe and locked cabinet while the other questionnaires were being gathered. Only the researchers had access to the data. All the data obtained

were secured in line with the Data Privacy Act implemented in the country.

A statistician assisted the researchers to process the data using SPSS version 20 for data analysis. Descriptive statistics, such as frequencies, percentages, and measure of central tendency, the median were used to present the socio-demographic characteristics of the participants, as well as their knowledge and practices concerning disaster preparedness. This study is only an assessment of the knowledge and practices, hence, descriptive statistics was employed in the analysis of data.

## Results

Table 1 shows that majority of the participants were aged 55 years and above (25.90%), females (78.42%), and married (66.19%). There were more diploma graduates (45.32%) since most of the personnel were registered midwives who had completed the two-year midwifery program. Thus, RHMs accounted for most of the participants (39.57%), followed by nurses (16.55%), since only one to two nurses are employed per municipality, while one physician is employed per municipality. However, only seven physicians participated because one RHU did not have a physician. More than half (81, or 58.27%) of the participants had only experienced one natural disaster in their lifetimes because the point of reference was the three years prior to 2018.

Table 2 shows the participants' knowledge about disaster preparedness; as can be seen, many of them scored correctly when answering the true or false questions. Almost all of the participants were knowledgeable about disaster preparedness (138, or 99%), with scores ranging from 55% to 98% of the total questions. However, two questions (numbers 5 and 16) about disaster preparedness were answered incorrectly by 80% of the respondents.

Table 3 shows the results for the practices related to disaster preparedness. The participants answered the questionnaire using a three-point Likert scale. The majority of the participants identified ten of these activities (items 1, 3-7, 12, 14-16) as the ones they sometimes practiced, while only six activities were always practiced (items 2, 8-11, 13).

## Discussion

The NDRRMP 2011-2028 as the fulfillment of RA 10121 serves as the framework and reference in disaster management from the national government to the local

***Table 1.*** *Characteristics of the respondents*

| Socio-Demographic Data | Frequency | Percentage |
|---|---|---|
| **Age** | | |
| 56 and above | 36 | 25.90 |
| 46-55 | 34 | 24.46 |
| 36-45 | 35 | 25.18 |
| 26-35 | 21 | 15.11 |
| 25 and below | 13 | 9.35 |
| **Sex** | | |
| Female | 109 | 78.42 |
| Male | 30 | 21.58 |
| **Civil Status** | | |
| Married | 92 | 66.19 |
| Single | 34 | 24.46 |
| Widowed | 12 | 8.63 |
| Separated | 1 | 0.72 |
| **Educational Attainment** | | |
| Doctor of Medicine | 8 | 5.76 |
| Master's Degree | 2 | 1.44 |
| Bachelor's Degree | 57 | 41.02 |
| Diploma/ Certificate | 63 | 45.32 |
| High-school Level | 9 | 6.47 |
| **Occupation** | | |
| Midwife | 55 | 39.57 |
| Utility workers | 23 | 16.55 |
| Nurse | 19 | 13.67 |
| Administrative Aide | 10 | 7.19 |
| Nurse Aide/ Medical Aide | 8 | 5.75 |
| Physician | 7 | 5.03 |
| Medical Technologist | 6 | 4.32 |
| Sanitary Inspector | 5 | 3.60 |
| Dentist | 4 | 2.88 |
| Pharmacist | 2 | 1.44 |
| **Average Monthly Income** | | |
| Above 30000 | 13 | 9.35 |
| 25,001-30,000 | 10 | 7.20 |
| 20,001-25,000 | 27 | 19.42 |
| 15,001-20,000 | 20 | 14.39 |
| 10,001-15,000 | 17 | 12.23 |
| 5,001-10,000 | 31 | 22.30 |
| Below 5,000 | 21 | 15.11 |
| **Number of Natural Disasters Experienced** | | |
| Six (6) | 2 | 1.44 |
| Five (5) | 3 | 2.16 |
| Four (4) | 3 | 2.16 |
| Three (3) | 9 | 6.47 |
| Two (2) | 41 | 29.50 |
| One (1) | 81 | 58.27 |
| **Total Respondents** | 139 | 100% |

***Table 2.*** *Knowledge on disaster preparedness of Rural Health Unit personnel*

| Knowledge Questions | Answers | | | |
|---|---|---|---|---|
| | Correct | | Incorrect | |
| | Frequency | % | Frequency | % |
| 1. Disaster preparedness program of the country adheres to the Philippine Disaster Risk Reduction Management Act of 2010 or RA 10121, a mandate to strengthen disaster management in our country. | 137 | 98.56 | 2 | 1.44 |
| 2. Disaster preparedness is a phase of and a basic component of the disaster risk reduction program of the Department of Interior and Local Government (DILG) agency, the lead agency that implements DRRM. | 136 | 97.84 | 3 | 2.16 |
| 3. Disaster preparedness is knowledge & capacities developed by governments, professional response & recovery of organizations, communities & individuals to effectively anticipate, respond to and recover from the impacts of imminent or current hazardous events. | 136 | 97.84 | 3 | 2.16 |
| 4. Disaster preparedness includes pre-disaster activities like community organizing, planning, training, equipping, hazard mapping, stockpiling, insuring of assets, information & education, & developing an overall preparedness strategy, policy & institutional structure. | 136 | 97.84 | 3 | 2.16 |
| 5. National disaster preparedness plan aims to establish effective measures in preparation for the occurrence of any natural disaster only. | 32 | 23.02 | 107 | 76.98 |
| 6. National disaster preparedness plan's primary objective is to increase the level of awareness and enhance the capacity of communities against threats and impacts of all hazards. | 136 | 97.84 | 3 | 2.16 |
| 7. Disaster preparedness' goal is to strengthen the coping ability of communities so they can recover from the negative impacts of disaster. | 136 | 97.84 | 3 | 2.16 |
| 8. Disaster preparedness are actions done before a disaster that enable families and communities to respond effectively during and after disasters. | 138 | 99.28 | 1 | 0.72 |
| 9. Disaster preparedness prior to a calamity is an approach to prevent or minimize the loss of life or property. | 137 | 98.56 | 2 | 1.44 |
| 10. Disaster preparedness includes the conduct of risk assessment of the community. | 128 | 92.09 | 11 | 7.91 |
| 11. Disaster preparedness implementation is before any hazard or disaster. | 137 | 98.56 | 2 | 1.44 |
| 12. Disaster preparedness actions carried out within the context of DRRM aims to build capacities for efficient management of all types of emergencies and to achieve orderly transition from response to sustained recovery. | 136 | 97.84 | 3 | 2.16 |
| 13. Disaster preparedness' very important element is readiness to respond. | 137 | 98.56 | 2 | 1.44 |
| 14. Disaster preparedness strengthens partnership among stakeholders, government and non-government organizations. | 137 | 98.56 | 2 | 1.44 |
| 15. Disaster preparedness' excellent indicators are resilience and continuity in the delivery of essential services. | 133 | 95.68 | 6 | 4.32 |
| 16. Disaster preparedness' parameter of action is within the post-disaster domain. | 24 | 17.27 | 115 | 82.73 |

***Table 3.*** *Practices on disaster preparedness*

| Activities | Always | | Sometimes | | Never | |
|---|---|---|---|---|---|---|
| | F | % | F | % | F | % |
| 1. Discusses disaster preparedness with colleagues. | 48 | 34.53 | 89 | 64.03 | 2 | 1.44 |
| 2. Volunteers in disaster responses during calamities. | 81 | 58.27 | 56 | 40.29 | 2 | 1.44 |
| 3. Attends to short trainings on disaster preparedness and response. | 37 | 26.62 | 99 | 71.22 | 3 | 2.16 |
| 4. Participates in inter-agency or community-wide disaster drills. | 58 | 41.73 | 73 | 52.52 | 8 | 5.76 |
| 5. Attends to meetings at the municipal level when a natural disaster is about to occur. | 63 | 45.32 | 67 | 48.20 | 9 | 6.47 |
| 6. Attends to formal disaster preparedness trainings with other agencies outside the municipality. | 41 | 29.50 | 77 | 55.40 | 21 | 15.11 |
| 7. Reads newspapers and other multimedia about a disaster that may strike the municipality. | 34 | 24.46 | 97 | 69.78 | 8 | 5.76 |
| 8. Participates in local and national disaster preparedness drills, example earthquake drill, fire drill and others. | 69 | 49.64 | 66 | 47.48 | 4 | 2.88 |
| 9. Practices the roles and responsibilities of RHU personnel in times of disaster. | 102 | 73.38 | 35 | 25.18 | 2 | 1.44 |
| 10. Teaches and motivates the community to develop their family disaster plan. | 73 | 52.52 | 61 | 43.88 | 5 | 3.60 |
| 11. Disseminates correct information to the community on how a major disaster would affect the area. | 81 | 58.27 | 51 | 36.69 | 7 | 5.04 |
| 12. Provides trainings to the community on injury and death prevention during a disaster. | 47 | 33.81 | 77 | 55.40 | 15 | 10.79 |
| 13. Prepares disaster and first aid supplies to be used during a disaster. | 68 | 48.92 | 62 | 44.60 | 9 | 6.47 |
| 14. Engages in evacuation drills/trainings. | 61 | 43.88 | 65 | 46.76 | 13 | 9.35 |
| 15. Attends to formal basic life support and first aid trainings. | 52 | 37.41 | 70 | 50.36 | 17 | 12.23 |
| 16. Conducts risk assessment and disaster preparedness planning. | 54 | 37.41 | 71 | 51.08 | 14 | 10.07 |

government units. The framework has four themes, one of which is disaster preparedness. The DILG is the government agency instructed as vice-chair for disaster preparedness' thematic pillars which also has authority over all the LGUs in the country. The Local Government Code of 1991 further mandates that LGUs are at the forefront of DRRM with basic roles in facilitating the community in times of disasters. This study mainly focused on assessing the knowledge and practices of RHU personnel concerning disaster preparedness.

The evidence from this study showed that the RHU personnel of the Province of Aurora are knowledgeable about disaster preparedness and practice its relevant activities. The findings imply that the NDRRMP 0f 2011-2028 was properly communicated to the LGUs of Aurora Province and this framework was disseminated to the RHU personnel as reflected by their knowledge scores. Results like this inform policymakers that the law has been implemented as mandated, though this is true only in Aurora Province as the setting of this study.

The present study reflects similarities with the results of previous studies in some aspects of knowledge and awareness concerning the concepts of disaster preparedness and activities. However, related studies that were conducted and published in the country were few, had different participants, and used different tools, same with those from other countries. Thus, This study among public health workers

is a first in the country. Singhal *et al.* [27] revealed an excellent basic knowledge of disaster planning and preparedness among medical intern students in hospitals, as did Joshi *et al.* [37], who also found a satisfactory level of knowledge in the majority of health care teams. Pascal's (2018) [32] study of the Philippines provided strong evidence that the respondents knew about and had participated in disaster risk-reduction education and training, while the study by Adenekan *et al.* (2016) [38] showed that almost half of the participants had good knowledge of emergency planning and preparedness. Moreover, the findings of Habte *et al.*'s (2018) [39] work revealed that more than half of the participants had good knowledge of hospitals' disaster preparedness and their plans.

Findings that contradicted this study were those of Labrague *et al.* [22], whose study revealed that nurses were insufficiently prepared and did not feel confident in responding to disasters. In addition, Paganini *et al.* [25] found that there was poor knowledge of basic hospital disaster planning concepts among the Italian emergency department physicians on duty, while Ibrahim [22] found that nurses lacked knowledge and practice concerning disaster and emergency preparedness. Xu *et al.* [40] found that more than half of the participants did not know what to do in the event of an emergency, and Nasr and Saleem [41] said that health professionals did not have good knowledge about emergency and disaster management. According to Gowing *et al.* [20], the overall focus of most studies is on the preparedness of medical, nursing, public health or paramedic professionals, but not on the entire healthcare team that includes other allied health professionals and support staff; thus, they recommended that these members should be included in future studies.

A study by Pascal (2018) supports the findings of this study wherein, [32] more than half of the participants agreed that they participated actively in risk-reduction campaigns; Ahayalimudin *et al.* [23] stated that Emergency Room (ER) and community nurses had adequate practice in disaster management, while the study by Nofal (2018) [42] stated that 81% of the respondents participated in drill exercises and more than 60% attended the on-going training in emergency preparedness and disaster response. Some of the findings of previous studies related to practices on disaster preparedness contradicted the results of this study. Ibrahim [21] reported that the level of practice among respondents was below average; Moabi [25] revealed that disaster preparedness practices among health care workers were deficient and that work still needs to be done; and Ulfat *et al.* [19] found there were insufficient programs and training on disaster-related matters. Singhal *et al.* [26] also found a negative response to disaster preparedness training and performance in drills, while Rehanna Shabbir *et al.* [43] stated that most participants did not know about the practice of disaster preparedness training, and Ashenafi Habte *et al.* [39] revealed that disaster preparedness practice was lacking in the Tikur Anbessa Hospital.

## Conclusion

The RHU personnel in this study were knowledgeable about disaster preparedness and mainly practiced activities in this regard. Public health workers with these characteristics are pillars of strength for the LGUs as they can provide comprehensive disaster preparedness education programs and training to their communities in coordination with other agencies, as well as assist their LGUs in disaster risk-reduction management and planning.

The results of this study can open doors for other researchers in the field of disaster preparedness and management who aim to focus on disaster preparedness plans of each municipality and see if what was present in the NDRRMP framework is being implemented by the LGUs as mandated. The study can be replicated in other regions, provinces, and municipalities with public health personnel and local government officials as the participants using a different research design.

This study has provided valuable findings regarding the knowledge and practices on disaster preparedness of RHU personnel; however, as it focused only on one province in the country, the study's results may not be generalizable to the other provinces and regions. Furthermore, during data gathering, the focus was only on the theme of disaster preparedness as mandated by the NDRMMP and RA 10121, thus, the local disaster risk reduction and management plans of every municipality were not considered. It could have been more significant if this was given emphasis. Also, the sampling method used is one factor that makes the analysis of the associations of variables not feasible.

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