

Safety And Health Practices On Disaster Risk Reduction And Management: Cagayano's Resiliency During Typhoons And Floods

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Abstract: Tuguegarao City and the municipality of Amulung in the coastal province of Cagayan are landlocked areas with probability of being flooded. These two towns are the frequent route of typhoons and floods. Safety and health practices including the challenges encountered before, during and after the typhoons and floods can not easily discern to determine the Cagayano's resiliency since there is no available data to show such. This study aims to explore the safety and health practices in selected local communities in Cagayan before, during and after typhoons and floods to come up with an analysis about Cagayano's resiliency to typhoons and floods. This case study research focuses on the experienced of individuals in the six barangays of the two towns before, during and after typhoons and floods. The data gathering was conducted during the month of June and July 2019, with a total of 42 individuals who are barangay officials and community residents. Data saturation was the basis of the identification of the total number of participants or key informants. The result of the study showed that the safety challenges encountered before typhoons and floods is the stubbornness of the community people, while during the typhoons and floods, unpreparedness and underestimation of the community people about the intensity of typhoons. The participants used their survival instincts and "bayanihan spirit" to surpassed those challenges that were identified. Vigilance, compliance and preparedness are now considered as their safety practices after realizing that typhoons are no longer as simple as before. The health practices observed by them are proper exercise, eating nutritious foods, and drinking clean water keep them healthy. Lastly, Cagayano's resiliency comprised adaptability and flexibility to situations with proper cooperation, coordination and communication with authorities and community people.

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I. Introduction

The Philippines is susceptible to natural disaster due to its geographical location on the Pacific Ring of Fire. Typhoons, floods, and earthquake, are among the natural disasters that Philippines usually encounter. Being in the typhoon belt, there are approximately 19 typhoons enters the country's area of responsibility and barely 6 – 9 make landfall⁴⁸ making it the world's third – highest disaster risk country. During the recent years the rains brought by southwest monsoon enhanced nearby storms and make it as more destructive when it enters the Philippine Area of Responsibility. Majority of land areas placed into water, living death of hundreds of people and homeless⁶.

Looking at the aftermath of typhoons and floods, community people who are living besides the river needs to evacuate to a higher places, and some needs to be vigilant for the possibility of landslides and lost of livelihoods that may last for sometime. Headlines from the different news center in the Philippines usually confirmed that lives were taken as an aftermath of typhoons or flood and these contributed negative impact on the psychological aspect of the survivors of catastrophe. During those moment, prayer is the main weapon of the Cagayano's in those moments of disastrous events. Disaster Nursing focuses not only based on the concept of disaster preparedness that comprises of preventive measures that aimed to enhance life safety, ability to undertake emergency actions to protect life and damages and disruption but also engage during the disaster, post – disaster restoration and early recovery activities⁴⁵. One emphasis also during disaster is that caring for fragile and vulnerable population in disaster nursing requires teamwork, professionalism and adaptability of nurses during those times to maintain the patient's dignity, confidentiality, privacy and the best care despite any difficulties encountered during disaster.

In the province of Cagayan, the City of Tuguegarao and the municipality of Amulung are included in the list of places frequently visited by typhoons and flood prone areas. The municipality of Amulung is a landlocked municipality in the coastal province of Cagayan. LiPAD,³⁰ 25 year flood hazard map showed shapefile illustrating the geological phenomenon of Amulung area which has high, medium and low risk probability of being flooded. On the other hand, the 5th Annual Natural Risk Atlas of the Mapiecroft conferred

that Philippines' extreme exposure to a countless of natural hazards and Tuguegarao City is included as top two (2) among the ten most at risk globally. Tuguegarao is one of the most vulnerable areas in the whole Cagayan Valley Region during wet season because it is mapped as a flood prone area and a catch basin of the waters from the different tributaries in the mountains surrounding the region¹⁹.

With the different experiences of the Filipino during calamities, the Department of Science and Technology came up with a project called "Project NOAH"¹³ that create tools for disaster preparedness and mitigation. In addition, the local and national government passed different laws and mandates to follow in case of disaster¹³:

The researcher being a nurse, wondered whether or not Cagayano's practices some safety and health practices during the process of preparation, response, and recovery since there are no available documents that shows that typhoons and floods left mark a numerous number of casualties or disaster related health problems. If the answer is in the positive side, what then are the safety and health practices that is innate to the Cagayano's that helps them to survive or overcome any safety and health problems?

II. Material And Methods

After obtaining clearance to continue the study, the researchers coordinated with the office of Disaster Risk Reduction Management officer who in turn recommended appropriate barangays to be included in the study. After coordinating with the barangay officials of those selected communities, this case study was conducted after explaining the informed consent to the participants. The included participants were those who are members of local disaster risk reduction management, community people who experienced typhoons and floods during the past two years and residing in the area for five years regardless of sex and age. Barangay officials of selected communities and officers of the Disaster Risk Reduction Management office of the two towns were included as key informants. A total of 42 individuals were included for this study. Data saturation was the basis of identifying the total number of participants or key informants of the study. The data gathering was conducted last June – July 2019. Focus group discussion and individual interview during the short visit were utilized in gathering of data. The field notes, observation, and recorded data was transcribed. The researcher utilized constant comparative study in organizing, categorizing and comparing the subjective data gathered from the participants of the two municipalities for analysis purposes. The interview transcript was analyzed and coded based on emerging themes and concepts which was organized that reflects analytic understanding of the coded entities¹⁸. The researcher presented the result of the study to the barangay officials through social media, who in turn affirmed the result.

Study Design: Case study

Study Location: Barangay Annavucolan, Barangay Unag and Barangay Abolo in the municipality of Amulung;

Barangay Linao, Centro 11, Barangay Annafunan in Tuguegarao City

Study Duration: June 2019 to July 2019.

Sample size: 42 participants

Sample size calculation: The researchers utilize purposive sampling in identifying participants or key informants

Subjects & selection method: The study population was based from the recommendation of the barangay officials who identified them based from the aim of the study.

Inclusion criteria:

1. Members of the local communities' disaster risk reduction and management.
2. Must have experienced typhoons and floods in the community for the past two years.
3. Living in the community for at least five years.

Exclusion criteria:

1. Age
2. Sex

Procedure methodology

After obtaining administrative clearance from the graduate school to pursue the study, the researchers submitted the proposal for ethical review. Upon approval, Upon approval, the researcher conducted courtesy call to the DRRMC of the two municipalities, who provided important information and recommended barangays that best suits the study. The researcher coordinated with the barangay captains from the barangays recommended by DRRM offices, who in turn approved the researcher's request. With the help of the barangay officials, informed consent was discussed to the participants indicating that confidentiality of their identity will

be observed. The researcher visited and interviewed the participants thru house – to – house visit in the three (3) barangays of Tuguegarao City; and focus – group discussion in the three (3) barangays in the municipality of Amulung. The researcher gathered data within the study period. The researcher decided that data was saturated when upon reviewing the transcribed data, the information from the different participants were the same and the verbalization of their experiences and opinions was repeated. For the purpose of validation of data, the researcher coordinated with the head of the provincial disaster risk reduction and management of Cagayan and requested relevant data base of the municipalities identified, who positively responded.

The field notes, observation, and recorded data was transcribed. After which the researcher organized and analyze the data. The researcher presented the result of the study to the barangay officials through social media, who in turn affirmed the result.

Statistical analysis

After gathering and transcribing the data, the researcher placed the findings on a continuum based on the order of importance for the purpose of exploring and interpreting the data gathered to tell the story from the beginning until the end and to get the clear picture of the result of the study to provide answers to the statement of the problem and theoretical significance ensuring credible and trustworthy interpretations³⁵.

The researcher utilized constant comparative study in organizing, categorizing and comparing the subjective data gathered from the participants of the two municipalities for analysis purposes. The interview transcript was analyzed and coded based on emerging themes and concepts which was organized that reflects analytic understanding of the coded entities¹⁸.

III. Result

The challenges experienced on safety by the local communities in Cagayan during:

- a. Pre – Disaster : Stubbornness
- b. During Disaster : Underestimation of the intensity of the typhoons and floods; unpreparedness and risky behaviors of the community people.
- c. Post Disaster : no challenges experienced

How are the challenges on safety addressed by the local communities in Cagayan during the:

- a. Pre – disaster : community people’s compliance with the disaster’s plan
- b. During Disaster : Survival instincts and “Bayanihan” spirit of the community people
- c. Post Disaster : none

Safety Practices of the Local Communities in Cagayan on Disaster Risk Reduction Management before, during and after typhoons and floods:

- a. Vigilance
- b. Compliance
- c. Preparedness

Health Practices of the Local Communities in Cagayan on Disaster Risk Reduction Management before, during and after typhoons and floods:

- a. Preparation of medicine kit
- b. Drink clean water and eat nutritious foods
- c. Exercise

Cagayano’s resiliency during typhoons and floods: adaptability and flexibility coupled with:

- a. Coordination
- b. Cooperation
- c. Communication

IV. Discussion

Challenges Experienced on Safety and Health Practices of the Local Communities:

Challenges molds every individual to become a better person, though it will frighten them especially if they are not used to it when they encounter for the first time. However to see the picture clearly and to analyze the situation someone needs to experience it to come up with strategies on how to overcome such challenges. Cambridge¹⁷ defined challenges as something needing great mental or physical effort in order to be done successfully, or the situation of facing this kind of effort.

SAFETY CHALLENGES

Pre-Disaster Phase

Stubbornness

Participants from the different barangays of the two municipalities mentioned stubbornness of their constituents is the only considered challenge they encountered when they were preparing for the coming of typhoons or floods. As verbalized by them, once the announcement made by PAG-ASA that the route of typhoon is in their area, they started their roving and encouraged their constituents to prepare some basic needs and emergency medicines, keep their house safe by placing an anchor to the ground so that strong wind blows will not destroy their houses and evacuate when it needs to. Some will automatically placed their belongings by hanging it the roof of their houses and go to a safe place or in the neighborhood with concrete houses. However, according to the barangay officials of the selected barangays of Amulung, when the intensity of the forthcoming typhoon is somewhat predicted to cause fatal blow in their area, they really encouraged their constituents to observe safety precaution by transferring to a safer place or concrete houses, but majority of them opted not to follow which concerned them most when calamity strikes.

Similar problem was encountered by the barangay officials in selected barangays of Tuguegarao City. As part of their preventive measures before typhoon or flood, once PAG-ASA announced that a certain typhoon will hit the town, or flood is expected, they made their rounds to the low lying areas and advised them to evacuate, however, their constituents decided to stay at home and wait until such time that the strong winds during the typhoon will hit their houses or when the flood water reach their floors.

The stubbornness of people during an impending natural disaster is a common problem encountered by the implementers. Despite the information provided stating that there's a typhoon or flood, people tend not listen to the warnings and this will leave people who did not evacuate early on to be stuck at their homes, others might make their way to the roof, some will try to transfer to the neighborhood during the typhoon or flood, and, sadly for some, they would die before they could seek help or save themselves. For one reason or another, despite their attachments to their homes, when disaster is coming, precautionary measures to maintain their safety since is what matters most. People should never underestimate any type of disaster, since this will always be unpredictable¹⁴. The group of Esteban¹⁶, shared in their study that people cited that the reasons for some individuals of not evacuating during typhoons or floods are more complex. People who stayed in their homes stated that they don't know how to evacuate or what to do, or that their house is safe and high enough, and others said that they have difficulty in going to the evacuation area or they underestimate the danger posted by the calamity and that they could run away easily.

Disaster Phase

In Tuguegarao City, participants verbalized that despite having super typhoons and floods that hit their respective places, there are no casualties nor injury before, during or after typhoons or floods. Barangay officials are proud to claim that their constituents have taken precautionary measures to avoid occurrence of accidents or injury nor be inflicted by any diseases.

Some severe weather events can be forecast hours before they arrive, providing valuable time to plan for the most protective actions for life safety¹⁵. Aside from that, emergency managers develops plan of action for the forthcoming disaster, and volunteer response of the community people capability is being considered to prevent the negative impact of a disaster⁹.

Zero casualty is an achievement of the barangay officials and their constituents when typhoon or flood strikes, however, after typhoon or flood, there are some children usually experienced having diarrhea, fever and colds. The same thing were experienced by children residing in Amulung.

Changes in weather basically challenge our immune system to adapt to the new one. According to Dr. Vikash Modi,³⁴ a Piedmont family medicine physician, our bodies get used to a certain climate, and when those things changes suddenly, our body tried to adapt and unfortunately for some - they have a difficult time to adjust which triggers body illness.

Underestimation

Underestimation was being observed when the participants verbalized that they did not expect the fatal blow of the typhoon with persistent rainfall and strong wind blows which is much different from what they previously experienced. Some participants also stated that they experience near drowning when they tried to return to their houses after evacuation to get some basic commodities that they need in the evacuation sites. Others shared that they experienced having uninhabited homes when the strong wind blows and heavy rain fall damaged their houses even if they are inside of it.

Unlike Tuguegarao City, based from the records, Amulung has one casualty during typhoon Lawin. The victim tried to rescue his parent but did not survive the strong blast of winds and heavy rains during the whirlwind of the typhoon.

When a person live fully and become functional everyday, able to perform his or her activities of daily living, can decide on his or her own can sometimes extremely under-estimates the probability of life. Underestimation of the effect of typhoon can risk one's life especially if during the typhoon and in danger no one will be there to rescue you. Wind and rain drops can be considered as destructive forces which might lost of life. Despite the forecast made by PAG - ASA, people instinctively decide to do drastic movements for our love ones without taking into consideration our own safety. To be safe during the calamity, precautionary measures were provided to the people like staying indoors and monitor its progress in television or radio⁴¹.

Some participants expressed how unpredictable the typhoons were. Although they said that they'd never became complacent and prepared well after an announcement of PAG –ASA for the coming of typhoons, however, during the time of typhoon, the intensity brought by it was underestimated by them and realized that the impact brought up by typhoons with super strong wind blows and heavy raindrops that almost killed people, destroyed houses and blown out roof of houses nearby especially when they tried to transfer from one house to another for their own safety is not a joke. Lands were submerged with water also which let them decide to stay in their roof and during those times, the members of the family were not able to take anything. These experiences brought fears into their hearts and don't know where to run to or don't know what to do but leave everything to God. Prayer is their greatest weapon and faith in God is the source of their strength during those moments.

Disaster is an unexpected, sudden, calamitous event, causing widespread damage, and are understood to be traumatic and associated with a high degree of psychological disturbance⁴³. The heavy and persistent rainfall and strong wind blows that typhoons bring have devastating effects making homes uninhabitable, and the flooding associated with typhoons can cripple rescue and aid efforts⁸. One thing for sure, human responses to natural hazards are assumed to be rooted primarily in the way individuals think, behave, and interact in the environment⁴³.

The personal experiences of the participants in selected barangays in Tuguegarao City is more traumatic than what was experienced by the participants in Amulung. When they shared their previous experience of flooding, they said that there were times that they almost lost their lives, houses were washed -out due to strong winds, some people experienced on how to defend their lives to others especially when they evacuate, a pregnant woman climbing a dump truck just to be in safe evacuation area, and sleeping in the streets by putting up tents as their shelter.

Natural disasters bring devastating effect which has an immediate and long-term impacts on both human life and livelihood⁸.

When PAG-ASA announced that the typhoon left the Philippine Area of Responsibility, the journey of the community people who are living in the low lying areas' did not end since according to them they are expecting flood as an aftermath which is clearly seen from the maps of flooded area in the municipality of Amulung and City of Tuguegarao from PCCDRM (Provincial Climate Change and Disaster Risk Reduction Management Council) and MDRRMC in Amulung which confirmed the information provided by the City Disaster Risk Officer and the verbalization of the participants.

The Disaster Risk Reduction Management Council in Tuguegarao City showed that Amulung and Tuguegarao are usually the catch basin of waters coming from Magat dam in Isabela and the heavy rains drops from Sierra Mountain and Cordillera Mountain. ABS - CBN¹ also shared a map of tributaries and flood-prone areas around the Cagayan River basin in elliptical shape, surrounding mountains in the east, south and west and the floods caused by the Cagayan river to its nearby places flow slowly due to its gentle slope.

Risky behaviors

Despite warnings to evacuate to avoid danger community people decided to stay at home and evacuate only when they know that they can not survive the whirlwind of the typhoon or the water level reach their homes.

In selected communities of the municipality of Amulung, and Tuguegarao City, the barangay officials described how hard to convince their constituents to evacuate before the typhoons or flood strikes despite the weather forecast of PAG-ASA about having supertyphoon or flood that will hit their places.

When the typhoon hits their area and the constituents feel that they were not safe for possibility of their houses being destroyed by the strong wind blows, or when the rain fall was strong enough to immerse their places into the water, that will be the only time that they ask for assistance from the barangay officials to help them evacuate from their houses to a safer place or they will take the initiative to transfer to their neighbors living in a concrete houses.

People are highly aware of the severity or intensity of typhoons that visited their area every year due to their frequent typhoon exposure. They are aware that they lived in a typhoon and flood high – risk area. However, they were terrified by the intensity of typhoons when it strikes them. Their behavior during the calamity was associated with their risk perception, residential location and knowledge of preparedness²⁶. When

they are confronted with any type of disaster, it is often difficult for them to realize the danger and take protective action. Some residents made their decisions to evacuate because they recognized the extent of the danger due to their frequent exposure. For those people who take the risk of staying at home, their reason was that they did not foresee that their houses will be flooded during typhoon and some felt it was all right to stay at home and valued the merits of staying home³⁶.

Unpreparedness

Lastly, for unpreparedness, though some prepared early for their safety and for the safety of their houses and belongings, some evacuate without preparing anything especially their basic commodities and needs to rely on the support of the government.

In Amulung, one of the participants present shared that she gave birth during the super typhoon. She shared how difficult it was during that vulnerable moment.

When an emergency occurs, the first priority is always life safety, second is the stabilization of the incident. To minimize the potential damage of any incident, actions can be taken by proper authorities and/or institutions who are in - charge of safety. The initial action is very critical but the first step is to conduct a risk assessment to identify potential problem and an understanding of what will happen that will enable them to determine the proper actions to solve the problem being encountered during an emergency¹⁵.

Most community people are very thankful for having good health before, during and after typhoons or floods but the participants can not help sharing their unforgettable experienced when typhoons or floods hits their area.

Typhoon is a major storm that affect everything they come in contact with, from source of livelihood to human beings. The destructive forces of typhoons may shake the capability of individual to survive. Along with the typhoon is flood. Flooding can cause people to drown, houses to be completely destroyed, property to be swept away, and farms to lose all of their crops to the winds and relentless rains. In communities cut off by typhoons, individuals may not be able to get the medical attention they so desperately need, and starvation becomes a big risk as well⁸.

Some community people became hopeless especially the vulnerable ones when typhoon and flood strikes them. People who underestimated the great impact of the strong typhoon made some desperate moves when they are facing the unexpected whirlwind of the storm and in the end, they call to God as their strength.

Participants from selected barangays in the municipalities of Amulung and Tuguegarao shared that in their low lying areas, the heavy rains brought by typhoons gives gradual rise of water in the lower main Cagayan River and its tributaries, Pinacanauan River in Tuguegarao, Chico River, Pared River, and Dummun River. In addition to, once the Magat Dam spillways gates opened after issuing a flood advisory warning to its catch basins - it cause flood for how many days¹².

Having been exposed to different typhoons and flood, participants shared that those calamities brought psychological impact to them. People might be laughing and at the same time emotional when they remember how their houses were destroyed due to the typhoons, the unending strong wind blows, how the waves brought fears into their heart, seeing blown up or flying roofs or debris, staying in their roof for how many days until the typhoon stops or the floods subsides, living in the evacuation area having nothing to eat and rely on the governments support, and developed "phobia" with what they witnessed during the typhoons and floods. These are some of the people's unforgettable experienced during floods and typhoons which are still fresh and somehow gave them goosebumps when they narrated it and made them feel that they are really hopeless during the time of calamities. Anthony Wallace in 1953 described this as disaster syndrome. Here, he stated that a disaster syndrome is where and individual stunned and dazed frequently to the point of immobility, they become passive and willing to take orders from everyone so long as they will be save from the impact of the disaster but once they will recover from the said situation, they begin to pull themselves together and approached the situation in a more rational manner so as not to be in the same situation as before - though we can not deny the fact that still, they may show signs of anxiety by narrating their experience to others again and again^{44, 49} like what the researcher observed during the time that she gathered information from the participants.

Phobias are sometimes described as "irrational" fears, but they don't always develop out of nowhere. When an individual experienced a natural disaster even if they didn't suffer any physical injury or trauma—it's possible that the unexpected, sudden, or overwhelming nature of the event could have taken an emotional toll on them specially when that individual might manifestations like jumping at every flash of lightning and rumble of thunder, which is considered as weather phobias. The fears of or anxiety about a specific weather type or event is triggered by objects or situations found in nature³² and people claiming that the typhoons in the last few years have been stronger and people have witnessed more destruction than in prior years⁴⁷.

People who experienced the strong blast of typhoons, not knowing what to do can be more helpless when they found out that there are some people who took advantage of their situation by forcibly entering their house and took their valuable things. In selected communities in Amulung, they shared that they help one

another during typhoons or floods. Unlike Amulung, some participants in Tuguegarao City shared their sentiments when some people tried to take advantage of the situation by going in their area when they evacuate and took important belongings of some families.

Dictionary¹⁰ defined safety as the condition of being protected from or unlikely to cause danger, risk, or injury. People do their best to be safe during calamities. Healthy Pinoy⁴¹ shared that people stay indoors or go to the nearest designated evacuation area, stack their appliances above the expected water level, avoid low lying areas, monitor tv and radio reports just to be safe⁴¹. However, no matter how people properly observed all the precautionary measures, there were some people who took advantage of the situation and took their belongings. Some researchers studied and tried to understand the human reaction after the calamities. When the typhoons destroyed their means of livelihood, people needs to live in shelter, streets, and with the magnitude outcome of these calamities, they tried whatever means to survive and this can lead people to commit crime like theft by people who took advantage of the situation⁴⁷.

Post Disaster Phase

Pre – disaster and During Disaster are important part in the role of nurses or first aider or the local authorities to monitor during any type of calamities with an aim to do greatest good for the greatest number of people, however monitoring post – disaster phase is quite equally important especially when there are numerous community people who suffered from post – traumatic syndrome. Nurses are trained to understand the community people’s live experienced and they are properly equipped with appropriate, knowledge, skills and attitudes to meet the needs of the community as reiterated by the Association of Public Health Nurses³.

With the interview conducted by the researcher to the office of Disaster Risk Reduction Management in both municipalities, the officers, who are nurses - shared that based from the verbal report of the barangay officials under their jurisdiction, who took the initiative to monitor the extent of the impact of typhoons and floods in their area. There were no problems encountered during post disaster since the community people cooperate with one another in rehabilitation of what was destroyed by the calamity and shared what they have with others because according to the barangay officials and the participants, helping one another in times of needs is part of their culture and they are happy with it.

HEALTH CHALLENGES

Health is a dynamic condition resulting from body’s constant adjustment and adaptation in response to stresses and changes in the environment to maintain inner equilibrium²⁸.

Pre – Disaster Phase

The participants and the barangay officials of selected barangays in both municipalities shared that in preparation for the landfall of typhoons, there is no report saying that a constituent of their barangay incurred any type of illness or disease nor accident while they are in the midst of their pre-disaster preparation. This fact is validated by the official reports provided by the office of Provincial Climate Change and Disaster Risk Reduction Management thru their Research and Planning department.

Disaster Phase

Development and strict implementation of disaster management plan and cooperation from the community people really serves as tool in having zero casualty report during any type of disaster. Human ability to capture information through the social media really gave enough time for the community people to prepare important needs that can maintain their good health like enough stock of nutritious foods and clean water that they utilized during those times that typhoon or floods strikes their places and this health practice attributed to the maintenance of the community’s good health. Having everyone’s contributions and actions can combat the impact of disaster especially when the government aims to promote disaster resiliency by utilizing the social media and applying the new technology²².

Post - Disaster Phase

Participants in both selected communities in the municipalities of Amulung and Tuguegarao City shared that after typhoons or floods subsides in their area, common diseases like diarrhea, fever, and colds were the most common manifestations of the community people’s little children.

Calamities can have rapid or slow onset, with serious health, social, and economic consequences. The risk factors for communicable diseases after disasters are associated primarily with population displacement, overcrowding and lack of safe water and sanitation facilities⁴⁶. Acute respiratory infections were among those listed major cause of illness and death among displaced populations, particularly in children less than 5 years of age²⁹.

How are the challenges on safety and health addressed by the local communities in Cagayan during the: Pre – Disaster Phase; During the Disaster and Post Disaster Phase

Disaster preparedness reduced the impact of any type of disaster. Institutionalizing the disaster risk reduction and management plan and appropriate funds provided the legal framework to decentralize the responsibilities and authority for implementing measures to the local governments⁴⁰.

With the authority and collaboration of the municipal and city Disaster Risk Reduction Management offices, barangay officials and health care providers in the two municipalities, the safety and health challenges were addressed appropriately.

Upon reviewing all data being shared and described by the participants, the main problem encountered by them before typhoon or flood strikes are the following: risky behaviors; unpreparedness of the community people; and under - estimation of the intensity of the flood or typhoon. The community people, despite encountering these challenges adapt and overcome these problems with their own initiatives and cooperation with the authorities and with one another.

**Pre – Disaster Phase
Compliance**

The public health professionals in both municipalities, barangay officials and Disaster Risk Reduction Management officers plays a critical role during any type of calamities. With their experience in weighing costs and risks in the face of uncertainty, they need to protect the common welfare of the community people¹⁷. When PAG-ASA provided advisory about the status of any typhoon, they convene to discuss about the disaster plan to avoid negative impact that might place the life of their constituent at risk. When they feel that there is a need to conduct pre –emptive evacuation, without further a do, they will instruct all concerned officers to implement such proviso.

Disasters may result from troubled relationship from individuals and sometimes these unpredictable events may affect how we deal with our environment and with each other in our daily lives⁴². As observed in the different communities, the barangay officials shared that after experiencing the great impact of previous calamities that hits their area, the participants and the barangay officials from the two municipalities verbalized that they no longer trace any stubbornness attitude from the community people for they are now compliant with the orders made by them when there is announcement for pre – emptive evacuation for they understand the real purpose of it. Compliance with the orders of authority will result into effective risk reduction of the severity of the negative impact of the calamities to the life and property of all concerned individual and this will depend on how they act before, during or after the calamity³¹. As observed and verbalized by the participants, the commitment of all officers to implement the disaster framework and the community people positive response showed they readiness in facing the challenges of any disaster.

Disaster Phase

The coping mechanisms of the participants during disaster includes survival instincts, and “bayanihan” spirit.

Survival Instinct

During flood, or typhoon, their instinct dictates them on how to survive especially when they can not ask for help from other people to rescue them, though there were some who lend a helping hand in times of typhoon or flood. Survival instinct is considered as nature’s personal attack alarm and manifest as the need for security, support, safety².

“Bayanihan” Spirit

Being vulnerable during flood or typhoon make people dependent to other people. When one of the participants gave birth at home with floors filled with water, the community people help one another to help by providing boat to ride at, and some assisted her during delivery. Community people termed this as ”bayanihan”. The “bayanihan” spirit, a Filipino custom refers to the spiritual spirit of community unity, work and cooperation to achieve a particular goal²⁴. People struggled not only with the effects of typhoon but also with the wrong doings of other people who took advantaged of the situation and took other belongings. The barangay officials responded positively by doing their rounds to ensure safety of the people as well as their belongings.

After disaster, the barangay officials begin to conduct their post - assessment and report to the proper authorities which in turn study and endorse to the provincial or municipal stakeholders. Participants also shared that the government agencies provides all their needs in the evacuation area. Those people whose livelihoods and houses destroyed or blown up during the typhoon or floods received financial assistance or materials from the government private institutions and they used it to build a strong concrete houses which is more disaster tolerant house. Farmers received free seedlings too. Though, people can not prevent any natural disaster, development visions, strategies, plans and programmes are being developed by government to address the risks

and challenges of typhoons and floods. Different researches for important implications for vulnerability and adaptation has been conducted and some places were provided several options to adapt like implementation of property – level flood risk adaptation measures were provided but the choice or decision was left in the hands of every individual⁴. Addressing the disaster risk and investing by the government extending financial support to the victims to put up a disaster tolerant building will reduce disaster impact³⁹.

Post – Disaster Phase

Filipinos being exposed to numerous calamities are great survivors who will not just wait for any help from other people or wait someone to dictate them what will they do after the storm. They take the initiative to come out and evaluate the effects that cause by the calamity and do something to fix whatever was destroyed. The capability of the community in collaborating with the local officials and the Disaster Risk Reduction Management office headed by nurses in the two municipalities is so strong that lessen the burden of the people. As being stated, during the Post Disaster phase, officials did not encounter any problem or challenges since all people are cooperative and help one another through the “Bayanihan” spirit.

Safety and Health Practices of the local communities in Cagayan on disaster risk reduction and management during the Pre – Disaster, During the Disaster and Post – Disaster.

Safety practices of the selected community in the municipality of Amulung and City of Tuguegarao before, during and after typhoons or floods includes: vigilance, preparedness and compliance.

Vigilance

People observed that typhoons and floods became stronger as years passed by and the government continues its effort to discover ways and means to improve disaster preparedness of the Filipinos especially those places which are frequently visited by floods and typhoons. “Project NOAH”¹³ is one of the most successful technology that is being search and created by the government which helps community people estimate the arrival of disaster and gave people an ample time to prepare.

Before the discovery of modern technologies to forecast typhoons or floods, Cagayanos observed beliefs that originated from their forefather. Participants from selected communities shared that their parents or grandparents observed signs that may forecast any increment weather or flood. Nowadays, the government adopted the strengthening disaster risk reduction in the Philippines with Strategic National Action Plan and capture the country’s roadmap, and created the “PROJECT NOAH”(National Operational Assessment of Hazards) with its goal to provide assistance and assessment prevention and warning against floods, typhoons and other disaster. The project has many features and components which helps people to determine the weather outlook, flood level depth and velocity and other factors related to the upcoming disaster¹³. In the municipalities of Amulung and Tuguegarao, the government through Department of Science and Technology started to provide early warning device in selected barangays. The early warning device really helped those who are residing in the low lying area who are usually affected by typhoons and floods to evacuate once the City Disaster or Municipal Disaster officers provides information and go signal to activate the alarm system of the device. For those who are in the low lying areas with no warning device, the City Disaster or Municipal Disaster Risk Reduction Management officers will provide information through radio to the different barangay officials within their area of jurisdiction and all of them will work together to monitor the situation and do pre- emptive evacuation once it is necessary. With the information provided by the barangay officials, the City or Municipal Disaster Risk Reduction Management Office, people become vigilant before the typhoons or flood strikes.

Barangay officials and their constituents in the selected barangays of Amulung and Tuguegarao performed their own duties and responsibilities. The barangay officials who received directives from the head of Disaster Risk Reduction Management office will inform all their constituents to prepare for the forthcoming typhoon or floods. Areas with early warning device will be activated which will alarm people to prepare before typhoon especially the important things to bring in case of evacuation. Some barangay officials will conduct door to door information dissemination to make sure that all their constituents will be updated about the intensity of the forthcoming calamity or the velocity of flood as well as the possibility of pre - emptive evacuation. Disasters are typically viewed as low - probability with high impact events and preparedness of the people focuses on understanding how a disaster might affects their lives and livelihood that is why the government officials and the office of disaster in - charge are trying their best to educate the community people by doing some capability building or training to respond and to recover from disaster²¹. Developing a protocol and procedure to alert first responders including public emergency devices and trained individuals. Most important thing is by determine proper channel of communication during emergency situation¹⁵.

Actions taken by the barangay officials and the office of City Disaster Risk Reduction Management in Tuguegarao City is the same with what transpired in the municipality of Amulung. Officer from the City Disaster office verbalized that once there is a forecast from PAG - ASA, they will immediately inform barangay

officials of the low - lying areas to prepare their constituents. Continuous monitoring also takes place by the City Disaster and the barangay officials and once the typhoon or floods is about to land, command will be given to all barangay officials to take the precautionary measures. Before, without the “early warning device”, the barangay officials will ring the bell to inform every one about typhoon, some used their own basin. Now that an early warning device is installed in some barangays in Tuguegarao City, the City Disasters office will give go signal to the in -charge of the early warning device to put it on which will alarm the people to prepared for the typhoon or flood.

Information provided by the barangay officials was validated by the participants. They claim that barangay officials are doing mandatory rounds in the low - lying areas and keep on reminding them to become vigilant, prepare all important things, and evacuate when necessary.

Compliance

Participation and cooperation of the community people prevent higher impact of typhoons and floods. Stakeholders involvement has been considered as one of the major requirement for effective, efficient and fair risk governance. Actions prior to disaster by community - based institutions and organizations can mitigate the effects of these events and preserve lives and assets²⁰. After experiencing the impact of the previous typhoons Lawin and Ompong, the community people complied when the barangay officials instructed them to evacuate, and once the “early warning device” is being activated.

Preparedness

In the selected barangays of Amulung, the barangay officials shared that what they do when there’s a forecast coming from PAG - ASA that typhoon will strike their area, they start to circulate information to their constituents and emphasize to prepare for the forthcoming calamity. Once the officer of the Municipal Disaster Risk Reduction Management gave signal to activate the early warning device through radio, the barangay official who is in - charge will do so which alarm the people who in turn prepare based from their orientation or training about the alarm signals of the early warning device. In addition to, barangay officials will call for an emergency meeting to warn their constituents about the intensity of the typhoon and also discussed some safety measures and how to help them during the typhoon.

Preparedness activities ensured safety of the people during disaster. Emergency managers develops plan of action when disaster strikes. The communication plans and chain of command is very important as well as the multi - agency cooperation and incident command⁹. Personal preparedness like preparing the “Go Bag” that contains important documents, and basic necessities are part of the information dissemination. The emergency management being a continuous process by which an individual, group and/or communities manage hazards in an effort to avoid or ameliorate the impact of disasters resulting from hazard and actions taken depends on the perception of all individuals to the risk in which they will be exposed. Educating people and learning from the past experiences, and prepare for the future can create a great impact on disaster preparedness²³. As reported by the different municipalities and city in the province of Cagayan, the response of the community people in the low - lying areas nowadays is positive after experiencing the whirlwind of previous typhoons and floods. They added, that at present, when there is announcement or information dissemination from the barangay officials on what to do before the typhoon, all of them will cooperate and bear in mind the safety measures provided by the barangay officials.

Health Practices

Another factor being considered during typhoons or floods is the health of individual. When they learn from PAG-ASA forecasting center about the forthcoming typhoon or floods that will hit their low lying areas, the participants from selected barangays in the municipality of Amulung and City of Tuguegarao observed health practices by preparing medicine kit before typhoon or flood strikes, prepare clean water and sufficient foods to sustain their good health and exercise to boost their energy. If medicine is not available, people used herbal medicines who is readily available in their herbal garden. Some participants verbalized that eating nutritious foods, drink clean water and exercise are their ways and means to maintain good health.

Living a healthy lifestyle can be one of the ways and means to maintain optimum level of health. Well - balanced meals ensures body of individual to receive sufficient nutrition that our body needs to function well. Drinking clean water will help in the excretion of waste products, eating nutritious foods ensures our body sufficient oxygenated blood that will nourish the different system to function well, and by doing exercise boost thinking, learning and judgment skills¹¹. Participants said that they allot a certain portion of their budget for food and medicines. They will buy common drugs as part of their preparation once forecast of forthcoming typhoon or flood is announced. The barangay officials also shared that the barangay health center has abundant medicines which is ready for their constituents to utilized during typhoon or flood. Health Centers are always open and they make sure that barangay health worker are on duty.

Preparatory activities of health care professionals like nurses to deal with actual and potential health problems during calamities is essential. Nurses shared their knowledge, skills and nursing expertise when it comes to disaster preparedness, response and recovery³⁸. For the attainment of all community people to their optimum level of function before typhoons and floods, UN System is mandated to provide leadership on global health matters and shape the public health research agenda²⁷. Participants shared that during and after typhoon or floods, nurses together with the members of the Regional and City or Municipal Department of Social Welfare Development monitored their health condition in the evacuation area. From time to time, City Health Officers will do their monitoring and check - up to make sure that the evacuees are not sick and to know if they need provide medicines if necessary. Participants shared that after typhoon or flood, medicines and first aid needed were provided by them in the health centers. Aside from the medicines provided, participants in Tuguegarao City verbalized that the Department and Social Welfare Development and nurses are monitoring their conditions to make sure that their health is in its optimum level.

Cagayano's resiliency during typhoons and floods

Preparation of different communities and countries for anticipated events is important to the development of resilient systems. Different countries agreed to the Sendai Framework for Disaster Risk Reduction which emphasized the importance of addressing disaster risk through four priorities, namely: understand disaster risk; strengthen disaster risk governance; invest in disaster risk reduction; and, enhance preparedness for response and to "Build Back Better" in recovery and rehabilitation. As emphasized by UNISDR, majority of countries worldwide invest to strengthen disaster management. The mechanisms, policy, legal frameworks, guidelines and coordination from different institutions improved as well as the capacity of the disaster risk reduction and management to oversee during calamity.

The recurrent experiences of flooding and storms by the community residents in both areas have provided them sufficient insight to act on appropriately. Adaptation to the new ways of coping and passing on the stories of what was experienced among children's children has brought about the resiliency of the Cagayanos to floods and storms.

The result of the data gathered from the participants, barangay officials and the office of the Disaster Risk Reduction Management offices showed that Cagayanos are resilient to typhoons and floods in terms of coordination, cooperation and communication.

Coordination

Organization working alone cannot address the complexity of the needs associated with disaster preparedness and disaster response. The government authorities, health care providers, Disaster Risk Reduction Management offices and the community groups have their own with roles and responsibilities in disaster preparedness and response. Effective coordination among these people is critical to successful preparation and response to any type of disaster. Utilization of proper coordination can eliminate gaps and duplication in service, can determine an appropriate division of responsibility, and it will establish a good framework²⁵.

Part of the approach to combat the great impact of disaster by the individuals involve is to coordinate properly with the authorized offices and officers. A systematic approach using proper design, implementation, monitoring and evaluation can improve all services and access to the high quality services. Mobilizing all equipment and facilities available in the area during disaster provides stern warning to everyone and be alert. Not only that, clearly identifying the roles and responsibilities will prevent confusions and duplication of activities of those who are in the public sectors, the health care providers and the office of the Disaster Risk Reduction Management before, during and after disaster. Expertise and cooperation of everyone will also help in conducting rapid predictions and actions that will preserve the life of the people and avoid possible losses⁵. The variety of responses from affected individuals bring path for development³⁹.

Communication

The Philippine Government learned from Typhoon Haiyan that risk communication is essential and NDRRMC has issued very specific warnings regarding potential storm impacts as a result^{11,12}. (Philippine Disaster Management Reference Handbook,2018)

Proper communication helps a lot during disaster. This will prevent losses and facilitate immediate action from the authorities. Communication really helps a lot since information related to the typhoon's alarming situation, what should people do to ensure they are safe, where they can go if they need help, and who they should listen to can be provided to the people since the purposes of disaster communication include preventing panic, promoting appropriate health behaviors, coordinating response, advocating for affected populations, and mobilizing resources (Medford – Davis, Kapur, 2014).

The ability to manage a system in a community or society to resist, respond and recover from the effects of hazard in efficient way and timely manner even if overcoming any type of risk can put vulnerable one to a desirable one but both the community and the officials need to work together for the common good²².

The implication of Cagayano's positive resiliency for typhoons and floods in the context of nursing practice, the role of nurses from disaster preparedness and disaster response is very important as evidence by the active leadership and expertise of the head of the Disaster Risk Reduction Management offices of both municipalities. The continuous adaptation with the professional nursing skills in recognizing and meeting the needs of the people, these nurses plays an integral role to come up with a secure and resilient nation with capabilities required across the whole community to prevent, protect against, mitigate, respond to and recover from the threats and hazards that pose the greater risk³.

V. Conclusion

Considering the findings of the study, the researcher concludes that the Cagayanos' resiliency to typhoon and floods, particularly in these two municipalities are their adaptability and flexibility behaviors which showed positive cooperation, coordination and communication that the community and the officials portrayed in times of typhoons and floods.

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