

Research article

Biophysical and Psychosocial Conditions of Typhoon Washi (*Sendong*) Survivors of Urban and Rural Public Schools in Iligan City, Lanao Del Norte, Philippines

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Abstract

A study determined the socio-economic factors influencing the biophysical and psychosocial conditions of the students, faculty and staff and stakeholders as survivors of Typhoon Washi (*Sendong*). This was done among the urban and rural schools in Iligan City, Lanao del Norte, Philippines. A total of 119 respondents from both urban and rural schools participated in this research. Using chi-square test, it revealed that for the faculty, the result was significantly different with P-value of 0.01. Among the students it revealed no significant differences at P-value of 0.99 and similarly among the stakeholders P-value of 0.99. This study therefore, implied that typhoon survivors had a relatively high tolerance level in terms of biophysical and psychosocial conditions. However, it is still recommended that at the local level, a plan for mitigation and adaptation of the possible problems occurring before and after a disaster will be considered. In the same way, an early warning system and recovery program to carry out interventions focusing on the psychological aspect must be considered immediately after the typhoon. This is to debrief them of the ill-effects of typhoon occurrence that may affect their educational conditioning. **Copyright © WJDCER, all rights reserved.**

Keywords: Typhoon Washi (*Sendong*), biophysical and psychosocial conditions, public school

Introduction

Philippines is known as one of the most hazard prone countries in the world due to its geographic circumstances. The most catastrophic of these hazards include earthquakes, tropical cyclones, volcanic eruptions, floods and droughts (Quero, 2012; World Bank, 2005; WHO, 2011). Accordingly, an average of 20 typhoons occurs annually in Philippines, which arrive in the country from the Pacific Ocean (World Bank, 2005; WHO, 2011). Intense atmospheric phenomenon such as tropical storms or typhoons dramatically modifies the ocean environment (Xu, et al., 2011). Increases in storm intensity and incidence along with rising sea levels due to climate change have resulted in a higher probability of damage caused by inundation from storm surges in major coastal areas located in low-lying coastal regions around the world (Yoon, 2014). It is estimated that climate change will worsen the frequency and severity of meteorological disasters in the future (Leary, et al., 2011). In addition to this, typhoons and torrential rains not only erode river beds and coasts and damage river-crossing structures, but also affect the geomorphology and topography of rivers and coasts. Additionally, typhoons and torrential rains cause debris flows and flooding in metropolitan areas and threaten the safety of people's lives and properties (Lin, et al., 2011).

Many of the areas in the Philippines affected by Typhoon Haiyan (Yolanda) are endemic for dengue; therefore, dengue prevention is a priority in the initial post-disaster risk assessment. Thus dengue prevention and response are strategies applied after Haiyan (Aumentado, 2015). Given the potential for a large dengue outbreak following Haiyan, the WHO public health riskassessment for Typhoon Haiyan recognized dengue fever as one of the health priorities for the affected areas with a potential increase in cases occurring in six weeks post-typhoon. (WHO, 2013)

Typhoons have killed about 29 000 people in the country in the 20th century, and about 500 people are killed each year (World Bank, 2005). Typhoons carry high concentrations of heavy metals due to their associated large water volumes (Cheng and You, 2010). Meteorological disasters, along with extreme heat, infectious diseases, water- and food-borne illnesses, and air pollution, are important components of climate change that impact morbidity and mortality rates (Kovats, et al., 2011). Studies of damages caused by meteorological disasters, however, usually address economic loss and rarely deal with disaster epidemiology regarding victims and vulnerable groups (McMichael and Woodruff, 2004). There are several examples of this trend, involving massive numbers of victims caused by powerful meteorological disasters in recent years, including the Sri Lanka tsunami of 2004 (Nishikiori, 2004) and Hurricane Katrina in the US in 2005 (Luten, 2005), Haiyan in the Philippines (Ballera, et al., 2015).

In the context of economic, eco-economic mechanism of dematerialization of the enterprise (EEMDE) as an integrated system of forms, methods and incentives for the reduction of material flow management of economic entity is used (Mykolayivna and Sergiyovych, 2015). Due to complex and multi-dimensional urban socio-economic system, the knowledge of organizational structure, urban energy and material inward-outward flows, capturing the trade-offs natural, economic and social capital, is a major step towards the design of sustainable development schemes (Sachs, 1992; and Graedel, 2002). Similarly, in Europe, for instance the role and place of the EU budget in the system of economic relations of integration association, sources of formation and targeted uses of the common budget (Poruchnyk and Kulai, 2015).

When it comes to mental health care programs during and after acute emergencies in resource-poor countries have been considered controversial. There is no agreement on public health value of post-traumatic stress disorder concept and no agreement on the appropriateness of vertical (separate) trauma-focused services. A range of social and mental health intervention strategies and principles have the broad support of expert opinion. Despite continuing debate, there is emerging agreement on what entails good public health practice in respect of mental health. In terms of early interventions, this agreement is exemplified by the recent inclusion of a "mental and social aspects of health" standard in the Sphere handbook's revision on minimal standards in disaster response. This affirmation of emerging agreement is important and should give clear messages to health planners (Ommeren, et al., 2005) in the aftermath of disasters (Weiss, et al., 2003).

As for the next disaster hits the Philippines, people should not incur out-of-pocket payments for health care. Financial risk protection should be mainstreamed into preparedness, risk assessment, mitigation, planning, response and recovery plans. National and local policies and mechanisms for financial protection should clearly benefit the poorest. Knowledge gaps in healthcare financing in disasters include demand questions (e.g. rate of being impoverish due to health care post-disasters event) and supply questions (e.g. disaster subsidies/ loans for private

hospitals) (Espallardo, et al., 2015). The health care system should focus on supply mechanisms to ensure the availability of health services and medicines at no or minimal cost with safety nets for the poorest households. Longer-term mechanisms are needed to ensure financial protection especially for the poorest beyond three months when the bulk of free services and medicines being provided by international responders end. Preparedness should include an intensive drive to enroll households in social health insurance or other mechanisms to ensure protection when the next disaster comes (Espallardo, et al., 2015).

In terms of gender, women participation in many environmental projects, it had promoted environmental awareness among their families and other sectors of the community involved, particularly the local government units for disaster risk management. The findings are discussed in the light of gender and development, social change and partnership (Desoloc, 2014).

In line with all the presented facts mentioned above, the biophysical and psychosocial conditions of typhoon Washi (Sendong) survivors of urban and rural public schools in Iligan City, Lanao del Norte, Mindanao, Philippines is need to be elucidated to cope up the typhoon Washi (Sendong). After a lapse of four (4) years, the period shall cover from 1:00 o'clock at dawn of December 17, 2011 up to the commencement of this study in March 2016. Likewise, a demographic profiling shall also be done to include the amenities that the survivors have been collecting in the relocation sites. It also shall deal on how the victims of the killer typhoon were faring in the various relocation sites, how the relocation sites affected their socio-economic endeavours, and how they lived their lives after they were vestige of the painful tragedy. The profiling shall further give the scenario on how the government leaders and stakeholders have assisted the victims after they have been relocated. When the coping-up mechanisms do not work and observers are just standing there by side doing nothing and the aids, and all forms of assistance do not reach to Typhoon Washi (Sendong) victims, these victims are suffering from another form of calamity. The calamity that the victims are harboring in their lives turns into a socio-economic injustices.

The study generally aims to determine the perceptions of the Typhoon Washi (Sendong) survivors on the conditions and the social, economic and environmental framework for rehabilitation and recovery of the city government of Iligan for their social, economic and environmental resilience. Specifically determine the socio-economic factors influencing the biophysical and psychosocial conditions of the students, faculty/staff and stakeholders of Typhoon Washi (Sendong) survivors in 2 urban and 2 rural public schools in Iligan City for sustainability, particularly, on the respondent's views of the relief allocation and utilization and the respondent's perspectives on how to sustain their livelihood in relocation areas and well being including a focus on demographic profile, relief resources use, perceptions on quality of rescue operations and characterization of the relocation programs.

Materials and Methods

Respondents and sampling method

The respondents were residents of Iligan City and chosen by random sampling. These respondents were academically classified as students, faculty/staff and stakeholders. In every school type, whether urban or rural school, 20 students, 5 faculty/staff and 5 stakeholders shall be considered as respondents. During the school visitation phase, the students were selected by draw by lot wherein their individual names were written on a sheet of paper, rolled and placed in 1 box that were labelled as students. The box was shaken well to have an even mixture of rolled papers. Twenty (20) names were picked from each of the labelled box which then became the student respondents of the said school. The faculty/staff and stakeholders were identified as Sendong survivors. Due to time, distance from site to site, availability of respondents to answer the questionnaire and cost constraints, only 30 respondents were taken from each school. The whole process was done in all stations. Thus, a total of 100 respondents from the academe and 20 respondents from stakeholders were obtained.

Research design

The study used survey research design influenced by the work of other authors (Monica Morris-Oswald and Slobodan P. Simonovic, 1997) modified and made it easy to answer in Philippine setting. This deals with the descriptive-normative form wherein a questionnaire was used to extract information from the 120 survivors of the

Typhoon Washi (Sendong) who were enrolled and were working at present in the 2 urban public schools and 2 rural public schools in afflicted zones, sitios, barangays in Iligan City, Lanao del Norte, Mindanao, Philippines.

Results and Discusions

Socio-demographic profile of the respondents

Age

The 59 respondents in urban high schools were composed of students, faculty and staff, and stakeholder. The garnered percentages for the students were 100% which was 26 years old below. For the faculty and staff, the highest percentage rating were both 33% for the age bracket 36 to 45 years old and 46 to 55 years old, followed by 22% for the 26-35 years old, and 11% for below 26 years old. As for the stakeholders, the highest percentage rating is 40% which was belong to 26 years old below, followed by 30% for both age bracket 26 to 35 years old and 36 to 45 years old, while none of the stakeholder respondents fall into the age bracket of 46 years old and above (Figure 1).

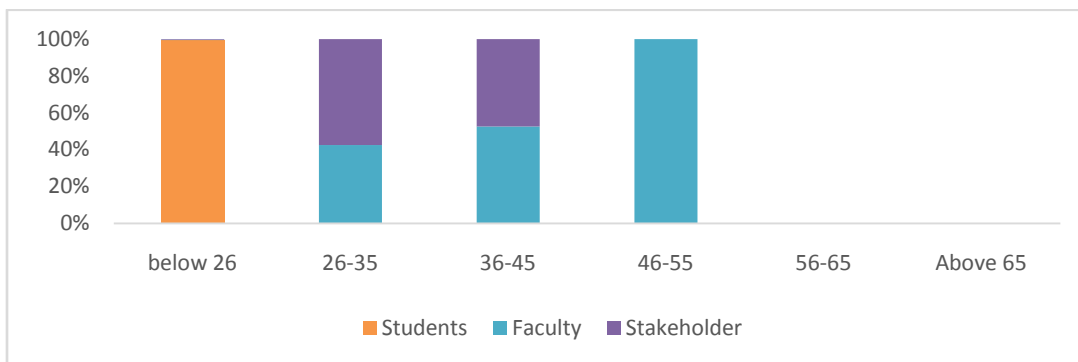


Figure 1. Percentage distribution of respondents' ages in urban high schools.

As for the rural respondents, there were 60 respondents composed of students, faculty and staff, and stakeholder. The garnered percentages for the students were 100% which was 26 years old below. For the faculty and staff, the highest percentage rating were both 50% for the age bracket 36 to 45 years, followed by 30% for the age bracket 26-35 years old, and 20% for the age bracket 46-55 years old. As for the stakeholders, the highest percentage rating is 30% which was belong to 36 to 45 years old, followed by 20% for both age bracket 26 to 35 years old and 26 years old below, 10 % for the age bracket 46 to 55 years old and 56 to 65 years old (Fig. 2)

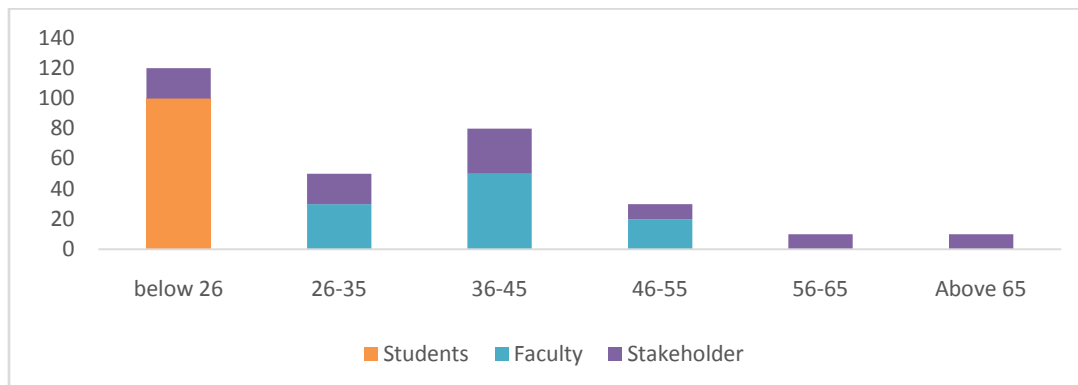


Figure 2. Percentage distribution of respondents' ages in rural high schools.

Gender

There was a dominance of female respondents in urban area, 90%, 88.89%, 62.5%, for stakeholder, faculty and students respectively. Correspondingly, the male student respondents gave 10% for the stakeholder, 11.11 % for the faculty and staff and 37.5% for the students.

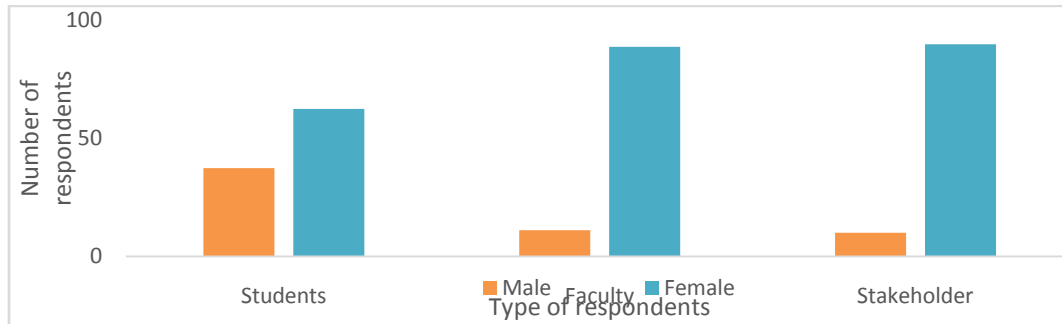


Figure 3. Percentage distribution of respondents' gender in urban high schools.

In the context of gender in rural area, there exist a dominance in female respondents also, 67% for the students, 55.56 % for the faculty and staff, and 70% for the stakeholders. Correspondingly, the male respondents gave 55.56% for the faculty and staff, followed by 32.5% for the students and 10 % for the stakeholder.

Gender emerged as a robust predictor of resilience. Gender has shown a complex relationship to adjustment among at-risk children, with the direction of prediction often depending on the type of symptom measured (Fergusson and Horwood, 2003).

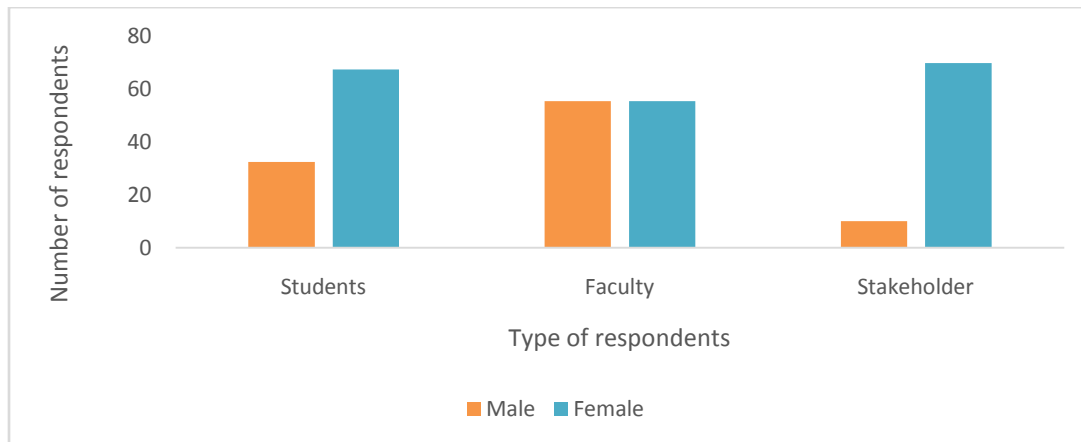


Figure 4. Percentage distribution of respondents' gender in rural high schools.

Family Size

It can be observed in figure 5 that in urban respondents the highest percentage in terms of family size among the students are 57.50% for the medium family size (6-8 members), followed by 27.50% for small size (less than 5 members), and 15.00% for large family (more than 8 members). As for the faculty and staff, the highest percentage rating is 77.78% for small family size (less than 5 members), followed by 22.22% for large (more than 8 members). In terms of the stakeholders, the highest percentage rating is 70.00% for the small size (less than 5 members), 20% for the medium family size (6-8 members), and 10% large family (more than 8 members).

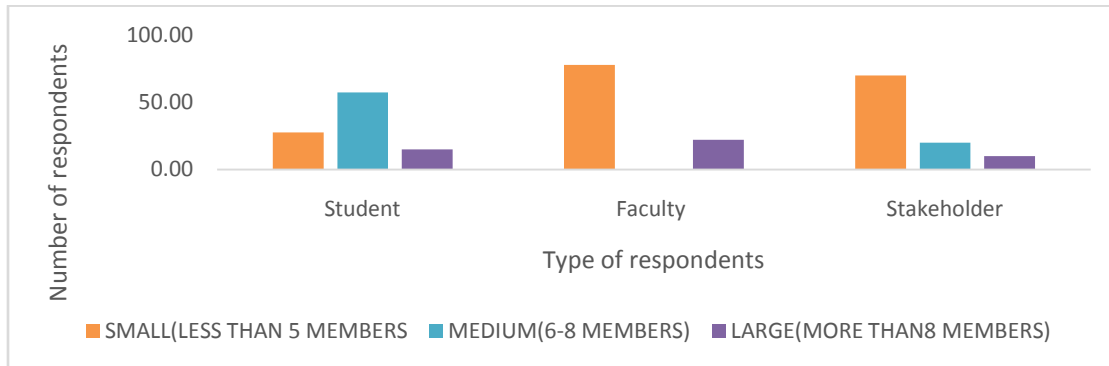


Figure 5. Percentage distribution of respondents' family size in urban high schools.

It can be observed in figure 6, that in rural respondents the highest percentage in terms of family size among the students are 37.50% for the medium family size (6-8 members), followed by 45.00% for small size (less than 5 members), and 17.50% for large family (more than 8 members). As for the faculty and staff, the highest percentage rating is 60.00% for small family size (less than 5 members), followed by 40.00% for medium family size (6-8 members), and none for large family (more than 8 members). In terms of the stakeholders, the highest percentage rating is 50.00% for the small size (less than 5 members), 30% for the medium family size (6-8 members), and 20% large family (more than 8 members).

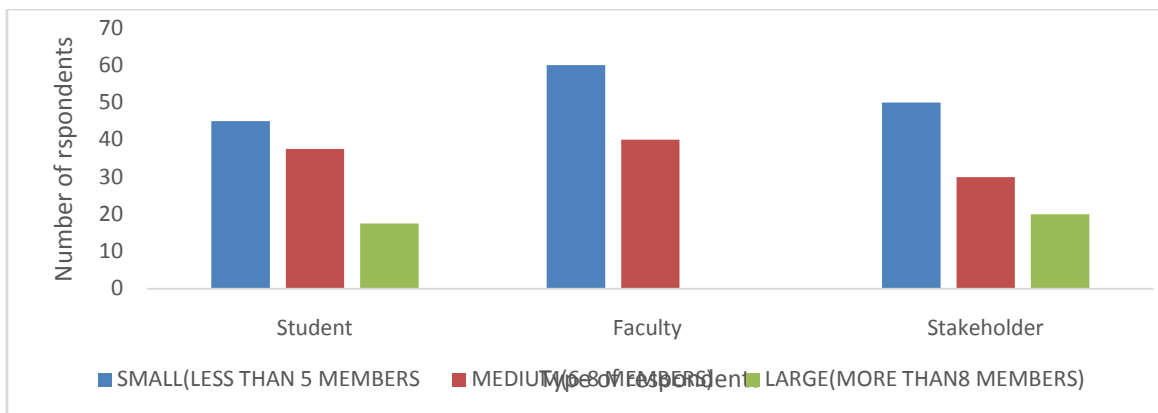


Figure 6. Percentage distribution of respondents' family size in rural high schools.

Educational attainment

When it comes to educational attainment in urban respondents, among students 100.00% are in some high school. In the context of faculty, the highest percentage rating is college graduate which is 66.67 %, followed by masters unit which is 22.22%, and vocational which is 11.11%. Among the stakeholders, the highest percentage rating is 40% for college graduate, 20% for high school graduate, and 10 % for elementary graduate, some high school, and vocational.

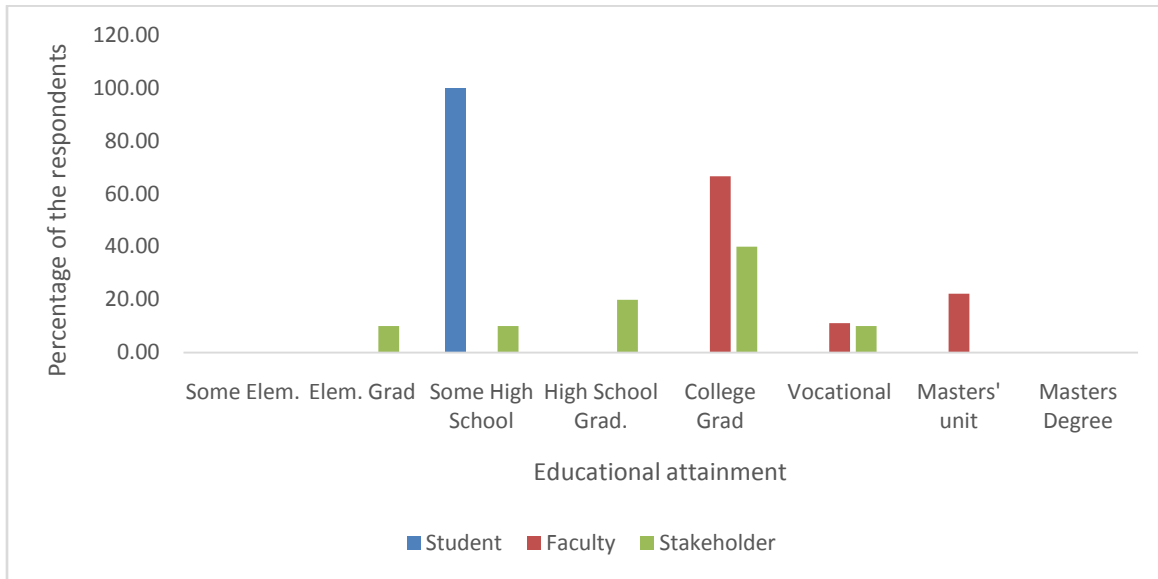


Figure 7. Percentage distribution of respondents' educational attainment in urban high schools.

As for the rural respondents' educational attainment, for the students, the highest percentage rating is 100% for some high school. For the faculty and staff, the highest mean rating is 40% for masters' unit, followed by 30% for masters' degree. As for the stakeholder, the highest percentage rating is 20% for both high school and college graduate, followed by 10% for some elementary.

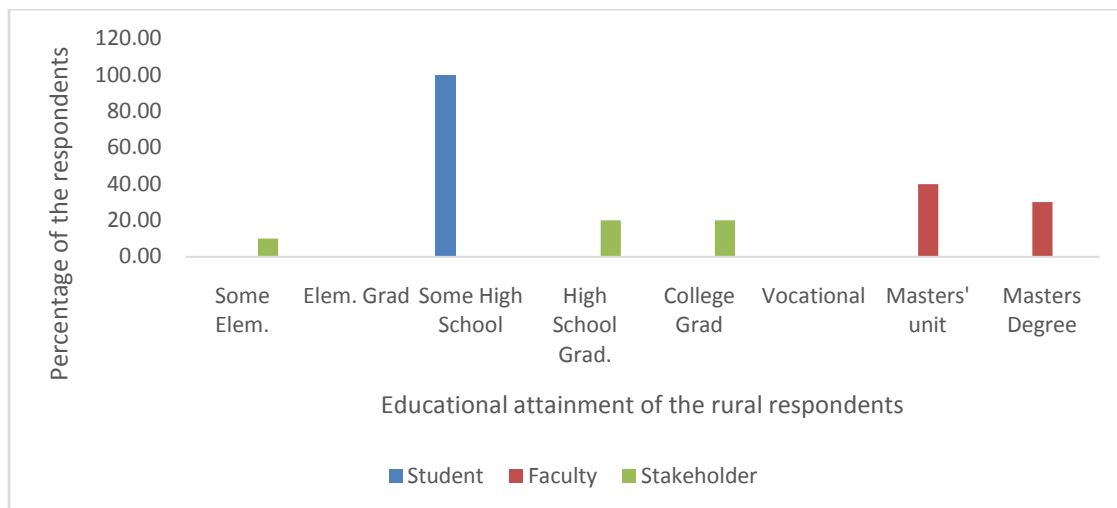


Figure 8. Percentage distribution of respondents' educational attainment in rural high schools.

Occupation

In terms of occupation in the urban respondents, faculty and staff work in the government and private agency which is 100%. Among stakeholders, the highest percentage rating is 50% which is self-employed, followed by 20% for the driver, and 10% for professionals (Figure 9).

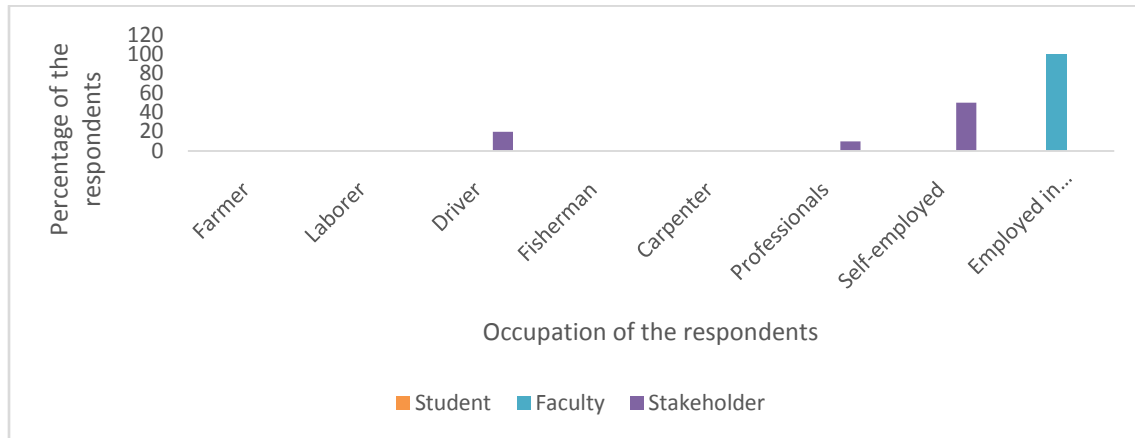


Figure 9. Percentage distribution of respondents' occupation in urban high schools.

As for the occupation in the rural respondents, faculty and staff work in the government and private agency which is 100%. Among stakeholders, the highest percentage rating is 50% for farmers, followed by 30% for is self-employed, 10% for the driver, and 10% for driver and carpenter.

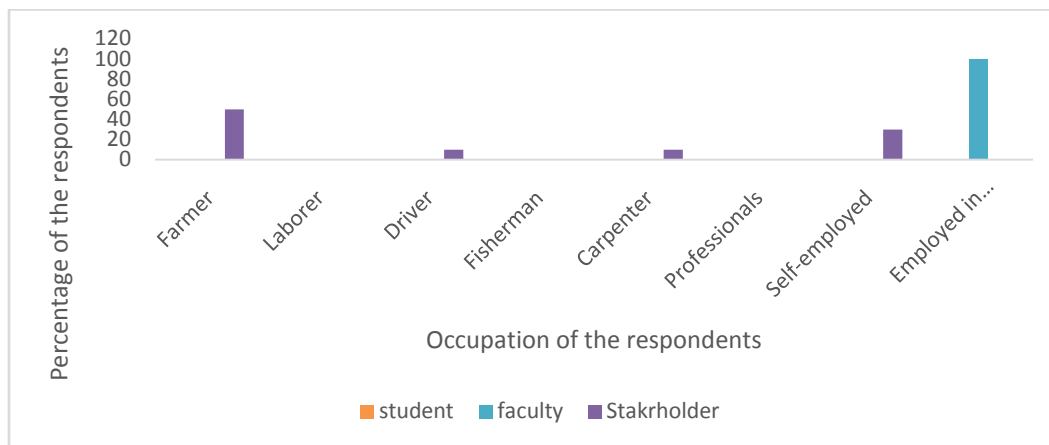


Figure 10. Percentage distribution of respondents' occupation in rural high schools.

Monthly income

In the context of monthly income among urban respondents, the highest percentage rating among faculty and staff is 77.78 % for above Php 9, 000, followed by 22.22% for the bracket Php 8001 to Php 9000. Among stakeholders, the highest monthly income is 30% for the bracket 1000 to 2000, followed by 20% for the bracket 3001 to 4000, 5001-6000, 7001-8000, 10% for above 9,000 monthly income (Figure 11).

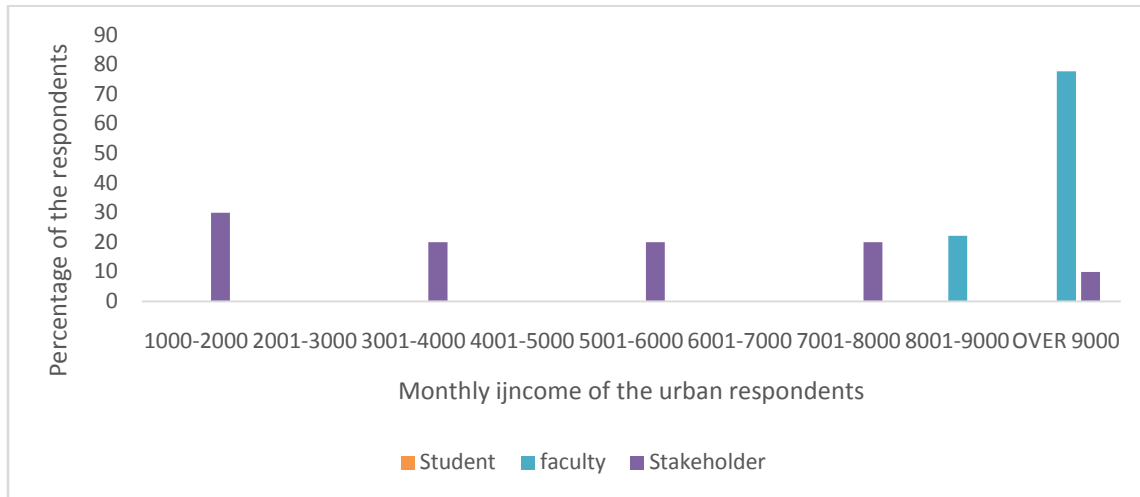


Figure 11. Percentage distribution of respondents' family income in urban high schools.

Monthly income in rural respondents, the highest percentage rating among faculty and staff is 100 % for above Php 9, 000. Among stakeholders, the highest monthly income is 50% for the bracket 3001 to 4000, followed by 40% for the bracket 1001 to 2000, 10% for 2001-3000 (Figure 12).

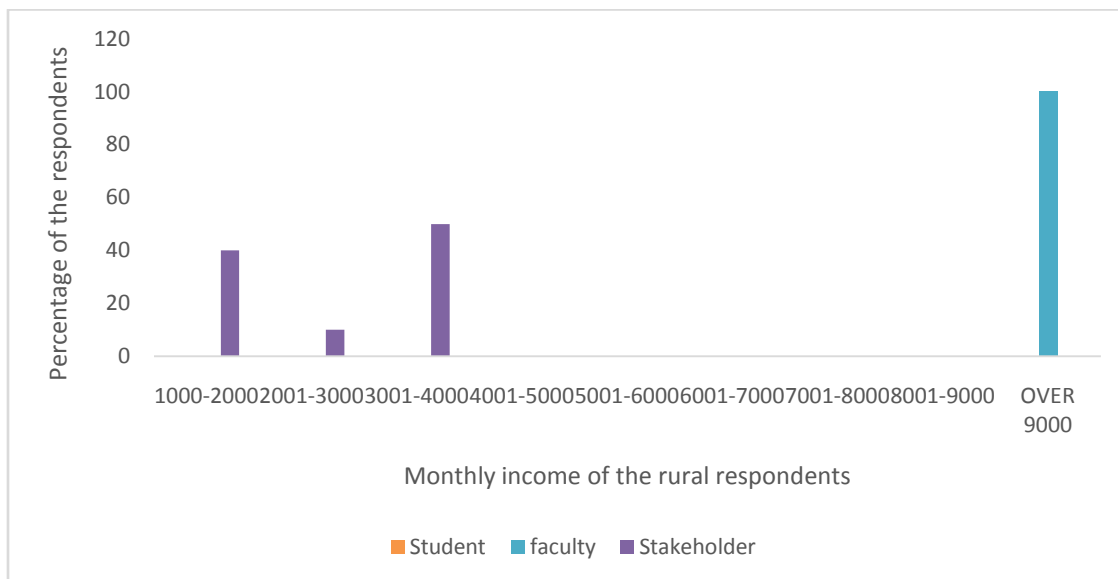


Figure 12. Percentage distribution of respondents' family income in rural high schools.

It can be observed in Table 11 and 12 that most of the respondents fall under the income bracket of below P9,000 a month. This result means that majority of the respondents are poor. This is based on the income threshold of National Statistics Coordination Board (NSCB) in 2008, wherein a family of five members with total monthly income less than P 10,000.00 (244 US dollars) is considered poor.

B. Psychological

Urban faculty vs. Rural faculty

In terms of comparing three sets of respondents (faculty, students and stakeholders) using chi-square test, it revealed that for the faculty, the result is significantly different with p-value of 0.01 and an F value (chi-square value) of 81.78 (Table 1). Faculty from both urban and rural differ in psychological and social/emotional feelings when sendong occurred. Urban respondents were more exposed to the aftermath of typhoon sendong such as physical and life threatening accident (Kessler, et al., 1995), difficulty sleeping, and intrusive memories of the event. However, in rural area respondents appeared to fully recover from any adverse effects of such symptoms within a relatively short period of time (Shalev, 2002), while others have little or no disruption in their normal ability to function (Bonanno, 2004).

Table 1. Source of variation of urban and rural faculty.

Source of variation	F value	P value
Urban vs rural faculty	81.78	0.01

Urban stakeholders vs. Rural stakeholders

For the stakeholders, stat result did not significantly vary at P value of 0.99 and F value of 6.08. Both urban and rural stakeholders were the same in terms of their behaviors and coping strategies during the typhoon sendong. Both rural and urban respondents easily cope up after typhoon sending due to the support through intervention programs of the Local Government Units (LGU's). Accordingly, early psychological interventions are only effective as long as enacted as part of a broader ecological approach that includes the assessment and intervention of socio-contextual factors (Sandler et al., 2003).

Table 2. Source of variation of urban and rural faculty.

Source of variation	F value	P value
Urban vs rural stakeholders	6.08	0.99

Urban students vs. Rural students

Disasters are unpredictable, uncontrollable, and brief environmental changes that affect many people aside from the loss of lives and property, victims also suffer psychosocially (Aldwin, 1994). Among the students, stat results revealed no significant differences at P value of 0.99 and F value of 8.80 in terms of psychosocial (Table 3). Both rural and urban student respondents are of the same age group who are dependent to their parents in terms of stress management. Accordingly, children after natural disaster have consistently demonstrated a spectrum of post-traumatic symptoms to include trauma specific fears, fears of recurrence, anxiety, intrusive recollection of the images and percepts of the traumatic event, post-traumatic play, behavioral reenactments, regressive behavior, somatic ills, avoidance of traumatic reminders, behavioral and school problems and changed attitudes about the self, world and the future (Shaw, 1993). However, both student respondents in rural and urban shows a coping mechanism after Typhoon Washi (Sendong).

Table 3. Source of variation of urban and rural faculty.

Source of variation	F value	P value
Urban vs rural students	8.80	0.99

Summary and Conclusion

In this study it has been observed that the students, faculty and staff, and stakeholders survivors can cope up Typhoon Washi (Sendong) and had a tolerance in terms psychosocial conditions. Student respondents from both urban and rural have the same emotions after the disaster due to their group age similarities. As for the stakeholders, it revealed no significant difference. Both urban and rural stakeholder held similar view of psychological aspect. In the context of the faculty and staff, a significant difference occurs. Faculty and staff of the urban schools are more exposed to the media that increased awareness of the degree of the damage done by Typhoon Washi (Sendong) in the localities.

Based on the findings of the study, it is concluded that respondents can easily cope up typhoon disaster in both urban and rural area. Being a Filipino helps the respondents in building coping mechanism. Friends, family, relatives, and people in local place help hand in hand in recovery stage of the disaster. Local Government Units (LGU's) plays a great role in coping stress after Typhoon Washi (Sendong).

Implications and Recommendations

This study implies Typhoon Washi (Sendong) survivors had a tolerance in terms of biophysical and psychosocial conditions. These findings suggest that an individual resilience intervention program is a useful approach that can be used to enhance the individual resilience of a victim and that respondents livelihoods, lives, and culture would be permanently protected (Cheng, et al., 2011) by integrating it as a plan in Disaster Risk Reduction Management Plan (DRRMP) in the barangay level. It is very essential that at the local level, a plan mitigation and adaptation plan of the possible problem occurred after disaster will be considered in the local level. In the same way, an early recovery program to carry out intervention focus on the psychological aspect must be consider immediately after the typhoon for it has a lifetime mental health effect among students, faculty and staff, and stakeholders.

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