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Research Article

Incidence of Dengue Hemorrhagic Fever in the Selected Elementary Schools in Jolo and Its Preventive Measures Applied by Their School Principals, School Teachers, and School Nurses

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ABSTRACT

This study was purposely conducted to determine the preventive measures employed by the principals, teachers and school nurses in the elementary schools in Jolo and the incidence of dengue hemorrhagic fever was also investigated. Moreover, the significant difference between the employment of preventive measures and the incidence of dengue hemorrhagic fever were assessed. The descriptive method served as the research design of the study. In gathering data, a validated self-devised survey questionnaire was used and results were interpreted using the statistical tools of frequency, percentage, mean and chi-square. A focus group discussion was also conducted using interview guide questions tool, video recorded interviews and notes. The study revealed that majority of the preventive measures enumerated by the national agencies like Department of Health, Department of Science and Technology and Department of Education were implemented by the principals, teachers and school nurses among the selected elementary schools in Jolo. These included information dissemination about dengue hemorrhagic fever, observation of strict environmental sanitation, giving advice to pupils on the application of mosquito repellant and placement of Department of Science and Technology OVI-Larvicidal Tap inside the classroom at least once a week. The item on protection of pupils from mosquito bites

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showed that spraying of insecticides in classroom was poorly implemented. Unfortunately, results revealed that there was poor implementation on school children's wearing of prescribed uniforms. As to the incidence of dengue hemorrhagic fever, there were 38 reported cases among children from the data provided from the Sulu Sanitarium and General Hospital and Sulu Provincial Hospital. The significant difference between the employment of preventive measures and the incidence of dengue hemorrhagic fever were revealed and the hypotheses were rejected.

***Keywords**: Dengue hemorrhagic fever, Elementary schools, Incidence*

Introduction

The case of dengue hemorrhagic fever is more often worldwide and mostly affected are children. It is one of the leading causes of illness and death where approximately 50 to 100 million infections occur globally in each year of which 500,000 people may develop it and about 22,000 will die according to the World Health Organization (Lee Suy, 2009). Dengue used to be mainly an urban problem but is now spreading to rural environments. Dengue hits an outbreak in Asia particularly in the Philippines. Despite the government tremendous campaign against the spread of dengue fever in the country, this deadly mosquito-borne disease continue to claim more lives with the increasing death incidence in Mindanao Region. Health authorities noted the rise of cases attributed to the dreaded disease in at least two regions in Mindanao; The Northern Mindanao and Northeastern Mindanao were 4, 065 persons reported infected as of 2010 (Ona, 2010).

There were increasing incident of dengue fever in Sulu particularly in Jolo, where most affected are school children as the data given by Sulu Sanitarium and General Hospital and Integrated Provincial Health Office Sulu Provincial Hospital. Dengue usually strikes people with low levels of immunity like children. Although the virus is not contagious and cannot be spread directly from person to person, it is possible to get dengue fever several times when bitten by infected mosquitoes. When a person got infected, he may show some physical and physiological changes like low blood pressure, skin rashes, sore throat, rapid pulse, swollen gland, and worst is enlarged liver. Dengue hemorrhagic fever has become a serious health problem in Jolo. There has been a report of diagnosed dengue among school children frequently in the medical literature from various hospitals in Jolo, Sulu. The continuous incident of mortality and morbidity among children enrolled at different elementary schools in Jolo despite of the preventive measures announced by the Department of Health and a campaign against dengue hemorrhagic fever all over the country, the incidence is still present and alarming which aroused the researcher to assess the incidence of this infectious disease and furthermore determine the preventive measures employed by the administrators, school nurses and teachers of the different schools in Jolo likewise the support of the parents in preventing the acquisition of dengue to their children.

In this study, the researcher wished to create awareness on the preventive measures which will eradicate the breeding places of dengue causing mosquitoes. It shall benefit the pupils, the parents, teachers and school heads in order for them to ensure that the schools will be free from the prevalence of dengue.

As an advocate of health, the researcher was determined to assess the incidence of dengue hemorrhagic fever in the different elementary schools in Jolo both in private and public schools. Moreover, the preventive measures that are employed by the school personnel will also be ruled out as they are gently important in the control and total eradication of dengue hemorrhagic fever. This study will provide baseline information which may serve as basis for program planning and decision-making geared towards control of dengue hemorrhagic fever.

Furthermore, this research study will serve as an evaluative tool in the assessment of effective implementation of preventive measures enumerated by the Department of Health in its campaign to eradicate dengue hemorrhagic fever in especially in school children.

Incidence of Dengue Hemorrhagic Fever

It is the most rapidly spreading mosquito-borne disease in the world and in the last 50 years its incidence has increased 30-fold with increasing geographic expansion to new countries (Koh et al., 2008, Guzman and Kouri, 2003, Jackson et al., 2012). It breached the subtropical temperature to rural settings extending its reach into places as far north as Nepal (Pandey et al., 2008, Jakson et al., 2012). The Pacific islands, with much lower population densities, have also not been spared with increasing dengue outbreaks since 1970's (Singh et al., 2005, Jackson et al., 2012). Incidence in South East Asia and the Western Pacific account for greater than 75% of global burden of dengue, within the Americas the burden of dengue accounts for 64.6% and other regions in which dengue is endemic include the Eastern Mediterranean and the East and West African Regions (WHO, 2009, Jackson et al., 2012). Through sporadic prior to the World War II, the frequency of dengue outbreaks increased significantly after the war, it was accompanied by an increase in the incidence of complicated forms of dengue in South East Asia (Halstead, 1966, Jackson et al., 2012). It was recorded in the world health organization statistics that there has been a world-wide increase in the number and severity of dengue cases. The increased intensity of dengue transmission is effected by the rise in number and size of densely populated urban cities, which are conducive for the spread of the disease and the adaptation and proliferation of dengue vectors (Gould et al., 2010, Jackson et al., 2012); and by international travel which results in the continuous important and exchange of dengue genotypes and genotypes that become established at various levels (Lee et al., 2010, Ng et al., 2009, Lambrechts et al., 2009, Jackson et al., 2012).

The Department of Health (2011) has reported that a 16-percent spike in dengue cases in the country. Most of the cases centered in Metro Manila with 11, 476 diagnosed of dengue, this was followed by Calabarzon with 7, 265 victims and Central Luzon with 7, 044 diagnosed. Sharp rises in dengue incidence were also recorded in the Zamboanga Peninsula from 687 (National Epidemiology Centers, 2011) to 2, 250 this year. Many of the patients were children and 40percent of the cases were also found to belong to the 1 to 10 age group (Department of Health, 2012). In Northern Mindanao comprising the provinces of Misamis Oriental, Bukidnon and Camiguin at least 10 persons succumbed to the disease among 2, 345 cases reported from January to June 2010 according to the Department of Health, 2010. In Northeastern Mindanao were health authorities reported the death of five persons and mostly children of about 1,720 stricken the infectious disease (Ona, 2010). Dr. David Mendoza, head of Epidemiology Department of the Department of Health said, the province is now being referred to as the "dengue hotspot" in the region.

The target populations of the dengue awareness are the general populations, the local government units, and the local health workers (Lee Suy, 2009). They have employing updates in the television, radio, newspapers, and the internet in disseminating advisories on dengue fever. As to the month, June has been declared Dengue Awareness on the preventive measures against this mosquito-borne viral disease (Manila Bulletin, 2009). Dengue fever is an acute illness of sudden onset that usually follows a benign course with fever, headache, exhaustion, rashes, and severe muscle pain, frequently accompanied by sore throat, dizziness, loss of appetite, vomiting, and diarrhea (Lee Suy, 2011). Statistics show in Sulu Sanitarium Hospital that compared to last year, the number of dengue cases increases in spite of the attribution to the continuing information dissemination and educational campaign of the Department of Health (Sulu Sanitarium, 2013), with incidence of 36 cases of the year 2011 and grew to 78 cases in the year 2012 diagnosed dengue.

Causes of Dengue Hemorrhagic Fever

The Aedes (Stegomyia) Albopictus, also known as the Asian tiger mosquito or forest day

mosquito, is a secondary vector of dengue in Asia (Moncayo et al., 2004, Jackson et al., 2012). The virus circulating in the blood of viraemic humans is ingested by female mosquitoes during feeding. The virus then infects the mosquito mid-gut and subsequently spreads systemically, including the salivary glands over a period of 8-12days. If suffered from dengue hemorrhagic fever previously, it is still possible to contract it again, because of the number of different types of viruses that cause fever (Mosqueda, 2010).

Dengue hemorrhagic fever is a life-threatening emergency which characterized by a fever that lasts two days to a week. These include headache, eye pain, musculoskeletal pain, and easy bleeding or bruising. As the fever goes away, fluid begins to leak from the tiny blood vessels known as capillaries. The fluid can collect in the abdominal cavity or around the lungs (Crismundo, 2010). Dengue hemorrhagic fever is a disease caused by a family of viruses that are transmitted by mosquitoes. Blood transfusions may be needed to control bleeding. Lastly, Rest is important (Crismundo, 2010). Growing populations and an increase in global travel have resulted in the virus spreading between different groups (Jao, 2010). The Aedes mosquito prefers to breed near water and is often found stagnant water in containers around building sites in urban environments. Rates of dengue hemorrhagic fever are often high in major cities in the developing world which have poor levels of sanitation. In the study of Hayudini, M.A.E.A., Jaddani, M.Y.T, and Habibun, S. I (2022) cited in https://ijmaberjournal.org/index.php/ijmaber/article/view/569 that improper waste disposal may cause environmental effects like diseases and reservoir of larvae.

Preventive measures on Dengue Hemorrhagic Fever

The worldwide incidence of this illness is estimated to be 50 to 100 million cases of dengue fever and over 500,000 cases of dengue hemorrhagic fever per year. In the Philippines health status of 32 cases out of 100, 000 populations have decrease to 20 cases of 100,000 populations as objectives by the Department of Health (Lee Suy, 2009). Perhaps due to the strong support of the stakeholders, the infection decreases. The incidence of dengue fever is variable and depends on the geographical region and density of mosquito-borne diseases in a region. However, mosquito breeding to some extent depends on the weather conditions. If the humidity is high or when the drought occurs and river beds dries up leaving small stagnant pools, then mosquitoes breed easily (Potvin, 2000). In the study of Hayudini (2018) cited in https://ijhss.net>index.php/ijhss/article/view/466/155 the disease prevention is also through the initiatives of the Public health Officials in each community.

Preventive measures aimed at preventing water stagnation, which serves as local breeding sites were the second most popular techniques in use (kroeger, 2006). In accordance with the studies in Thailand, they have significant reduction of dengue vectors in areas having clean-up campaigns before and during rainy seasons. In some countries, window and door screens are a popular method of vector control. Window curtains and domestic water container covers treated with insecticides can reduce densities of dengue vectors to low levels and potentially affect dengue transmission. Further, it displays that the use of adequate preventive methods aim to control both vector's breeding site and its spread (Fradin, 2002). It is a need to intensify anti-dengue campaigns such as mist spraying, fogging operations, and de-clogging of canals where mosquitoes are expected to breed (Luczon, 2010). The urged for the public to help battle dengue-causing mosquito species Aedes Aegypti by eliminating possible breeding sites, these mosquitoes are day-biting and thrive in clean but stagnant water.

It is estimated that dengue is fatal and serious on school children because of their low immune system. Therefore, the Department of Health in the Philippines intensifies anti-dengue campaign thru information strategies which targeted public schools because they believed that students are most vulnerable to the disease.

In line with this, the government has taking its lead to have mass awareness campaigns on dengue, providing information to the general

public and a comprehensive knowledge about dengue was provided.

Here are the Methods of Prevention and Control by Department of Health:

a) Recognition of the Disease.
b) Isolation of patient (Screening or sleeping under the mosquito net).
c) Epidemiological investigation.
d) Case Finding and Reporting.
e) Health Education.

Control Measures:

1) Eliminate Vector by:
    a) Changing water and scrubbing sides of lower vases once a week.
    b) Destroy breeding places of mosquito by cleaning surroundings.
    c) Keep water containers covered.
2) Avoid too many hanging clothes inside the house
3) Residual spraying with insecticides.

It also encourages the observance of the strategy against dengue which to search and destroy, self-protection measures, seek early consultation and say no to indiscriminate fogging.

The Department of Health emphasized that cleanliness is still the key to prevent dengue fever. Sec. Enrique Ona said, "Maintaining cleanliness is the best way to avoid the spread of the disease."

Mode of Transmission

Dengue is spread by the bite of an "Aedes" mosquito. It is a day-biting which appears two hours after sunrise and two hours before sunset (Navales, 2010). This mosquito bites the infected person and then bites someone else who is not affected thus transmitting the infection. After this extrinsic incubation period, the virus can be transmitted to immunologically naïve humans during subsequent probing or feeding (Moncayo et al., 2004, Jackson et al., 2012). The extrinsic incubation period is influenced in part by environmental conditions, especially ambient temperature and genetic make-up of the virus. Thereafter the mosquito remains infective for the rest of its life (Moncayo et al., 2004, Jackson et al., 2012).

The virus is transmitted from an infected mosquito to human. The process begins when a person who is infected with the dengue virus is bitten by a mosquito, the virus is then passed on when someone else is then bitten by the infected mosquito (Mosqueda, 2010).

This type of mosquito is transmitted through female mosquitoes that breed in household water containers and unused materials on the roof and around the houses, it spreads during rainy seasons but can breed all year round in standing water in flower, pots, plastics bags, tires, and cans (Lee Suy, 2011).

Management

Patient should be kept in a mosquito-free environment to avoid further transmission of infection and promote rest during bleeding episodes. However, affected person is not infectious and not needed for isolation (Cuevas, 2007).

Intravenous fluids are then needed to support the circulatory system and will treat dehydration and electrolyte imbalances, and as far as the treatment is concerned there is no specific course. There is no specific medicine or vaccine to treat dengue because it is caused by a virus. There is no effective antiviral therapy for dengue fever. Treatment is entirely symptomatic (Navales, 2010). The treatment is to relieve the patient of the symptoms. However, the affected person is treated with anti-pyretic to bring down fever.

In the study of Hayudini, M.A.E.A. and Kasim, K.S. cited in https://ijmaberjournal.org/index.php/ijmaber/article/view/610 that medication shall be taken on time and complied accurately to avoid default of treatment.

Agent-Host Environmental Model by Leavell and Clark (1965) is relevant to this study. This model is useful for examining causes of disease in an individual and is used primarily in preventing illness rather than in promoting wellness. The agent, host and environment interact in ways that create risk factors, and understanding these is important for the promotion and maintenance of health. An agent mosquito is the environmental factor or stressor that must be present or absent for an illness to occur. A host is a living organism capable of being infected or affected by an agent. The host reaction is influenced by family history, age, and health habits. All factors external

to the host that may or may not predisposes the person to a disease in the environment. Relating to this model, the bites of an infected *"Aedes"* mosquito over an infected person and then someone else who is not affected yet show the process on how illness occur. The infected person is the host in these (3) three interactive elements while the surroundings, living condition and climate composed the physical environment. This study is also anchored on Nightingale's Environmental Theory. According to Florence Nightingale (1860), health is linked with environmental factors which are pure or fresh air, pure water, efficient drainage, cleanliness and light especially direct sunlight.

The incidence of dengue hemorrhagic fever may be attributed to the deficiency in some of this factors contributing to health such as the absence of efficient drainage and cleanliness in the environment which allow the mosquitoes to breed freely.

Conceptual Framework

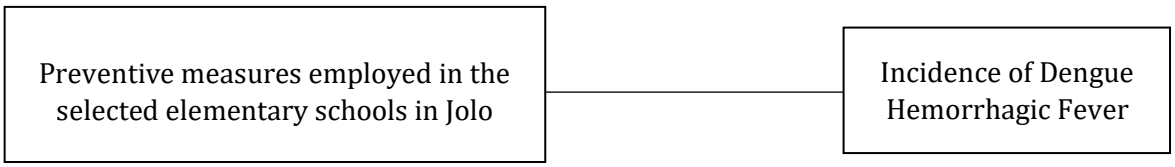

Figure 1: Conceptual Framework of the Study

Figure 1: The framework presents the preventive measures as the independent variable. The employment of preventive measures is determinant to the incidence of dengue hemorrhagic fever. When these measures are followed and implemented, it will most likely achieve its goal of controlling the incidence. On the other hand, if they are poorly or partially implemented, the culprit of the disease will continuously spread the infection. Hence, the second box which is the prevalence of dengue hemorrhagic fever is the dependent variable of this study.

Methods

This section discusses the overview of the research design, participants, setting, measures, procedures, data analysis and limitations of the study. It summarizes the set of procedures that was used in obtaining the data to answer the research problems. Each part represents an idea on how the research is implemented. The purpose of this research determined the incidence of dengue hemorrhagic fever in the different elementary schools in Jolo and identify each preventive measure. To undergo the objective of the study, qualitative and quantitative research designs was employed, which both believed to find answers to the problems (Field and Morse, 1985). The qualitative data was based on the responses of the participants. This study utilized descriptive-survey design in order to define the limit of the study and described the phenomena and the situation. The respondents of this study were the principals and selected elementary school teachers in Jolo. There were 60 respondents on this study composing of selected Teachers, School Nurse and Principal of the school. Teachers were selected using purposive sampling design. It is a sampling design based on the criteria laid down by the researcher on his/her adviser.

The number of participants to be included in this study will be computed using Slovin's Formula shown below.

$$n = \frac{N}{1 + Ne^2}$$

Where: N = Population
n = Sample
1 = Constant
e = Sampling Error (.05 or .01)

The researcher gathered data from them in order to assess and determine the incidence of dengue hemorrhagic fever in their respective schools. The study was conducted in the different elementary schools in Jolo, Sulu.

There were six different elementary schools selected in the town of Jolo and where the case of diagnosed dengue hemorrhagic fever is endemic. The basis of diagnosed data was taken from Sulu Sanitarium and General Hospital and Sulu Provincial Hospital. The terms were defined operationally or as used in this study. ***Dengue hemorrhagic fever*** refers to acute febrile disease caused by infection of a dengue virus which is transmitted by a female vector name "Aedes". It is mainly the primary source of morbidity and mortality in the different elementary schools in Jolo. ***Prevalence*** is the number of incidence of dengue hemorrhagic fever in the different elementary schools in Jolo. It is used to measure the increasing rate of dengue and used as baseline data in the occurrence of dengue fever in the different elementary schools in Jolo. ***Different elementary schools*** refer to Mohammad Tulawie Central School, Cerilo Buelo Elementary School in Jolo, Hamid Elementary School, Ututalum Elementary School, Notre Dame Asturias and Mohammad Jajurie Elementary School. All of them are located mainly in the town of Jolo. It is where the area of study has conducted. It is composed of elementary pupils from kindergarten up to grade six. ***Preventive measures*** refer to recognition of disease in the different elementary schools in Jolo which provided an early detection and treatment and eliminate vector by destroying the breeding places of mosquitoes anywhere in the school. It is also use to control the incidence of dengue hemorrhagic fever by applying the appropriate preventive measures. The questionnaire was formulated base on the result of the focus group discussions conducted from the 10 participants. The participants composed of elementary teachers in Jolo, (3) three from Mohammad Tulawie Elementary School, (3) three from Hji. Hassiman Elementary School, and (4) four from Hji. Buto Elementary School. The survey questionnaire has been done with content validity rating however it was also face validated by three experts.

The survey questionnaire was given and conducted personally to the different elementary schools in Jolo which has been tantamount to the research process. It is composed of three parts. Part I is composed of the demographic profile of the respondents and location of the research. Part II is composed of three items on the prevalence of dengue hemorrhagic fever and Part III is composed of three items on the preventive measures on the dengue hemorrhagic fever.

The researcher conducted to the best of her interests and safety. However, respondents were given the assurance of ethical standard of research and provide them with confidentiality.

The empirical undertaking can be classified as descriptive method of research by defining the limits, describing the phenomena and the situation. It described and analyzed a given group without drawing any conclusions or inferences about a larger group.

When the data has been assembled and tabulated, it then needs to be summarized to determine the general trend of the data. The data was enumerated, organized and graphically presented. The data that has been gathered were obtain and has compiled into type of table or graph.

The researcher used data gathering through distributing of survey questionnaires to the respondents, conducted focus group discussion to the selected elementary teachers, and the researcher conducted an ocular survey for the purpose of assessing the environment of the participants on the area of research study.

The letter of request was disseminated to the different teachers and head of the school in Jolo on the (6) selected schools namely Mohammad Tulawie Central School, Cerilo Buelo Elementary School in Jolo, Hamid Elementary School, Ututalum Elementary School, Notre Dame Asturias and Mohammad Jajurie Elementary School . When permission had granted, the researcher conducted to the best of her interests and safety. Dengue diagnosed were provided by the Sulu Sanitariun and General Hospital and Sulu Provincial Hospital.

Ethical Consideration

Concerning confidentiality on human subjects, the researcher believed that in the interest of good research, the information should be gathered in as natural setting as possible and provide privacy on the respondents in order not to betray the confidence of the subjects.

According to Prof. Carry (2000), data are raw materials of reflection until by comparison, combination and evaluation. They are stepped-up to higher level of generalization where they serve as a basic material for higher thinking.

The ultimate aim of the researcher is to present the results of each of the research approaches and provide descriptive presentation in order to be systematic and accurate.

Objectives	Statistical tool
1. To determine the prevalence of dengue hemorrhagic fever in the different elementary schools in Jolo.	Frequency and percentage
2. To determine the preventive measures employed by the different elementary schools in Jolo to reduce the prevalence of dengue hemorrhagic fever.	Frequency and percentage
3. To determine the significant relationship between the prevalence of dengue hemorrhagic fever and its preventive measures used by the different elementary schools in Jolo.	Correlational analysis at .05 level of significance

The study is limited to the determination and assessment on the incidence of dengue hemorrhagic fever in the different elementary schools in Jolo and the preventive measures employed by the selected elementary school this is in order to reduce the prevalence of the disease.

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ATTACHMENT

Questionnaire/Research Tool

PART I – Demographic Profile

Name (Optional) : _____
Age : _____
Sex : _____
Occupation : _____
Institution : _____ Address : _____
Length of service : Please check the appropriate box below.

☐ 1 –2 years ☐ 3 – 5 years
☐ 6 – 10 years ☐ 11 years above

Please indicate the number

Number of students per classroom: ☐ Male ☐ Female
Number of students per school campus: ☐ Male ☐ Female
Number of classrooms: ☐

Part II – Prevalence of Dengue Hemorrhagic Fever in your School. Please check the appropriate box.

1. Is there any of your pupils who were hospitalized due to dengue hemorrhagic fever? Please check the appropriate box.
   ☐ Yes ☐ No
   If yes, please indicate the number._____
2. Is there a mortality incident of dengue hemorrhagic fever in your school? Please check the appropriate box.
   ☐ Yes ☐ No
   If yes, indicate the number. _____
3. Is the susceptibility to acquisition of dengue hemorrhagic fever in your school high? Please check the appropriate box.
   ☐ Yes ☐ No

   If yes, please check the possible factor/s stated below.
   Dress coding/Uniform (Short sleeves and Short pants)
   ☐ Poor sanitation
   ☐ Open-sewerage system
   ☐ Improper waste disposal
   ☐ Lack of information dissemination
   ☐ Classroom congestion
   ☐ Improper building construction

PART III – Preventive measures that have been utilized in your school. Please check the appropriate box.

1. Does your school implement precautions against dengue hemorrhagic fever? Please check appropriate box below
   ☐ Yes ☐ No
2. Are you aware of the Department of Health Program against dengue hemorrhagic fever?
   ☐ Yes ☐ No

If yes, choose the preventive measures on dengue hemorrhagic fever that have been utilized in your school given below and check the appropriate box

- ☐ Pupils are dressed with long-sleeve clothing
- ☐ Pupils are encouraged with long pants
- ☐ Pupils wear light coloured clothes (Dark colors may attract mosquitoes)
- ☐ Sprays on insecticides before classes begins
- ☐ Install mosquito meshes (Screen) on windows
- ☐ Encourage use of citronella oil-based creams (Insect repellent)
- ☐ No flower pots with water inside/outside classroom
- ☐ No stagnant drainage in the surrounding
- ☐ No containers/materials that contain water in it
- ☐ Periodic inspection and cleaning of school premises

3. How would you evaluate the preventive measures applied in your school? Please Check the appropriate box
   - ☐ Effective
   - ☐ Fairly effective
   - ☐ Ineffective

(FGD) Focus Group Discussion Questions Interview Tool

1. What is your opinion on the prevalence of dengue hemorrhagic fever in your school?
   Tausug: *Uno in panghati mo sin kahalan sin dengue ha school nyo?*
2. What is your school doing to prevent the incidence of dengue hemorrhagic fever in your school?
   Tausug: *Uno in hinang sin school niyo ha hikapahgang sin sakit dengue duon ha school niyo?*
3. What will you suggest your school should do to prevent the prevalence of dengue hemorrhagic fever?
   Tausug: *Uno in hika dihil mo pikilan ha school nyo ha supaya kapahgangan in sakit dengue?*