

Background knowledge of differences between Ebola and Dengue Fever among students in Phangnga Province, Thailand

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Abstract: Background: Ebola is a contagious disease that is transmitted from animals such as bats, monkeys, or from the secretions of infected people. When infected the virus damages vital organs, eventually lowering blood clotting cell levels and leading to severe, uncontrolled bleeding. As for dengue fever that is transmitted from Aedes mosquitoes. The first infection is usually mild. But if infected a second time often severe to the point of bleeding or shock or death.

Purpose: To assess the level of Background knowledge of differences between Ebola and Dengue Fever.

Methodology: A cross sectional observational study was conducted. 134 students participated in the study. Background knowledge of differences between Ebola

and Dengue Fever was assessed. Differences between outcomes and sociodemographic were analyzed through independent t-test, ANOVA. A generalized linear model was calculated to determine the predictive variables of Background knowledge of differences between Ebola and Dengue Fever

Findings: Students revealed a moderate level of knowledge of differences between Ebola and Dengue Fever. Factors influenced Ebola and Dengue Fever preventive behaviors among students were knowledge about differences between Ebola and Dengue Fever

Conclusion: Students had a moderate level of knowledge of differences between Ebola and Dengue Fever. More practical health education programmes should be organized. To enhance more benefits and exposure about the effect of good practice towards Ebola and Dengue Fever prevention.

Keywords: Ebola virus , Dengue Virus , Background Knowledge , Ebola Virus Disease (EVD) , Dengue Hemorrhagic Fever (DHF).

1. INTRODUCTION

The Ebola Virus Disease (EVD) was first discovered in 1976 near the Ebola River in what is now the Democratic Republic of Congo. Since then, the virus has been infecting people from time to time, leading to outbreaks in several African countries. Scientists do not know where the EVD comes from. Based on similar viruses, they believe EVD is animal-borne, with bats or nonhuman primates being the most likely source. Infected animals carrying the virus can transmit it to other animals, like apes, monkeys, duikers and humans^[1].

EVD is caused by an infection with a group of viruses within the genus Ebolavirus: Ebola virus (species Zaire ebolavirus), Sudan virus (species Sudan ebolavirus), Tai Forest virus (species Tai Forest ebolavirus, formerly Côte d'Ivoire ebolavirus), Bundibugyo virus (species Bundibugyo ebolavirus), Reston virus (species Reston ebolavirus), Bombali virus (species Bombali ebolavirus) . Only four of these (Ebola, Sudan, Tai Forest and Bundibugyo viruses) have caused disease in people.

Reston virus can cause disease in nonhuman primates and pigs, but there have not been cases in people. Bombali virus was first identified in bats in 2018, and experts do not know yet if it causes disease in either animals or people^[1].

The virus spreads through direct contact with: blood or body fluids of a person who is sick with or has died from EVD, objects contaminated with body fluids from a person who is sick with or has died from EVD, infected fruit bats or nonhuman primates and semen from a man who recovered from EVD. It can survive on dry surfaces, like doorknobs and countertops for several hours; in body fluids like blood, the virus can survive up to several days at room temperature. Cleaning and disinfection should be performed using a hospital-grade disinfectant^[1].

When people become infected with Ebola, they do not start developing signs or symptoms right away. A person can only spread after they develop signs and symptoms of Ebola. Symptoms may appear anywhere from 2 to 21 days after contact with the virus, The course of the illness typically progresses from “dry” symptoms initially (such as fever, aches and pains and fatigue), and then progresses to “wet” symptoms (such as diarrhea unexplained hemorrhaging, bleeding or bruising and vomiting) as the person becomes sicker^[1].

There are currently two treatments, The first drug is a combination of three monoclonal antibodies. The second drug, Ebanga™ external icon, is a single monoclonal antibody. Monoclonal antibodies act like natural antibodies to stop a germ from replicating after it has infected a person^[1].

Dengue (DENG-gey) fever is a mosquito-borne illness that occurs in tropical and subtropical areas of the world. Mild dengue fever causes a high fever and flu-like symptoms. The severe form of dengue fever, also called dengue hemorrhagic fever, can cause serious bleeding, a sudden drop in blood pressure (shock) and death. Millions of cases of dengue infection occur worldwide each year. Dengue fever is most common in Southeast Asia, the western Pacific islands, Latin America and Africa. But the disease has been spreading to new areas, including local outbreaks in Europe and southern parts of the United States^[2].

Dengue viruses are spread to people through the bite of an infected *Aedes* species (*Ae. aegypti* or *Ae. albopictus*) mosquito. These mosquitoes also spread Zika, chikungunya, and other viruses. Dengue viruses can transmit through mosquito bites from mother to child^[3].

The symptoms vary depending on the severity of the disease. Mild dengue fever: symptoms can appear up to 7 days after being bitten by the mosquito that carries the virus. They include: aching muscles and joints, body rash that can disappear and then reappear, high fever, intense headache, pain behind the eyes and vomiting and feeling nauseous. Symptoms usually disappear after a week. Dengue hemorrhagic fever (DHF): at first, symptoms of DHF may be mild, but they gradually worsen within a few days, and there may be signs of internal bleeding. A person with DHF may experience: bleeding from the mouth, gums or nose, clammy skin, damage to lymph and blood vessels, internal bleeding which can lead to black vomit and feces or stools, a lower number of platelets in the blood, sensitive stomach, small blood spots under the skin or weak pulse. Without prompt treatment, DHF can be fatal^[4].

Dengue is a virus, so there is no specific treatment. For milder forms, treatment includes: preventing dehydration (when patients have a high fever and vomiting can dehydrate the body. The patients should drink clean water and rehydration salts can also help replace fluids and minerals), Painkillers such as Tylenol or paracetamol can help lower fever and ease pain. Non-steroidal anti-inflammatory drugs (NSAIDs), such as aspirin or ibuprofen, are not advised, as they can increase the risk of internal bleeding. More severe forms of dengue fever may need: intravenous (IV) fluid supplementation, or drip (if the patients cannot take fluids by mouth) and blood transfusion for patients with severe dehydration^[4].

In this study, the researcher is interested in assessing background knowledge of differences between Ebola and Dengue Fever among students in Phangnga Province, Thailand. It is expected that the results of the research can be used as a guideline to promote better background knowledge of the differences between Ebola and Dengue Fever. This will help affect the health and hygiene of students. It also reduces the economic bad effect and time spent on medical treatment for staff due to the misknowledge of background knowledge of differences between Ebola and Dengue Fever.

2. RESEARCH METHODOLOGY

Participants and procedure

This was a cross-sectional observational study. 134 students participated in the study. An online questionnaire has purposely developed an mead available through Google From between 14 June 2022 and 21 June 2022. All students were eligible and were invited to participate in the study. The invitation was sent to the school's social media groups. The students have

access to school social media groups, so they all receive an invitation. In this invitation, information about the objectives of the study as well as the ethical guarantee of confidentiality and anonymity in the data collected as stated in the informed consent was explained. Participation was completely free and voluntary, and no personal data were collected from any participant.

Instrument

The questionnaire was developed based on a literature review including (1) What is Ebola and Dengue Fever, Ebola and Dengue Fever symptoms, what causes Ebola and Dengue Fever, Ebola and Dengue Fever infections in animals, spread of Ebola and Dengue Fever, how to prevent Ebola and Dengue Fever infections, and the effects of Ebola and Dengue Fever from CDC (2) studies performed on the same topic were several common items were used to assess each of the dimensions analyzed in this study. The proposed items were then grouped and redundant items were removed.

A preliminary version of the instrument was reviewed by three experts to validate its content. A pretest was then performed with a small sample of grade 9-12 students to test for comprehension and difficulty. All the questions remained without modifications. The psychometric characteristics of the questionnaire were tested, as described in the statistical analysis subsection.

The final version of the questionnaire contained 21 questions; 5 about the sociodemographic data (gender, age, education level, study program, Dengue Infected before, and Aware of Ebola) and 16 items.

Knowledge about Ebola: this scale consisted of 5 questions related to Symptoms of Ebola, the spread of Ebola, Ebola treatment, and Ebola prevention. Knowledge about Dengue Fever: this scale consisted of 5 questions related to Symptoms of Dengue Fever, the spread of Dengue Fever, and Dengue Fever prevention. And another 5 questions related to Symptoms of Ebola and Dengue Fever, Ebola and Dengue Fever infection, Ebola and Dengue Fever prevention. The participants were asked to choose the correct answer from True or false. One point was assigned to each correct answer while providing an incorrect answer received zero points. The sum of all items was made hence higher scores corresponded to a higher level of knowledge.

Statistical analysis

The analysis was performed using SPSS for windows, version 26. To analyse psychometric characteristics of the scales, an exploratory factor analysis, using principal component analysis with varimax rotation, was carried out. Reliability was analyzed through the calculation of item-total correlation coefficients and Cronbach's alpha (α) for the scales of the questionnaire. The descriptive analysis were presented in absolute (n) and relative (%) frequencies, mean (M) and standard deviations (SD). To assess the differences between the outcome variables (Background knowledge of differences between Ebola and Dengue Fever among students) and the sociodemographic characteristics, considering the sample size, independent t-test and the ANOVA were used as appropriate. The correlations between the outcomes of the study were calculated by Pearson's correlation. Lastly, a generalized linear model was calculated to determine the predictive variables of the preventive behaviors. Exp (β) and the respective 95% confidence intervals (95% IC) were presented. Statistical significance was defined as $p < 0.05$.

Ethical Considerations

This research had been approved by the school. This research uses an anonymous data collection method to collect data from high school students of Phangnga Province, Thailand, by using Google form. The invitation was sent to the school's social media groups. In these invitations, information about the study's objectives and the ethical guarantee of confidentiality and anonymity in the data collected as stated in the informed consent was explained. Participation was completely free and voluntary, and no personal data were collected from any participant.

3. RESULT

This study comprised a total of 134 students. The sociodemographic characteristics of the sample are presented in Table 1. Most students were female (n=90, 67.2%). Most students were grade 10 (n=50, 37.3%) followed by grade 11 (n=38, 28.8%), grade 9 (n=27, 20.1%) and grade 12 (n=19, 14.2%) respectively. Most students' study programs were Science-Mathematics (n=78, 58.2%) followed by English-Mathematics (n=42, 31.3%) and Chinese- Arts (n=14, 10.4%) respectively. 102 (76.1%) of the students never infected Dengue Fever while the rest ever infected Dengue Fever (n=32, 23.9%). And 77 (57.5%) of the students ever aware of Ebola while the rest never aware of Ebola (n=57, 42.5%).

Regarding knowledge of differences between Ebola and Dengue Fever, students revealed moderate knowledge, correctly answering mean of 9.72 (SD=1.79) questions in a total of 15. Female students showed higher knowledge of differences between Ebola and Dengue Fever scores (M=9.76, SD=1.66) than male students (M=9.94, SD=2.04). Students in grade 12 showed the highest knowledge of differences between Ebola and Dengue Fever with a score of 10.68 (SD=2.11), Students who study Science Mathematics study program showed the highest knowledge of differences between Ebola and Dengue Fever with a score of 9.97 (SD=1.66). Students whose ever infected Dengue Fever showed the highest knowledge of differences between Ebola and Dengue Fever with a score of 10.03 (SD=1.58). And students who were ever aware of Ebola showed the highest knowledge of differences between Ebola and Dengue Fever with a score of 9.90 (SD=1.81).

Table 1: Participants' characteristics and knowledge of differences between Ebola and Dengue Fever

Variable	n (%)	Range
		Knowledge of differences between Ebola and Dengue Fever
		M (SD)
Gender		
Male	44 (32.8)	9.64 (2.04)
Female	90 (67.2)	9.76 (1.66)
Class Level		
Grade 9	27 (20.1)	9.74 (2.31)
Grade 10	50(37.3)	9.24 (1.30)
Grade 11	38 (28.4)	9.84 (1.59)
Grade 12	19 (14.2)	10.68 (2.11)
Study Program		
Science-Mathematics	78 (58.2)	9.97 (1.66)
English-Mathematics	42 (31.3)	9.45 (2.04)
Chinese-Arts	14 (10.4)	9.07 (1.49)
Dengue Infected before		
Ever	32 (23.9)	10.03 (1.58)
Never	102 (76.1)	9.62 (1.85)
Aware of Ebola		
Ever	77 (57.5)	9.90 (1.81)
Never	57 (42.5)	9.47 (1.74)
Total	134 (100)	9.72 (1.79)

From questions that measure knowledge about differences between Ebola and Dengue Fever found that the 3 questions the students answered most correctly were: 1) Dengue Fever can be prevented by destroying mosquito breeding sites around the house and nearby areas. Correct answers 124 students, representing 92.5%, followed by 2) Ebola Virus infection can be prevented by washing hands regularly. If it is necessary to travel to a pandemic country. Correct answers 122 students, representing 91.0%, followed by 3) The incubation period for Ebola Virus infection is 2 to 21 days from the onset of infection to the onset of symptoms. Correct answers 119 students, representing 88.8%

As for the questions that the students answered with the least 3 questions, they were 1) Dengue Fever and Ebola Virus infection It can be infected through direct contact with blood, secretions, organs, or body fluids from an infected person. Correct answers 39 students, representing 29.1%, followed by 2) There is currently a vaccine against Dengue Fever but there is no vaccine against Ebola virus infection. Correct answers 40 students, representing 29.9%, followed by 3) Ebola Virus infection spreads immediately after infection. Even if there are no symptoms of infection Correct answers 42 students, representing 31.3%

Table 2: Number and percentage of each question items

Question item	No. of Corrected answer n (%)
1. Patients with Dengue Fever should opt for aspirin to reduce fever and should avoid paracetamol.	56 (41.8)
2. Ebola Virus infection can be transmitted from animals to humans.	118 (88.1)
3. There is currently a vaccine against Dengue Fever but there is no vaccine against Ebola virus infection.	40 (29.9)
4. Dengue Fever and Ebola Virus infection are caused by the same virus.	64 (47.8)
5. Ebola Virus infection spreads immediately after infection. Even if there are no symptoms of infection	42 (31.3)
6. Dengue Fever patients should not eat milk, chocolate or tomato juice.	45 (33.6)
7. Dengue Fever cannot be transmitted from person to person.	82 (61.1)
8. The incubation period for Ebola Virus infection is 2 to 21 days from the onset of infection to the onset of symptoms.	119 (88.8)
9. Early symptoms of Ebola Virus infection and Dengue Fever have similar symptoms.	118 (88.1)
10. Ebola Virus cannot cause bleeding. which is different from Dengue Fever.	58 (43.3)
11. Dengue Fever can be sick again. If infected with different virus strains.	111 (82.8)
12. Dengue Fever and Ebola Virus infection It can be infected through direct contact with blood, secretions, organs, or body fluids from an infected person.	39 (29.1)
13. Ebola Virus infection does not have a cure yet. Therefore, symptomatic treatment must be treated accordingly.	103 (76.9)
14. Dengue Fever can be prevented by destroying mosquito breeding sites around the house and nearby areas.	124 (92.5)
15. Ebola Virus infection can be prevented by washing hands regularly. If it is necessary to travel to a pandemic country.	122 (91.0)

4. DISCUSSION

From the study of Knowledge of differences between Ebola and Dengue Fever comprised a total of 134 students. Most students were female (n=90, 67.2%), grade 10 (n=50, 37.3%), Most students' study programs were Science-Mathematics (n=78, 58.2%), 102 (76.1%) of the students never infected Dengue Fever and 77 (57.5%) of the students ever aware of Ebola. Students showed a moderate level of knowledge of differences between Ebola and Dengue Fever (M=9.72, SD=1.79). 3 questions the students answered most correctly were: 1) Dengue Fever can be prevented by destroying mosquito breeding sites around the house and nearby areas. followed by 2) Ebola Virus infection can be prevented by washing hands regularly. If it is necessary to travel to a pandemic country. and 3) The incubation period for Ebola Virus infection is 2 to 21 days from the onset of infection to the onset of symptoms. As for the 3 questions the students answered least correctly were: 1) Dengue Fever and Ebola Virus infection It can be infected through direct contact with blood, secretions, organs, or body fluids from an infected person. followed by 2) There is currently a vaccine against Dengue Fever but there is no vaccine against Ebola virus infection. And 3) Ebola Virus infection spreads immediately after infection. Even if there are no symptoms of infection.

This could be attributed to the fact that Ebola Virus wasn't academic context knowledge that was taught in high school while Dengue Fever was academic context knowledge. This was consistent with Aliya Hisam, Mariam Nadeem Rana and Mahmood-Ur-Rahman 's study^[5] that participants had a moderate level of knowledge about Ebola. And Ebola was a major epidemic in 2014. which a long time ago made students less familiar with this disease. Dengue fever is a fever that occurs in Thailand every year. Teaching about dengue fever was organized, There was a campaign and help to destroy mosquito breeding sites from public health agencies. This is different from Ebola, which has never been an epidemic in Thailand. Female students showed a higher level of knowledge of differences between Ebola and Dengue Fever than the male students.

This may be because being female paid more attention to details than males. As for students in grade 12, they had the highest level of knowledge of differences between Ebola and Dengue Fever among other classes while grade 10 were showing the lowest scores. This could be attributed to grade 10 students needing to focus on their studies and adapt to the new environment that has just gotten to 10th grade. So they did not pay attention to anything besides their studies. The students in the Science-Mathematics study program had the highest level of knowledge of differences between Ebola and Dengue Fever among other programs due to the Science-Mathematics program being more concentrated than other programs.

Mostafizur Rahman et al.^[6] conducted a study about Knowledge, Attitude, and Practices towards Dengue Fever among University Students of Dhaka City, Bangladesh and found that some of these students had exemplary Dengue Fever knowledge (66.72%), attitude (89.28%), and practices (68.32%). However, many of them were also observed with a lack of knowledge about this disease's infectious behavior, recognizing Aedes mosquito breeding sites, multiple infection cases, and the risk of Dengue Fever viral infection during pregnancy. As a result, the students studying in this faculty had a moderate level of Dengue Fever. Sami Abdo Radman Al-Dubai et al.^[7] conducted a study about Factors affecting Dengue Fever knowledge, attitudes and practices a selected Urban, SEMI-Urban and RURAL Communities in Malaysia and found that the awareness of dengue fever was relatively high. As a result, the participants who have been infected with Dengue Fever before or the participants who are aware of dengue fever have more knowledge about dengue fever than the participants who had never been aware of dengue fever and never infected dengue Fever. Olayinka Ilesanmi and Faith Osaretin Alele^[8] conducted a study about Knowledge, Attitude and Perception of Ebola Virus Disease among Secondary School Students in Ondo State, Nigeria, October, 2014 and found that respondents who were in the senior secondary class were found to have significantly good knowledge of Ebola compared to those in the junior secondary class. As a result, the grade 12 students had the highest level of knowledge of differences between Ebola and Dengue Fever among other classes. This may be due to the higher level of education and experience make the better the health seeking knowledge and healthier outcomes

Limitation

The study was conducted during the COVID-19 pandemic, methods of collecting data were an online survey where only students who had access to the internet could participate in this study. which could limit students who hadn't access to the internet to participate in this study. Due to during the COVID-19 pandemic, most students were aware of hygiene practices such as washing hands during the pandemic, therefore, this could result in higher scores on hygienic-related questions and due to the study collected data with the online form, some students might use the Internet to search for answers during the survey. because they wanted to give themselves a high score.

5. CONCLUSIONS

Students had a moderate level of knowledge of differences between Ebola and Dengue Fever of students. Therefore, more practical health education programmes should be organized. It will give more benefits and exposure about the effect of good practice towards Ebola and Dengue Fever prevention.

6. RECOMMENDATION

Students must be educated about Ebola and Dengue Fever more in order to be able to prevent various epidemics to have knowledge about Ebola and Dengue Fever more. Health education campaigns should be promoted more to prevent infectious diseases.

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