KNOWLEDGE OF DENGUE HEMORRHAGIC FEVER BY A PARENTS-TEACHERS GROUP IN A FILIPINO HIGH SCHOOL

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ABSTRACT. School-age children are particularly susceptible to dengue hemorrhagic fever. During January 1993, schools in Dumaguete City, Philippines were found to have breeding sites for the *Aedes aegypti* mosquito, the carrier of the dengue virus. In response to a dengue outbreak, a mass media campaign followed. In addition, dengue information sheets with parental returns slips were distributed among the pupils of the city's schools. Parent/teacher meetings were held as a response to the information sheet distribution. One high school parent/teacher group was evaluated on dengue knowledge by questionnaire. About 75% of the participants claimed exposure to dengue health communication other than the information sheets. The total correct response rate to the questionnaire was 64.5%. The questionnaire topics included dengue transmission, treatment, and control. The most favorable response dealt with the knowledge of mosquito breeding sites. The least favorable response dealt with effective mosquito control.

Dengue hemorrhagic fever (DHF), also known as "H-fever" or Philippine hemorrhagic fever, was first reported in the Philippines in 1954.(San Juan, 1960) Since then dengue has occurred around the world in the tropics in locations such as the Caribbean (Kouri et al., 1986) and South America (Figueiredo, et al. 1990; Phillips, et al., 1992).

Dengue is perilous in that there are no vaccines nor anti-virals available for prevention or treatment. Immunity to one of the four dengue serotypes does not lessen susceptibility to the other three serotypes. Dengue is capable of attacking infants despite the immune status of their mothers. Young children are most often the host of dengue. Individuals infected with the dengue virus can develop vascular permeability and abnormal hemostasis.(Halsted, 1990).

Dengue hemorrhagic fever (DHF) begins with fever and malaise which may last two days to a week. In the absence of virological testing and diagnosis (which is the case in most community settings) the diagnosis must be based upon serological laboratory findings. The World Health Organization has set classifications based upon laboratory values of hemoconcentration and thrombocytopenia. This may necessitate up to 48 hours before confirma-

tion of dengue. In the meantime the disease may have already caused sufficient vascular permeability to compromise the patient before receiving further medical attention. This may present an especially critical situation in children (Sanford, 1987).

The more severe form of dengue, called dengue shock syndrome (DSS), is characterized by internal bleeding and shock. The mortality associated with dengue may reach as high as 10%., Thus according to Gubler and Casta-Valez (1991), "dengue is currently the most important vector-borne viral disease afflicting humanity, in terms of both morbidity and mortality."

As there are difficulties in the diagnosis and treatment of DHF, it is essential to emphasize the prevention and control of the disease. It is therefore essential to control the vector of dengue, the *Aedes aegypti* mosquito (Brown, 1975) Weikel states, "long-term control of dengue viral infections depends on health education and community projects aimed at reducing the breeding sites of *Aedes* mosquitoes" (Weikel, 1987).

Dengue in the Philippines and Dumaguete City

The number of cases and rate of dengue hemorrhagic fever ("H-Fever") at its earliest listing in 1964 in the Philippines were 74 and 0.3 per 100,000, respectively. The total number of dengue cases in the Philippines for the years 1954 to 1958 was 1,579 (San Juan, 1960). In 1965 the number of dengue (H-fever) cases, mortality rate, number of deaths and mortality rate were 652; 2.0 per 100,000; 109 and 0.3 per 100,000, respectively. By 1985 the number of dengue cases, case rate, number of deaths, and mortality rate had increased to 2,096; 3.8 per 100,000; 210 and 0.4 per 100,000, respectively. Over 75% of the 1985 dengue cases occurred between 14 years of age and birth. The greatest number of dengue cases listed for the 21-year period from 1965 to 1985 registered was in 1966, with 9,384 cases. However the average number of dengue cases per year from 1966 to 1985 was 1,384. The number of cases and rate per 100,000 for dengue in the entire Philippines for 1985 were 2,096 and 3.8, respectively (Health, 1988).

In 1985 the number of dengue cases and rate in Dumaguete City, Negros Oriental were 2 and 2.8 per 100,000 cases, respectively. There were no dengue-registered deaths in Dumaguete for 1985 (Health, 1988). The number of dengue cases per year in Dumaguete for the years 1988, 1989, 1990, 1991, and 1992 were, respectively, 96, 15, 45, 130, and 134 cases. The five year dengue morbidity rate from 1986 to 1990 in Dumaguete was 25.05 per 100,000. The 1991 dengue rate in Dumaguete was 161.96 per 100,000. The rate of dengue cases in 1992 in Dumaguete City had risen to approximately 165 per 100,000. There were two registered dengue related deaths in Dumaguete for 1992. For the year 1992 Dumaguete City registered dengue cases for every month except the dry Philippine summer month of April. December

1992 registered the greatest number of confirmed dengue cases with 37. There was a total of 96 suspected cases of dengue in December 1992. The period of January through March 1993 shows an increases unconfirmed cases from the same period for 1992 (see Figure 1) (Dumaguete, 1993; Piñero, 1992).

The cases of dengue in Dumaguete were distributed in all but three of the barangays (community-level government unit). The majority of dengue cases were in barangays located within one kilometer of the Bay and north of the Banica River. The heavily populated barangays of Poblacion, Taclobo, and Daro lead the list with the most dengue cases (see Figure 2) (Dumaguete, 1993; Piñero, 1992).

Response to the Dengue Situation in Dumaguete

In response to the increased number of dengue cases in December 1992 the Silliman University College of Education students enrolled in the "Environmental Sanitation and Health" course surveyed the campuses of six Dumaguete elementary schools in January 1993. Each school had multiple preventable mosquito breeding sites. Subsequently, the education students of the university began a dengue health communication campaign in cooperation with the Provincial Department of Health (Lennon, 1993). The students presented classroom talks, led assemblies, and passed out dengue information sheets (with a parental return slip acknowledging the reading of the sheet and family implementation of anti-dengue measures) in 25 of 31 Dumaguete City elementary schools and high schools. In a total city school population of over 20,000, a total of 7,822 dengue information sheets were passed out to the pupils. The pupils returned 3,961 parental acknowledgment slips with a response rate of 50.6%. The dengue information sheets (Figure 3) were based upon a pamphlet developed by the Philippine Region 7 Department of Health entitled "What Everyone Should Know about Dengue Fever" (Department of Health). Radio, television, and newspapers discussed the problem of dengue in Dumaguete. These combined health communication activities generated interest among the Parent/Teacher associations of various schools to hold dengue information meetings.(Dengue, Rabies, 1993).

In developing dengue prevention programs in the U.S. Virgin Islands and Puerto Rico, Gubler and Casta-Valez (1991) stated, "one key population group is school-age children; major educational work has been directed toward the schools." However the principal group of people that will reinforce any health behavior or environmental clean-up changes promoted through pupils are teachers and parents—most especially parents. Therefore, this study's objective was to gain insight into the knowledge of parents and teachers about the prevention and control of dengue fever. The results of this study may better define strategies and develop appropriate anti-dengue health education materials.

Materials and Methods

A ten-point questionnaire was administered to all 94 parent and teacher members a the scheduled Parent-Teacher Association meeting at Silliman University High Scho Dumaguete City, Negros Oriental, Philippines, on February 2, 1993. The participants we given instructions previous to questionnaire administration (for the questionnaire sample s Figure 4). The first nine questions dealt with dengue fever transmission, control, symptom and treatment. The tenth question dealt with dengue health communication awarene previous to the administration of the questionnaire. The questionnaire response possibiliti were *true* or *false* or *not sure*. The questions were based on a pamphlet developed by t Department of Health entitled "What Everyone Should Know about Dengue Fever."(D partment of Health).

Results

The total overall correct response rate for the surveyed group of parents and teache on the DHF questionnaire was 64.5% for questions nos. 1 to 9. Questions no. 6 and no. had the best and second best response rates at 98.9% and 89.4%, respectively, for the enti PTA group. Questions no. 8 and no. 4 had the poorest and second poorest rates at 27.7% a 44.7%, respectively for the entire PTA group. Dengue health communication previous the questionnaire was claimed by 74.5% of the total PTA group (see Figure 5).

The best response for those who claimed previous dengue health communicatio those that claimed no previous dengue health communication, and those not sure (or le blank) of previous dengue health communication were, respectively, no. 6 at 89.6%, no. and no. 6, both at 100%, and also no. 6 at 100%. The worst responses among the previou dengue health communication group, the no previous dengue health communication grou and those not sure (or left blank) of previous dengue health communication were, respe tively, no. 8 at 27.1%, no. 4 and no. 8, both at 40%, and for the not sure/blank group, no. and no. 8 at 11.1%. The overall average percentage responses for those parents and teache who claimed previous dengue health communication, those who claimed no previous dengu health communication, and those not sure (or left blank) of previous dengue health comm nication were, respectively, 70.7%, 74.1%, and 42.0% (see Figure 6).

A median test of scores among the group with previous dengue health comm nication versus those with no previous dengue health communication yielded an X =.333 with a non-significant p-value > .10. A median test of scores among th previous dengue health communication versus those unsure (or left blank) of previou dengue health communication yielded $X^2 = 7.596$ with a $p < .01$. However this sco was not valid, as a cell within the two by two table had less than the required fiv units per cell.

Discussion

Nearly three-quarters of the P.T.A. claimed to have received previous dengue health communication by way of mass media or meeting (Figure 5). There was, however, no significant difference between the responses of those who claimed to have received health communication prior to the questionnaire administration and those P.T.A. participants who claimed not to have received prior dengue health communications. In the instructions preceding the questionnaire administration it was specified that question no. 10 did not refer to the dengue health information fact sheet which was distributed to all of the pupils in the high school (Figure 3). It is possible, then, that the higher percentage score among those who claimed no previous health communication exposure versus those that claimed previous health communication may have been attributed to exposure to the dengue information sheet brought home by the pupils (Figure 3). The unsure group scored lower than the other two groups on all questions except no. 6. Perhaps those unsure of their exposure to dengue health communication previous to the questionnaire administration were actually the people with no previous dengue information exposure (Figure 6).

Question nos. 8 and 4 consistently received the lowest responses among all groups of the P.T.A. Both questions dealt with mosquito control (Figure, 5 and 6). These responses go against the advice of the dengue information sheet (Figure 3) and the Philippine Department of Health advice that "measures directed toward adult mosquitoes are expensive, temporary and not effective for routine mosquito control, thus measures directed towards larval mosquitoes should be utilized"(Department of Health).

The P.T.A. group correctly identified the breeding sites of mosquitoes in question no. 1 at 98.9% (as this was the group's overall best question response). They did not connect it with the importance of larvae control in question no. 5 at 68.1% (see Figure 5). Question no. 5 implied the destruction of the vector related to dengue. The question was written so as not to give away the carrier species (Figure 4).

The majority of the P.T.A. group scored correctly on questions 1, 2, and 3 (Figure 5). Question no. 3 has relevance to the school age population in that the *Aedes aegypti* mosquito may bite during the day (unlike the malaria carrying *Anopheles* mosquito, which bites at night). Thus the times that children go to and from school or the period they are on the school grounds may place them at risk for dengue. Preliminary studies had already indicated the presence of *Aedes aegypti* on school campuses in Dumaguete. Also *A. aegypti* was identified in family living quarters about 200 meters from one school (Lennon, 1993).

In response to dengue epidemics in the 1970s to early 1980s, Cuba conducted an *A. aegypti* eradication program. From their Cuban experience Armada Gessa and Figueredo Gonzales stated, " The most effective way of fighting *aegypti* is to adopt rigorous environ-

mental sanitation measures." In addition to insecticide spraying, the Cuban anti-mosqui campaign emphasized the stocking of larvivorous fish in ponds and lakes, the prohibition open water containers, prohibition of of car tires in yards, the prohibition of plants th accumulate water, and strict enforcement of sanitary regulations. It is possible that thes measures may be applied to the Philippines as well (Armada Gessa and Figueredo Gonzale 1986). Gubler further asserts that dengue fever has been on the rise as a result of "lack effective, long-term mosquito control in most tropical countries." Therefore an anti-dengu program should be on-going, with appropriate environmental measures to control th development of mosquitoes, especially mosquito larvae. This level of control cannot b accomplished by spraying or fogging alone (Gubler, 1989).

Question no. 7 was the only question dealing with dengue treatment. This questio required technical background. About 40% scored incorrectly on this answer. Since th dengue virus attacks the blood-clotting mechanisms and increases vascular permeability, is not advisable to administer aspirin. Aspirin may worsen the dengue illness by increase hemorrhaging (Halstead, 1988; Sanford, 1983; Department of Health).

Even though environmental sanitation measures are essential in dengue contro Armada Gessa and Figueredo Gonzales (1986) state, "timely health education designed enlist the community's active participation in the drive to reduce the number of foci is vital important." A community-based approach to dengue control was emphasized in Puer Rico. A key component of their approach was to design health education materials based o the knowledge, attitudes, and behaviors of various socio-cultural-economic groups with their respective communities. While recognizing the importance of government's continue material, financial, and organizational support in dengue control, the role of the people w emphasized for disease control in Puerto Rico. Gubler and Casta-Valez (1991) state:

> "dengue can be prevented by controlling these domestic larval habitats, but only the people involved can effectively clean the areas around their own homes to prevent mosquito breeding."

It might be added that people (teachers, staff, pupils and parents) are the ones best able t clean up their school environments in order to control dengue transmission. This will onl occur when participants have a clear understanding of the problem. Effective health educa tion therefore is essential to facilitate an understanding of the dengue problem (Gubler an Casta-Velez, 1991).

The current study of the P.T.A. group in a Filipino high school demonstrated some o the strengths and weakness of media in health education. A high percentage of the paren and teachers had become aware of the dengue problem as a result of mass media (74.5% and virtually 100% by the dengue information sheets brought home by the pupils. Th

5. A distribution of responsibilities for on-going school campus clean-up for mosqui hazards by pupils, teachers, and staff with parental assistance may enable a program be sustainable.

6. Develop and enforce legislation to restrict environmental violations related to DHF.

7. Any school anti-dengue program should have a complementary counterpart in th barangays (communities).

8. Anti-dengue health information campaigns should precede the known peak dengu months and continue on through the rainy season and school year.

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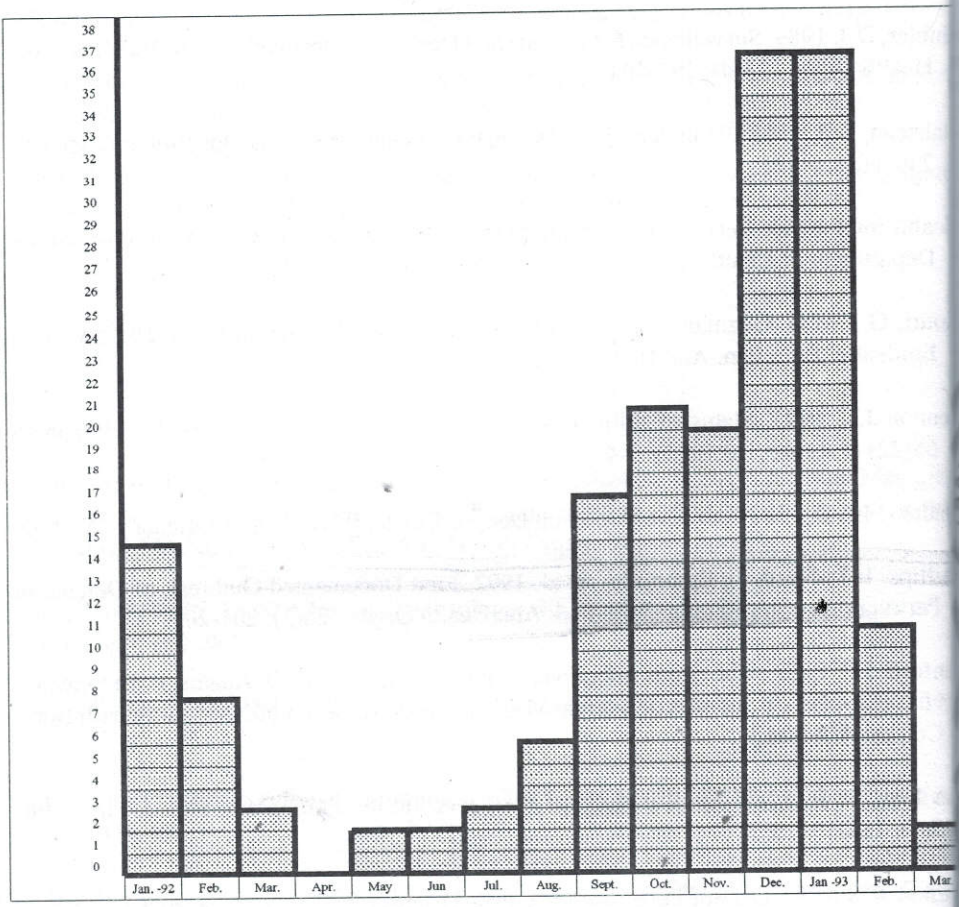
FIGURE 1

Cases of Dengue per Month in Dumaguete City, January 1992 - March 1993.



MONTHS

Figure 2

Geographic Distribution of Dengue Cases in Dumaguete City, 1992

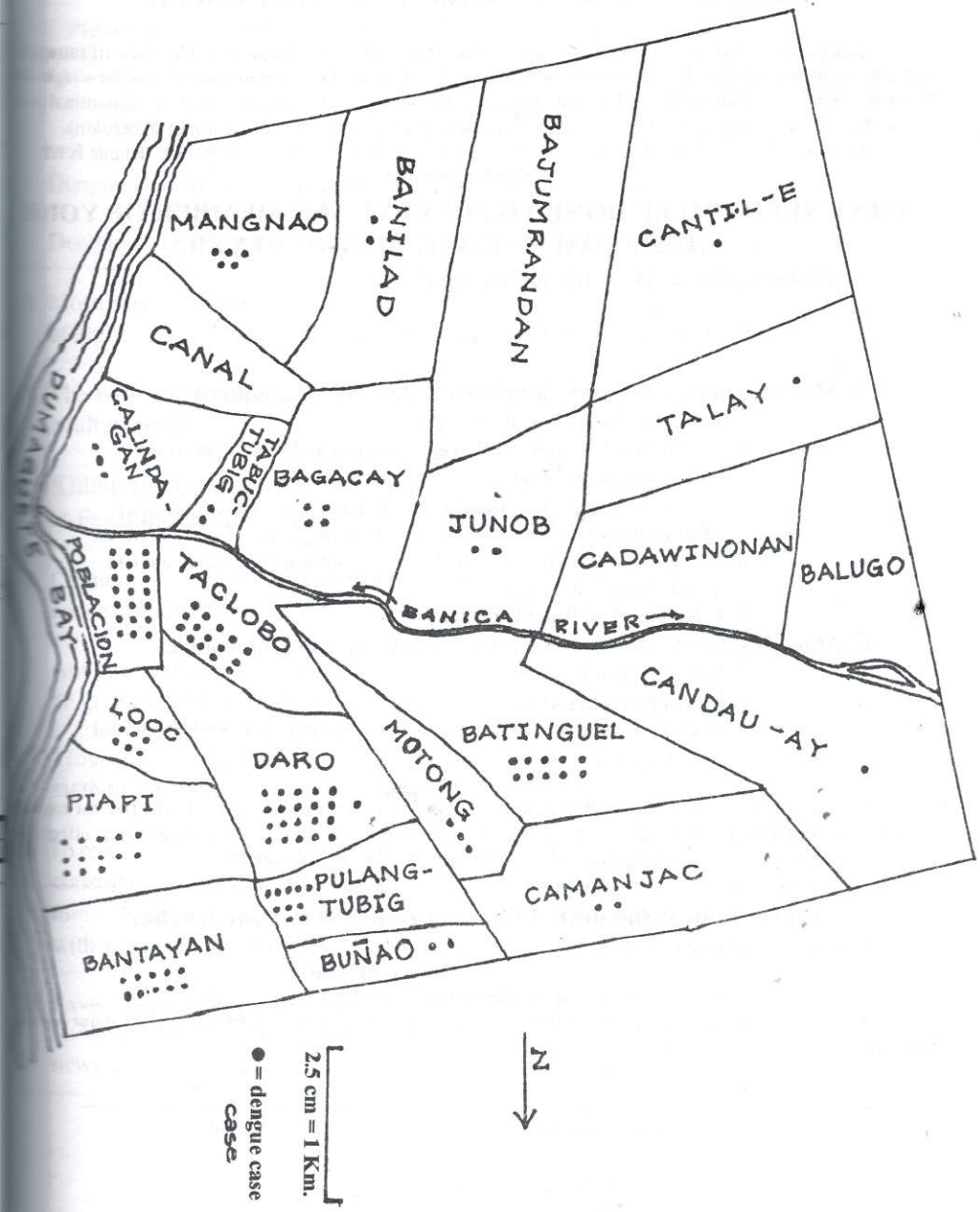


FIGURE 3: Dengue Information Sheet.

BAD NEWS: DENGUE H-FEVER IS HERE AND IT CAN HARM OR KILL
GOOD NEWS: THERE IS SOMETHING YOU CAN DO ABOUT IT

Dengue (also called H-Fever) is a viral disease transmitted by mosquitoes. This type of mosqu
often bites during the day. It often causes high fever. Therefore medical consultation should be sought
fever of three (3) to four (4) days duration especially if associated with nausea, vomiting, abdominal p
and rashes. Treatment includes bed rest, many fluids and paracetamol (but not aspirin or pyrazolon).

However the most important measures you can do it to help prevent or control the dengue fever.

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WHAT NEEDS TO BE DONE TO PREVENT ANY MEMBER OF YOU FAMILY FROM GETTING DENGUE FEVER?

A. Measures directed towards adult mosquitoes:

1. Fogging
2. Household residual insecticide spraying

B. Measures directed towards larval (developing baby) mosquitoes:

1. Frequent shaking of leaves of plants
2. Replacement of water in flower vases, jars and other open water containers every 24 hours.
3. Disposal of used tires, tin cans, coconut shells and other containers of stagnant water that could serve as breeding places for mosquitoes.
4. Flooding with used crude oil all places with stagnant water such as ponds, canals and others.
5. Covering of all water containers.

C. Measures directed towards the source of infection and susceptibles:

1. Use of mosquito repellent
2. Use of protective clothing
3. Place infected cases under the mosquito net during the febrile period
4. Screening of houses

Measures directed towards adult mosquitoes are expensive, temporary and not effective for routi
mosquito control, thus measures directed towards larval mosquitoes should be more utilized. The effecti
ness of these measures on the participation and concreted effort of the community.

Please tear at the dotted line and return it to your teacher.

From the parent/guardian of _____

(Name of pupil)

I have read the above information about Dengue H-Fever. YES:_____ No:_____

We will conduct an active plan to control dengue by removing mosquito breeding sites at our hous
or community. YES:_____ NO:_____

_____ _____

(Parent's/Guardian's Signature) (Date)

FIGURE 4

QUESTIONNAIRE = DENGUE H-FEVER

Please place a checkmark in the box of the most appropriate answer.

	TRUE	FALSE	NOT SURE
1. Dengue H-Fever can be transmitted by any animal.			
2. Dengue H-Fever can be transmitted by any mosquito.			
3. Mosquitoes that transmit Dengue H-fever bite most often at night.			
4. The best way to control Dengue H-Fever is by killing the adult mosquitoes.			
5. Killing the larvae (the worm-baby form) of the Dengue H-Fever mosquito has no effect on controlling the disease.			
6. Containers of stagnant water such as tin cans, used tires, coconut shells serve as breeding places for mosquitoes.			
7. Anyone suspected of having Dengue H-Fever should not be given aspirin to treat the fever.			
8. Household insecticide spraying is the most effective method for routine mosquito control.			
9. To reduce the possible dangers of Dengue H-Fever medical consultation should immediately be sought for fever of three (3) to four (4) days duration especially if associated with vomiting, rashes and abdominal pain.			
10. Have you heard about the control and prevention of Dengue H-Fever from a previous meeting, radio, T.V., or newspaper before answering this questionnaire?			

FIGURE 5

Dengue Questionnaire — Total Responses

Question No.	True	False	Not Sure/Blank	% Correct
1	5	**79**	10	84.0
2	26	**60**	8	63.8
3	9	**71**	14	75.5
4	38	**42**	14	44.7
5	15	**64**	15	68.1
6	**93**	1	0	98.9
7	**57**	16	21	60.6
8	59	**26**	9	27.7
9	**84**	6	4	89.4
10	70	15	9	

N = 94
$\bar{X}$ of 1 through 9 = 64.5%
bold number = correct response

FIGURE 6

Percentage of Correct Responses to Dengue Questionnaire By Groups

Question No.	Previous Media Health Communication	No Previous Media Health Communication	Unsure/Blank About Previous Media Health Communication
1	82.3	100	66.7
2	62.9	93.3	22.2
3	81.4	73.3	33.3
4	50.0	40.0	11.1
5	70.0	73.3	44.4
6	98.6	100	100
7	65.7	60.0	22.2
8	27.1	40.0	11.1
9	92.6	86.6	66.7
	n = 70 $\bar{X}$ = 70.25	n = 15 $\bar{X}$ = 74.1%	n = 9 $\bar{X}$ = 42.0%