SCHOOL OF ARCHITECTURE, BUILDING AND DESIGN

FOUNDATION IN NATURAL BUILD ENVIRONMENT

MATHEMATICS (MTH 10304)

FINAL PROJECT: STATISTICS

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DESEASE   : DENGUE

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CONTENT

Introduction

We are given a task to do a survey on a specific disease in order to find out the proportion of people who really understand and concern about the disease. Our survey target are the students in Taylor University, which are aged between 17 to 26 and above.

We chose Dengue as our survey topic because it is a very common and popular disease that happens frequently in our country. This topic is familiar for every individual who lives in Malaysia. However, how many of them actually know and understand about this disease?

Malaysia recorded 336 dengue deaths last year. It was the highest number of dengue deaths ever recorded in the country. Dengue is a mosquito-borne viral infection. The infection causes flu-like illness and occasionally develops into a potentially lethal complication called severe dengue. The global incidence of dengue has grown dramatically in recent decades. Although government has employed a lot of strategies to control the number of dengue cases from increasing, the data recorded by the Health Ministry is still disappointing.

The dengue cases rise at an alarming rate every year. We always hear from our parents, teachers as well as mass media about the ways to save us from dengue disease. For example, one of the ways is that we should remove and change the water inside the vase every day to avoid the breeding of mosquitos. However, most people fall on deaf ears.

To find out how many people understand about this disease, we form and arrange some questions to test how well the students from Taylor University know about dengue. We prepared 17 questions in total. From the survey, we organize and analyze the information and create several bar charts to show the data.

Objective

Study of statistic helps us to collect and analyze information in a systematic and alternative way. This project gives us an opportunity to explore the ways or processes to accomplish a statistic by using bar chart, pie chart and graph. Before starting to create a statistic, we need to form a survey to collect data from the targeted individuals. The survey helps us to see the proportion or ratio of people based on the topic we choose. After that, we start to differentiate and classify the data into groups with similar characteristic such as age and gender. We investigate and analysis the number of students who understand the disease based on the number of correct answers they chose. Then, we form a bar chart for each of the question to show the statistic data.

This survey allows us to analyze and solve the problems that involves various mathematic principles. For instance, we apply mathematics principle, statistics to calculate the mean, frequency, median and etc. to get a more accurate result for this survey. It gives us a chance to learn how math principle complete a statistic in an easier and rapid way.

Furthermore, we have a chance to improve our communication skills. We develop this skill by distributing the survey forms for others to fill. We feel pleasant when people are willing to scarify their precious time to do our survey forms. Through a simple and brief interaction, we can meet some new friends as well. In this project, we learnt to be more confident and brave to speak to people we don't know.

We learnt and gained a lot of knowledge while doing this project. Before we prepare the survey papers, we do research through internet and look for books that are related to dengue disease. We tend to discover some extra information and new knowledge which makes us feel interesting and fun to complete this project. Other than that, we would be aware and concern about this disease after understanding all the symptoms and effects of dengue.

Methodology

This section will explain how we obtained the data followed by pictures revealing areas and the interview. We brainstormed on the areas and the age group of students to aim for. We chose 3 areas, the campus itself, SS15, or Bandar Sunway. We discussed the age group, the type of students, the present time and the willingness of the students. We started with Bandar Sunway. Clearly Bandar Sunway is filled with students as two of the biggest universities reside in the Area, being Sunway University followed by University of Monash. Both universities provide Undergraduate and Foundation programs. Hence, we roughly assumed the age group would be from 17 years old to 25 years old. This age group is quite suitable for our assignment as we aimed for young adults as participants. We then discussed the current time and the events that were occurring during this period of time. It was during the month of December and January. Based on statistics and sources, we concluded that most students would be on Semester break. Hence, even though the age group was ideal, most students wouldn't be available to participate let alone approached.

We then discussed the potential of SS15. The age group would be around 16 years old to 20 years old as the universities there, being Taylor's College and Inti College, only provide Pre-University and Diploma programs. This was not ideal to us as we aimed for a bigger age group. Hence, the area of SS15 was not chosen. Finally, we discussed our own area, the campus of Taylor's University. We know that this university provides Foundation, Undergraduate, and Postgraduate programs. Hence, the age group would be from 17 years old to 26+ years old. This was ideal to us due to its big range and we could get multiple opinions and answers. During this period of time some of the Undergraduate students and the Foundation students will be present. Hence, since we are students of Taylor's University, furthermore they would be comfortable with out approach due to this reason; we chose our university as the area to conduct our surveys.

We conducted our surveys in multiple areas. We approached students studying in the library, with the permission of our teacher we passed the survey sheets around our class during lectures, and some of us even managed to approach fellow hostel mates. We were appreciative that our fellow university mates could spare time and answer these surveys.

SURVEY

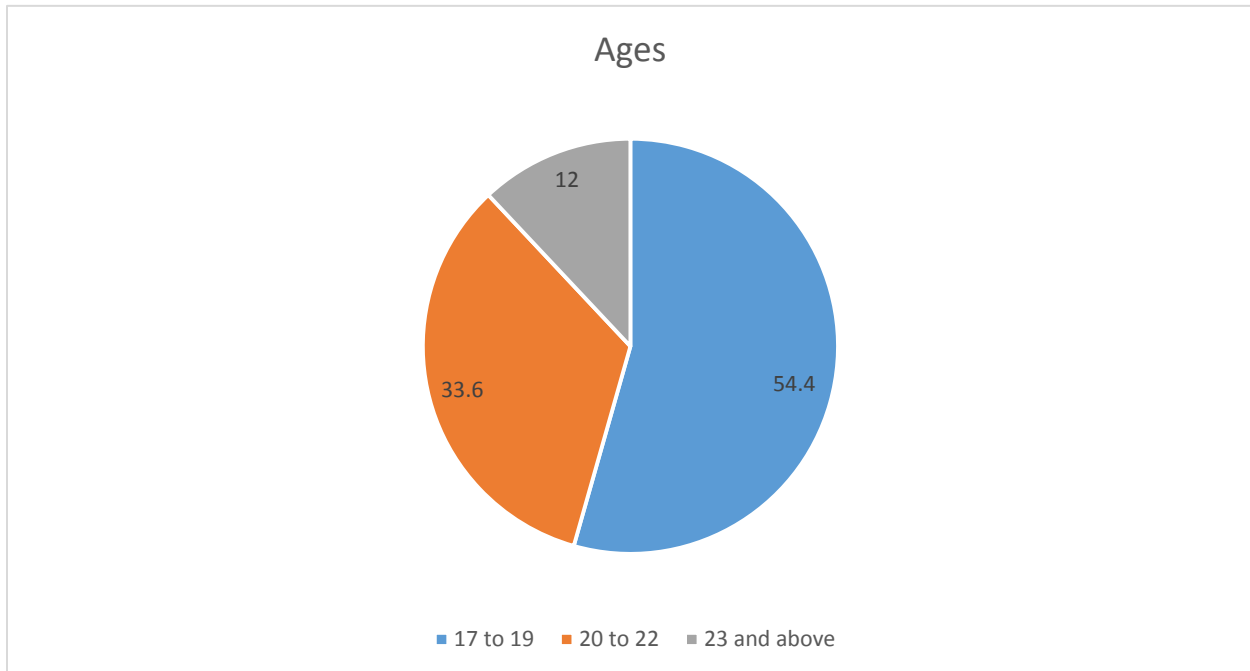# FORMS

Statistical analysis

Gender
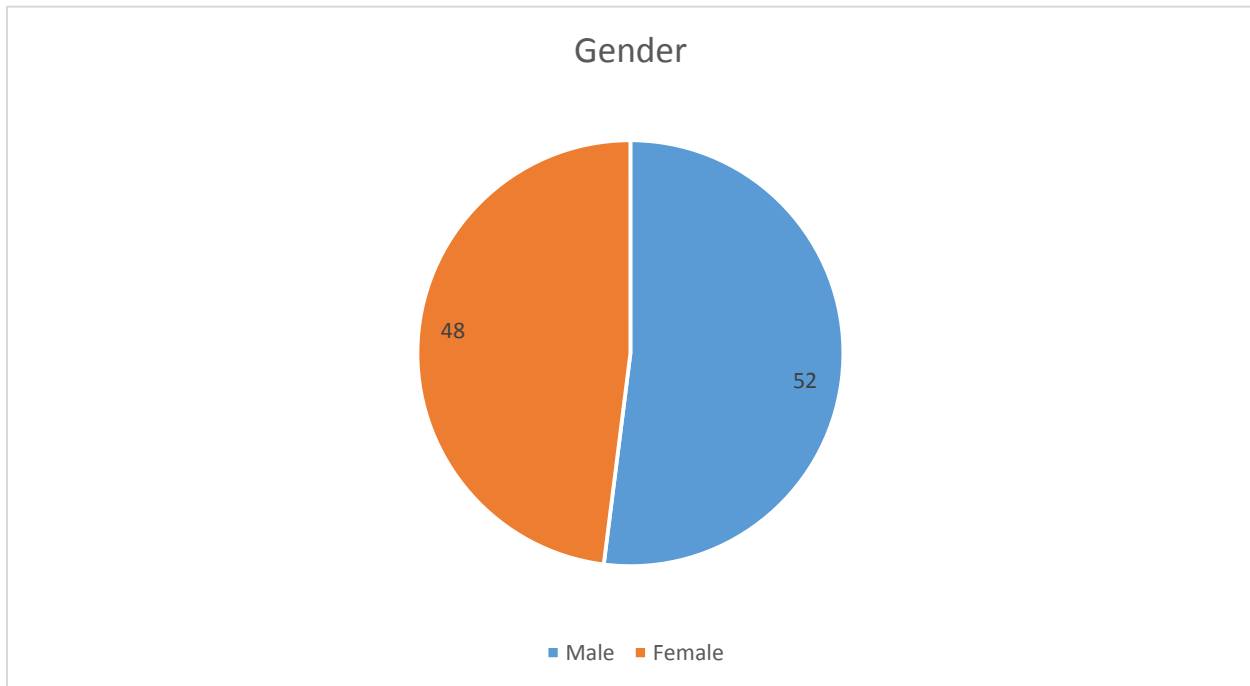
There are 250 students involved in this survey. After giving out and receiving all the survey forms, we calculated that we had 120 male students and 130 female students. Therefore, there are 48% of male students and 52% of female students.

Male: 120/250 x 100% = 48%
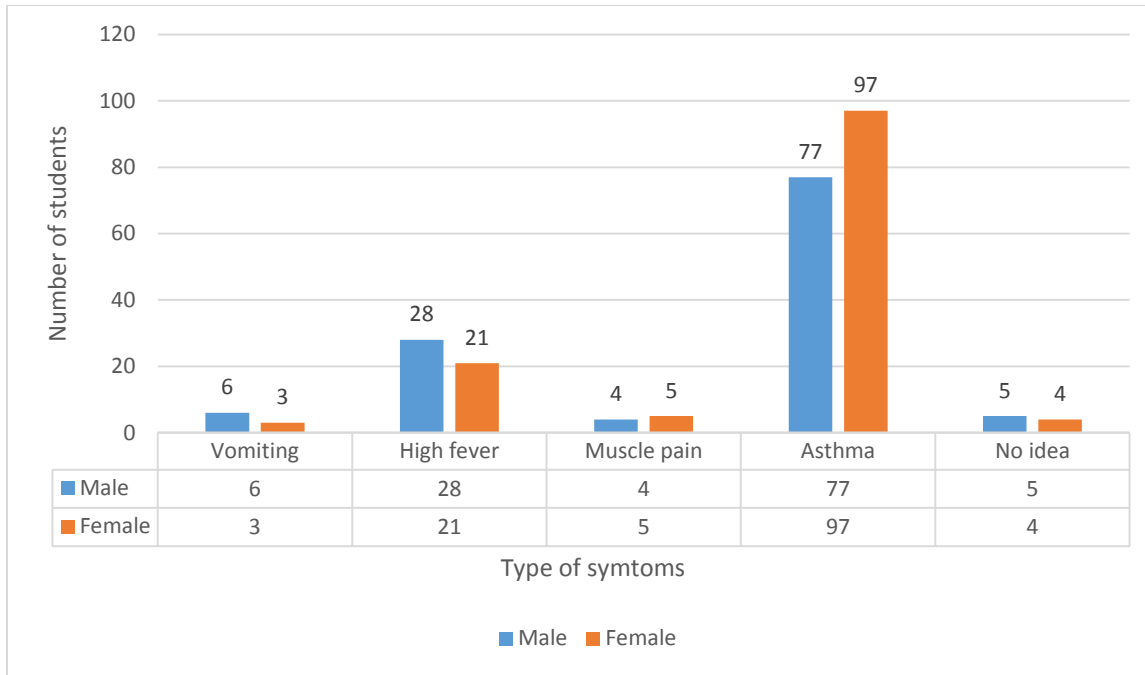
Female: 130/250 x 100% = 52%

Ages

According to the pie chart, 54.4% of the students are from the age group 17 to 19 years old while 33.6% of the students are from the age group 20 to 22 years old, followed by 12% of students from 23 and above. You can see that most of the students are from 17 to 19 years old. The percentage is influenced by the number of students in school since most of the degree students were on holiday.

17 to 19: 136/250 x 100% = 54.40%

20 to 22: 84/250 x 100% = 33.60%

23 and above: 30/250 x 100% = 12%

Q1: Which one is not the symptoms of dengue?

	Vomiting	High fever	Muscle pain	Asthma	No idea
Male	6	28	4	77	5
Female	3	21	5	97	4

For male:

Answers	No. of students	Cumulative frequency
Vomiting	6	6
High fever	28	34
Muscle pain	4	38
Asthma	77	115
No idea	5	120

Mode	Asthma It is the most chosen answer.
Median	Median = T $n/2^{th}$ = $120/2^{th}$ = 60th. The 60th term lies on Asthma. Therefore, median= Asthma.

For female:

Answer	No. of student	Cumulative frequency
Vomiting	3	3
High fever	21	24
Muscle pain	5	29
Asthma	97	126
No idea	4	130

Mode	Asthma It is the most chosen answer.
Median	Median = $130/2^{TH}$ $= 65^{th}$ The 65th term lies on Asthma. Therefore, median=Asthma.

From the bar chart, we can clearly see that the majority of the students chose Asthma as the answer. 77 male students and 87 female students chose Asthma, which is the correct answer as it is not the symptom of dengue fever. People, especially children and teens, may experience no signs or symptoms during a mild case of dengue fever. When it does occur, they usually begin four to ten days after you are bitten by an infected mosquito. Vomiting, high fever and muscle pain are common signs and symptoms of dengue. Since most people chose the right answer, therefore, it shows that most of the students truly understand that Asthma is not the symptoms of dengue fever.

Q2: Select the correct minor symptoms for dengue fever.
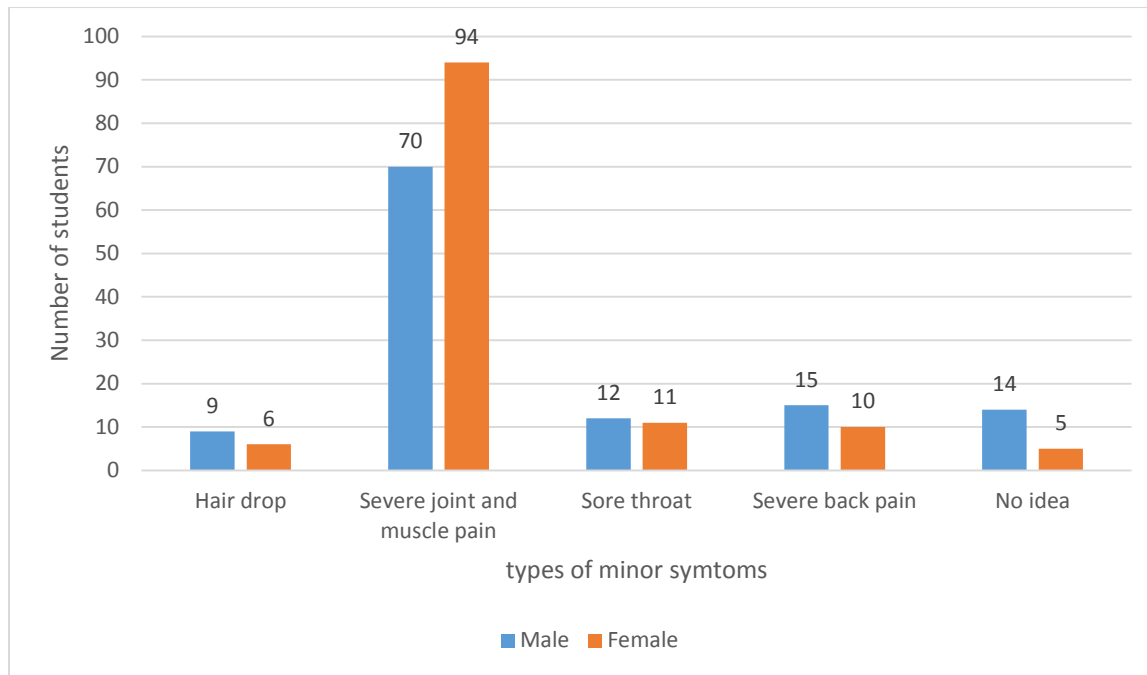
For male:

Type of minor symptoms	Number of students	Cumulative frequency
Hair drop	9	9
Severe joint and muscle pain	70	79
Sore throat	12	91
Severe back pain	15	106
No idea	14	120

Mode (Male)= Severe joint and back pain

Median (Male) = $120/2^{TH}$

$\qquad = 60^{TH}$ term

$\qquad$ = Severe joint and muscle pain

For female:

Type Of Minor Symptoms	No. Of Students	Cumulative Frequency
Hair drop	6	6
Severe joint and muscle pain	95	101
Sore throat	14	115
Severe back pain	15	130
No idea	15	145

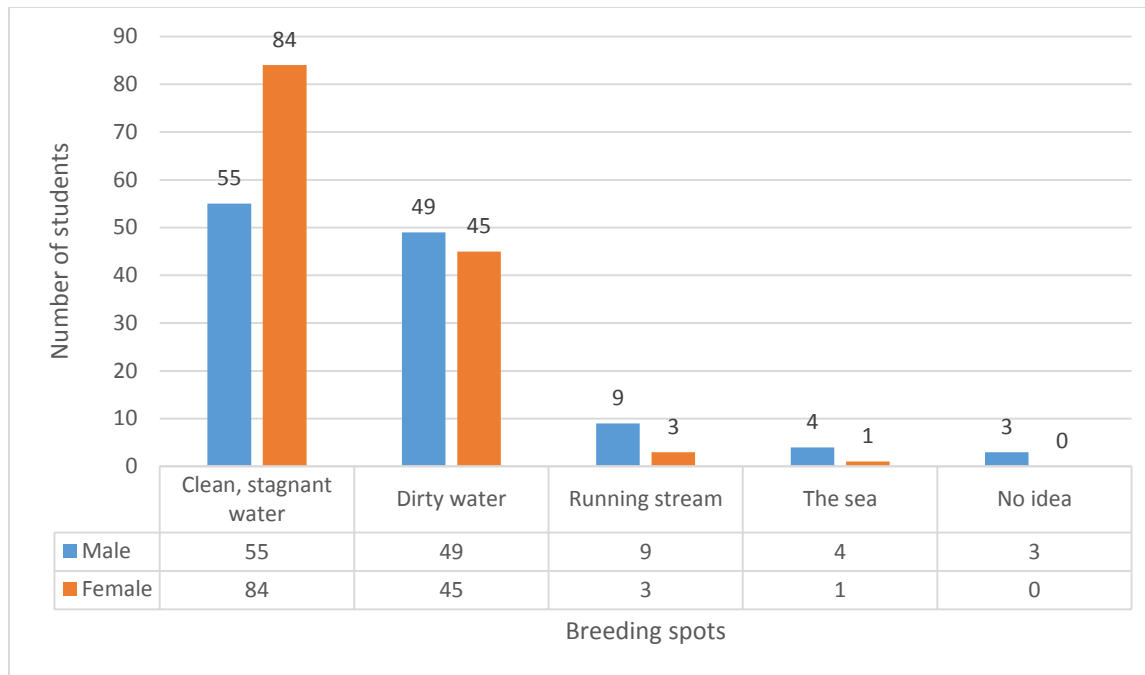Mode(female) = Severe joint and muscle pain

Median(Female) = $130/2^{th}$

$\qquad$ =65th term

$\qquad$ = Severe joint and muscle pain

According to the bar chart, we can see that most students chose severe joint and muscle pain as the answer. 70 male students and 94 female students chose this answer. 9 male and 6 female students chose hair drop while 12 male students and 11 female students chose sore throat as the minor symptoms. Besides, 15 male students and 10 female students chose severe back pain. Only a minority of people chose those answers. This means that most of the students knows that hair drop, sore throat and severe back pain is not a minor symptoms of dengue fever.

Q3: Where do Aedes mosquitoes breed?

	Clean, stagnant water	Dirty water	Running stream	The sea	No idea
■ Male	55	49	9	4	3
■ Female	84	45	3	1	0

Breeding spots

For male

Mode = Clean, stagnant water

Median = 60th term

= Dirty water

Since many male students chose 'dirty water', unfortunately the median answer is different from the actual answer.
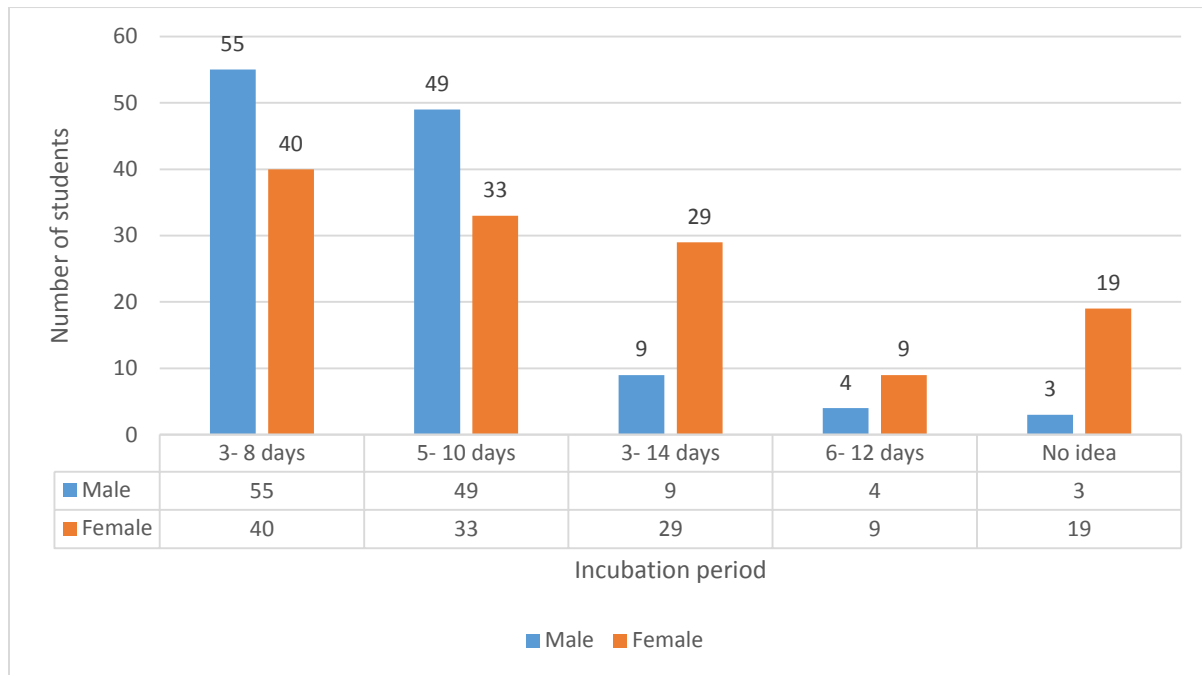
For female

Mode = Clean, stagnant water

Median = 65th term

= Clean stagnant water.

According to the bar chart, most people chose 'clean, stagnant water' as the breeding spot, consisting of 55 male students and 81 female students. Even though 'clean, stagnant water' is the correct answer, only 136/250 people got it correctly. The other 94/250 students must have been confused and thought that the Aedes mosquitoes breed in 'dirty water'. In reality, Aedes mosquitoes need clean and unmoving water to breed efficiently.

Q4: The incubation period of dengue fever infection within the range of …

	3- 8 days	5- 10 days	3- 14 days	6- 12 days	No idea
Male	55	49	9	4	3
Female	40	33	29	9	19

Incubation period

Male Female

For male:

Mode = 3-8 days

Median = 5-10 days

For Female:

Mode = 3-8 days

Median = 5-10 days

According to the bar chart, you can see that 55 male students and 40 female students chose the incubation period of dengue fever infection within the range of '3 -8 days' while 49 male students and 33 female students chose the answer as the range '5-10 days'. Although those two was the most chosen answer, it was also the wrong answer. That means most students do not know how to answer the question. Only 28 students out of 250 students chose the correct answer which is the range of '3-14 days'. Meaning only 11.2% of the students know the actual answer. The other 88.8% of students most probably just simply put in an answer.

Q5: Can dengue fever be passed on from one person to another?
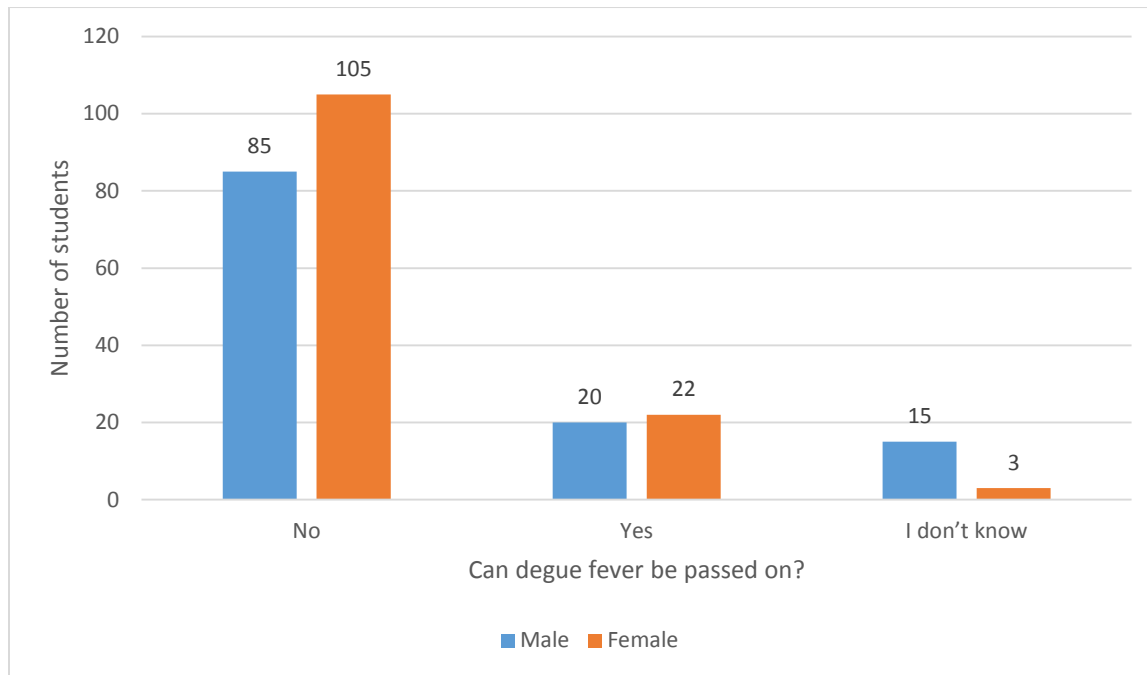
For female and male students:

Mode = No

Median = No

According to the bar chart, most of the students chose 'no' as the answer for these questions. 'No' is the right answers because dengue cannot be passed on from one person to another. 85 male students and 105 female students chose 'no' while 20 male students and 22 female students, followed by 15 male students and 3 female students who chose 'I don't know'. Since most people got the answer accurately, therefore, it means that they really know that dengue can't be passed from people to people.

Q6: Dengue is fatal?
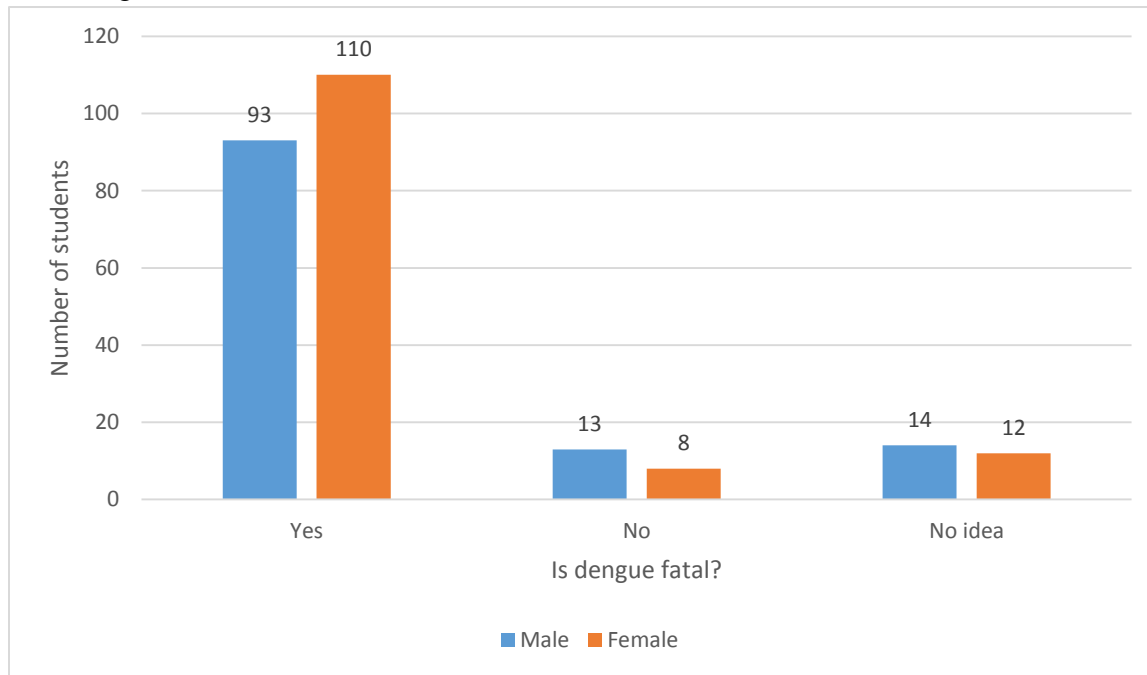
Mode = Yes

Median = Yes

According to the bar chart, you can see that most students chose 'yes' as the answer to 'Is dengue fatal?' 203 out of 250 students chose 'yes', as they know that dengue is fatal as research over the years.

Q7: The Aedes mosquito can transmit the viruses that cause dengue fever. True or false?

	TRUE	FALSE	No idea
Male	99	7	14
Female	109	11	10

Does Aedes mosquito transmit the viruses?
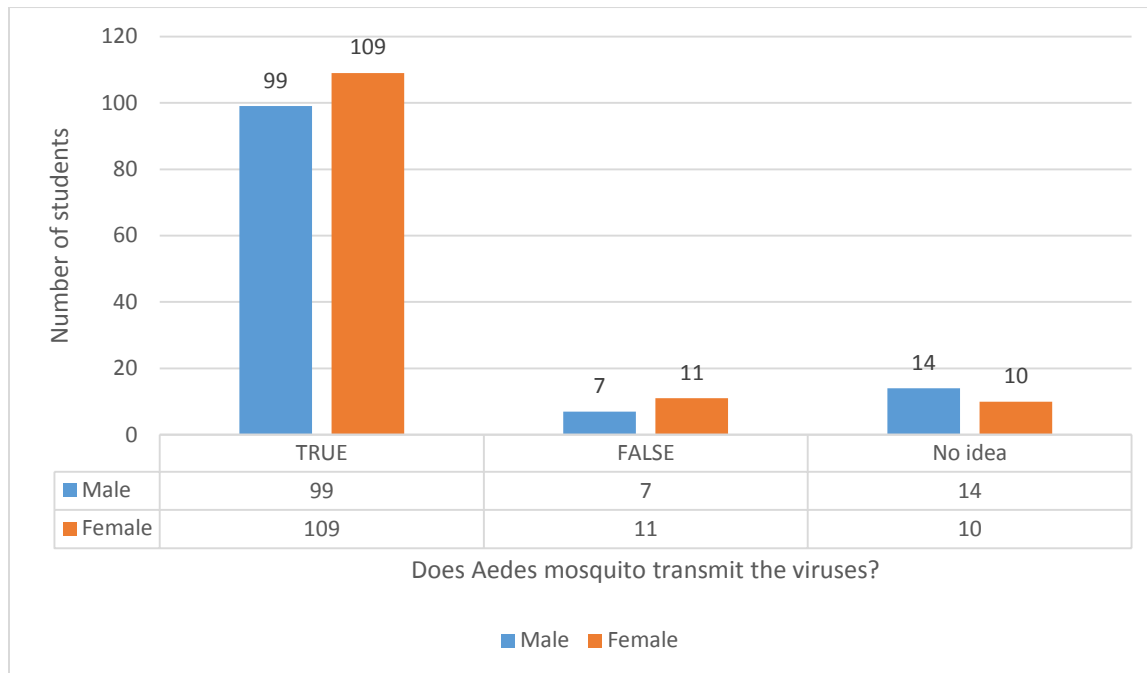
Mode (Male and female):

= True

The answer for this question is True.

Based on the bar chart, there are 208 of students, which are 99 of males and 109 of females get the correct answer for this question. Obviously, the number of students who choose "True" is far higher than the other two which are "False" and "No idea". There are only 18 students choose "False" while 24 students choose "No idea". Therefore, we could make an inference that most of the students know that Aedes mosquito transmits the virus that cause dengue fever.

Q8: Transmission route for dengue fever is through …

	Person to person	Mosquito bites	Faecal-oral route	No idea
Male	4	97	11	8
Female	2	113	12	5

Does Aedes mosquito transmit the viruses?
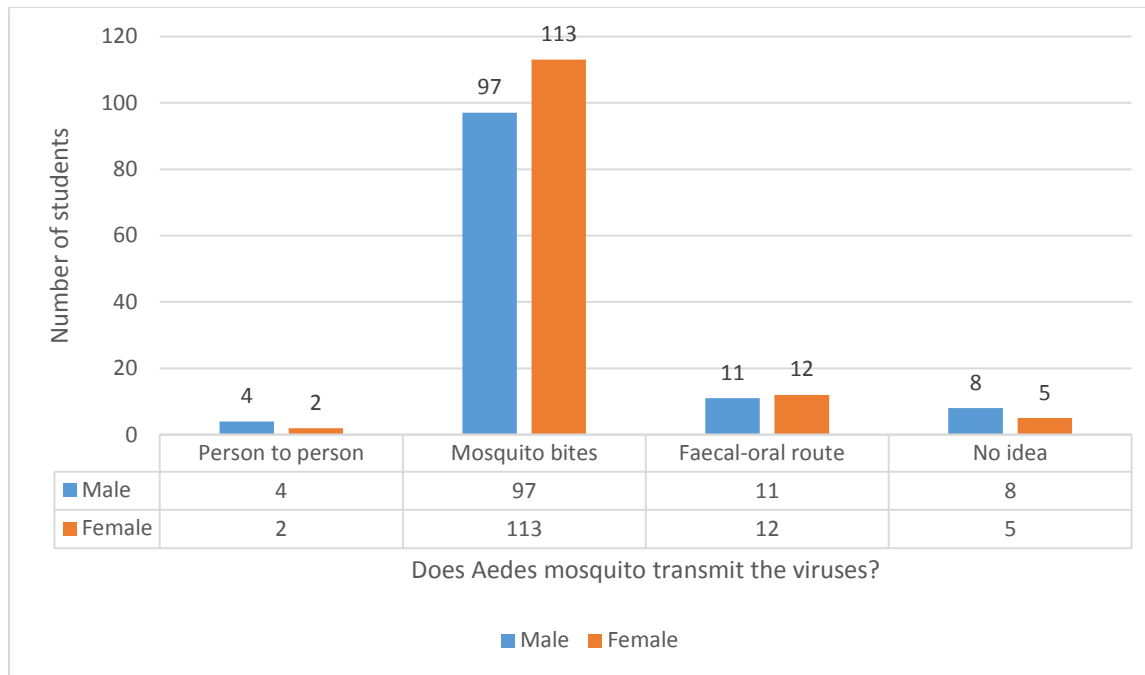
Mode (male) = mosquito bite

Mode (female) = mosquito bitten

The answer for this question is mosquito bites.

210/250 x 100% = 84%

From the bar chart, we could see that almost 84% of students choose "mosquito bites". It shows that most of the students know where the disease comes from and how it transmits to another person. Some students choose "faecal-oral route" which are 11 of males and 12 of females. 13 of students choose "no idea". The least record is 6 students for the answer "person to person".

Q9: If you get bitten by an AEDES mosquito, are you will contract the disease straight away?

	Yes	No	No idea
Male	7	76	27
Female	32	74	24

Would you contract the disease straight away?
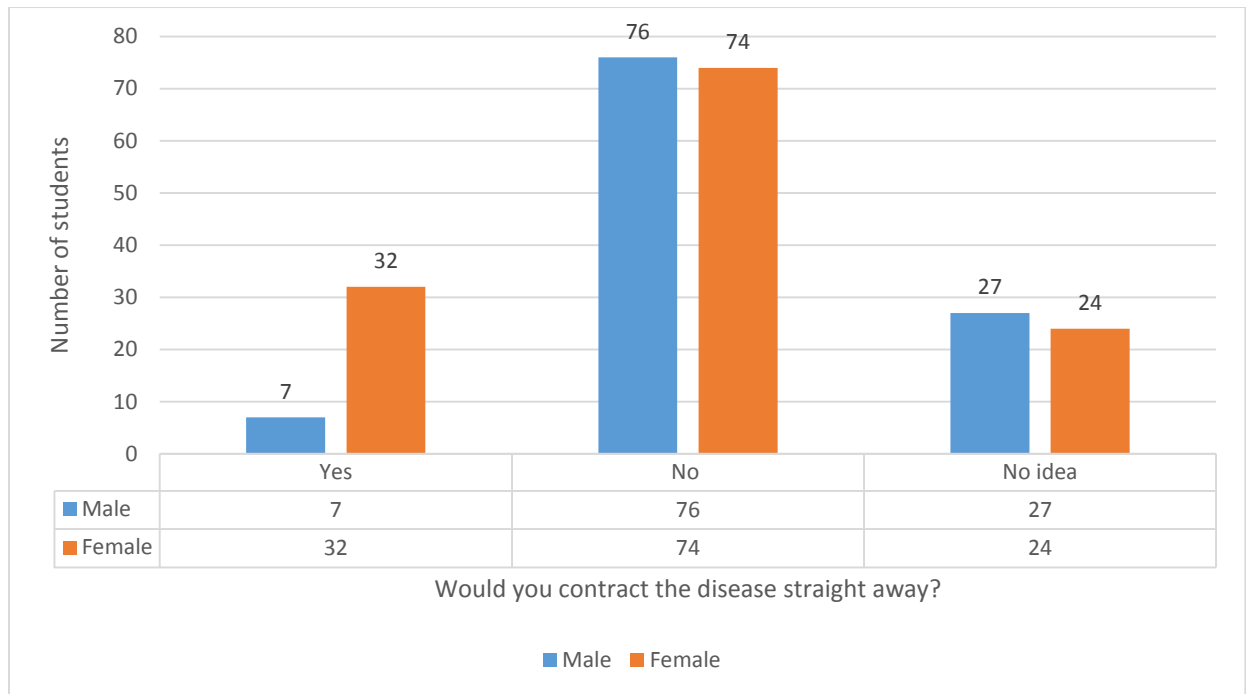
Mode(male) = No

Mode(Female) = No

The correct answer for this question is No.

From the bar chart we could see a large proportion of Taylor students choose the correct answer which is "No". 150 of students answer correctly which are 76 of males and 74 of females. Most of the students know very well that the bites of AEDES mosquito will not directly transmit the viruses into our bodies. However, there are still 51 students with 27 of males and 24 of females choose "No idea". It is because we usually think that AEDES mosquito is the only media that passes the virus into human. However, not all the AEDES mosquitoes are carrying the dengue viruses. A small proportion of students choose "Yes" as they are not really understand how dengue viruses are transmitted.

Q10: Dengue can be spread through touch of hand or body touch?

	Yes	No	No idea
Male	7	105	8
Female	6	113	11

Does Dengue spreads through touch of hand or body touch?
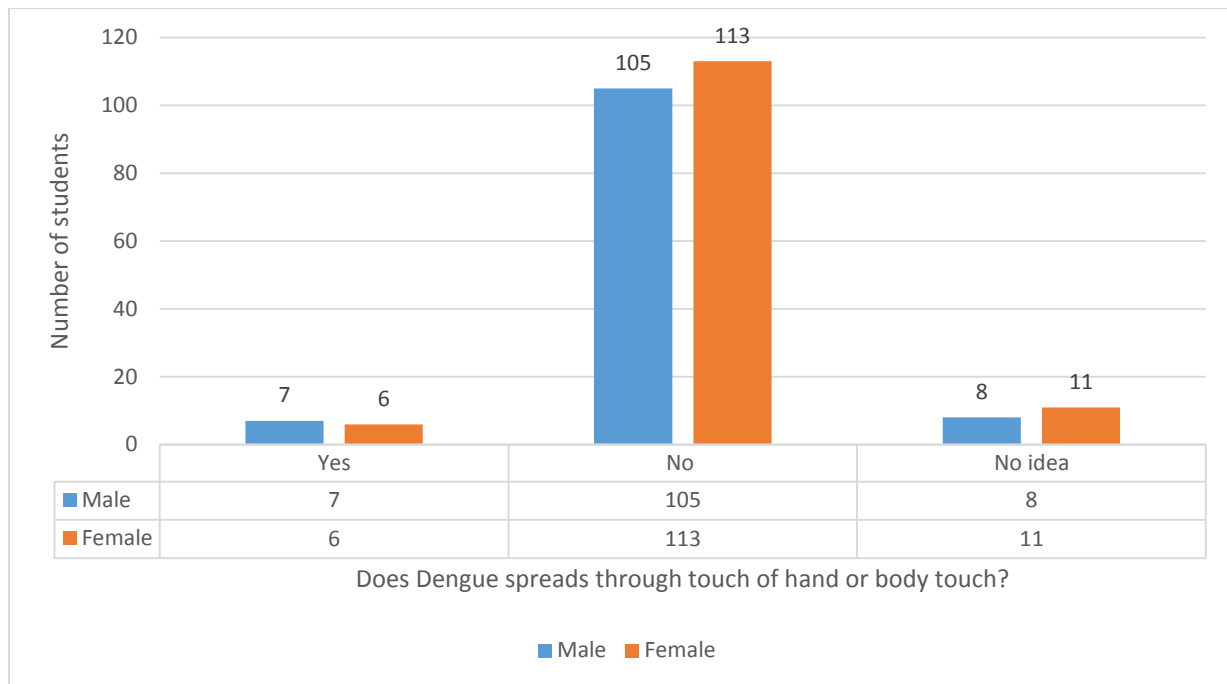
Mode (Male) = No

Mode (Female) = No

The answer for this question is No.

Based on the bar chart, 218 of students answer correctly which are 105 are males and 113 are females. You could see that it is a big contrast among "No" and the other two which are "Yes" and "No idea". As the result, we could inference that most of the students know that dengue viruses would not be spread through touch of hand and body. 13 of students have chosen "Yes" while 19 of students have chosen "No idea".

Q11: What can be done to reduce the risk of obtaining dengue fever?

	Wear protective clothing	Use mosquito repellent	Reduce mosquito habitat	All of the above
Male	5	12	41	62
Female	2	10	31	87

The risk of obtaining dengue fever
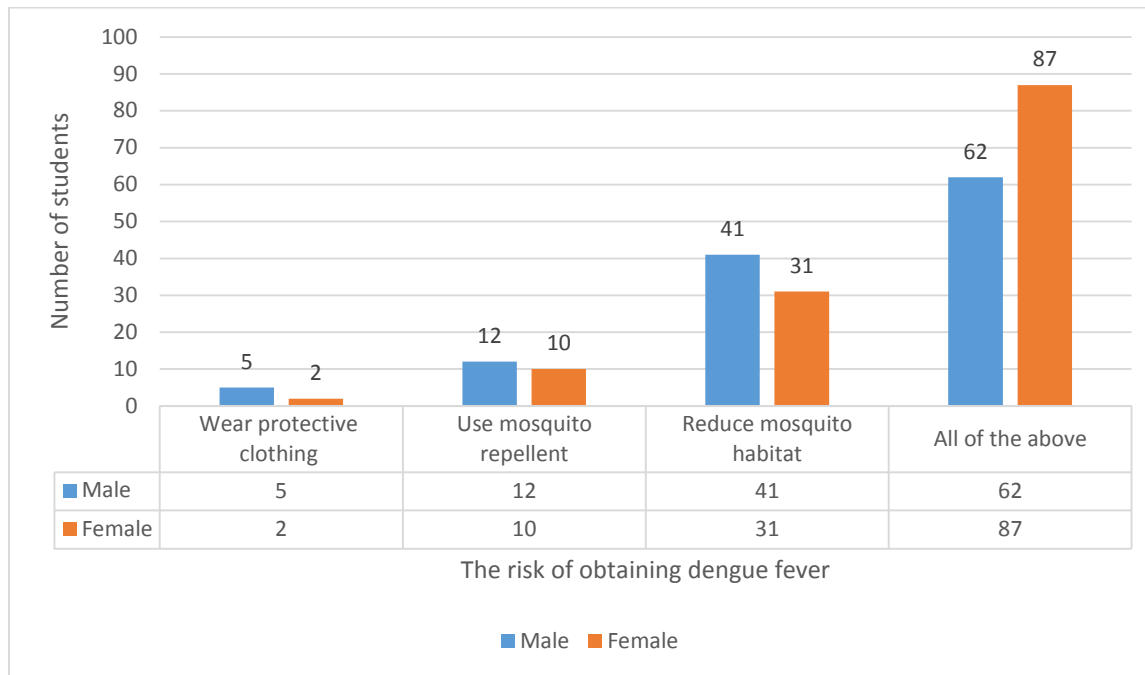
Mode (Male) = All of the above

Mode(Female) = All of the above

The answer for this question is "All of the above".

This question is a common question based on your knowledge and experience about this disease. 149 of students choose "all of the above" which females has a highest record of 87 and males has a record of 62. It means that they are very clear with the ways to reduce the risk of obtaining dengue fever. There are 41 males and 31 females choose "reduce mosquito habitat". It is one of the correct ways as well, but they only focus on this section. 22 of students choose "use mosquito repellent" and 7 of students choose "wear protective clothing". They are also considered choosing the correct ways of avoiding dengue fever, but there are still many ways they have never notice.

Q12: There are currently no vaccines for dengue fever. True or false?

	TRUE	FALSE	No idea
Male	58	41	21
Female	65	42	23

There are currently no vaccines for dengue fever.
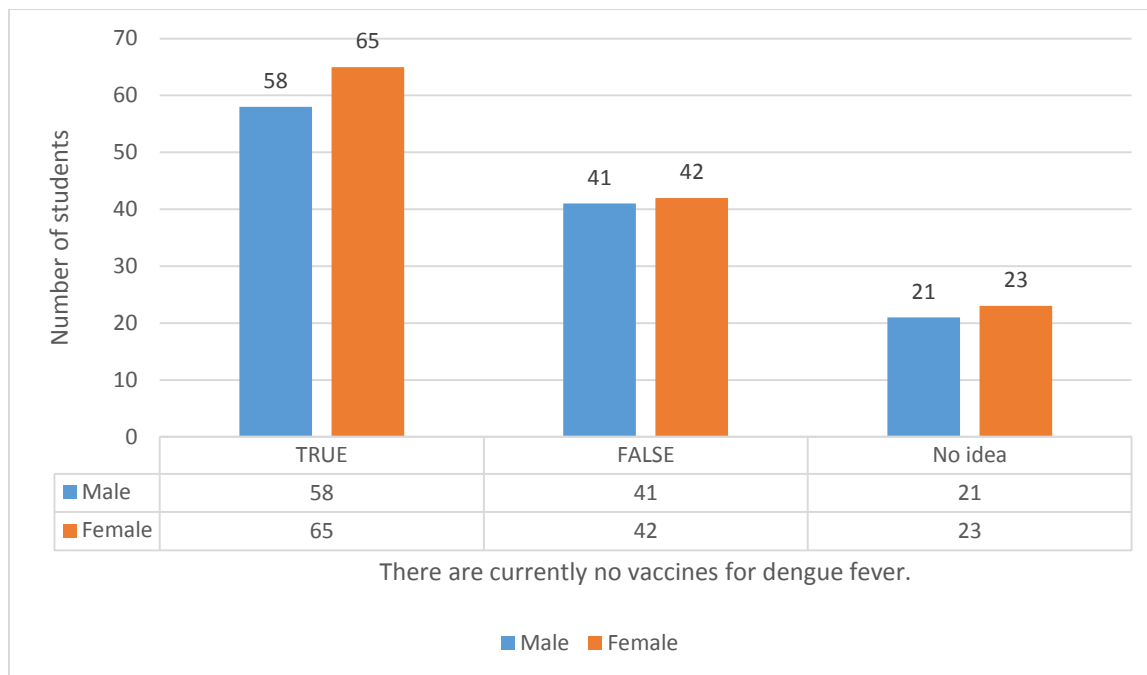
Male Female

Mode (male) = True

Mode (female) = True

The answer for this question is true.

123/250 x 100% = 49.2%

Based on the bar chart shows above, 49.2% of students choose "True", which means approximately half of the students discover that there are currently no vaccines for dengue fever. 65 of females and 58 of males occupy the 49.2%. Next, 33.2% of students choose "False" and 17.6% of students choose "No idea". Total of 50.8% of students have no idea for this question.

Q13: what is the treatment for dengue?

	i	I, ii	ii, iii	All the above	No idea
Male	9	7	57	25	22
Female	7	14	62	22	25
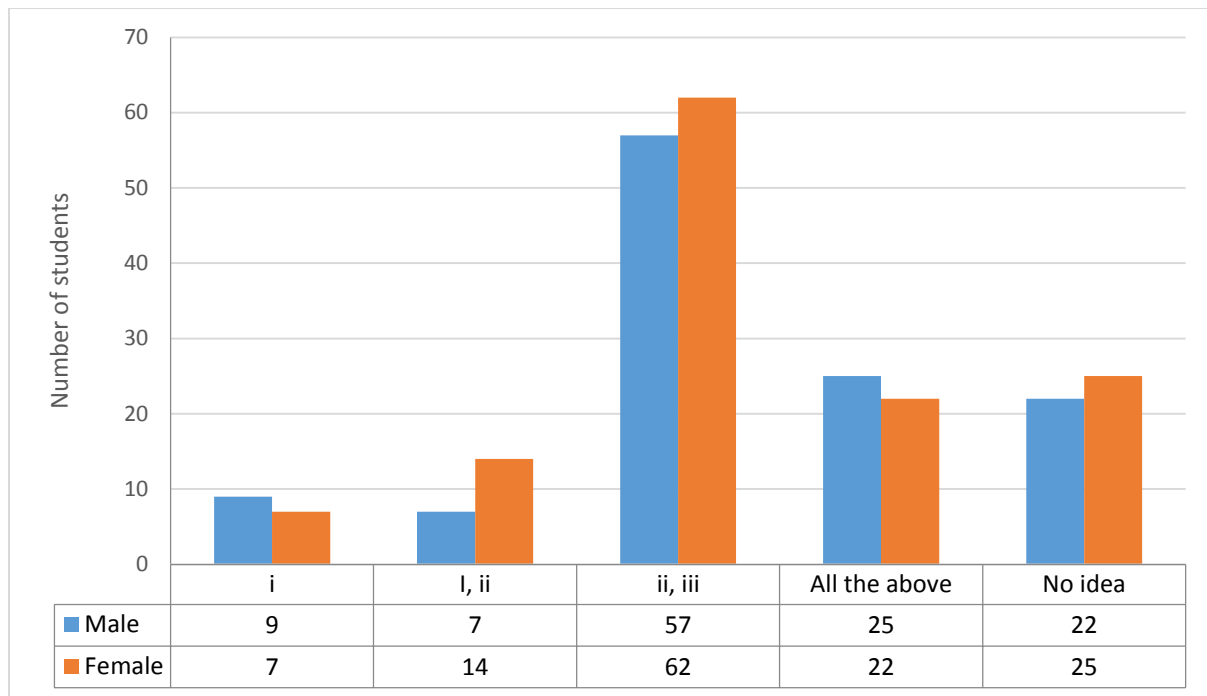
For male:

Answer	No. of student	Cumulative frequency
I	9	9
I,ii	7	16
Ii, iii	57	73
All the above	25	98
No idea	22	120

Mode	ii.iii (use analgesic with acetaminophen, sleep more and get more drinks) It is the most chosen answer.

Mean	Mean= cumulative frequency/ no. of answers in the table
	    = 120/ 5
	    = 24th
	 Therefore, the average of male students answers ii, iii for this question.

For Female:

Answer	No. of student	Cumulative frequency
I	7	7
I,ii	14	21
Ii, iii	62	83
All the above	22	105
No idea	25	130

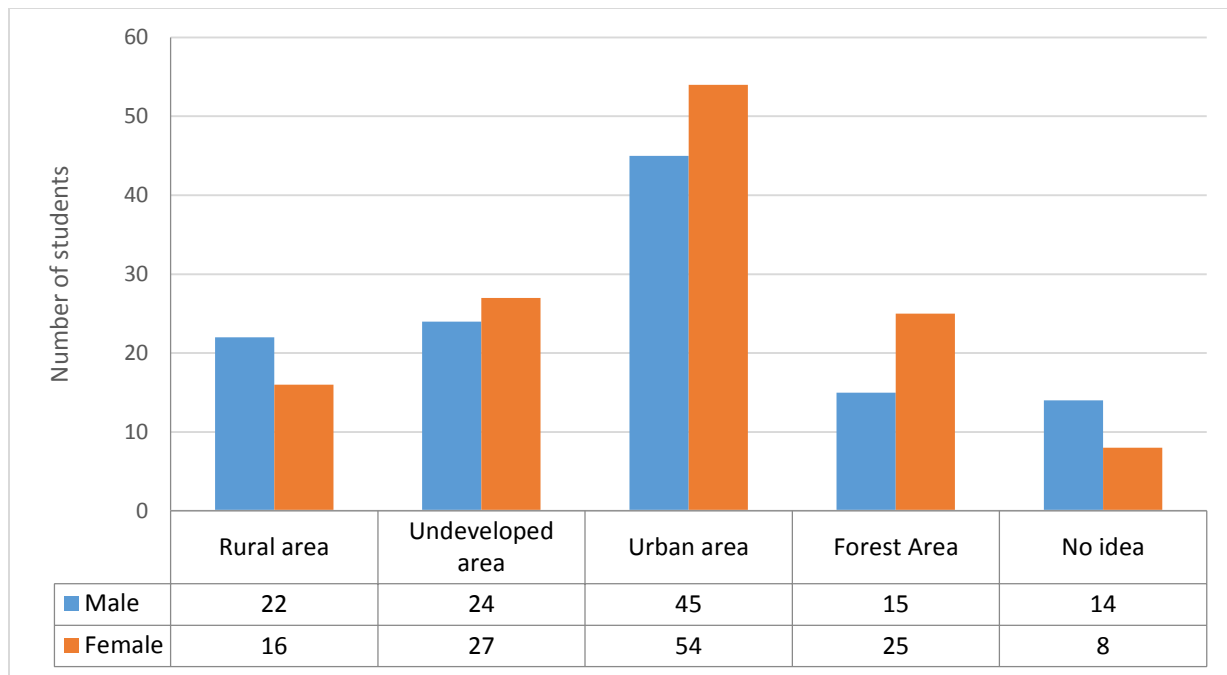| Mode	ii.iii (use analgesic with acetaminophen, sleep more and get more drinks) It is the most chosen answer.

Mean	Mean= cumulative frequency/ no. of answers in the table
	    = 130/ 5
	    = 26th
	 Therefore, the average of female students answers ii, iii for this question.

The answer for this question is ii, iii. So based on this question, we know that most of male and female students have knowledge regarding the treatment for dengue. But some of the students are surely aware that there is no vaccine for dengue fever at the moment.

Q14: Which area do you think dengue is most common?

	Rural area	Undeveloped area	Urban area	Forest Area	No idea
Male	22	24	45	15	14
Female	16	27	54	25	8

For male:

Answer	No. of student	Cumulative frequency
Rural area	22	22
Undeveloped area	24	46
Urban area	45	91
Forest area	15	106
No idea	14	120

Mode	Urban area It is the most chosen answer.
Mean	Mean= cumulative frequency/ no. of answers in the table 　　　= 120/ 5 　　　= 24th Therefore, the average of male students answers undeveloped area for this question.

For female:

Answer	No. of student	Cumulative frequency
Rural area	16	16
Undeveloped area	27	43
Urban area	54	97
Forest area	25	122
No idea	8	130

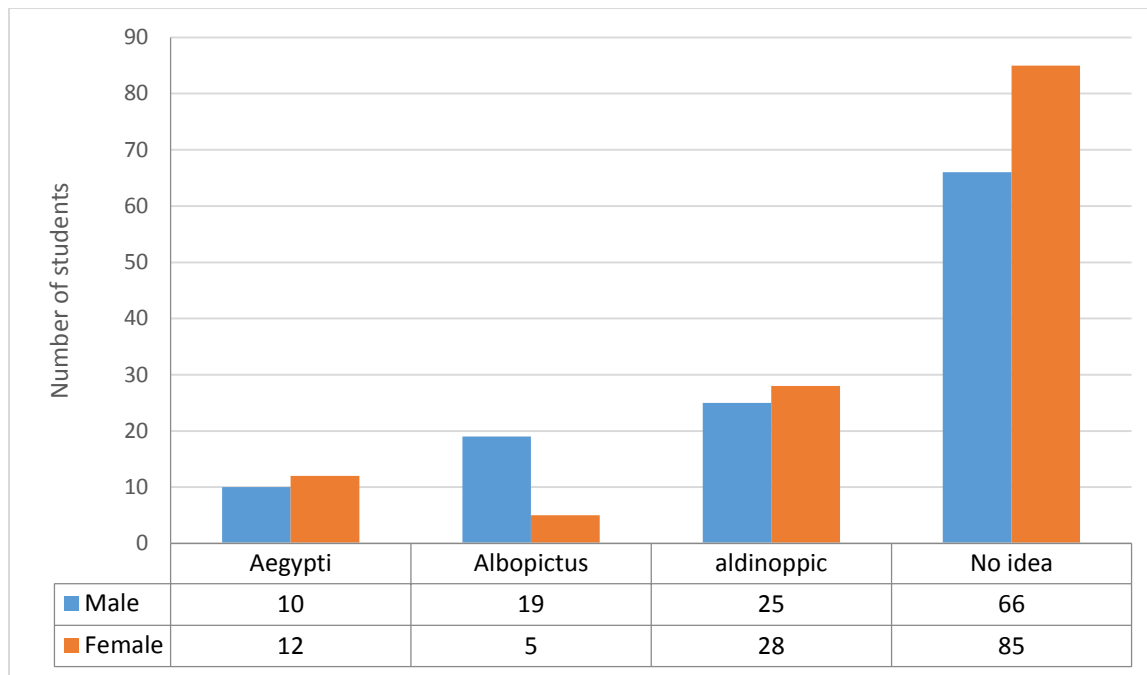| Mode	Urban area It is the most chosen answer.

Mean	Mean= cumulative frequency/ no. of answers in the table
	    = 1300/ 5
	    = 26th
	 Therefore, the average of female students answers undeveloped area for this question.

The answer for this question is urban area. Based on the chart, most of both male and female students got the right answer. But male students thought of aedes mosquito breeding area is at rural area higher than female students. Apart from that, there least number of students who have no idea at all where the aedes mosquito breeds.

Q15: Which type of mosquito does not travel dengue flu?

	Aegypti	Albopictus	aldinoppic	No idea
Male	10	19	25	66
Female	12	5	28	85

For male:

Answer	No. of student	Cumulative frequency
Aegypti	10	10
Albopictus	19	29
Aldinoppic	25	54
No idea	66	120

Mode	No idea
	It is the most chosen answer.

For female:

Answer	No. of student	Cumulative frequency
Aegypti	12	12
Albopictus	5	17
Aldinoppic	28	45
No idea	85	130

Mode	No idea
	It is the most chosen answer.

The answer for this question is Aldinoppic. Based on the table, it is clearly showed that most of the male and female students have clearly no idea of which type of mosquito does not travel dengue flu. However, the number of female students who have no idea about this question is higher male student. But there are still have students who know the answer. The number of female student who got the answer right is slightly higher than male student as some of the students are from medical school.

Q16: How many types of dengue?

	1	2	3	4	No idea
Male	6	20	29	13	52
Female	11	24	25	14	56
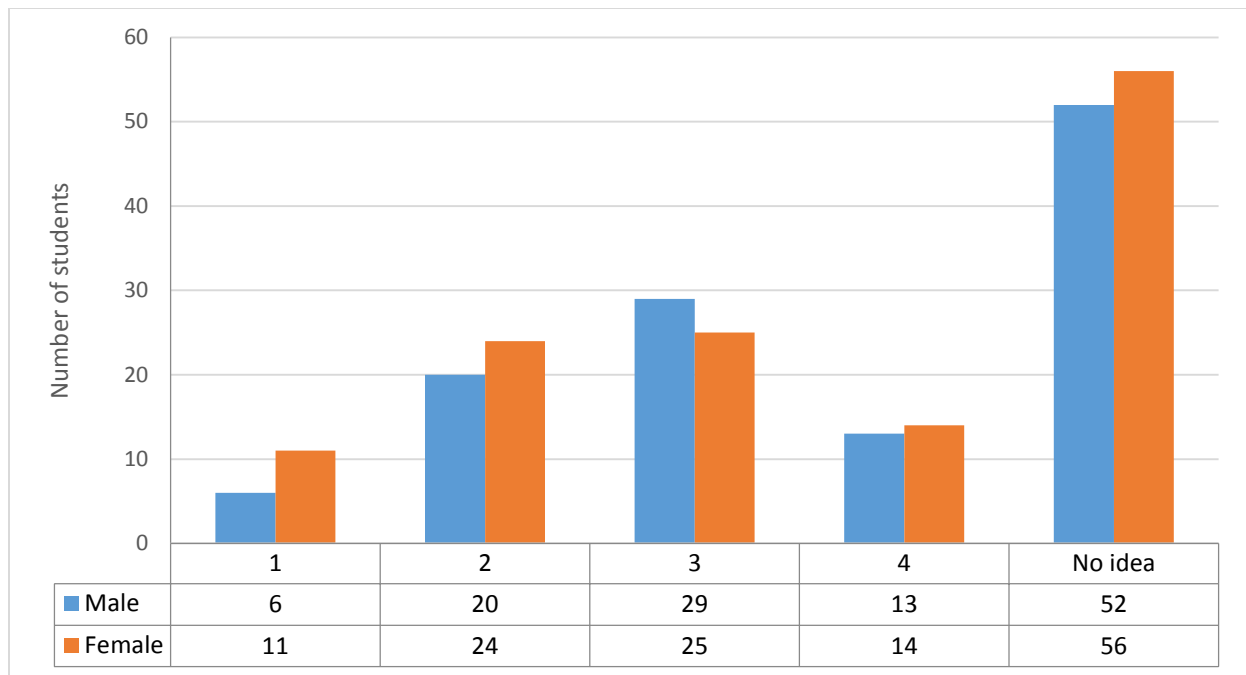
For male:

Answer	No. of student	Cumulative frequency
1	6	6
2	20	26
3	29	55
4	13	68
No idea	52	120

Mode	No idea
	It is the most chosen answer.
Lower Quartile range	Lower Quartile range = n/ 4
	= 120/4
	= 30th
	Therefore, ¼ male students got the correct answer.

For female:

Answer	No. of student	Cumulative frequency
1	11	11
2	24	35
3	25	60
4	14	74
No idea	56	130

Mode	No idea It is the most chosen answer.
Lower Quartile range	Lower Quartile range = n/ 4 $$= 130/4$$ $$= 32.5^{th}$$ Therefore, even ¼ female students didn't got the correct answer.

The answer for this question is there are 3 types of dengue. Based on the mode and the chart, most of the male and female students have no idea of how many types of dengue there are. However, from the table, there are over quarter of male students got the correct answer while for the female students, there are less then quarter students who got the correct answer. Besides, there are some of students who are confused about the types of dengue who answered 1,2 and 4.

Q17: which the following are the types of dengue?

	I,ii	iii,iv	I, iii, iv	All the above	No idea
Male	7	8	51	7	47
Female	8	10	52	18	42
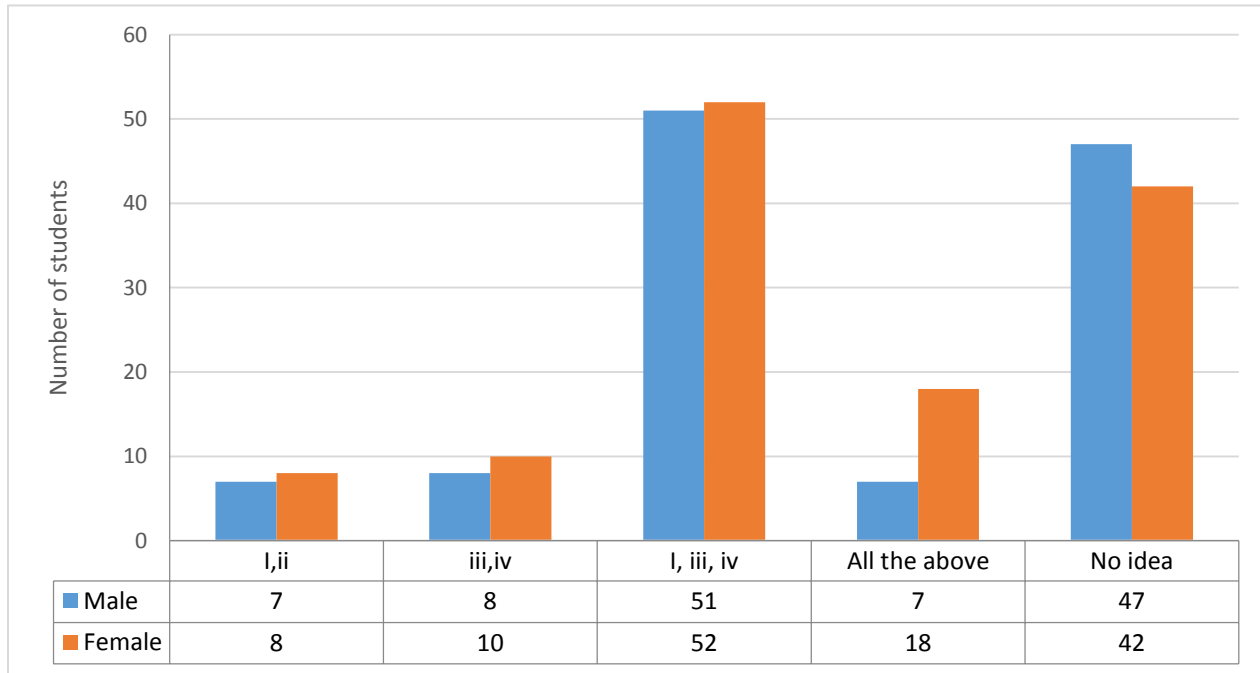
For male:

Answer	No. of student	Cumulative frequency
i, ii	7	7
Iii, iv	8	15
I, iii, iv	51	66
All the above	7	73
No idea	47	120

Mode	I, iii, iv It is the most chosen answer.
Lower Quartile range	Lower Quartile range = n/ 4 = 120/4 = 30th
Upper Quartile range	Upper Quartile range = 3n/ 4 = 120(3)/4 = 90th

Interquartile range	Upper quartile range – lower quartile range = 90 – 30 = 60th

For female:

Answer	No. of student	Cumulative frequency
i, ii	8	8
Iii, iv	10	18
I, iii, iv	52	70
All the above	18	88
No idea	42	130

Mode	I, iii, iv It is the most chosen answer.
Lower Quartile range	Lower Quartile range = n/ 4 = 130/4 = 32.5^{th}
Upper Quartile range	Upper Quartile range = 3n/ 4 = 130(3)/4 = 97.5^{th}
Interquartile range	Upper quartile range – lower quartile range = 97.5 – 32.5 = 65th

The answer for this question is I, iii, iv (Dengue fever, Dengue Shock Syndrome, Dengue Hemorrhagic Syndrome). Based on the graph, it showed most of the male and female students got the correct answer. Surprisingly compared to previous question which is relatable, most of the students have no idea of how many types of dengue there are. The interquartile range shows there are students who have no idea about the question even though there have clue of the type of dengue. Somehow, there are least number of student tried to answer the question but got it wrong.