



**UNIVERSITI PUTRA MALAYSIA**

***KNOWLEDGE, ATTITUDE AND PRACTICE (KAP) ON WATER,  
SANITATION AND HYGIENE (WASH) AND ITS RELATIONSHIP WITH  
DIARRHEA AMONG SECONDARY SCHOOL STUDENTS IN JELI,  
KELANTAN***

**SITI NORSYAHIRAH BINTI HAMBALI**

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DIARRHEA AMONG SECONDARY SCHOOL STUDENTS IN JELI,  
KELANTAN**



**BY**

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**This thesis submitted in fulfillment of the requirement for the degree of Bachelor  
Science (Environmental and Occupational Health) from the Faculty of Medicine  
and Health Sciences, Universiti Putra Malaysia**

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## ABSTRACT

### KNOWLEDGE, ATTITUDE AND PRACTICE (KAP) ON WATER, SANITATION AND HYGIENE (WASH) AND ITS RELATIONSHIP WITH DIARRHEA AMONG SECONDARY SCHOOL STUDENTS IN JELI, KELANTAN.

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**Introduction:** Malaysia enjoys a wide coverage of treated water, and has a low prevalence of diarrhea. Nevertheless, there are still diarrheal episodes reported and most studies done showed acute diarrhea happened among children. Evidence has shown that deaths due to diarrheal illness are attributed to unsafe water, inappropriate sanitation and poor hygiene. This study aims to determine the knowledge, attitude and practice (KAP) on water, sanitation and hygiene (WASH) and its relationship with diarrhea among secondary school students in Jeli, Kelantan. **Methods:** This was a cross-sectional study involving 99 participants from 2 secondary schools that were chosen by stratified random sampling. The data was collected by answering a set of questionnaires on WASH and diarrhea. **Result and Discussion:** This study showed that all of the respondents were Malay with 31.8% were males while 68.2% were female and 84.8% were from the B40 family. There were 67.7% of the respondents have good knowledge, 97% have a good attitude and 91.9% have good practice. The chi-square test of the relationship between levels of KAP on WASH with diarrhea showed a significant relationship on the level of attitude ( $p=0.004$ ) and practice ( $p=0$ ) but not on their level of knowledge ( $p=0.938$ ). **Conclusion:** Overall, most of the students have a "Good" level of KAP on WASH. Their level of knowledge does not show the risk for them to get diarrhea. However, their level of attitude and practice shows that they are risky toward getting diarrhea. It is recommended to increase the sample size of the study as it help to increase the significance level of the findings.

**Keywords:** *KAP, WASH, Diarrhea, Secondary school students*

## ABSTRAK

### **PENGETAHUAN, SIKAP DAN TINGKAH LAKU (KAP) MENGENAI AIR, SANITASI DAN KEBERSIHAN (WASH) DAN HUBUNGANNYA DENGAN CIRIT- BIRIT DALAM KALANGAN PELAJAR SEKOLAH MENENGAH DI JELI, KELANTAN.**

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**Pendahuluan:** Malaysia menikmati liputan air terawat yang luas, dan mempunyai kes cirit-birit yang rendah. Walaupun begitu, masih terdapat episod cirit-birit berlaku dan kebanyakan kajian yang dilakukan menunjukkan cirit-birit berlaku dalam kalangan kanak-kanak. Bukti menunjukkan bahawa kematian akibat penyakit cirit-birit disebabkan oleh air yang tidak selamat, sanitasi yang tidak betul dan kebersihan yang teruk. Kajian ini bertujuan untuk mengetahui pengetahuan, sikap dan amalan (KAP) mengenai air, sanitasi dan kebersihan (WASH) dan hubungannya dengan cirit-birit dalam kalangan pelajar sekolah menengah di Jeli, Kelantan. **Objektif:** Ini adalah kajian keratan rentas yang melibatkan 99 peserta dari 2 sekolah menengah yang dipilih melalui pensampelan rawak berstrata. Data dikumpulkan melalui soal selidik mengenai WASH dan cirit-birit. **Hasil dan Perbincangan:** Kajian ini menunjukkan bahawa semua responden adalah berbangsa Melayu dengan 31.8% adalah lelaki manakala 68.2% adalah perempuan dan 84.8% berasal dari keluarga B40. Terdapat 67.7% responden mempunyai pengetahuan yang baik, 97% mempunyai sikap yang baik dan 91.9% mempunyai amalan yang baik. Ujian chi-square hubungan antara tahap KAP pada WASH dengan cirit-birit menunjukkan hubungan yang signifikan terhadap tahap sikap ( $p = 0.004$ ) dan tingkah laku ( $p = 0$ ) tetapi tidak pada tahap pengetahuan mereka ( $p = 0,938$ ). **Kesimpulan:** Secara keseluruhan, kebanyakan pelajar mempunyai tahap KAP "Baik" mengenai WASH. Tahap pengetahuan mereka tidak menunjukkan risiko mereka mendapat cirit-birit. Walau bagaimanapun, tahap sikap dan amalan mereka menunjukkan bahawa mereka berisiko mendapat cirit-birit. Dianjurkan untuk meningkatkan ukuran sampel kajian kerana dapat meningkatkan tahap kepentingan kajian.

**Kata Kunci:** KAP, WASH, Cirit birit, Pelajar sekolah menengah

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## ABBREVIATIONS

|      |                                  |
|------|----------------------------------|
| KAP  | Knowledge, Attitude and Practice |
| WASH | Water, Sanitation and Hygiene    |



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# CHAPTER 1

## INTRODUCTION

### 1.1 Study Background

Community access to household water, improvements in water quality and source and on-site sanitation or sewage connections, hand washing promotion, or hygiene education in general are all part of WASH strategies (Wolf et al., 2018). These initiatives have been proved to have a positive impact on one's health (Wolf et al., 2019). Besides, it is also a part of the Sustainable Development Goals 6 (SDG 6) which is to provide access to properly managed sanitation services, such as toilets where excreta is processed and disposed of (United Nations, 2018).

Unsafe water, improper sanitation, and inadequate hygiene are responsible for around 88% of diarrhea-related deaths (Liu et al., 2012). In the developing world, each child has suffered three episodes of diarrhea each year on average (Black et al., 2008). The majority of acute diarrhea research in Malaysia appear to have been conducted on children. This information was gathered via public-health surveillance and hospital surveillance systems (Gurpreet et al., 2011).

Acute diarrhea is defined as the beginning of three or more loose stools per day in a period of no more than 14 days (Guandalini, 2021). In most cases, diarrhea is self-limiting and resolves without medical intervention. However, if diarrhea does not improve and clear entirely, the person is at risk (Cleaveland Clinic, 2021).

## **1.2 Problem Statement**

According to WHO (2017), diarrhea is one of the top ten children's causes of death aged 10 to 19 (Moghaddam et al., 2016). Diarrhea affects 6.3% (CI: 5.8- 6.8), of youth aged 10 to 19 according to the National Health and Morbidity Survey. Even though Malaysia has a large coverage of treated water, diarrhea cases among youngsters continue to be reported.

Better sanitation and personal hygiene habits are thought to be important in minimizing the risk of communicable disease transmission and enhancing public health (Stephen et al., 2019). As a result, public health interventions aimed at reducing the frequency of acute diarrhea while also boosting surveillance and notification of the disease must be intensified (Gurpreet et al., 2011).

## **1.3 Study Justification**

This study will allow collecting the information on knowledge, attitude and practice (KAP) on the water, sanitation and hygiene (WASH) on the population targeted. The information will enable us to detect their knowledge gaps, cultural beliefs, and behavioral patterns, which will help us identify needs, problems, and hurdles for future planning and solutions (Oral Cholera Vaccine Stockpile Monitoring and Evaluation Working Group, 2014). At the same time, the baseline information also can be obtained, as it is essential to determine the requirements for further intervention (WASHplus, 2015) and also to compare the behavior before and after intervention (Piper et al., 2017). Furthermore, it is always vital to be aware of the state of WASH because the information will be useful in preventing exposure to a variety of diseases (Dahlstrom et al., 2018).

#### **1.4 Research Questions**

This study has several research questions that want to be answered namely:

- I. What are the socio-demographic characteristics of secondary school students in Jeli, Kelantan?
- II. What is the level of KAP on WASH among secondary school students?
- III. Does the level of KAP on WASH have a significant relationship with diarrhea?

#### **1.5 Research Objectives**

I. General objective:

To determine the knowledge, attitude and practice (KAP) on water, sanitation and hygiene (WASH) and its relationship with diarrhea among secondary school students in Jeli, Kelantan.

II. Specific objectives

- To identify socio-demographic characteristics of secondary school students in Jeli, Kelantan.
- To identify the level of KAP on WASH among secondary school students.
- To determine the relationship between the level of KAP on WASH with diarrhea.

## 1.6 Hypothesis

- I. There is a significant difference in the level of KAP on WASH among secondary school students.
- II. There is a significant relationship between the levels of KAP on WASH with diarrhea.



## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Study Background

Diarrhea is a disease of the digestive system that is often caused by swallowing infected food or water (NIDDK, 2016). Infection is more common when there is a shortage of adequate sanitation and hygiene and safe water for drinking, cooking and cleaning (WHO, 2017). It also causes an increase in normal daily stool volume and frequency is generally described as watery or loose stool. Other signs of diarrhea include stomach pain and cramps, nausea and vomiting, fatigue, fever, and complication can also follow. Serious types of diarrhea may occur as dehydration and dysentery that is called blood-stained diarrhea. It can cause death if left untreated (Dadonaite, 2019).

#### 2.2 Diarrhea as Cause of Death

Diarrhea is the world's greatest cause of infant death and morbidity, and it is caused primarily by contaminated food and water sources (WHO, 2017). Diarrheal illnesses claimed the lives of over 1.6 million people worldwide in 2017. Children under the age of five made up one-third of those who died from diarrheal illnesses. Children under the age of five have accounted for the majority of diarrheal illness deaths for the past three decades and it killed 1.7 million children in 1990 (Dadonaite, 2019). Diarrhea killed 499,000 children under the age of five and 1.3 million persons of all ages in 2015, making it the fourth highest cause of death among young children. Diarrhea was the cause of 8.6% of all fatalities in children under the age of five (Lyons, 2017).

### **2.3 Microorganism That Cause Diarrhea**

According to a study conducted in the United States and Canada, causal microorganisms such as *Giardia intestinalis*, *Norovirus*, *E.Coli*, *Campylobacter*, and *Shigella sonnei* caused countless people to become ill from waterborne illness outbreaks from 1970 to 2014 (Hashi et al. 2017). It also depends on the location-specific etiologic patterns (WHO, 2017). Different microorganisms create three different types of illnesses that induce diarrhea. First, there are viral infections to contend with. Norovirus and rotavirus are two viruses that can cause diarrhea. A common cause of acute diarrhea is viral gastroenteritis. Bacterial infections are the second major cause of death. The second, are bacterial infections. Diarrhea can be caused by a variety of bacteria that enter your body through contaminated food or water such as *Campylobacter*, *Escherichia coli* (*E. coli*), *Salmonella*, and *Shigella* are some of the most common bacteria that cause diarrhea. The third microorganism is parasitic infections. Parasites can enter your body via food or drink and lodge in your gastrointestinal tract. *Cryptosporidium enteritis*, *Entamoeba histolytica*, and *Giardia lamblia* are some of the parasites that cause diarrhea (NIDDK, 2016). Diarrhea can also be passed from person to person and is made worse by poor personal hygiene. When food is cooked or stored in unsanitary circumstances, it is another main cause of diarrhea. Domestic water storage and handling that is unsafe is also a significant risk factor. Polluted seafood and fish may also contribute to the sickness (WHO, 2017).

### **2.4 Water, Sanitation and Hygiene (WASH) by United Nations Children's Fund (UNICEF)**

United Nations Children's Fund (UNICEF) said that implementation of water, sanitation and hygiene (WASH) can help to reduce these cases. For water, it is focused on the access

to clean water, the nature of the water they can access, and the journey they need to take to collect. For sanitation, it focuses on ensuring access to and use of basic toilets and ways of separating human waste from humans while for hygiene, it focuses to promote good hygiene practices, especially handwashing with soap (UN, n.d.). For handwashing practices, after coming into contact with excreta, an estimated 19% of the world's population washes their hands with soap (Fewtrell, 2014). Based on a study done in the Somali region, correct handwashing practices, washing with soap and WASH educational interventions on the incidence of childhood diarrhea shown a 35% reduction in diarrheal diseases for households who practiced handwashing with soap and the WASH key messages (Sibiya et al., 2013).

## **2.5 Information on WASH**

780 million people in the world do not have improved drinking water, and 2.5 billion do not have improved sanitation. In low-income countries, children under the age of three have an average of three episodes of diarrhea each year. Every episode deprives the baby of vital nutrients for development (WHO, 2019). Many people also lack accurate information or understanding about WASH, causing them to practice incorrectly at home. According to a study on handwashing in Mawabeni, Zimbabwe, the inhabitants have differing viewpoints on why they wash their hands. The reasons are to avoid infections, to follow standard procedures, to eliminate odor, and to keep hands clean. However, Only 27% of people successfully demonstrated how to wash their hands according to WHO/UNICEF guidelines (Merga et al., 2015)

2.6 Conceptual Framework

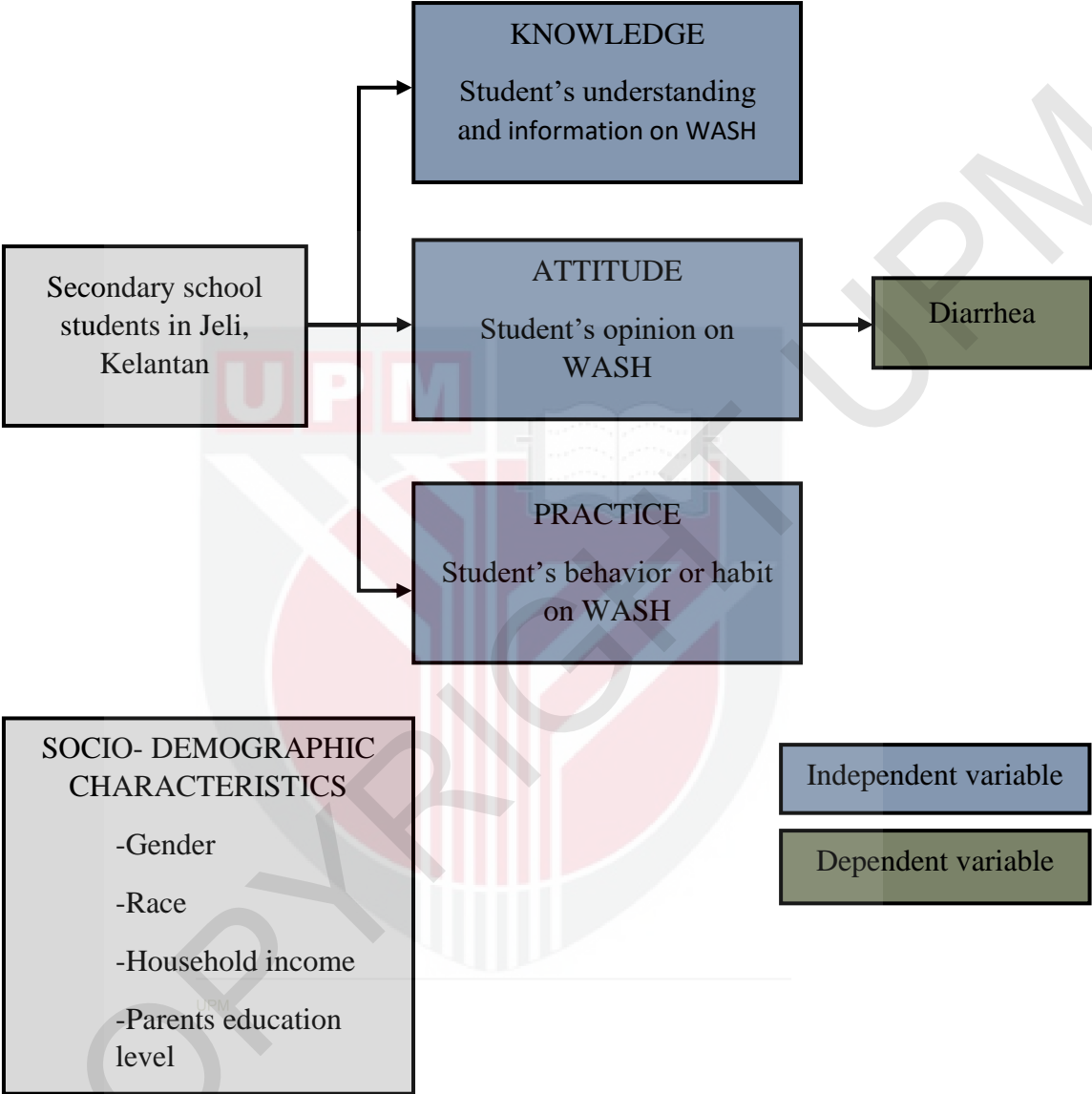


Figure 2.1: Conceptual framework of the study

## CHAPTER 3

### METHODOLOGY

#### 3.1 Research Design

In this study, a cross-sectional study design was used to determine the knowledge, attitude and practice (KAP) on water, sanitation and hygiene (WASH) and its relationship with diarrhea among secondary school students in Jeli, Kelantan.

#### 3.2 Study Location

This study was conducted at Sekolah Menengah Kebangsaan Jeli 1 (SMK JELI 1) & Sekolah Menengah Kebangsaan Jeli 2 (SMK JELI 2).

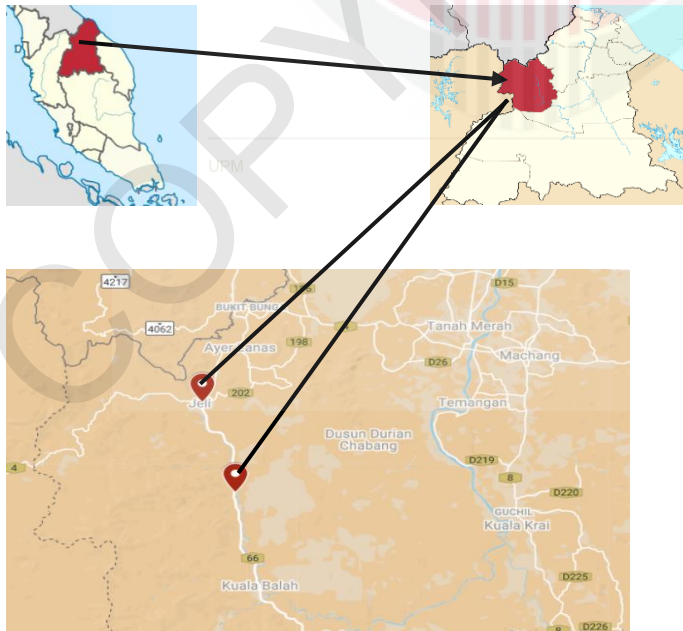


Figure 3.1: Location of SMK Jeli 1 & SMK Jeli 2

### 3.3 Study Population

#### 3.3.1 Target Population:

This research study population was Form 4 Pure Science Stream students in Jeli, Kelantan which includes students from SMK JELI 1 & SMK JELI 2.

#### 3.3.2 Sampling Frame:

The sampling frame for this study is Form 4 Pure Science Stream students from SMK Jeli 1 & SMK Jeli 2 who fulfill the inclusion and exclusion criteria.

### 3.3 Subject Criteria (Inclusion and Exclusion Criteria)

Table 3.1: Inclusion and exclusion criteria of the study sample

| Inclusion criteria   | Exclusion criteria   |
|--|--|
| <ul style="list-style-type: none"><li>All respondents must be Pure Science Stream Form 4 students (Age 16 years old)</li></ul> | <ul style="list-style-type: none"><li>Unhealthy respondents that unable to respond well.</li></ul> |

### 3.4 Sample Size Calculation

Sample size calculations was done based on the single population proportion formula as below. This formula is taken based on a previous study by Berhe et al. (2020).

$$n = \frac{Z^2 P (1-P)}{d^2}$$

Where,

n= sample size

Z= Z statistics for a level of confidence

P= expected prevalence of proportion (extracted from previous study)

d= precision

$$\begin{aligned} n &= \frac{Z^2 P (1-P)}{d^2} \\ &= \frac{1.96^2 (0.063) (1-0.063)}{0.05^2} \\ &= 90 + (10\% \times 90) \\ &= \mathbf{99} \end{aligned}$$

A sample size of **99** respondents was calculated. The level of confidence used is 95%. The prevalence of diarrhea was taken from a study by Gurpreet et al., (2011) for the prevalence of diarrhea among the 10 to 19 years old children which is 0.063%. The expected precision is 0.05 while none response rate is 10%. This sample calculation is based on objective number 3.

### **3.5 Sampling Method and Subject Recruitment**

The sampling method for this study was stratified random sampling. Half of the respondents were taken from SMK Jeli 1 which is 50 students and the other 49 students from SMK Jeli 2. The proportion was made to obtain same number of representative from each school.

### **3.6 Research Tools/ Instrument**

The questionnaire consisted of 30 closed-ended sociodemographic questions, KAP on water, sanitation and hygiene, and a few questions regarding diarrhea. It is based on a few studies which are study by Cambodia National Sanitation and Hygiene Knowledge, Attitude and Practice Survey, (2010), and Razak et al. (2016). The questionnaire was divided into several parts.

#### **I. Part A- Sociodemographic characteristics of the respondent**

This part contains 7 questions such as family income, parent education and others.

#### **II. Part B- Knowledge of WASH**

This part contains 8 questions. Respondents were required to choose 'Yes' or 'No' answers from this section.

#### **III. Part C- Attitude on WASH**

This part contains 3 questions and also a few sub-questions. The choice of answer is based on a Likert scale of 3 which are agree, neutral and disagree.

#### **IV. Part D- Practice on WASH**

This part contains 9 questions. Respondents were required to choose 'Yes' or 'No' for this section.

V. Part E- Questions regarding diarrhea

This part contains 3 questions. Respondents were required to choose 'Yes' or 'No' for this section.

A scoring system will be used to determine the level of KAP of the respondents. For knowledge and practice, correct answers were scored as 1, while the wrong answer was scored as 0. The attitude was measured using a score of 1 for respondents who agreed with positive attitudes. A score of 0 was given when respondents agreed with negative attitudes and neutral responses. The final score will be divided into 3 categories as below.

Table 3.2: Division of categories based on scores

| <b>Category</b> | <b>Total score (%)</b> |
|-----------------|------------------------|
| Poor            | < 50                   |
| Fair            | 51-74                  |
| Good            | >75                    |

### 3.8 Pilot Study

Questionnaires were pre-tested before the actual study conducted to ensure that respondents were able to understand the questions. The pre-test was conducted on 10 secondary school students in Jeli, Kelantan. Reliability Coefficient analysis was performed on the questions. Table 3.12 presents the reliability Coefficient as measured by Cronbach's alpha.

Table 3.3: Cronbach's alpha for pre- test

| Analysis         | Knowledge | Attitude | Practice |
|------------------|-----------|----------|----------|
| Cronbach's alpha | 0.841     | 0.618    | 0.828    |

### 3.9 Ethical Consideration

This survey was approved by Jawatankuasa Etika Universiti Putra Malaysia (JKEUPM).

**3.10 Study Flowchart**

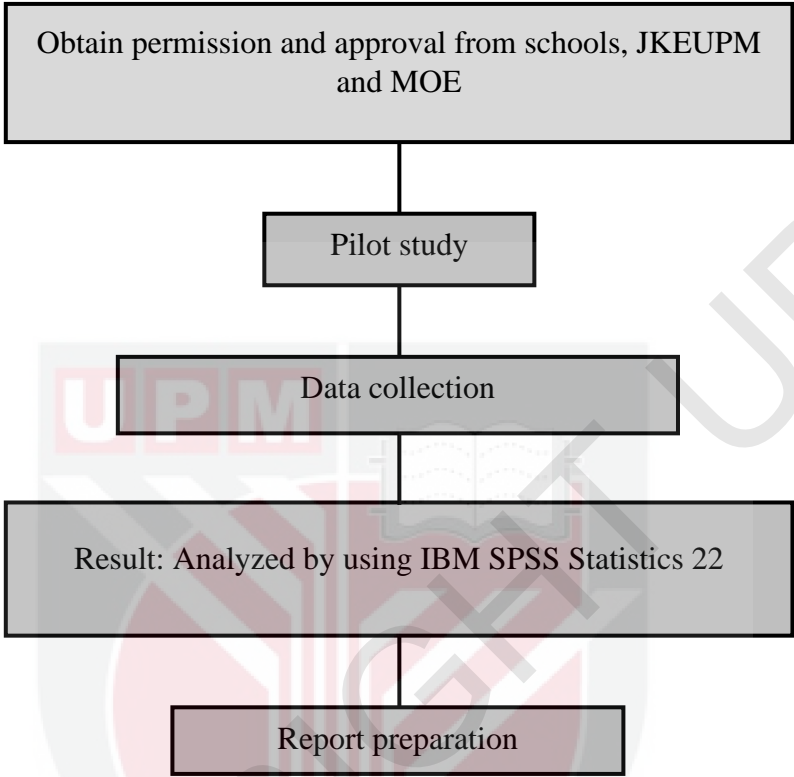


Figure 3.2: Flow chart of study

### 3.11 Data Analysis

IBM SPSS Statistics 22 was used as the statistical analysis tool. The statistical test was conducted according to certain study objectives which are as follows:

Table 3.4: Data analysis for the study

| No. | Specific objectives   | Statistical analysis |
|-----|---|----------------------|
| 1.  | To identify socio-demographic characteristics of secondary school students in Jeli, Kelantan. | Descriptive analysis |
| 2.  | To identify the level of KAP on WASH.   | Descriptive analysis |
| 3.  | To determine the relationship between on level of KAP on WASH with diarrhea.                  | Chi-square           |

## CHAPTER 4

### STATISTICAL ANALYSIS

#### 4.1 Descriptive Analysis

A demographic detail and level of KAP on WASH of the respondents were analyzed through descriptive statistics and explained.

##### 4.1.1 Socio-demographic Analysis

Table 4.1 shows that the ethnic makeup was entirely Malay, with 31.8 % men and 68.2% women. The majority of them belong to the B40 family, which includes B1, B2, B3, and B4, with values of 48.5 %, 13.6 %, and 9.1 %, respectively. The remaining 9.1 % and 6.1 % came from the M1 and M2 groupings.

It comprises education levels such as primary, secondary, tertiary, and not going to school for the parents' educational level. The father's level of education is 30.3 %, 47.5 %, 12.1 %, and 10.1 %, respectively. There were 41.4 %, 40.4 %, 8.1 %, and 10.1 %, correspondingly, for the mother's educational level.

Table 4.1: Sociodemographic characteristics

| Demographics     | Characteristics      | N  | %    |
|------------------|----------------------|----|------|
| Gender           | Male                 | 31 | 31.8 |
|                  | Female               | 68 | 68.2 |
| Race             | Malay                | 99 | 100  |
| Household Income | B1 ( $\leq$ RM2500)  | 48 | 48.4 |
|                  | B2 (RM2500 – RM3169) | 14 | 14   |
|                  | B3 (RM3170 – RM3969) | 13 | 13.6 |

|                          |                        |    |      |
|--------------------------|------------------------|----|------|
|                          | B4 (RM3970 – RM4849)   | 9  | 9    |
|                          | M1 (RM4850 – RM5879)   | 9  | 9    |
|                          | M2 (RM5,881 – RM7,100) | 6  | 6    |
| Father's Education Level | Primary level          | 30 | 30.3 |
|                          | Secondary level        | 47 | 47.5 |
|                          | Tertiary level         | 12 | 12.1 |
|                          | Others                 | 10 | 10.1 |
| Mother's Education Level | Primary level          | 41 | 41.4 |
|                          | Secondary level        | 40 | 40.4 |
|                          | Tertiary level         | 8  | 8.1  |
|                          | Others                 | 10 | 10.1 |

#### 4.1.2 Knowledge on WASH

Questions regarding Knowledge on WASH consist of 8 questions with "Yes" and "No" format that was used as a survey instrument to test their knowledge. Each correct answer "Yes" carried 1 point while the incorrect answer "No" carried 0 points.

Table 4.2: WASH Knowledge questions

| WASH Knowledge disciplines | Questions Numbers |
|----------------------------|-------------------|
| Water                      | 1, 2, 3           |
| Sanitation                 | 7, 8              |
| Hygiene                    | 4, 5, 6           |

The table and figure below summarize the knowledge scores. Item analysis was performed, correctly identified items were summed and the score was transformed into a percentage.

Questions 1, 2, and 3 evaluated the respondents' knowledge of water. All of them understood that treating water can prevent disease but their knowledge about water quality is moderate which is 50% (N=50). There were 90.7% (N=90) of the respondents knew that water supplied by Air Kelantan Sdn. Bhd. are treated water. Overall, 80.2% of students answered the water knowledge questions correctly.

Questions 4, 5 and 6 evaluated the respondents' knowledge of hygiene. All of them understood that bacteria can be transmitted from hands to nose and mouth and can easily spread through long nails. There were 73.5% (N=73) know that there are 6 steps to handwashing recommended by the MOH. Overall, 91.2% of students answered the hygiene knowledge questions correctly.

Questions 7 and 8 evaluated the respondents' knowledge of sanitation. Both questions which are about the proper disposal of baby/adult attachments as one of the ways to maintain cleanliness and presence of animal feces in the home environment as a sign of lack of hygiene have the same score which is 93.9% (N=93). Thus, it gives an overall score for sanitation knowledge of 93.9%.

Table 4.3: WASH Knowledge questions' score

| No. | Item  | Correct Answer | Yes (%)        | No (%)       |
|-----|---|----------------|----------------|--------------|
| 1   | Treating water can prevent disease<br>(Examples of water treatment methods: Boiling water, use of water filters, etc.). | Yes            | 100<br>(N=99)  | -            |
| 2   | Water supplied by Air Kelantan Sdn. Bhd. are treated water.   | Yes            | 90.7<br>(N=90) | 9.3<br>(N=9) |

|   |   |     |                |                |
|---|---|-----|----------------|----------------|
| 3 | Did you receive any information on water quality                                      | Yes | 50<br>(N=50)   | 50<br>(N=49)   |
| 4 | Bacteria can be transmitted from hands to nose and mouth                              | Yes | 100<br>(N=99)  | -              |
| 5 | There are 6 steps to handwashing recommended by the MOH                               | Yes | 73.5<br>(N=73) | 26.5<br>(N=26) |
| 6 | Bacteria spread easily if you have long nails   | Yes | 100<br>(N=99)  | -              |
| 7 | Proper disposal of baby/ adult attachments is one of the ways to maintain cleanliness | Yes | 93.9<br>(N=93) | 6.1<br>(N=6)   |
| 8 | The presence of animal feces in the home environment is a sign of a lack of hygiene.  | Yes | 93.9<br>(N=93) | 6.1<br>(N=6)   |

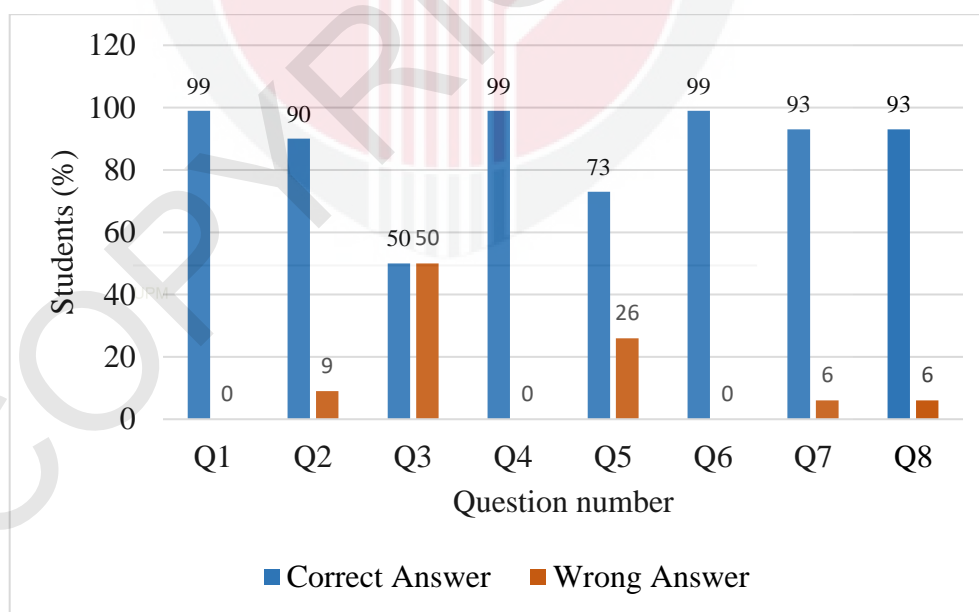


Figure 4.1: Item analysis of WASH Knowledge questions

The figure below shows the percentage of students who scored correct answers for WASH Knowledge for each discipline. There were 82% passed the water knowledge test. 91.2% had knowledge of hygiene, while 93.9% had knowledge of sanitation.

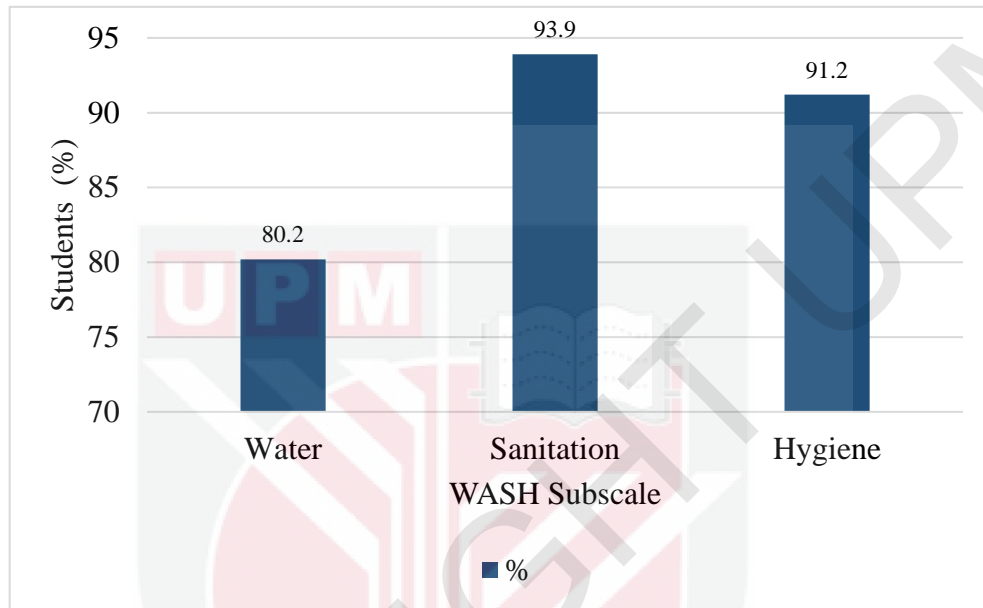


Figure 4.2: WASH Knowledge's score for each discipline

Table and figure below shows the mean score for total WASH knowledge was 7.030+/- 0.897 SD with score range of 0-8. The distribution of the scores on this index was significantly skewed towards negative (skewness =-0.320, S.E skew = 0.243) with the score clustering around higher values. The WASH knowledge scores were divided into 3 categories namely, poor knowledge (0- 4), fair knowledge (5-6) and good knowledge (7-8). Table below illustrates the scores obtained by the students and the category in which they fit.

Table 4.4: WASH Knowledge mean scores

| Mean  | Standard Deviation | N  | Variance | Skewness | SE Skew | Range |
|-------|--------------------|----|----------|----------|---------|-------|
| 7.030 | 0.897              | 99 | 0.805    | -0.320   | 0.243   | 0-8   |

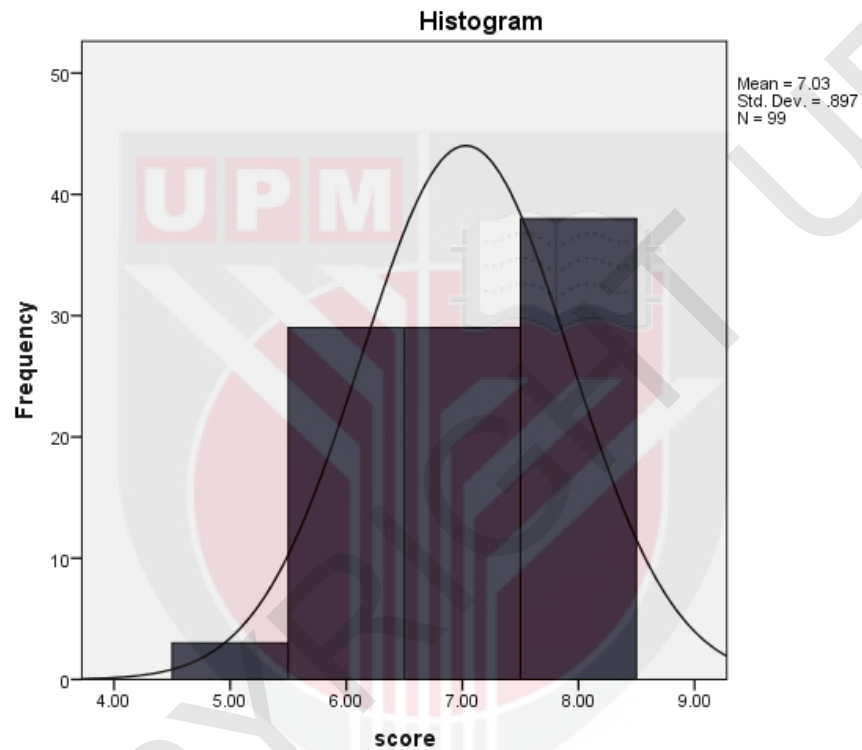


Figure 4.3: WASH Knowledge mean scores

The figure and table below shows the WASH knowledge level of Form 4 Pure Science Stream students in Jeli, Kelantan. Only 32.3% of them have fair knowledge while the rest 67.7% have good knowledge regarding WASH.

Table 4.5: WASH knowledge score categories

| Category       | Total | Poor | Fair | Good |
|----------------|-------|------|------|------|
| Scores         | 8     | 0-4  | 5-6  | 7-8  |
| Respondents    | 99    | 0    | 32   | 67   |
| Percentage (%) | 100   | 0    | 32.3 | 67.7 |

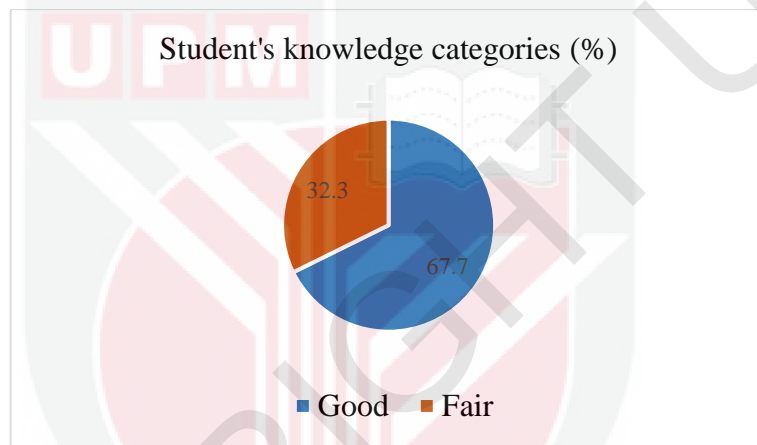


Figure 4.4: WASH Knowledge categories

### 4.1.3 Attitude on WASH

WASH Attitude's questionnaire consists of 3 main questions with "Agree", "Not sure" and "Not agree" format was used as a survey instrument to test their attitude. Each correct answer "Agree" carried 1 point while incorrect answers "Not sure" and "Not agree" carried 0 points.

Table 4.6: WASH Attitude questions

| WASH knowledge discipline | Questions (Numbers)      |
|---------------------------|--------------------------|
| Water                     | 1 (with 3 sub questions) |
| Sanitation                | 3 (with 7 sub questions) |
| Hygiene                   | 2 (with 5 sub questions) |

The table and figure below summarize the descriptive summary for the knowledge scores. Item analysis was performed, correctly identified items were summed and the score was transformed into a percentage.

Question 1 evaluated the respondents' attitude on water. All of them agree that boiling/ filtering water can kills germs. 67.32% (N=67) agree that boiling/ filtering water can eliminate odor, 15.84% (N=16) students were not sure and do not agree. There were 63.36% (N=63) knew it can remove chlorine, 27.72% (N=28) students were not sure and 7.92% (N=8) do not agree. Overall, 76.9% of students answered the water attitude questions correctly.

Question 3 evaluated the respondents' attitude on sanitation. As a way to keep clean, all of them agree on storing water and food properly and clean up the environment, 97%

(N=97) agree on washing hands with soap and take care of drinking water, 96% (N=95) agree on taking a shower while 92% (N=92) agree on cooking food perfectly. The rest were not sure about the question. Overall, 97.4% of students answered the sanitation attitude questions correctly.

Question 2 evaluated the respondents' attitude on hygiene. All of them that agree that the good time to wash hand is after using the toilet, before preparing food, after handling/ playing with animals and before eating while 96% (N=95) agree on washing hand after taking care/ treat a sick family member. The rest 4% (N=4) were not sure. Overall, 99.2% of students answered the hygiene attitude questions correctly.

Table 4.7: WASH Attitude questions' score

| No. | Item   | Correct answer | Agree (%)       | Not sure (%)    | Not agree (%)   |
|-----|--|----------------|-----------------|-----------------|-----------------|
| 1.  | In my opinion, boiling/ filtering water can... | Agree          | 67.32<br>(N=67) | 15.84<br>(N=16) | 15.84<br>(N=16) |
|     | i. Eliminates odor                             |                |                 |                 |                 |
|     | ii. Kills germs                                | Agree          | 100<br>(N=99)   | -               | -               |
|     | iii. Remove chlorine                           | Agree          | 63.36<br>(N=63) | 27.72<br>(N=28) | 7.92<br>(N=8)   |
| 2.  | Here are the steps to keep it clean:           | Agree          | 97              | 3               | -               |
|     | i. Wash hands with soap                        |                | (N=97)          | (N=2)           |                 |

|    |  |       |               |            |   |
|----|--|-------|---------------|------------|---|
|    | ii. Take care of drinking water                        | Agree | 97<br>(N=97)  | 3<br>(N=2) | - |
|    | iii. Cook food perfectly                               | Agree | 92<br>(N=92)  | 8<br>(N=7) | - |
|    | iv. Store water properly                               | Agree | 100<br>(N=99) | -          | - |
|    | v. Store food properly                                 | Agree | 100<br>(N=99) | -          | - |
|    | vi. Take a shower                                      | Agree | 96<br>(N=95)  | 4<br>(N=4) | - |
|    | vii. Clean up the environment                          | Agree | 100<br>(N=99) | -          | - |
| 3. | In my opinion, here is a good time to wash your hands: | Agree | 100<br>(N=99) | -          | - |
|    | i. After using the toilet                              |       |               |            |   |
|    | ii. Before preparing food                              | Agree | 100<br>(N=99) | -          | - |
|    | iii. After handling/ playing with animals              | Agree | 100<br>(N=99) | -          | - |
|    | iv. Before eat   | Agree | 100<br>(N=99) | -          | - |
|    | v. After taking care/ treat a sick family member       | Agree | 96<br>(N=95)  | 4<br>(N=4) | - |

The figure below shows the percentage of students who scored correct answers for WASH Attitude for each discipline. There were 76.9% of students passed the attitude on water. Followed by 97.4% on attitude on hygiene and 99.2% on sanitation attitude.

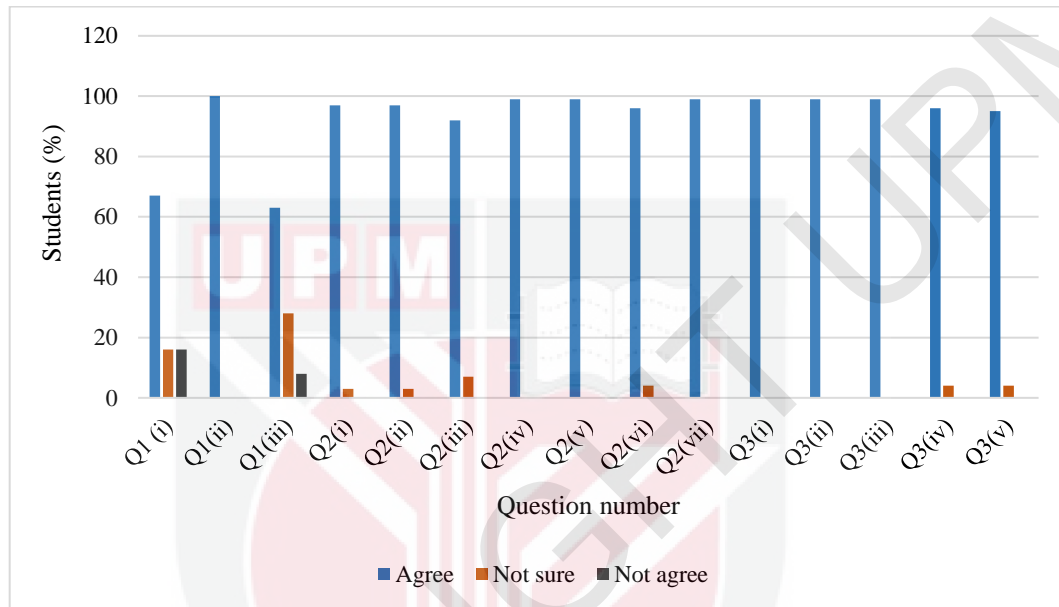


Figure 4.5: Item analysis of WASH Attitude questions

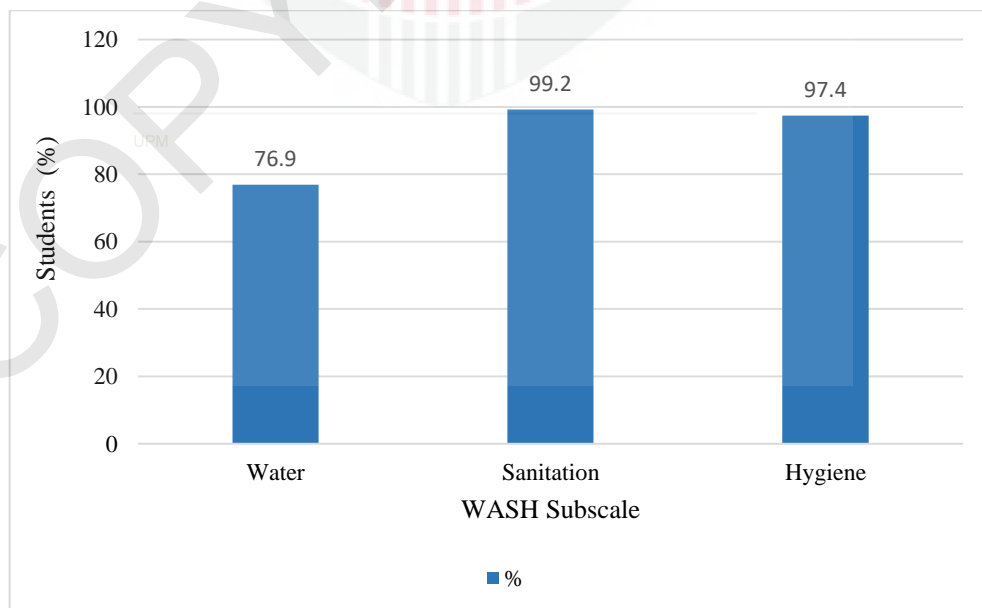


Figure 4.6: WASH Attitude's score for each discipline

The figure and table below shows the mean score for WASH attitude is 14.131+/- 0.932

SD and the score range was 0-15. The distribution of the scores on this index was significantly skewed towards negative (skewness = -0.498, SE skew = 0.243) with the score clustering around higher values. The WASH attitude scores were divided into 3 categories, namely, poor attitude (0-8), fair attitude (9-11) and a good attitude (12-15).

Table 4.8: WASH Attitude mean scores

| Mean   | Standard Deviation | N  | Variance | Skewness | SE Skew | Range |
|--------|--------------------|----|----------|----------|---------|-------|
| 14.131 | 0.932              | 99 | 0.87     | -0.498   | 0.243   | 0-15  |

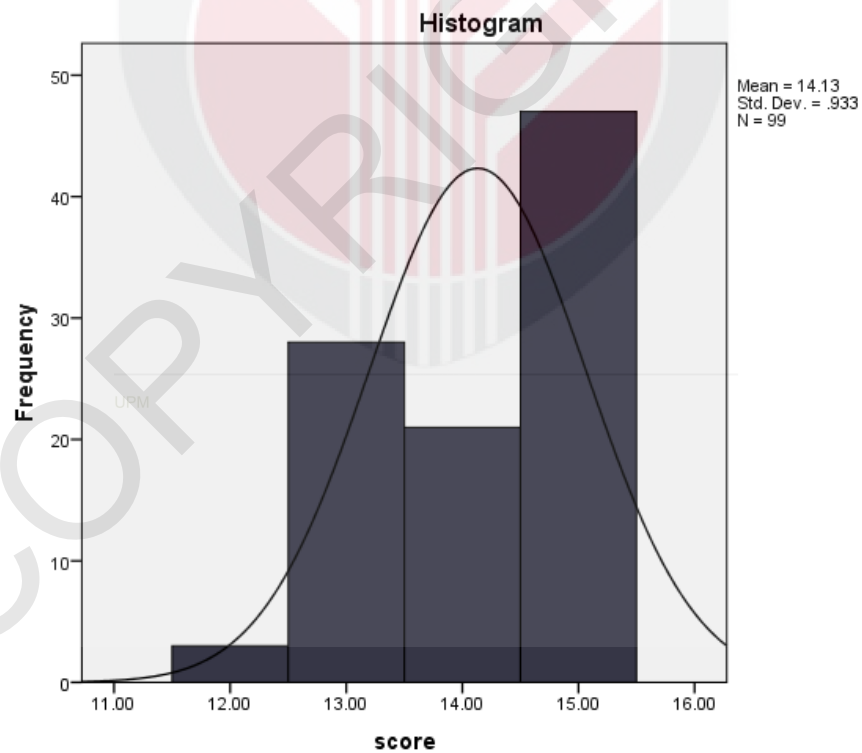


Figure 4.7: WASH Attitude mean scores

The figure below shows the WASH attitude categories of Form 4 Science Stream students in Jeli, Kelantan. Only 3% of them have a fair attitude while the rest 97% have a good attitude regarding WASH.

Table 4.9: WASH Attitude score categories

| Category       | Total | Poor | Fair | Good  |
|----------------|-------|------|------|-------|
| Scores         | 15    | 0-8  | 9-11 | 12-15 |
| Respondents    | 99    | 0    | 3    | 96    |
| Percentage (%) | 100   | 0    | 3    | 97    |

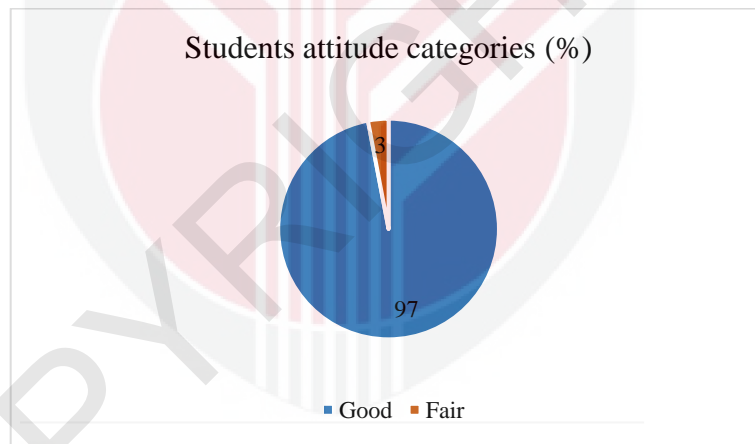


Figure 4.8: WASH Attitude categories

#### 4.1.4 Practice on WASH

WASH Practice's questionnaire consist of 3 main questions with "Yes" and "No" format was used as a survey instrument to test their attitude. Each correct answer "Yes" carried 1 point while the incorrect answer "No" and carried 0 point.

Table 4.10: WASH Practice questions

| WASH knowledge discipline | Questions Numbers |
|---------------------------|-------------------|
| Water                     | 1, 2, 3           |
| Sanitation                | 4, 5, 6, 7        |
| Hygiene                   | 8, 9              |

The table and figure below summarize the descriptive summary for the practice scores. Item analysis was performed, correctly identified items were summed and the score was transformed into a percentage.

Question 1, 2, 3 evaluated the respondents' practice on the water. All of them treat their drinking water at home. However, only 88.5% (N=88) use treated tap water as the main source of drinking water at home and 80.8% (N=81) use treated water sources for other purposes such as bathing, washing clothes and others. Overall, 89.8 % of students answered the water practice questions correctly.

Question 4, 5, 6, 7 evaluated the respondents' practice on sanitation. Everyone has access to the toilet at home and the toilet works well. However, only 80.1% (N=79) clean their toilet every week. For a clean house environment, 69.2% (N=69) are free from animal

feces, 88.5% (N=88) free from garbage or sewage and 84.6% (N=84) free from unpleasant smells. Overall, 87% of students answered the sanitation practice questions correctly.

Question 8, 9 evaluated the respondents' practice of hygiene. All of them wash their hand when they are dirty, before preparing food, before eating, after touching the animal and after defecation but only 84.6% (N=84) wash their hand when coming home from work. Besides, only 76.9% (N=76) use soap to wash their hand. Overall, 94.5% of students answered the hygiene practice questions correctly.

Table 4.11: WASH Practice questions' score

| No. | Item   | Correct Answer | Yes (%)        | No (%)         |
|-----|--|----------------|----------------|----------------|
| 1.  | At home, I use treated tap water as my primary source of drinking water. (Example: Air Kelantan Sdn. Bhd.)       | Yes            | 88.5<br>(N=88) | 11.5<br>(N=11) |
| 2.  | I use treated water sources for other activities. Example: Purpose of bathing, washing clothes, etc.)            | Yes            | 80.8<br>(N=81) | 19.2<br>(N=18) |
| 3.  | I treat drinking water at home. (Examples of water treatment methods: Boiling water, use of water filters, etc.) | Yes            | 100<br>(N=99)  | -              |
| 4.  | There is a toilet in my house.   | Yes            | 100<br>(N=99)  | -              |

|    |  |     |                |                |
|----|--|-----|----------------|----------------|
| 5. | The toilet in my house works fine            | Yes | 100<br>(N=99)  | -              |
| 6. | I clean the toilet every week                | Yes | 80.1<br>(N=79) | 19.9<br>(N=20) |
| 7. | My home environment is free of these signs.  | Yes | 69.2<br>(N=69) | 30.8<br>(N=30) |
|    | i. Animal feces                              |     |                |                |
|    | ii. Garbage or sewage                        | Yes | 88.5<br>(N=88) | 11.5<br>(N=11) |
|    | iii. Unpleasant smell                        | Yes | 84.6<br>(N=84) | 15.4<br>(N=15) |
| 8  | I always use soap to wash my hands           | Yes | 76.9<br>(N=76) | 23.1<br>(N=23) |
| 9  | I wash my hands...                           | Yes | 100<br>(N=99)  | -              |
|    | i. When hands are dirty                      |     |                |                |
|    | ii. Before preparing food                    | Yes | 100<br>(N=99)  | -              |
|    | iii. When coming home from work and the like | Yes | 84.6           | 15.4           |

|                              |     |     |        |        |
|------------------------------|-----|-----|--------|--------|
|                              |     |     | (N=84) | (N=15) |
| iv. Before eat               | Yes | 100 | (N=99) | -      |
| v. After touching the animal | Yes | 100 | (N=99) | -      |
| vi. After defecation         | Yes | 100 | (N=99) | -      |

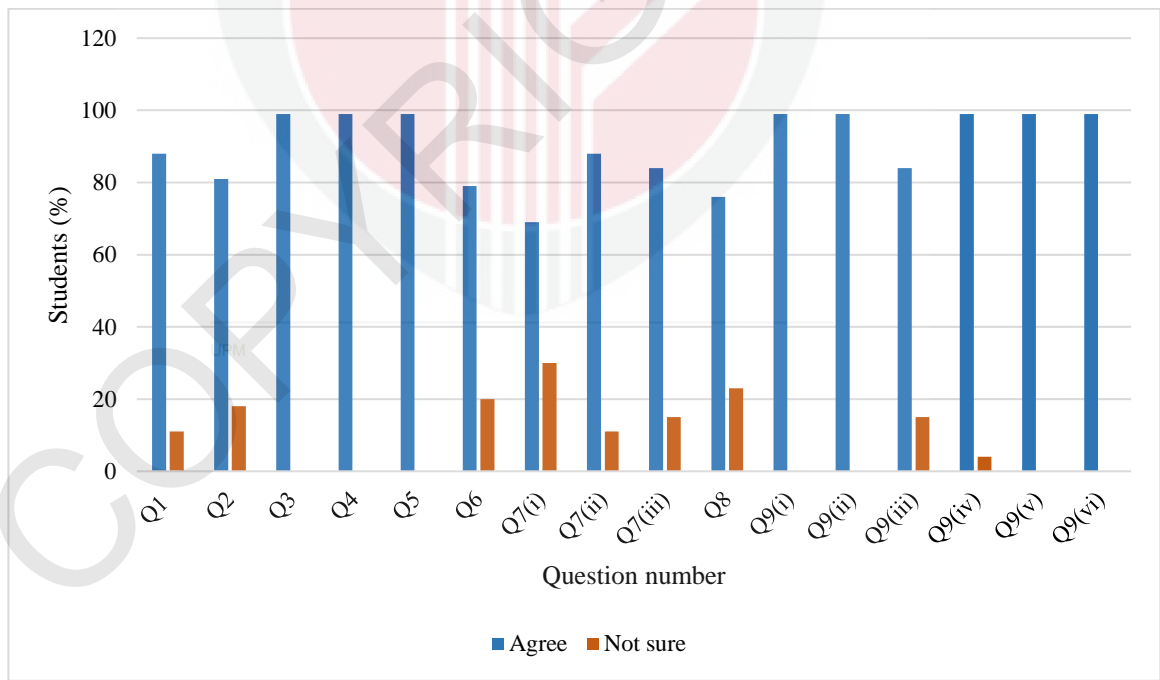


Figure 4.9: Item analysis of WASH Practice questions

The figure below shows the percentage of students who scored correct answers for WASH Practice for each discipline. There were 89.8% of students passed the practice on the water. Followed by 94.5% on practice on hygiene and 87% on practice on sanitation.

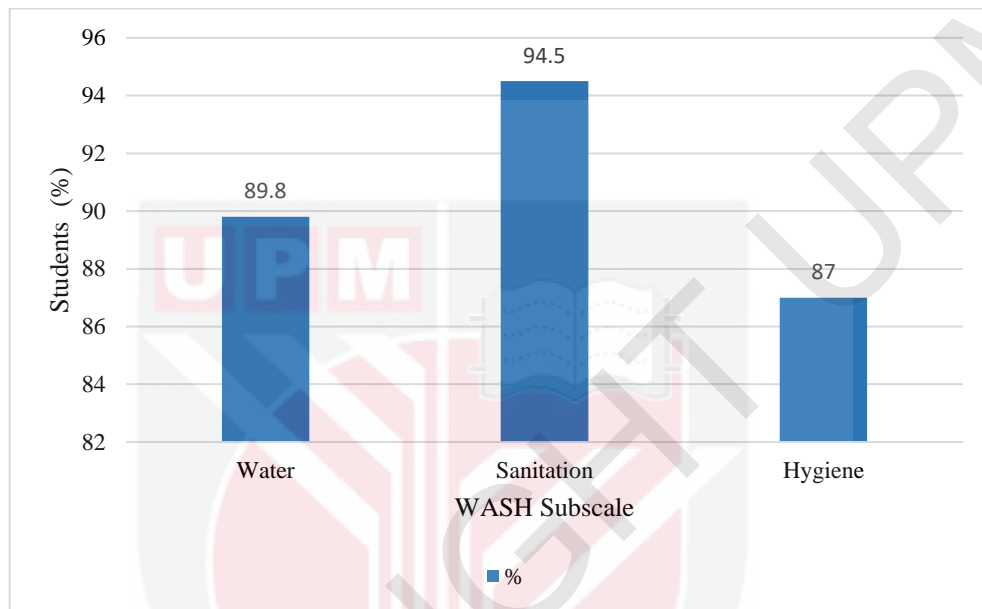


Figure 4.10: WASH Practice score for each discipline

The table and figure below mean score for total WASH Practice was 14.505+/- 1.452 SD and the score range was 0-16. The distribution of the scores on this index was significantly skewed towards negative (skewness =-0.591, SE skew = 0.243) with the score clustering around higher values. The WASH Practice scores were divided into 3 categories, namely, poor practice (0- 9), fair practice (10-12) and good practice (13-16). Table 4.4.4 illustrates the scores obtained by the students and the category in which they fit.

Table 4.12: WASH practice mean scores

| Mean   | SD    | N  | Variance | Skewness | SE Skew | Range |
|--------|-------|----|----------|----------|---------|-------|
| 14.505 | 1.452 | 99 | 2.110    | -0.591   | 0.243   | 0-16  |

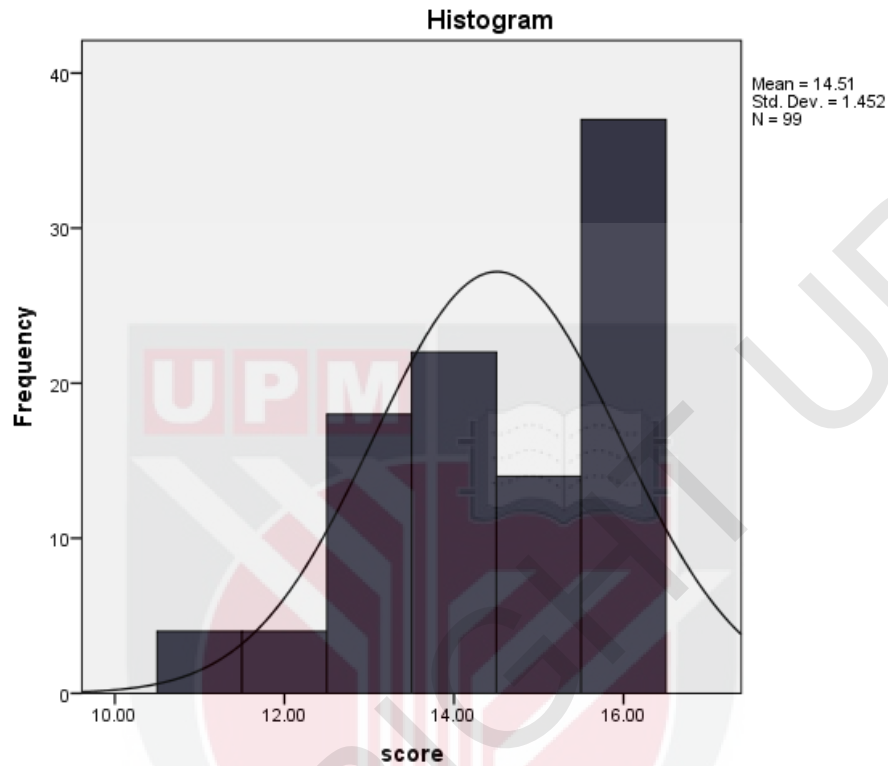


Figure 4.11: WASH Practice mean scores

The figure below shows the WASH practice categories of Form 4 Science Stream students in Jeli, Kelantan. There were 8.1% of them have fair practice while the rest 91.9% have good practice regarding WASH.

Table 4.13: WASH practice score categories

| Category       | Total | Poor | Fair  | Good  |
|----------------|-------|------|-------|-------|
| Scores         | 16    | 0-9  | 10-12 | 13-16 |
| Respondents    | 99    | 0    | 8     | 91    |
| Percentage (%) | 100   | 0    | 8.1   | 91.9  |

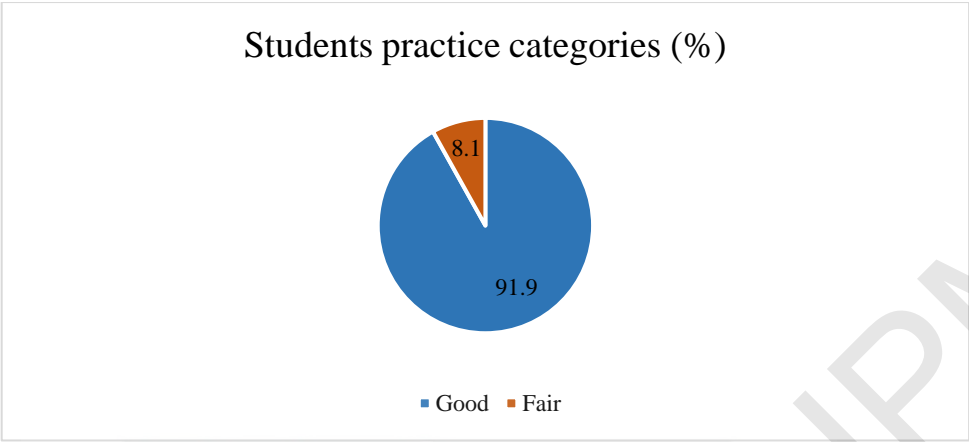


Figure 4.12: WASH practice categories

#### 4.1.5 KAP levels on WASH

The overall knowledge, attitude and practice level on WASH of the Form 4 Pure Science Stream students as the figure below.

In conclusion, the students have good knowledge, 67.7% have a good attitude, and 91.9 % have good practice about WASH, whereas the remaining 32.3 % have fair knowledge, 3% have fair attitude, and 8.1 % have fair practice.

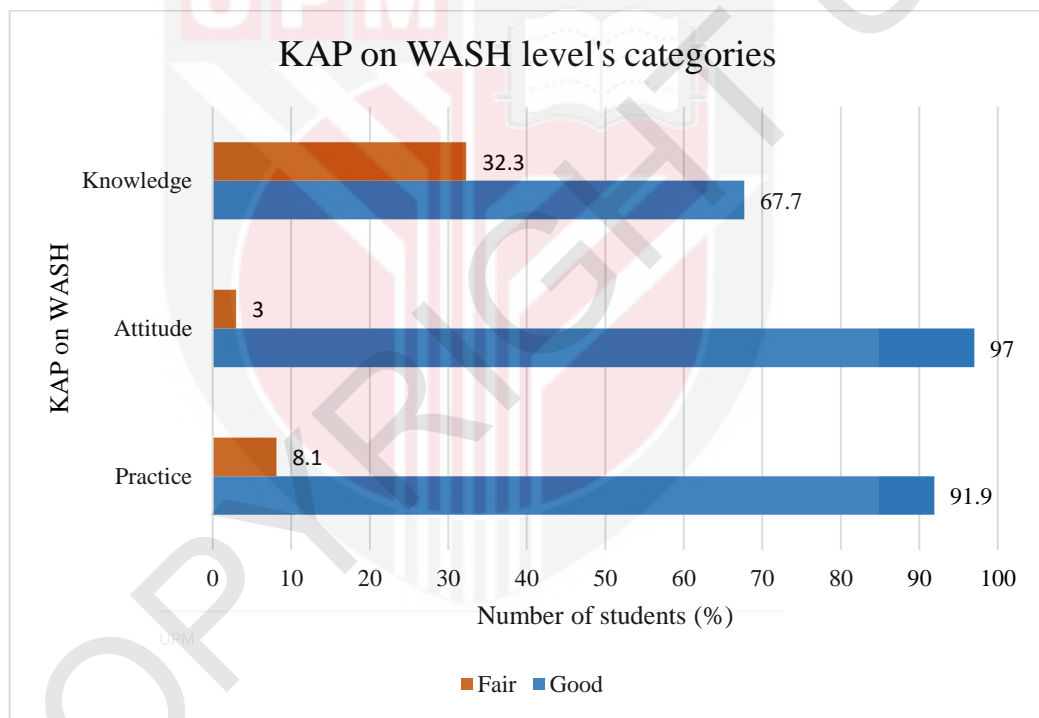


Figure 4.13: Summary of knowledge, attitude and practice level on WASH

## 4.2 Chi- square Analysis

This section measures the degree of relationship of the independent variables (Level of KAP on WASH) with the dependent variable (Diarrhea) of the Form 4 Science Stream students in Jeli, Kelantan in an attempt to test the hypotheses in this study. Chi-square was used to the significance of the relationship between the variables.

### 4.2.1 Relationship between WASH Knowledge Scores with diarrhea.

The relationship between the Scores of WASH Knowledge with was tested using the response of students using the WASH Knowledge questionnaire and questions regarding the risk of getting diarrhea. It was analyzed statistically using chi-square.

The results of the study demonstrated that there is no significant relationship between WASH knowledge and diarrhea;  $\chi^2(2, N=99) = 0.129, p=0.938$ .

Table 5.1: Chi-square test for the relationship between WASH knowledge score with diarrhea

| Analysis                     | Value        | df       | Asymp. Sig. (2-sided) |
|------------------------------|--------------|----------|-----------------------|
| <b>Pearson Chi-Square</b>    | <b>0.129</b> | <b>2</b> | <b>0.938</b>          |
| Likelihood Ratio             | 0.126        | 2        | 0.939                 |
| Linear-by-Linear Association | 0.120        | 1        | 0.729                 |
| N of Valid Cases             | 99           |          |                       |

#### 4.4.2 Relationship between WASH Attitude Scores with diarrhea.

The relationship between the Scores of WASH Attitude with diarrhea was tested using the response of students using the WASH Attitude questionnaire and questions regarding the risk of getting diarrhea. It was analyzed statistically using chi-square.

The results of the study demonstrated that there is significant relationship between WASH knowledge and diarrhea;  $\chi^2(2, N=99) = 10.195, p=0.004$ .

Table 5.2: Chi-square test for the relationship between WASH Attitude score with risk of getting diarrhea

| Analysis                     | Value         | df | Exact Sig. (2-sided) |
|------------------------------|---------------|----|----------------------|
| Pearson Chi-Square           | 15.813        | 2  | 0.004                |
| Likelihood Ratio             | 10.166        | 2  | 0.009                |
| <b>Fisher's Exact Test</b>   | <b>10.195</b> |    | <b>0.004</b>         |
| Linear-by-Linear Association | 13.852        | 1  | 0.004                |
| N of Valid Cases             | 99            |    |                      |

#### 4.4.3 Relationship between WASH Practice Scores with diarrhea.

The relationship between the Scores of WASH Practice with diarrhea was tested using the response of students using the WASH Practice questionnaire and questions regarding risk of getting diarrhea. It was analyzed statistically using chi-square.

The results of the study demonstrated that there is significant relationship between WASH knowledge and diarrhea;  $\chi^2(2, N=99) = 22.429, p=0$ .

Table 5.3: Chi-square test for the relationship between WASH Practice score with risk of getting diarrhea

| Analysis                     | Value         | df | Exact Sig. (2-sided) |
|------------------------------|---------------|----|----------------------|
| Pearson Chi-Square           | 25.141        | 2  | 0.000                |
| Likelihood Ratio             | 23.731        | 2  | 0.000                |
| <b>Fisher's Exact Test</b>   | <b>22.429</b> |    | <b>0.000</b>         |
| Linear-by-Linear Association | 23.683        | 1  | 0.000                |
| N of Valid Cases             | 99            |    |                      |

#### 4.4.4 Chi- Square Test on Level of KAP on WASH

Table 5.4: Chi- Square Test on Level of KAP on WASH

| Variable  | P-value | Relationship    |
|-----------|---------|-----------------|
| Knowledge | 0.938   | Not significant |
| Attitude  | 0.004   | Significant     |
| Practice  | 0.000   | Significant     |

## CHAPTER 5

### DISCUSSION

#### 5.1 WASH Knowledge

According to the poll results, 67.7% of students have a good knowledge of WASH, while another 32.3 % have a fair knowledge of WASH.

In particular, 80.2 % passed the water knowledge test. 91.2 percent of people have a good knowledge of hygiene, and 93.9 % have a good knowledge of sanitation. According to Yahia et al. (2014), students majoring in health sciences scored 7% higher than students majoring in non-health sciences ( $p= 0.001$ ), implying that students specializing in health sciences would have done more research on these topics.

Students' knowledge on sanitation shows that 93.9% of the students understand environmental sanitation which includes a question about feces disposal and animal waste disposal. A similar result was shown in a study by Mamady, (2015) which 96.2% of those surveyed were aware that improper waste management is unsanitary and dangerous.

For hygiene's knowledge, 91.2 % of respondents successfully answered the hygiene questions. Tan et al., (2013) found that 93.9 % have a good understanding of personal hygiene. The results of the survey suggest that 96.5 % believe that filthy nails are one of the easiest ways to transfer disease. However, only 45% of the population know about washing procedures by KKM compare to this study which is 73.5%.

This study discovered that there is no significant relationship between level of knowledge on WASH and diarrhea. The student level of knowledge was not one of risk factor for them to get diarrhea. However, this result is different from a study by Vivas et al., (2010). Students with adequate understanding of proper hygiene were shown to be 22% less likely than their less aware counterparts to have prevalent parasite diseases.

## **5.2 WASH Attitude**

It was discovered that students who had adequate understanding of proper hygiene were 22% less likely than their less aware counterparts to have prevalent parasite diseases.

On attitude on water, 76.9% of students answered the water attitude questions correctly. Razak et al., (2016) identified that 80 % of respondents had a positive attitude toward water quality. According to the study, which also included a question concerning the benefits of water treatment. This section includes a question regarding the advantages of water treatment, and the results are similar, particularly in the response that it can eliminate odour and kill germs.

There were 97.4 % and 99.2 % of students correctly answered the questions about sanitation and hygiene, respectively. Pang et al., (2015) found a similar outcome, demonstrating strong hygiene knowledge and attitudes. The question of handwashing with soap attitude, a critical time to wash hands, and the effective method to wash hands are all part of the hygiene practices.

This study discovered that there is a significant relationship between WASH attitude and diarrhea. Lack of awareness of personal and dietary hygiene practices for diarrhea

prevention was a significant risk factor for diarrheal disease in this cohort of children in Cochabamba, Bolivia, according to a study by Sarker et al., (2015).

### **5.3 WASH Practice**

According to the results of the survey, 94.5 % have a good level of WASH practice, while another 5.5 % have a fair level of WASH practice.

For practice on water, 89.8% of students answered the questions correctly while for practice on sanitation, 87 % of the students got all of the questions right. This section addresses questions about bathroom access and administration. According to an article published by East Asia Pacific in the year 2020, Malaysia has nearly universal access to toilets and safe sanitation, which matches the findings of this study.

There were 94.5 % properly answered the water hygiene questions during hygiene practice. This section addresses two issues: the use of soap when washing hands and the important time for hand washing. According to Pang et al. (2015), 71.2 % of all families use soap to wash their hands. Demssie et al., (2015) discovered a similar effect for handwashing after using the restroom and before eating, whereas Sultana et al., (2016) discovered a similar result for handwashing before cooking a meal when coming home, and after touching animals.

This study discovered that there is a significant relationship between WASH practices and the risk of diarrhea. Lack of awareness of personal and dietary hygiene practices for diarrhea prevention were important risk factors for diarrheal disease in this cohort of children in Cochabamba, Bolivia, according to a study by Sarker et al., (2015).

#### **5.4 Study Limitation**

The present study has certain limitations that ought to be addressed. Firstly, this study only involving Form 4 Pure Science stream students. Therefore, there is a high possibility for them to be more knowledgeable regarding this study topic as it is included as a basis for their field of study.

Other than that, there is limited sampling and respondent availability as this study was conducted via an online survey. The survey is limited to students with access to electronic devices and the internet for them to respond to the online questionnaires.

Besides, survey fraud also a challenge for an online survey. The questionnaire that is long and/or confusing you might get fake answers. Since there is less accountability, the chances for people just hitting buttons to finish are high. As a result, it will not accurately contribute to the study.

Lastly, no interviewer or lack of a trained interviewer to clarify and probe may also lead to less reliable data.

## CHAPTER 6

### CONCLUSION

#### 6.1 Conclusion

From this research, it can be concluded that the majority of Form 4 Pure Science stream students in Jeli, Kelantan are highly knowledgeable as the majority of the students achieve the "Good category" in all 3 WASH disciplines. However, there is still a need to improve their level of attitude and practice regarding WASH since it shows there is a risk for them to develop diarrhea.

This survey will help to act as the baseline information that will allow more research to be done on this population and also will be benefitted for further intervention to carry out. Besides, it is very crucial to always keep on track about the WASH status as it is considered as the parameter for the health of the community.

#### 6.2 Recommendation

As a suggestion, I would suggest to increase the sample size of the study. Higher sample size help to increase the significance level of the findings, since the confidence of the result are likely to increase with a higher sample size. This is to be expected because larger the sample size, the more accurately it is expected to mirror the behavior of the whole group.

Besides, WASH information should be more specific and is taught as the main topic at school instead of being a general subtopic in Science subjects. Students should have the ability to identify and masters all the disciplines of WASH so that they can applicate the knowledge in their life.

Other than that, a continuous assessment also must be done to always keep updated with the current status of WASH knowledge, attitude and practice among the students. This will help to work as an outpline for intervention to be done easier and faster. Besides, it is suggested that the same study be conducted on children of various ages, particularly children under the age of five, as they are the most vulnerable to the condition.

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## APPENDICES

### Appendix A: Questionnaire

|   |                                |
|---|--------------------------------|
| RESEARCH TITLE:   | RESEACHER:                     |
| KNOWLEDGE, ATTITUDE AND BEHAVIOR TOWARDS WATER, SANITATION AND HYGIENE AND ITS RELATIONSHIP WITH DIARRHEA | SITI NORSYAHIRAH BINTI HAMBALI |

#### Instructions:

This question has 5 sections:

1. Part A: Sociodemographic characteristics of participants.
2. Part B: Knowledge on water, sanitation and hygiene (WASH)
3. Part C: Attitudes on water, sanitation and hygiene (WASH)
4. Part D: Behavior on water, sanitation and hygiene (WASH)
5. Part E: Questions on diarrhea

**Please answer all questions.**

## PART A: SOCIODEMOGRAPHIC CHARACTERISTICS OF PARTICIPANTS

**Instructions:** Please fill the space below and choose only one answer from the options

1. Gender:

2. Nation:

3. Household income:

| Category | Subcategory            | Mark (/) |
|----------|------------------------|----------|
| B40      | B1 (Below RM2500)      |          |
|          | B2 (RM2500 – RM3169)   |          |
|          | B3 (RM3170 – RM3969)   |          |
|          | B4 (RM3970 – RM4849)   |          |
| M40      | M1 (RM4850 – RM5879)   |          |
|          | M2 (RM5880 – RM7099)   |          |
|          | M3 (RM7100 – RM8699)   |          |
|          | M4 (RM8700 – RM10959)  |          |
| T20      | T1 (RM11000 – RM15039) |          |
|          | T2 (Above RM15039)     |          |

4. Father's education level:

| Level of education | Mark (/) |
|--------------------|----------|
| Primary            |          |
| Secondary          |          |
| Tertiary           |          |
| Not go to school   |          |

7. Mother's education level:

| Level of education | Mark (/) |
|--------------------|----------|
| Primary            |          |
| Secondary          |          |
| Tertiary           |          |
| Not go to school   |          |

## PART B: KNOWLEDGE OF WATER, SANITATION AND HYGIENE

**Instructions:** Please choose either “Yes” or “No” for the questions below.

| No. | Item  | Yes | No |
|-----|---|-----|----|
| 1   | Treating water can prevent disease<br><br>(Examples of water treatment methods: Boiling water, use of water filters, etc.). |     |    |
| 2   | Water supplied by Air Kelantan Sdn. Bhd. are treated water.   |     |    |
| 3   | Did you receive any information on water quality  |     |    |
| 4   | Bacteria can be transmitted from hands to nose and mouth  |     |    |
| 5   | There are 6 steps to handwashing recommended by the MOH   |     |    |
| 6   | Bacteria spread easily if you have long nails   |     |    |
| 7   | Proper disposal of baby/ adult attachments is one of the ways to maintain cleanliness                                       |     |    |
| 8   | The presence of animal feces in the home environment is a sign of a lack of hygiene.  |     |    |

**PART C: ATTITUDES TOWARDS WATER, SANITATION AND HYGIENE**

**Instructions:** Please choose either “Agree” or “Not Sure” or “Not Agree” for the questions below.

| No. | Item   | Agree | Not sure | Not agree |
|-----|--|-------|----------|-----------|
| 1.  | In my opinion, boiling/ filtering water can...         |       |          |           |
|     | i. Eliminates odor                                     |       |          |           |
|     | ii. Kills germs  |       |          |           |
| 2.  | Here are the steps to keep it clean:                   |       |          |           |
|     | i. Wash hands with soap                                |       |          |           |
|     | ii. Take care of drinking water                        |       |          |           |
|     | iii. Cook food perfectly                               |       |          |           |
|     | iv. Store water properly                               |       |          |           |
|     | v. Store food properly                                 |       |          |           |
|     | vi. Take a shower                                      |       |          |           |
|     | vii. Clean up the environment                          |       |          |           |
| 3.  | In my opinion, here is a good time to wash your hands: |       |          |           |
|     | i. After using the toilet                              |       |          |           |
|     | ii. Before preparing food                              |       |          |           |
|     | iii. After handling/ playing with animals              |       |          |           |
|     | iv. Before eat   |       |          |           |
|     | v. After taking care/ treat a sick family member       |       |          |           |

## PART D: BEHAVIOR TOWARDS WATER, SANITATION AND HYGIENE

**Instructions:** Please choose either “Yes” or “No” for the questions below and fill the “Notes” area if related.

| No. | Item   | Yes | No |
|-----|--|-----|----|
| 1.  | I use treated tap water as the main source of drinking water at home. (Example: Air Kelantan Sdn. Bhd.)          |     |    |
| 2.  | I use treated water sources for other activities. Example: Purpose of bathing, washing clothes, etc.)            |     |    |
| 3.  | I treat drinking water at home. (Examples of water treatment methods: Boiling water, use of water filters, etc.) |     |    |
| 4.  | There is a toilet in my house.   |     |    |
| 5.  | The toilet in my house works fine  |     |    |
| 6.  | I clean the toilet every week  |     |    |
| 7.  | My home environment is free of these signs.  |     |    |
|     | i. Animal feces  |     |    |
|     | ii. Garbage or sewage  |     |    |
|     | iii. Unpleasant smell  |     |    |
| 8   | I always use soap to wash my hands   |     |    |
| 9   | I wash my hands...   |     |    |
|     | i. When hands are dirty  |     |    |
|     | ii. Before preparing food  |     |    |
|     | iii. When coming home from work and the like   |     |    |
|     | iv. Before eat   |     |    |
|     | v. After touching the animal   |     |    |
|     | vi. After defecation   |     |    |

## PART E: QUESTIONS ON DIARRHEA

**Instructions:** Please choose either “Yes” or “No” for the questions below.

| No. | Question  | Yes | No |
|-----|---|-----|----|
| 1.  | Do you know what diarrhoea is?                        |     |    |
| 2.  | I have not experience diarrhea for the past few weeks |     |    |
| 3.  | Here's how diarrhoea is contagious                    |     |    |
|     | i. Dirty water  |     |    |
|     | ii. Flies   |     |    |
|     | iii. Solid waste                                      |     |    |
|     | iv. The food is not clean                             |     |    |
|     | v. Dirty toilet                                       |     |    |
|     | vi. Open defecation                                   |     |    |
|     | vii. Through animal waste / manure                    |     |    |

UNIVERSITI PUTRA MALAYSIA

|                       |  |
|-----------------------|--|
| <b>Research title</b> | : <b>Knowledge, Attitude and Practice (KAP) on Water, Sanitation and Hygiene (WASH) and its Relationship with Diarrhoea among Secondary School Students in Jeli, Kelantan.</b> |
| <b>Study Site</b>     | : <b>Sekolah Menengah Kebangsaan Jeli 1, Sekolah Menengah Kebangsaan Jeli 2 &amp; Sekolah Menengah Ugama Nahdatul Ulum Jeli, Kelantan.</b>                                     |
| <b>JKEUPM Ref No.</b> | : <b>JKEUPM-2021-023</b>   |
| <b>Researcher</b>     | : <b>Siti Norsyahirah Hambali</b>  |
| <b>Supervisor</b>     | : <b>Dr. Shahrudin Mohd Sham</b>   |

Documents received and reviewed with reference to the above study:

1. Ethics Application Form, Version 1 dated 11/1/2021
2. Respondent Information Sheet & Consent (English), Version 2 dated 26/4/2021
3. Respondent Information Sheet & Consent (Malay), Version 1 dated 26/4/2021
4. Respondent Information Sheet & Guardian's/Parent's Consent (English), Version 2 dated 26/4/2021
5. Respondent Information Sheet & Guardian's/Parent's Consent (Malay), Version 1 dated 26/4/2021
6. Proposal (English), Version 2 dated 9/3/2021
7. Questionnaire/Interview (Malay), Version 3 dated 26/4/2021
8. Curriculum Vitae of:
  - a. Dr. Shahrudin Mohd Sham

The University Research Ethics Committee, Universiti Putra Malaysia (JKEUPM) operates in accordance to the ICH-GCP Guidelines.

Decision by JKEUPM:

- Approved
- Permission MUST BE OBTAINED from the respective hospitals/ institutions before conducting the research**
- Disapproved

Please note that the approval is **VALID UNTIL 27 MARCH 2022**

Researchers should comply with the following:

- I. Complete a Study Final Report upon study completion (Form 3.2).
- II. Ethical approval is required in the case of amendments/ changes to the study documents/ study sites/ study team.
- III. Applicable for Clinical Trial Studies and Clinical interventional Studies only: Progress Report has to be submitted to JKEUPM at **every 6 months** from the date of approval (Form 3.1). Report occurrences of all Serious Adverse Events (SAEs), Suspected Unexpected Serious Adverse Reaction (SUSARs) and Protocol Deviation/ Violation at all JKEUPM approved sites to