UNIVERSITI PUTRA MALAYSIA

KNOWLEDGE, ATTITUDE, AND PRACTICE (KAP) TOWARDS WATER, SANITATION, AND HYGIENE AMONG STREET FOOD VENDORS IN SERDANG, SELANGOR

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BY

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Thesis submitted in fulfilment of the requirement for the degree of Bachelor Science (Environmental and Occupational Health) from Faculty of Medicine and Health Sciences, Universiti Putra Malaysia

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"Khairunnas anfa'uhum linnas" – (HR Ahmad, At-Thabrani)

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ABSTRACT

Objective: This KAP study was conducted to determine the level of knowledge, attitude and practice (KAP) towards water, sanitation and hygiene (WASH) among Serdang's street food vendors and determine the KAP level association with sociodemographic characteristics and the food handling course attendance. **Method**: A pre-tested questionnaire adapted from United Nations Human Settlement Programme containing open-ended questions and 5 scores Likert scale was distributed to 85 street food vendors in Serdang Selangor. **Result:** The highest frequency (percentage) of Serdang's street food vendors were vendors around age 18-35 years old 61(71.8%), male 55(64.7%), local 77(90.6%) and had completed secondary education 45(52.9%). The mean percentage of score (SD) obtained for knowledge was 76.4(14%), attitude 84.4(15%), and practice 96.6(13%). Out of 85 respondents, 82(96.5%) had good knowledge, 83(97.6%) had a good attitude, and 84(98.8%) had a good practice towards WASH. Furthermore, chi-square analysis found an association between citizenship and the level of knowledge, and there was no association between food handling course attendance with the level of knowledge, attitude and practice. **Conclusion**: Most street food vendors had scored a good level of knowledge attitude and practice towards WASH. However, the vendors in Serdang can further improve their current knowledge, attitude and practice towards WASH by the aids of the government in providing better education and more facilities towards clean water and sanitation goals. Therefore, there will be less prevalence of food and water-related diseases in our country.

Keyword: environmental, water, sanitation, hygiene, street food vendors

PENGETAHUAN, ATITUD DAN SIKAP (KAP) TERHADAP AIR, SANITASI DAN KEBERSIHAN DI KALANGAN PENJAJA MAKANAN TEPI JALAN DI SERDANG, SELANGOR

NUR AL AMIN BIN ABDUL AZIZ

ABSTRAK

Objektif: Kajian KAP ini dilakukan untuk mengetahui tahap pengetahuan, sikap dan amalan (KAP) terhadap air, sanitasi dan kebersihan (WASH) di kalangan penjual makanan jalanan Serdang dan untuk menentukan perkaitan tahap KAP dengan ciri sosiodemografi dan pengendalian makanan kehadiran kursus. Kaedah: Soal selidik pra-ujian yang diadaptasi dari 'United Nations Human Settlements Programme' yang mengandungi soalan terbuka dan skala skor Likert 5, diedarkan kepada 85 penjual makanan jalanan di Serdang Selangor. Hasil: Frekuensi (peratusan) tertinggi penjual makanan jalanan Serdang, adalah penjual berusia sekitar 18-35 tahun 61 (71.8%), lelaki 55 (64.7%), 77 penjual makanan tempatan (90.6%) dan telah menamatkan pendidikan menengah 45 (52.9). Peratusan min skor (SD) yang diperoleh untuk pengetahuan adalah 76.4 (14%), sikap 84.4 (15%), dan amalan 96.6 (13%). Dari 85 responden, 82 (96.5%) mempunyai pengetahuan yang baik, 83 (97.6%) mempunyai sikap yang baik, dan 84 (98.8%) mempunyai amalan yang baik terhadap WASH. Selanjutnya, analisis 'chi-square' mendapati bahawa terdapat hubungan antara kewarganegaraan dan tahap pengetahuan, dan tidak ada hubungan antara kehadiran kursus pengendalian makanan dengan tahap pengetahuan, sikap dan amalan. Kesimpulan: Sebilangan besar penjual makanan jalanan telah memperoleh tahap pengetahuan dan amalan pengetahuan yang baik terhadap WASH. Namun, penjual makanan di Serdang dapat meningkatkan lagi pengetahuan, sikap dan amalan semasa mereka terhadap WASH, dengan bantuan kerajaan dalam memberikan pendidikan yang lebih baik dan lebih banyak kemudahan ke arah tujuan air bersih dan sanitasi. Dengan itu, terdapat lebih banyak penurunan kes penyakit berkaitan makanan dan air di negara kita.

Kata kunci: persekitaran, air, sanitasi, kebersihan, penjual makan jalanan

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ABBREVIATIONS

KAP	Knowledge, attitude and practice
WASH	Water, sanitation and hygiene
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

1.1 Study Background

In early history, many of the diseases are caused by water-related diseases. Poor sanitation contributes to the spread of diseases like cholera, diarrhoea, dysentery, hepatitis A, typhoid, and polio and exacerbates stunting. The United Nations General Assembly declared safe and clean drinking water and sanitation to be a human right in 2010 and asked for international assistance to help countries provide safe, clean, accessible, and affordable drinking water and sanitation (WHO, 2021-a). Universal access to safe drinking water, sanitation, and good hygiene (WASH) services are critical for population, health, welfare, and development (WHO, 2021-b). In the Western Pacific Region, preventable water-related diseases take the lives of tens of thousands of people. More than 14 000 people die each year in the Region from diarrhoea due to contaminated drinking water, poor sanitation, and poor hygiene (WHO, 2021-c). Drinking water that is sufficient, inexpensive, and safely managed, as well as improved hygiene behaviours, can drastically reduce this number. From 1990 to 2018, most of the nations in the area achieved significant progress in meeting global drinking water and sanitation standards (WHO, 2021-c).

Malaysia is one country aside from Singapore and Brunei Darussalam and other countries listed under United Nations Development Program, UNDP Sustainable Development, committed to achieving Goal 6: Clean water and sanitation. By 2030, the country must invest in enough infrastructure, sanitation facilities, and hygiene promotion to ensure that everyone has access

to safe and inexpensive drinking water. (*Goal 6: Clean Water and Sanitation*, n.d.).

Looking from different perspectives, safe drinking water, sanitation, and hygiene is not limited to the household in an urban or rural area and the food business in any country, such as street food vendors. In both developed and developing countries, street food vending is a common and distinct aspect of a massive informal industry (Mizanur et al., 2012). The term "street food" refers to a wide range of ready-to-eat foods and beverages sold and occasionally made in public spaces. It is possible to eat street food right where it is purchased or take it home and eat it somewhere (WHO, 1996). It is widespread in public spaces, especially in cities, and it is unique in that it meets an essential requirement for city dwellers. Due to expanding and changing food demands by urban people searching for cheaper food amid a tough economy, this sector is booming (Muzaffar et al., 2009).

There are various sorts of food vending sites, such as mobile stalls, various pushcarts, roadside stands, and hawkers, depending on the individual's resourcefulness, available resources, type of food sold, and other amenities (FAO, 1990). On the other hand, several foodborne disease outbreaks have been linked to inadequate personal cleanliness among food workers. Foodborne infections are rising in both developed and developing countries (Hoffmann & Scallan, 2017). The impacted groups for any unprecedented foodborne outbreaks from poor sanitation at the stall will be the seller and the

buyer. These may come from the nearby community, visitors, or even tourists from other countries.

1.2 Problem Statements

Based on reported UN-Water Global Analysis and Assessment of Sanitation and Drinking-Water, GLAAS 2016/2017 data, there are 26 total diarrhoea deaths in Malaysia due to inadequate WASH in children under five years old (WHO, 2018).

Recently, based on the data from Statista Research Department, published by Hirschmann (2021), they were 16 thousand food poisoning cases, 180 typhoid cases, and 94 hepatitis A cases in Malaysia related to food and waterborne diseases in the year 2019.

Food and waterborne disease are related to few factors such as the condition of the food itself, source of water and poor management of water that lead to poor sanitation (WHO, 2015). Ingestion of meals contaminated with bacteria or chemicals causes foodborne illnesses. The contamination of food may result from environmental contamination and poor sanitation. As for the street food vendors setting, wash food and cutlery using contaminated stored water was the contamination route.

If not treated promptly, food poisoning can be fatal. As a result, under Malaysian law, all new cholera cases, typhoid, paratyphoid, and any other form of food poisoning or dysentery must be reported (Ezat, 2013). Moreover, stalls

that do not have their running water have minimal safe water. Improper water treatment like unfinished boiling water may happen simultaneously, and the water might be contaminated again without a proper storage method. The growth of mould and other fungal will contaminate the water stored inside (Babič et al., 2017).

1.3 Study Justification

Knowledge, attitude and practice is a type of study to measure the current level of respondents knowledge- what they know, attitude- what they believe, and practice- what they do related to specific topics through the survey. In this KAP study, the findings will help to identify knowledge gaps, cultural beliefs, and behavioural patterns that may identify needs, problems, and barriers to help plan and implement intervention related to WASH among Serdang's street food vendors.

Stalls that did not have their own running water (piped water) have very limited safe water at one time. Water may get contaminated again without a proper storage method, and there will be a limitation in maintaining sanitation and cleanliness at the stall. Serdang was selected because it has many street food vendors and potential buyers as this location are surrounded by many institutes of higher education and few residential areas.

In other hand, sociodemographic are the most suitable variable to classify and compare the data collected, as conduct in other KAP study as to determine which specific category have low or high scored on item assessed. Moreover,

it is better to identify which category have the highest score, so that people can choose better street food stall, and authority can conduct specific intervention programmes to reduce food and waterborne diseases originated from street food vendors.

1.4 Research Questions

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

i. What is the level of knowledge, attitude and practice towards WASH among street food vendors?

ii. Is there any correlation between the level of knowledge, attitude and practice towards WASH?

iii. Is there any association between sociodemographic and the level of knowledge attitude and practices of street food vendors related to WASH?

iv. Is food handling course is one of the contributing factors for the level of knowledge, attitude and practice among street food vendors towards WASH?

1.5 Research Objectives

1.5.1 General Objective

To determine the level of knowledge attitude and practice towards water sanitation and hygiene among Serdang's street food vendors.

1.5.2 Specific Objective

i. To describe the sociodemographic of the respondents.

ii. To determine the level of knowledge, attitude and practice towards WASH among street food vendors in Serdang, Selangor.

iii. To determine the association between respondents' sociodemographic characteristics with level of knowledge, attitude and practice towards WASH.

iv. To determine the relationship between the food handling course attended and the level of knowledge, attitude and practice towards WASH.

1.6 Hypothesis

i. There is an association between respondents' sociodemographic characteristics and the level of knowledge, attitude and practice towards WASH among Serdang's street food vendors.

ii. There is a relationship between food handling course attendance and level of knowledge attitude and practice towards WASH.

1.7 Conceptual Framework

Figure 1.1 shows all variables that will be included in this study. The population that will be studied is the street food vendors around Serdang, Selangor area. The sociodemographic characteristic and other confounding factors based on the previous study correlate to the respondent's level of knowledge, attitude and practices. The level of knowledge determines the respondent's understanding of WASH and where the knowledge comes from to determine the most effective medium for providing the knowledge for street food vendors. In addition to that, the level of attitude shows the respondent thought and perception towards WASH. Lastly, the level of practices shows how respondents practice their knowledge and how their attitude affects the practices. An internal and external barrier of practising the best measure to WASH can be determined at this level. All of the assessed levels were

associated with each other. The outcome of inadequate knowledge, attitude, and practice will result in unsafe water/contaminated water that will lead to food and waterborne disease.

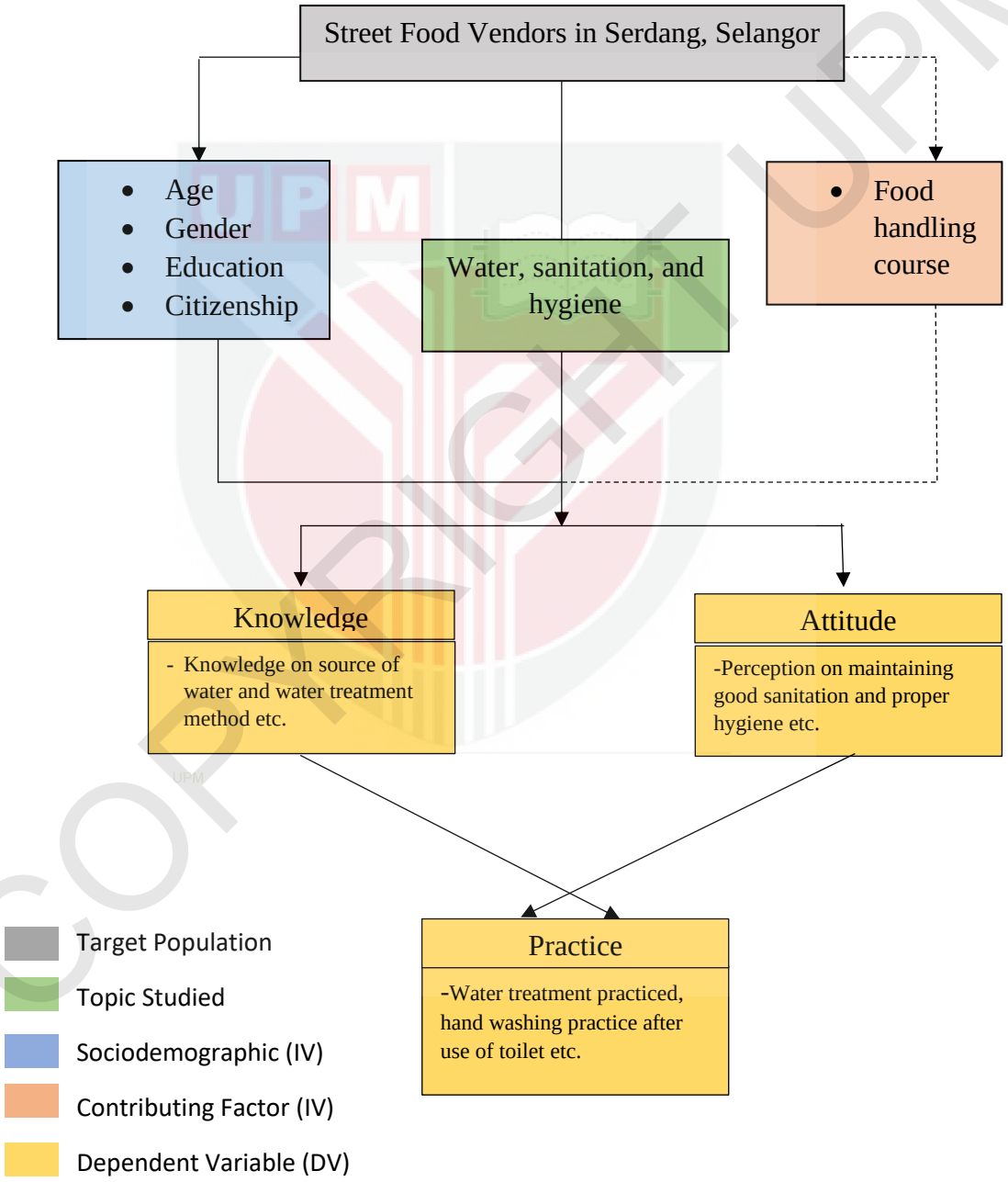


Figure 1.1 Conceptual Framework

CHAPTER 2

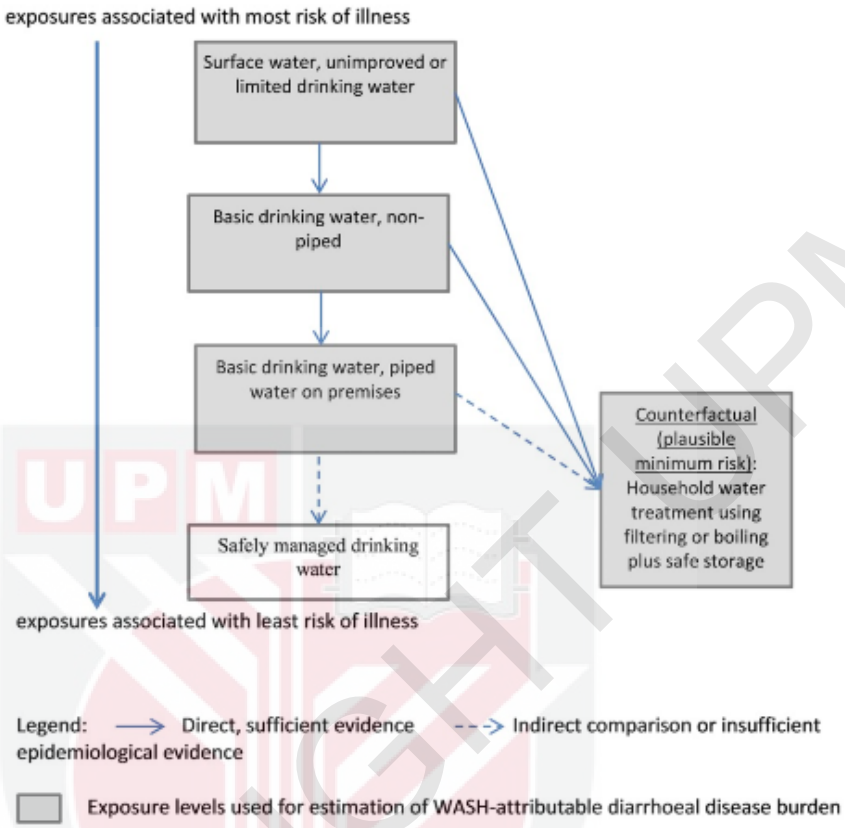
LITERATURE REVIEW

2.1 Water, Sanitation and Hygiene among Street Vendors

"Inadequate WASH" refers to a variety of WASH services, behaviours, and associated hazards for specific health outcomes, such as drinking water, sanitation, and hygiene (Prüss-Ustün et al., 2019). The WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation, and Hygiene defines sanitation and drinking water services and the provision of a handwashing facility with soap and water on-premises (WHO, n.d.-e). Street food vendors without easy access to safe water may have difficulty practising proper hygiene and sanitation practice. Moreover, food is easily contaminated by unsafe water, germs on hands and flies, and unclean surfaces if people do not have access to safe drinking water, basic sanitation, and hygiene. These routes of contamination can result in diarrhoea, environmental enteropathy, and other gastrointestinal illnesses, as well as malnutrition (WASH Advocates, 2013)

2.1.1 Drinking-Water

Over 5 billion people drank water from well-managed sources. Another 1.4 billion people accessed at least essential services. More than 206 million people relied on rudimentary services, 435 million relied on unimproved sources, and 144 million relied on surface water (UNICEF, 2019). Each different source of water comes with a different risk of illness. Figure 1 shows exposure levels for drinking water-related burden of diarrhoeal disease estimates (Prüss-Ustün et al., 2019).



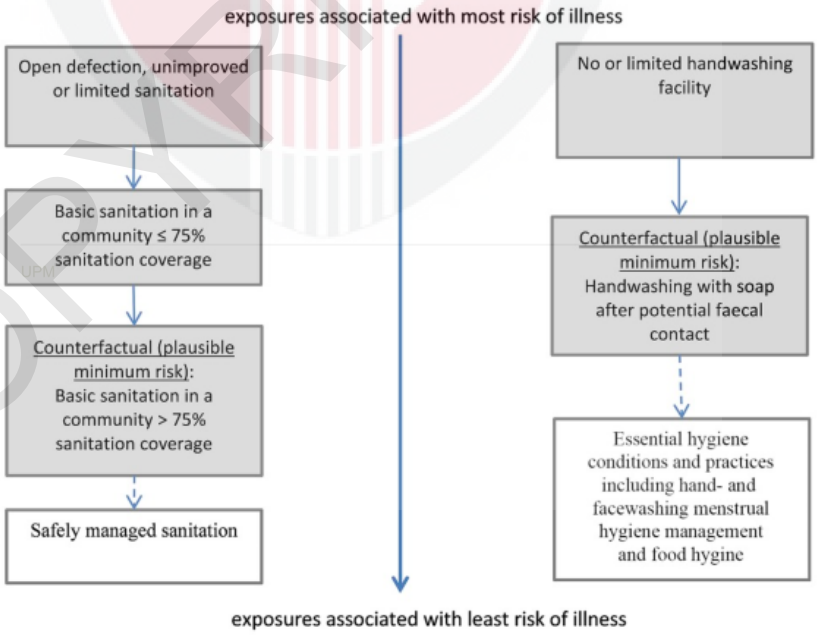
(Prüss-Ustün et al., 2019)

Figure 2.1: Exposure levels for drinking water-related burden of diarrhoeal disease estimates

Data on relevant exposure levels were available from country-representative surveys and censuses published by the JMP, resulting in exposure estimates (WHO & UNICEF, n.d.). Water filtration or boiling to prevent recontamination was picked as the counterfactual exposure level. The evidence on other improvements such as improved water quality and the availability of piped water to buildings remains insufficient. The most recent meta-analysis provided the corresponding exposure-response associations (Wolf et al., 2018)

2.1.2 Sanitation

Health, survival, and development are all dependent on sanitation and hygiene. Many countries struggle to provide appropriate sanitation for their entire populations, putting individuals at risk of diseases connected to water, sanitation, and hygiene (WASH). An estimated 2.4 billion people (more than 32% of the world's population) do not have access to basic sanitation (WHO & UNICEF, 2015). In addition to that, access to facilities for the safe disposal of human waste is defined as basic sanitation (faeces and urine). Additionally, through services such as garbage collection, industrial/hazardous waste management, and wastewater treatment and disposal, it is possible to maintain hygienic conditions (CDC, 2017). Figure 2 shows sanitation exposure levels and their association with the risk of illness (Prüss-Ustün et al., 2019).



(Prüss-Ustün et al., 2019)

Figure 2.2: Exposure level of sanitation and hygiene water-related burden of diarrhoeal disease estimates

Sanitation exposure data from the JMP was used to calculate exposure estimates (WHO & UNICEF, n.d.). An examination of survey data at the cluster level is used to determine exposure to essential sanitation services in a community with more than 75 percent coverage with essential sanitation services (Wolf et al., 2018). The new evidence on additional diarrhoeal illness benefits from safe sanitation when people reside in communities with high sanitation coverage is known as the exposure-response connection (Fuller & Eisenberg, 2016; Jung et al., 2017). As a result, the counterfactual exposure scenario involves using basic sanitation services in a community where basic sanitation services cover more than 75% of people. The 75 percent sanitation coverage cut-off was chosen based on previous sanitation intervention studies that indicated improved diarrhoea reductions after that point (Wolf et al., 2018).

2.1.3 Hygiene

Hand washing, face washing, and bathing with soap and water are examples of hygiene activities that can increase cleanliness and lead to better health. Personal hygiene etiquette is challenging to practise in many parts of the world due to a shortage of clean water and soap. Many diseases can spread if the hands, face, or body are not cleansed properly at important periods (CDC, 2021).

Figure 2 show hygiene exposure level associated with risk of illness (Prüss-Ustün et al., 2019). Exposure estimates are predicated on "having a handwashing facility with soap and water on-premises," that is, a basic handwashing facility (WHO & UNICEF, 2018), and information can be accessed through the JMP through country-representative household surveys like Demographic Health Surveys and Multiple Indicator Cluster Surveys (WHO & UNICEF, n.d.). This proxy indicator has been translated to actual handwashing with soap prevalence based on an investigation of the relationship between the presence of a basic handwashing facility and observed handwashing with soap (Wolf et al., 2018).

Infections, non-communicable diseases from exposure to toxins in drinking water, and negative effects on well-being have all been related to unsafe WASH (WHO, n.d.-a). Table 1 below presents a list of adverse health outcomes that can at least partly be attributed to inadequate WASH, and Table 2 shows the matching exposure-exposure relationship used for WASH attributable burden of diarrhoeal disease estimation (Prüss-Ustün et al., 2019).

Table 1: Adverse health outcomes that are least partly attributable to inadequate water, sanitation and hygiene behaviours.

Global WASH-attributable disease burden not quantified	Global WASH-attributable disease burden estimates available	
Health outcomes	Health outcomes	Main WASH exposure
Arsenicosis	**Ascariasis**	sanitation
Cyanobacterial toxins	Cancer (bladder)	drinking water
Fluorosis	Dengue	water resource management/water bodies
Hepatitis A, E	**Diarrhoeal diseases**	drinking water, sanitation, hygiene behaviours*
Lead poisonings	Drowning[d]	recreational water/water bodies
Legionellosis	**Hookworm disease**[a]	Sanitation
Leptospirosis	Japanese Encephalitis	water resource management/agricultural practices
Methaemoglobinaemia	Lymphatic filariasis	water resource management/water bodies
Neonatal conditions and maternal outcomes	**Malaria**[d]	water resource management/water bodies
Poliomyelitis	Musculoskeletal diseases	drinking water
Scabies	Onchocerciasis	water resource management
Spinal injury	**Protein-energy malnutrition**[a,b,c]	drinking water, sanitation, hygiene behaviours*
	Respiratory infections[c]	hygiene behaviours*
	Schistosomiasis[a,b,c,d]	drinking water, sanitation, hygiene behaviours*, water resource management/ agricultural practices/recreational water
	Trachoma[a,c]	sanitation, hygiene behaviours*
	Trichuriasis[a]	Sanitation

(Prüss-Ustün et al., 2019)

Table 2: Information on counterfactual, outcome association and potential for bias by health outcome

health outcome	WASH counterfactual exposure definition	prevalence of WASH counterfactual exposure in 2016	RR for/association between WASH counterfactual exposure and outcome# (against lowest level of exposure, e.g., unimproved WASH)	counterfactual definition used	potential for bias
diarrhoea	water: household water treatment using filtering or boiling	33.1% (WHO and UNICEF, undated)	RR 0.52 (0.35, 0.77)* (Wolf et al., 2018a)	plausible minimum risk	predominately non-blinded intervention studies but bias-adjustment performed
	sanitation: basic sanitation in a community > 75% sanitation coverage	45.3% (Wolf et al., 2018c)	RR 0.55 (0.34, 0.91) (Wolf et al., 2018a)		
	hygiene: handwashing with soap after potential faecal contact	26.2% (Wolf et al., 2018b)	RR 0.86 (0.35, 2.07)* (Wolf et al., 2018a)		
acute respiratory infections	hygiene: handwashing with soap after potential faecal contact	26.2% (Wolf et al., 2018b)	RR 0.84 (0.79, 0.89) (Rabie and Curtis, 2006)	plausible minimum risk	predominantly non-blinded intervention studies
protein-energy malnutrition	*same as for diarrhoea*	*same as for diarrhoea*	combining the PAF for stunting attributable to diarrhoea (25% (8%, 38%)) (Checkley et al., 2008) with the PAF of WASH-attributable diarrhoeal disease (60% (54%, 65%))	*same as for diarrhoea*	includes only WASH-attributable burden via diarrhoea, only stunting is considered as indicator for malnutrition
schistosomiasis	basic drinking water and basic sanitation services	basic drinking water: 87.2%; basic sanitation: 62.0% (WHO and UNICEF, undated)	basic drinking water: RR 0.53 (0.47, 0.61) (Grimes et al., 2014); basic sanitation: RR 0.65 (0.54, 0.78) (Freeman et al., 2017)	feasible minimum risk	RR estimates from observational studies only
malaria	safe water resource management	0% (Keiser et al., 2005)	RR 0.21 (0.13–0.33) (Keiser et al., 2005)	theoretical minimum risk	disease burden estimates based on stronger assumptions
soil-transmitted helminth infections	safely managed water and safely managed sanitation services, essential hygiene conditions and essential hygiene practices	NA	RR 0	theoretical minimum risk	disease burden estimates based on stronger assumptions
trachoma	safely managed water and safely managed sanitation services, essential hygiene conditions and essential hygiene practices	NA	RR 0	theoretical minimum risk	disease burden estimates based on stronger assumptions

RR: relative risk, NA: not applicable, # separate RR for water, sanitation and hygiene are combined using equation (2), * adjusted for potential non-blinding bias.

(Prüss-Ustün et al., 2019)

2.2 Knowledge, attitude and practice towards water, sanitation and hygiene

The prevalence of waterborne diseases in communities is influenced by people's knowledge, attitudes, and practices around WASH. Poor WASH awareness leads to unsanitary habits and attitudes, polluting water and spreading disease (Yusuff et al., 2014). Such a lack of WASH knowledge leads to false perceptions of water quality, resulting in a high reliance on surface waters, as well as inefficient water collection and storage practices that contaminate water and cause illnesses (J. Kurui et al., 2019).

2.2.1 Source of water

Access to clean water is critical to one's health and survival. There were 99.2% of food handlers aware that washing food with clean water reduces the risk of contamination and that eating raw water increases the risk of food contamination. (Cempaka et al., 2019). However, this study fails to justify either the food handlers know the exact meaning of safe water as stated by WHO. They are two types of source water that suits the street food vendors: surface water, precipitation, and running water. An example of surface water is river water, and this water source comes in relatively large quantities but usually contaminated and considered unsafe. Rainwater is an example of precipitation. This two-source often being used in emergencies situation (Maes et al., 2019). Direct running water is another secure and safest water source among the other two. Nonetheless, water usage is mostly determined by access to water, including distance, altitude differences, and queue at the supply point (Maes et al., 2019).

2.3.2 Water Treatment Method Used

Water treatment procedures have been demonstrated to minimise the rate of diarrhoea infection in children and the level of the cholera outbreak and disease transmission among individuals, as well as increase microbiological drinking water quality and prevent infections (WHO, 2002). The boiling procedure is simple and effective, but it leaves a terrible taste in the water and increases the possibility of post-contamination. The filtration method is relatively simple but rather expensive and also have the risk of post contamination (Maes et al., 2019).

2.3.3 Water Storage Practices, Handling Attitudes, and Knowledge of Quality and Safe Water

Maintaining quality drinking water and preventing waterborne diseases at home requires the proper use of storage vessels and handling attitudes (Oloruntoba et al., 2016); uncovered water storage containers and those with large apertures make water vulnerable to contamination; container cleaning is critical in preventing bacterial recontamination of domestic water. (Meierhofer et al., 2019). On the other hand, cups used to retrieve water from storage containers should have ladles or handles to avoid filthy hands dipping into the water during the etching procedure and should be kept on a clean surface (Haftu et al., 2017) or hung after usage.

Apart from that, a study by Soboksa et al. (2019) founds that the respondents lack knowledge of quality drinking water as many responded that quality water means visually clear water. This knowledge has an impact on roadside stall water storage practices, putting people at risk of diarrhoea and waterborne infections. However, in

terms of attitude, the majority of respondents had an attitude that the water used to wash utensils should be discarded when the colour changes. (Iwu et al., 2017).

As for the storage of the water, jerry cans with a narrow aperture lessen the possibility of people sticking their hands inside, but they are more difficult to clean. Buckets with customised lids that have a narrow aperture are appropriate since they allow for safe water collection and internal cleaning (Maes et al., 2019).

2.3.4 Stall and Environmental hygiene

According to a KAP study by Sridhar et al. (2020), respondents define household and environmental hygiene as sweeping the house, cleaning the kitchen, properly disposing of wastewater, and properly disposing of solid trash on a regular basis. This can be applied the same to stall hygiene since food stalls had their owns kitchen or area to prepared food.

In order to keep the stalls clean, wastewater drainage and disposal are also a consideration. Stagnant water, whether it is rainwater or wastewater, necessitates efficient wastewater disposal systems to prevent odours, insect larva nesting sites, contamination of water sources, and pathogen transmission. (Maes et al., 2019). When compared to respondents who practised washing with cold water and a dry cloth, the number of respondents who practised washing with cold water, soap, and a dry cloth has tripled (Iwu et al., 2017).

2.3.5 Water-related diseases perceived in communities

Typhoid and diarrhoea/dysentery are two prevalent waterborne diseases that are similar to foodborne diseases. Diarrhoea, cholera, and typhoid fever are frequent diseases linked to WASH, and they can be prevented by providing safe water, adequate sanitation, and enhanced hygiene. (CDC, n.d.). The majority of survey participants in Jakarta are aware of foodborne diseases, and the study discovered that hand washing is one of the most significant approaches to prevent foodborne diseases. (Cempaka et al., 2019)

2.3.6 Sociodemographic factor

WASH comprises water, hygiene, and sanitation, and food hygiene is one of the primary topics. Female gender, youth age group, and one with a lot of experience dominated the level of knowledge, attitude, and practise for food handlers (Abdul-Mutalib et al., 2012). However, high education background does not assure that they have an excellent level of knowledge, attitude, and good practice as the food handler with lower education show a higher amount of excellent level of KAP based on that study.

2.4 Conclusion

In conclusion, the knowledge of respondents towards water sanitation and hygiene was high, but their practice of ensuring the availability of safe running water is poor. Having running water at the stall is a detrimental factor in preventing foodborne illness or any water-related disease, not only for the vendors but also for the local customers and tourists. It is the first step of securing hygiene and sanitation at the street food vendors.

CHAPTER 3

MATERIALS AND METHODS

3.1 Research Design

This research was a qualitative study since the KAP; no measurement and collection of water samples used by street food vendors.

3.2 Study Design

In this study, a cross-sectional study design was to determine the level of knowledge attitude and practice towards water sanitation and hygiene among street food vendors.

3.3 Study Location

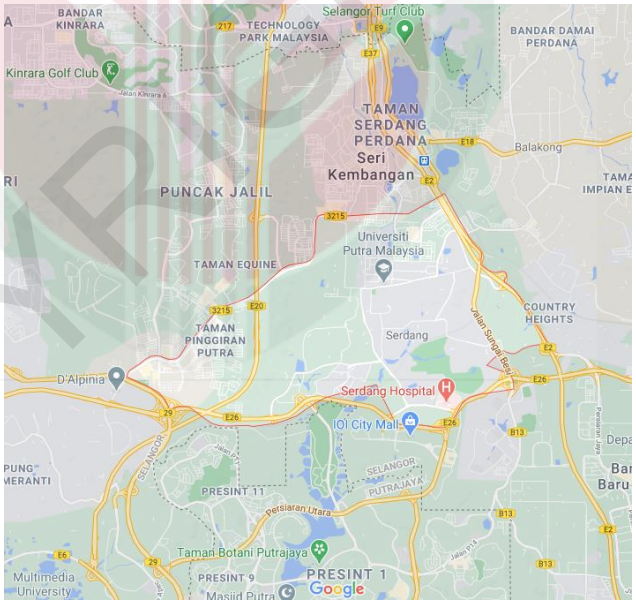


Figure 3: Map Location of Serdang Area

(Google, n.d.)

This study was conducted around Serdang in Selangor Darul Ehsan.

3.4 Study Population

The study population of this survey was Serdang's street food vendors.

3.5 Sampling Method

The sampling method that was used is purposive sampling, whereby only the street food vendors in the selected area have the probability of becoming the respondents.

3.6 Sample Size Calculation

The sample size was based on the single proportion formula:

$$N=Z^2pq/d^2 \quad (1)$$

where N is the required sample size, Z is the reliability coefficient at 90% confidence interval (1.645), p is the population proportion, q is equal to 1−p, and d is the acceptable error (0.1) (Barman, 2015).

The following shows the overall score percentages based on previous studies (the value for p used in this study was 37%) knowledge, 37%; attitude 19% and practice, 11% towards among street food handlers (Rahman et al., 2016). Standard values that could be used in this formula to calculate sample size might be either larger or smaller of a better estimate of p. This procedure should be used when someone is unable to arrive at a better estimate of p (Wesson, 2006)

$$\begin{aligned} N &= 1.645^2 \text{x} 0.37 \text{x} 0.63 / (0.1)^2 \\ &= 63 + 6\ (10\%) \\ &= 69 \end{aligned} \quad (2)$$

Therefore, the required minimum sample size for this study was 69 with 10% relative precision and after considering 10% non-response rate into account.

3.7 Research Instruments

3.7.1 Questionnaire

A questionnaire was used to collect relevant information based on study objectives, especially concerning the knowledge attitude and practices level. The questionnaire was adapted from another study by United Nations Human Settlements Programme (2015) and was modified according to the targeted population. This questionnaire will be scored using a percentage score from true or false for knowledge and from 5 points Likert scale for attitude and practice. The questionnaire is only available in the Malay language. The questionnaire consists of several parts in which are as following.

- Part A: Sociodemographic and Personal Information

  This section contains items on gender, age, race, religion and level of education

- Part B: Knowledge Assessment

  This section comprises questions that will assess respondents' knowledge related to WASH.

- Part C: Attitude Assessment

  This section comprises questions that will assess respondents' attitudes towards WASH.

- Part D: Practice Assessment

  This section comprises questions that will assess respondents' practice according to WASH.

3.7.2 Inclusion and Exclusion Criteria

In this study, there were a3 few inclusion and exclusion criteria for choosing or accepting responses from the respondent.

3.7.2.1 Inclusion criteria

Those who have all criteria listed below were included or allowed to partake in this study.

i. Related to street food vendors (owner, staff) and,
ii. Street food stall located in Serdang, and
iii. Local workers or foreign workers that understand Bahasa Malaysia
iv. More than 18 years old

3.7.2.2 Exclusion criteria

Those who have one of the listed criteria were prohibited from partaking in this study, and the already filled questionnaire was discarded.

i. Not related to street food vendors (customer) or
ii. Street food stall that located exceed 10km from Serdang area borderline, or
iii. Immigrants
iv. Below 18 years old

3.7.3 Quality Assurance and Quality Control of Questionnaire

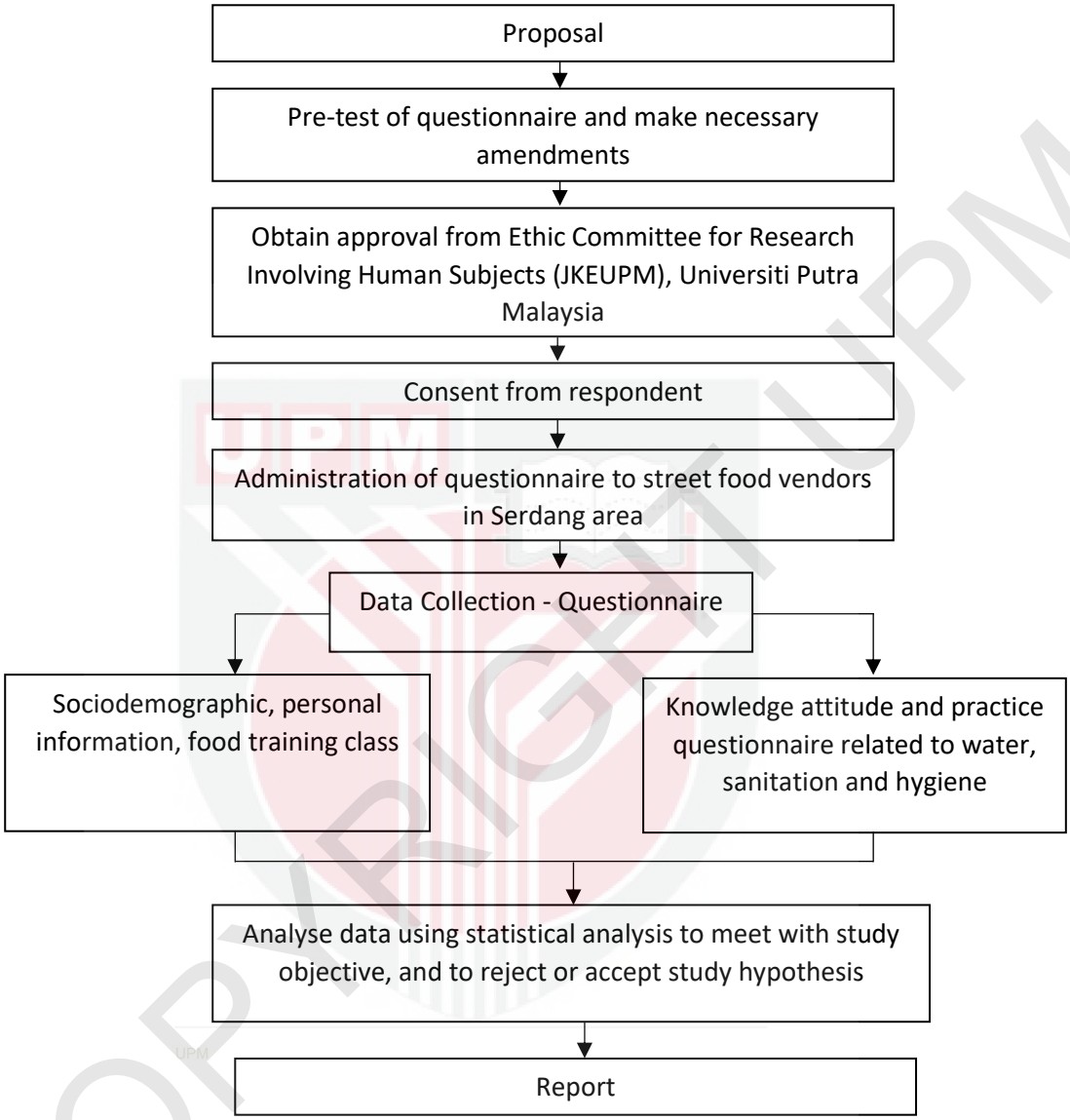
A pre-test questionnaire has been conducted prior to data collection. The population surveyed in this pre-test is the street food vendors in Bangi, Selangor. The sample size for the pre-test is 10% of the real sample size, which is 7 out of 69 respondents. For this pre-test, the data was collected from 10 street food vendors that vary in age and gender. The pre-test has been conducted to observe whether the questionnaire is understandable, to avoid any unfamiliar terms to them, and to find any error in the questionnaire booklet.

Overall, a minor modification has been made to make the questionnaire clearer and understandable. The questionnaire has been tested for its reliability using IBM SPSS Version 22, whereby the Cronbach alpha value was obtained to indicate its internal consistency. The Cronbach alpha for each Likert scale question has been determined by using the choice of answer from the pre-test respondent, and all the Cronbach Alphas are more than 0.7, Knowledge items; α=0.859, Attitude items; α=0.73, Practice items; α=0.87 which are acceptable for its' internal consistency. In addition to that, the questionnaire was marked only with a unique respondent code for the issue of confidentiality.

3.8 Data Collection

The data collection will be conducted through the questionnaire. The overall process of data collection was depicted in Section 3.9.

3.9 Study Flowchart



3.10 Data Analysis

The questionnaire data obtained were recorded and analysed using IBM Statistical Package for Social Science (SPSS) Version 22. Statistical analysis was performed to analyse the variables in this study. Categorical and continuous will be identified as well for further statistical analysis with other variables.

3.10.1 Inferential Statistics

Statistical Package for Social Science Version 22 (SPSS) will be select as the statistical analysis tool. The inferential statistical test was conducted according to study objectives, which are as follow:

Objectives	Statistical Test
To determine sociodemographic characteristics of respondents.	Descriptive analysis
To ascertain the level of knowledge, attitude and practice towards WASH among street food vendors in Serdang, Selangor.	Descriptive analysis
To determine the association between respondents' sociodemographic and the level of knowledge attitude and practice towards WASH.	Chi-Square Test

To determine the relationship between the food training program and the level of knowledge, attitude and practice towards WASH.	Chi-Square Test

3.11 Declaration of Conflict of Interest

No conflict of interest.

CHAPTER 4

RESULTS

4.1 Study Background

This study was conducted at street food vendors located in Serdang, Selangor. The response rate was 86.7% where out a total of 98 respondents were identified and approached; 85 individuals agreed to participate in the survey.

4.2 Sociodemographic

Sociodemographic of Serdang's street food vendor was collect by analyzing the answer given by respondents in Part A; Sociodemographic and Personal Information. The majority of the respondents came from the young age group, which at 61(71.8%), followed by 22(25.9%) respondents from the middle age group and 2(2.4%) respondents from the elderly age group. They were 77(90.6%) local respondents and 8(9.4%) non-local respondents. They were 55(64.7%) male street food vendors and 30(35.3%) female street food vendors involved in this study. They were 45(52.9%) respondents that currently in or stop at secondary education, which was the majority in this study. The next to follow is tertiary education. They were 29(34.1%) respondents at this level. They were also 6(7.1%) respondents in primary education and 5(5.9%) respondents that did not go to school. The results were tabulated in Table 4.1.

Table 4.1. Sociodemographic characteristics of street food vendors in Serdang

Sociodemographic characteristics	Study group (N=85) N (%)
Age group (years)	
Young (18-35)	61 (71.8)
Middle age (36-55)	22 (25.9)
Elderly	2 (2.4)
Gender	
Male	55 (64.7)
Female	30 (35.3)
Citizenship	
Local	77 (90.6)
Non-local	8 (9.4)
Level of Education	
No education	5 (5.9)
Primary Education	6 (7.1)
Secondary Education	45 (52.9)
Tertiary Education	29 (34.1)

4.3 Knowledge Towards WASH

Knowledge level towards WASH for street food vendors in Serdang, Selangor was high at 96.5% (n=82). Despite the high percentage of good knowledge level, some of the items in the questions they did not know and failed to answer correctly.

Source of water

Of 85 respondents, 49(57.6%) respondents did not know that tube well/ borehole is also one of the safe sources of drinking water practice in Malaysia and some regions in another country. Also, 67(21.2%) respondents had the idea that rainwater is a safe source of drinking water. However, 40(47.1%) respondents believe rainwater can be used for kitchen and other uses.

Water treatment

Water treatment is a crucial process to makes the source of water safe to be consumed by humans. There were 68(80%) respondents who answered boiling is an effective water treatment method. However, there are more respondents, 77(90.6%) answered filtration using ceramic, sand, composite; as an effective water treatment method. On the other hand, there were 11(12.9%) of respondents that show poor knowledge by having the idea that filtration using cloth, and 8(9.4%) of respondents answer that letting the water stand and let the sediments settle will make the water safe to drink.

Water parameter

The majority of the respondents knows well about the parameter of safe and clean water. There were 69(81.2%) respondents who answered safe water is colourless, and 68(80%) respondents answered safe water is also odourless. Other than that, 32(37.6%) respondents answered water that has sediments is also safe water. These were the three physical water parameters assessed in the questionnaire. Besides, there were 73(85.9%) respondents answered safe water should also free from germs.

Waterborne disease

Many waterborne diseases can occur from the use of unsafe and untreated water. There were 71(83.5%) respondents who answered that they know about diarrhoea, and 70(82.4%) respondents knew that stomach pain is also the disease that one can get from drinking unsafe water. However, 57(67.1%) of respondents failed to recognise cholera and typhoid and, 59(69.4%) of respondents failed to recognise dysentery as the disease related to consuming contaminated or unsafe water. Apart from that, one of the highest percentages of poor knowledge in this study, which was 62(72.9%) of the respondents that they did not recognise tapeworm as one of the waterborne diseases.

Water contamination

There were 78(91.8%) respondents who knew that dispose trash near the water storage, 81(95.3%) knew that trash fall into the water, and 70(82.4%) knew that contaminated water combines with safe and clean water, not considering the amount, will surely contaminate the water inside. As for contamination during storing, 81(95.3%) respondents knew that using a dirty container or unwashed container, and 78(91.8%)

respondents knew if larvae were found inside the water storage, the water inside is contaminated and not safe to be used. There were 76(89.4%) respondents who knew that stored water should be close tightly all the time, and 71(83.5%) respondents knew that water containers should be wash daily or weekly, depends on their use.

Water contamination can occur while handling the water. The majority of respondents, 78(91.8%), knew that using contaminated or unclean pot/bucket/handling cup, 68(80%) knew that handling water using dirty hands, and 54(63.5%) knew that putting hand or fingers inside the water, will contaminate the water. There were 51(60%) who knew that using piped water containers can reduce the risk of contamination, and 49(57.6%) respondents knew pouring could reduce the risk of contamination rather than using a handling cup.

Sanitation

Sanitation of street food vendors is mainly at the toilet facilities use. There were 68(80%) respondent knew using the clean and proper toilet will reduce risk of contamination at the stall, and 53(62.4%) respondents knew that toilet that experiencing water supply cut or disruption cannot be used since it the same of using out of service toilet.

Personal hygiene

As for the personal hygiene of the food handlers, all 85(100%) respondents knew hands need to be wash before preparing foods or drinks. There were 81(95.3%) respondents knew hands supposed to be wash anytime when hands are dirty; however, although it was only a minority, of 9(10.6%) respondents do not know they were

supposed to wash hand after using the toilet. Moreover, 83(97.6%) respondents knew the best method of washing hand is using water along with soap, and there were 81(95.3%) respondents knew drying wet hands are supposed to use clean towel/napkin, and 83(97.6%) of respondents knew they could not clean their wet hands using their work outfits. Table 4.2 below shows all the distribution of knowledge items.

Table 4.2: Distribution of knowledge items on WASH

Knowledge items	*n* = 85 Correct n **(%)**[a]
General knowledge:	
Water	
Source of drinking water	
1. surface water/pipe	77 (90.6)
2. tube well/borehole	36 (42.4)
3. rainwater	67 (78.8)
Source of water for kitchen and other uses	
1. surface water/pipe	83 (97.6)
2. tube well/borehole	42 (49.4)
3. rainwater	40 (47.1)
Water treatment	
1. boiling	68 (80)
2. filtration (ceramic, sand, composite)	77 (90.6)
3. filter using cloth	74 (87.1)
4. let it stand and settle	77 (90.6)
5. water treatment makes water safe for drink	85 (100)
Safe drinking water	
1. colourless	69 (81.2)
2. odourless	68 (80)
3. no sediments	53 (62.4)
4. boiled water	70 (82.4)
5. filtered water	74 (87.1)
6. free form germs	73 (85.9)
Water-related diseases/illnesses	
1. diarrhoea	71 (83.5)
2. stomach pain	70 (82.4)
3. dysentery	26 (30.6)
4. cholera	28 (32.9)
5. tapeworm	23 (27.1)
6. typhoid	28 (32.9)
Water contamination	
1. dispose trash near water	78 (91.8)
2. trash falls into the water	81 (95.3)
3. animals get contact with the water	53 (62.4)
4. contaminated water combine with safe/clean water	70 (82.4)
5. contaminated pot/bucket/barrel	78 (91.8)

6. handling container with dirty hands	68 (80)
7. putting hand/fingers into the water	54 (63.5)
8. using unwashed containers as storage	81 (95.3)
9. stored water not covered properly	64 (75.3)
10. larvae found in water	78 (91.8)
11. stored water should be kept close at most of the time	76 (89.4)
12. the piped water container can reduce the risk of contamination	51 (60)
13. pouring can reduce the risk of contamination rather than using handling cups	49 (57.6)
14. the water container should be wash daily/weekly depends on the purposes	71 (83.5)
Sanitation	
Toilet / latrines	
1. using a clean toilet can reduce the risk of contamination at a food stall	68 (80)
2. toilet facilities that experiencing water disruption/ no water supply cannot be used	53 (62.4)
Hygiene	
Personal hygiene	
1. both hands need to be wash before eat preparing food/drinks	85 (100)
2. after using	76 (89.4)
3. using water and soap	83 (97.6)
4. drying wet hands with a clean towel/napkin	81 (95.3)
5. cannot dry wet hands with work outfits	83 (97.6)

[a]Percentage of respondents who gave correct answers

4.3 Attitude Towards WASH

Table 4.3 below show that there were 80(94.1%) respondents prefer to have water pipes at their stall since it will increase the accessibility and supply of safe water. Besides, there were 35(41.2%) respondents who have an attitude to consider the use of rainwater as an alternative to clean dishes and kitchen tools. On the other hand, 81(95.3%) will use treated water, 76(89.4%) will use colourless water, 65(76.5%) will use odourless water for drinking. In addition, there were 73(85.9%) respondents who will clean water storage containers to remove seen and unseen dirt, as well as to avoid the growth of fungal or moss, and 70(82.4%) respondents want their stored water free from microbes. There were 76(89.4%) respondents who want their stored water free from being contaminated with chemical substances, 72(84.7%) respondents want to

ensure that the water being used for drinking or cooking is clean and safe so that water-related illness can be prevented, and 64(75.3%) will use safe and clean water to prevent parasitic diseases.

As for sanitation and hygiene items, 83(97.6%) respondents will search for and use a toilet that is clean to be used while at work, 74(87.1%) respondents will never consider open urination and open defecation. Moreover, 83(97.6%) respondents will make sure their hands clean most of the time while at work, and the same amount percentage will use soap when washing their dirty hands rather than using water only. Lastly, there were 56(65.9%) respondents who will make sure that the working outfits they wore were clean.

Table 4.3: Distribution of attitude items on WASH

Attitude items	*n* = 85 Good attitude n **(%)**[a]
Water	
1. I prefer to have a water pipe at my stall since it will increase the accessibility towards safe water, hygiene and reduce the risk of contamination	80 (94.1)
2. I may consider use rainwater as it is a possible alternative for pipe water in case of emergency, for kitchen and other uses only	35 (41.2)
3. I will use treated water (boiled/filtrated) compared to direct pipe water for drinking purposes	81 (95.3)
4. I will use colourless water as it is a sign of safe water	76 (89.4)
5. I will use odourless water as it is a sign of safe water	65 (76.5)
6. I will clean the water storage container to remove dirt and avoid the growth of moss	73 (85.9)
7. I will prevent my stored water from being contaminated with microbe (uncovered/unwashed water containers)	70 (82.4)
8. I will prevent my stored water from being contaminated with chemical drops (harmful kitchen chemical products)	76 (89.4)
9. I will ensure clean and safe water was used in my stall, as it can prevent water-related diseases like diarrhoea and stomach pain	72 (84.7)

10. I will ensure clean and safe water was used in my stall, as it can prevent parasite diseases like tapeworm	64 (75.3)
Sanitation	
1. I will use a clean toilet as it will affect my personal cleanliness	78 (91.8)
2. I will use the toilet and never consider open urination and defecation	74 (87.1)
Hygiene	
1. I will make sure my hand is clean most of the time since dirty hands can contaminate water/food prepared/handle	83 (97.6)
2. I will make sure my working outfits are clean since dirty outfits can contaminate water/food prepared/handle	56 (65.9)
3. I will use soap for washing dirty hands	83 (97.6)
4. I will use soap as it cleaned more thoroughly compared to wash with water only	82 (96.5)

[a]Percentage of good attitude of respondents who answered "strongly agree" or "agree" for attitude that they should have agreed.

4.4 Practice Towards WASH

Table 4.4 showed that among 85 respondents, 84(98.8%) use clean and safe water at their stall, 83(97.6%) did not use any other water from an unimproved source even during a water crisis, 81(95.3%) use treated water for drinking purposes. They use filtration (ceramic, sand, composite) in which were from water filtration machine, 82(96.5%) clean their water storage container and cover it properly, 81(95.3%) will use a clean and functioned toilet whenever they feel urge to go to the toilet at the workplace. The same amount of respondents, 81(95.3%), will wash their hands after went to the toilet. In addition, 83(97.6%) bathe more than twice a day and wear clean cloth for work.

Table 4.4: Distribution of practice items towards WASH

Practice items	*n* = 85 Good attitude n **(%)**[a]
Water	
1. I use clean and safe water sources from surface water/pipe water, or underground water or protected well	84 (98.8)
2. I did not use water source from a pond or unprotected dug well even during a water crisis	83 (97.6)
3. I use treated water for drinking purposes	81 (95.3)
4. I practice filtration (ceramic, sand, composite)/ boiling as my water treatment method	81 (95.3)
5. I keep my water container clean and covered so that no possible contamination from microbes, animals and vectors.	82 (96.5)
6. I place my stored water far from a trash site and dirty place	83 (97.6)
Sanitation	
1. I use a toilet that clean and functions well whenever I feel the urge to go to the toilet when I am at the stall	81 (95.3)
Hygiene	
1. I wash hand using soap after using the toilet	81 (95.3)
2. I bath more than twice a day and wear clean work	83 (97.6)

4.5 Level of Knowledge, Attitude and Practice

Tables 4.5 below shows the level of knowledge, attitude and practice of the respondents. The mean percentage of score (SD) obtained for knowledge is 76.4% (14), attitude 84.4% (15), and practice 96.6 (13).

Table 4.5: Descriptive analysis of the score

Descriptive Statistics				
	Minimum	Maximum	Mean	Std. Deviation
Knowledge	47.73	100.00	76.4706	14.05257
Attitude	37.50	100.00	84.4118	14.99081
Practice	.00	100.00	96.6013	12.71766

Table 4.6 shows, out of 85 respondents, 82(96.5) had good knowledge, 83(97.6) had a good attitude, and 84(98.8) showed good practice towards water, sanitation and hygiene (WASH).

Table 4.6: Distribution of knowledge, attitude, and practice

Category	N (%)
Knowledge	
Good	82 (96.5)
Poor	3 (3.5)
Attitude	
Good	83 (97.6)
Poor	2 (2.4)
Practice	
Good	84 (98.8)
Poor	1 (1.2)

4.5.1 Relationship Between Knowledge, Attitude, and Practice

Based on table 4.7, the correlation between knowledge-attitude shows a significant correlation since the significance value of two-tailed (α-level) shows less than 0.01. Other than that, both correlation between attitude-practice shows significant correlation since the alpha value is less than 0.01. However, there was no significant correlation between knowledge-practice.

Table 4.7: Correlations between the level of knowledge, attitude, and practice

Correlations

		Knowledge	Attitude	Practice
Knowledge	Pearson Correlation	1	.554**	.200
	Sig. (2-tailed)		.000	.067
Attitude	Pearson Correlation	.554**	1	.283**
	Sig. (2-tailed)	.000		.009
Practice	Pearson Correlation	.200	.283**	1
	Sig. (2-tailed)	.067	.009	

**. Correlation is significant at the 0.01 level (2-tailed).

4.7 Sociodemographic and Level of KAP

Based on Table 4.8, there was an association between citizenship and the level of knowledge since the p-value is 0.01, which was less than 0.05. However, there was no association shown between other sociodemographic characteristics and the level of knowledge.

Table 4.8: Association between sociodemographic and knowledge

Variable	Knowledge, N (%)		Test statistics	
	Good	Poor	X^2	p-value
Age Group				
Young (18-35)	60 (98.4)	1 (1.6)	2.712[a]	0.258
Middle age (36-55)	20 (90.9)	2 (9.1)		
Elderly (56 and older)	2 (100)	-		
Gender				
Male	53 (96.4)	2 (3.6)	0.05[b]	0.942
Female	29 (96.7)	1 (3.3)		
Level of Education				
No education	5 (100)	-	4.396[c]	0.222
Primary education	5 (83.3)	1 (16.7)		
Secondary education	43 (95.6)	2 (4.4)		
Tertiary education	29 (100)	-		
Citizenship				
Local	76 (98.7)	1 (1.3)	11.957[d]	0.01*
Non-local	6 (75)	2 (25)		

[a]4 cells (66.7%) have expected count less than 5. The minimum expected count is .07.
[b]2 cells (50.0%) have expected count less than 5. The minimum expected count is 1.06.
[c]5 cells (62.5%) have expected count less than 5. The minimum expected count is .18.
[d]2 cells (50.0%) have expected count less than 5. The minimum expected count is .28.
*p-value more less than 0.05, shows association

Table 4.9 below shows, there was no association shown by the chi-square test between all sociodemographic characteristics and the level of attitude as all p-value obtained exceeds 0.05. Therefore, it was statistically proven that there was no association between each level of sociodemographic and level of attitude on WASH.

Table 4.9: Association between sociodemographic and attitude

Variable	Attitude, N (%)		Test statistics	
	Good	Poor	X^2	p-value
Age Group				
Young (18-35)	60 (98.4)	1 (1.6)	0.644[a]	0.725
Middle age (36-55)	21 (95.5)	1 (4.5)		
Elderly (56 and older)	2 (100)	-		
Gender				
Male	54 (98.2)	1 (1.8)	0.194[b]	0.660
Female	29 (96.7)	1 (3.3)		
Level of Education				
No education	5 (100)	-	0.420[c]	0.936
Primary education	6 (100)	-		
Secondary education	44 (97.8)	1 (2.2)		
Tertiary education	28 (96.6)	1 (3.4)		
Citizenship				
Local	75 (97.4)	2 (2.6)	0.213[d]	0.645
Non-local	8 (100)	-		

[a]4 cells (66.7%) have expected count less than 5. The minimum expected count is .05
[b]2 cells (50.0%) have expected count less than 5. The minimum expected count is .71.
[c]5 cells (62.5%) have expected count less than 5. The minimum expected count is .12
[d]2 cells (50.0%) have expected count less than 5. The minimum expected count is .19

Table 4.10 below shows, there was no association shown by the chi-square test between all sociodemographic characteristics and the level of practice as all p-value obtained exceeds 0.05. Therefore, it was statistically proven that there is no relationship between each level of sociodemographic and level of attitude on WASH.

Table 4.10: Association between sociodemographic and practice

Variable	Practice, N (%)		Test statistics	
	Good	Poor	X^2	p-value
Age Group				
Young (18-35)	60 (98.4)	1 (1.6)	0.398[a]	0.819
Middle age (36-55)	22 (100)	-		
Elderly (56 and older)	2 (100)	-		
Gender				
Male	54 (98.2)	1 (1.8)	0.552[b]	0.458
Female	30 (100)	-		
Level of Education				
No education	5 (100)	-	0.899[c]	0.826
Primary education	6 (100)	-		
Secondary education	44 (97.8)	1 (2.2)		
Tertiary education	29 (100)	-		
Citizenship				
Local	76 (98.7)	1 (1.3)	0.105[d]	0.746
Non-local	8 (100)	-		

[a]4 cells (66.7%) have expected count less than 5. The minimum expected count is .02.
[b]2 cells (50.0%) have expected count less than 5. The minimum expected count is .35.
[c]5 cells (62.5%) have expected count less than 5. The minimum expected count is .06.
[d]2 cells (50.0%) have expected count less than 5. The minimum expected count is .09.

4.8 Food Handling Course Attendance and Level of KAP

Based on Table 4.11, there is no association between food handling courses attended by street food vendors and the level of KAP on WASH, as the p-value obtained from the chi-square test were all exceed 0.05. Therefore, the level of KAP on WASH is not associated with the food-handling course.

Table 4.11: Association between food handling course and level of KAP

Variable	Food Handling Course		Test statistics	
	Yes	No	X^2	p-value
Knowledge				
Good	56 (96.6)	26 (96.3)	0.004	0.953
Poor	2 (3.4)	1 (3.7)		
Attitude				
Good	57 (98.3)	26 (96.3)	0.314[a]	0.575
Poor	1 (1.7)	1 (3.7)		
Practice				
Good	57 (98.3)	27 (100)	0.471[b]	0.493
Poor	1 (1.7)	-		

[a]2 cells (50.0%) have expected count less than 5. The minimum expected count is .64.

[b]2 cells (50.0%) have expected count less than 5. The minimum expected count is .32.

CHAPTER 5

DISCUSSION

5.1 Sociodemographic

In this study, the number of Serdang's street food vendors that were male, in young age (18-35); local; and in or finish at secondary education, dominates the percentage in their respective sociodemographic characteristics. In addition, the percentage of respondents that attend the food-handling course was more compared to the one that did not attend.

There was a study conducted by Ismail et al. (2016) in Shah Alam, Selangor, found that out of 320 respondents involved in his study among mobile food handlers consists of 168(52.5%) male and 150(46.9%) female. In addition, the percentage of the respondent that currently in or stop at the secondary level is the highest in which at 135(42.2%). These findings were similar to this study, whereas more male respondents compared to the female respondent, and the majority of the food handlers stop or finished their education at the secondary level.

In contrast to this study, a study conducted by Jores et al. (2018) for 117 street food vendors in Padawan, Sarawak, found that the female respondent, 70(59.8%), was more than male respondents at 47(40.2%). In addition to that, also found that the percentage of the respondent that does not attend food handling courses was higher at 75(64.1%) than the percentage that attends food handling course, 42(35.9%). However, this study showed similarity in citizenship and the level of education, in

which the non-Malaysian was the lowest 2(1.7%) compared to Malaysian 115(98.3%), the level of education was the highest at secondary education 81(69.2%).

5.2 Knowledge on WASH

In this study, the percentage of street food vendors that show good knowledge of WASH was high compare to those shows poor knowledge. Even the mean score of the knowledge items is the lowest when compared to the mean score of attitude and practice. Overall, the respondents in this study had shown a good knowledge of WASH. In contrast to this, a KAP study on was that was conducted in Tigray Region, Northern Ethiopia, found that the respondent that having poor knowledge on WASH, 437(57.8%), was higher compared to the respondent that was having good knowledge, which was at 319(42.2%) (Berhe et al., 2020).

In this study, the majority of Serdang's street food vendors know that diarrhoea and stomach pain is an example of diseases or illness that one can get from consuming unsafe water and the water they stored can be contaminated. Similar to this study finding, a KAP study on WASH conducted by Berhe et al. (2020) among rural residents in Tigray Region, Northern Ethiopia, show majority of respondents, which at 726(96.9%), knew that unsafe water could cause diarrheal diseases and 680(90.9%) of respondents knew that water could get contaminated. Another study by United Nations Human Settlements Programme (2015) showed that, out of 500 respondents, 331(66.2%) believe that water can be made safe to drink by straining it through a piece of cloth, while 448(90%) believe that water can be made safe by

boiling it. These findings were similar to our study except for the straining with cloth items. The majority of Serdang Street's food vendors knew that filtration (ceramic/sand/composite), and boiling was the effective water treatment method, and only a minority, 11(12.9%) believed that filter using cloth is a correct water treatment method.

Moreover, the most important regulation of food service personal hygiene is that vendors must wash their hands often, according to 116(96.6%) respondents in Padawan, Sarawak. More than 96% of respondents were able to properly answer the personal hygiene knowledge question (Jores et al., 2018). Correspondingly, a study by Cempaka et al. (2019) found that 99.2% of respondents know that washing hands before work reduce the risk of food contamination and using raw water as food can increase the risk of food contamination. This was similar to our findings since the majority (more than 89%) of street food vendors in Serdang know the importance of personal hygiene, in which the knowledge on handwashing was assessed.

In addition, this study found that less than half of the total respondents know that a small towel use for drying hands can be a source of food contamination (Cempaka et al., 2019). This finding was in contrast with the finding of this study. The vast majority of Serdang's street food sellers are aware that wet hands should be dried with a clean towel or napkin. This possibly means that they also had knowledge that visibly dirty towels or faulty smell napkins can contaminate the food and drinks they handle.

5.3 Attitude Towards WASH

In this study, the mean score of attitude was higher than the mean score of knowledge but slightly lower than the mean score of practice. Besides, the percentage of vendors that show a good attitude is more than the percentage of vendors that show a poor percentage. Overall, the attitude shown by Serdang street food vendors towards WASH was good.

A similar study conducted in Northern Ethiopia, contrarily, showed that 385(48.5) had a favourable attitude, while 365(51.5%) respondents had an unfavourable attitude. There were 447(59%) respondents who agreed, and 272(36%) respondents strongly agreed that consumption of safe and enough water can prevent waterborne diseases, and 336(44%) agreed, and 376(50%) strongly agreed that boiling water before consumption helps to remove disease-causing microorganisms. Besides, 293(39%) respondents agreed, and 441(58%) respondents strongly agreed that water containers must always be clean (Berhe et al., 2020). The majority of respondents in this study answered that they will use treated water either from filtration or boiling and will clean the water storage container to remove seen or unseen dirt and to avoid promotion of algal growth, thus affecting the safety and cleanliness of their water.

On the other hand, a study by Berhe et al. (2020) found that 379(50%) respondents agree and 329(44%) respondents strongly agree that diarrheal diseases are caused by poor personal hygiene and sanitation. There were 393(52%) respondent agree,

and 309(41%) respondents strongly agree that washing hands after using latrine prevents diarrheal diseases, and 363(48%) respondents disagree, and 152(20%) respondents strongly disagree that washing hands with water alone is enough to sanitise hands. The majority of respondents in this study showed the same attitude, as they will use the clean toilet as the cleanliness of toilet can affect their personal cleanliness, would use soap for washing dirty hands.

Another study found that, according to the respondents' perceptions, 367(73.4%) respondents believe the treated water is clean, whereas 109(21.8%) respondents believe it is not. There were 20(4%) respondents who believed that the water they have treated is completely safe (United Nations Human Settlements Programme, 2015). This attitude is quite similar to our findings, in which the majority of Serdang's street food vendors will only use treated water, boiled or filtrated, for drinking purposes, although the source of water they use is from piped water. The majority of them will never use the piped water directly for drinking purposes.

5.4 Practice Towards WASH

In this study, the mean score of practice is the highest compared to the mean score of knowledge and mean score of attitude. Besides, the percentage of respondents that had shown good practice is more than the poor practice. Overall, the majority of Serdang's street food vendors showed good practice towards WASH.

In contrast to this study finding, based on a study conducted by Berhe et al. (2020), 372(49.2%) respondents showed good practice while 384(50.8%) respondents showed poor practice. They showed an almost equal level of good and poor practice among the respondents. However, the majority of them use a protected source of water supply (pump/spring), while only a minority of the total respondents use an unprotected source of water supply (river/spring). Another similar study by United Nations Human Settlements Programmes (2015) at Wundwin, Myanmar, found that the majority of respondents use improved water sources from tube well, boreholes, protected dug wells, and rainwater collection, while only 69(13.8%) respondents use unimproved water source from unprotected dug well, dam, and creek for drinking purposes. This may be happening since some region on Northern Ethiopia and Myanmar still does not have accessibility to pipe water system which. Majority of Serdang Street food vendors use pipe water as main source of water since Malaysia government and local government authority provide high accessibility towards pipe water in most of the building and houses located in this sub urban area.

In addition, another study showed that the majority of respondents did not use any water treatment methods, while just a minority of respondents used a water filter and boiling as their water treatment method. The absence of water treatment is due to a belief that water is already pure, the cost of purifying methods, a lack of time, and a lack of knowledge about water treatment procedures (Hothur et al., 2019).

As for sanitation, and only a minor percentage of respondents practised appropriate solid waste practice, while the majority of them practised inappropriate disposal. However, this result may be affected by only 267(35.3%) respondents have latrines, and only 224(84%) respondents among those having latrines utilise it. As for hygiene, the majority of respondents wash their hands using water and soap/ash (Berhe et al., 2020). The majority of Serdang's street food vendors use the toilet whenever they feel the urge to urinate or defecate while at their workplace. However, they were still a minority who may practice open urination or even open defecation based on the score on these items. This might happen due to toilet facilities is too far from the workplace or the lack of staff at the workplace prevent one from being absent at his/her position for too long.

Sanitation is a crucial practice item in one's life, especially for food handlers. In China, sanitation is critical for diarrhoea and cholera reduction, with (1.56) relative risk for diarrhoea reduction by excreta disposal and (11.2) higher relative risk for diarrhoea reduction without improved drinking water (Cairncross & Valdmanis, 2006). Furthermore, sanitation facilities for human waste disposal resulted in a 68%reduction in cholera incidence, as well as a lower risk of spreading and developing secondary cholera cases in the community, demonstrating that sanitation helped cholera control (Shultz et al., 2009). Therefore, the high number of sanitation facilities in Serdang, either private or own by local government authorities, well plan and proper distribution on the location of toilet and location of street food stall, along with the good practice shown by Serdang's street food vendors, would surely affect the reduction rate of diarrhoea and cholera cases.

Moreover, in contrast to this study, a study in Jakarta found that only 43.8% of food workers wash their hands, indicating a poor practice. This is possible because there are insufficient facilities for food handlers to wash their hands, such as a sink, clean toilets, and a clean water source (Cempaka et al., 2019). Although Serdang's street food vendors were facing the same problem, being far from direct piped water, no sink and no toilet on-premises, the majority of them show good practice on washing hands with soap by using their stored water.

5.5 Association Towards Level of KAP

In this study, we found that there was no association between all sociodemographic characteristics and level of knowledge, attitude and practice except for citizenship and the level of knowledge on WASH. There was also no association between the food-handling course attended and the level of knowledge. Maybe this is because the items assessed in the knowledge assessment was not teach in the course, or maybe the general question of knowledge items can be correctly answered without the knowledge gained by attending a food handling course.

Knowledge is a critical aspect in determining one's behaviour. Knowledge has numerous degrees, one of which is application; if someone reaches this level, his knowledge will be utilised or applied in line with well-established principles (Efendi & Makhfduli, 2009). Knowledge is delivered from the certified food handling course agency that was made detrimental for all food handlers, based on authority's order. A study by Cempaka et al. (2019) found that having good knowledge can improve the practice. Food handlers with a good level of

knowledge tend to be three times more likely to obtain a good level of practice compared to food handlers with a moderate level of knowledge.

In addition, citizenship was the only variable that statistically associated with the level of knowledge. We believe that this was due to differences in working experience and surrounding environment, Malaysia's policies and infrastructure corresponding to SDG Goal No.6 make local vendors more knowledgeable than non-local vendors. All local involved in this study was Malay. A study by Rahman et al. (2012) found that Malay vendors in Northern Kuching City had about three times good knowledge compared to poor knowledge.

There was no association between the food-handling course attended and the level of knowledge. It was because the items assessed in the knowledge assessment was not taught specifically in the course, although WASH items were mentioned in Food Hygiene Regulations 2009, or maybe the question of knowledge items are general and can be correctly answered without the knowledge gained from attending food handling course.

CHAPTER 6

CONLUSION AND RECOMMENDATION

6.1 Conclusion

Street food vendors are blooming in Malaysia, as it is a common culture of Asian countries. Without proper implementation strategy in providing access to safe and clean water to the street food vendors, Malaysia will surely have a higher incidence rate of food and waterborne disease coming from street food vendors customers, either local customers or foreigners. WASH term may be unknown to street food vendors as they were nonprofessional, but the aspect of WASH generally known to all. Street food vendors are also an important part of society, as they live in a community and providing ready to eat foods and drinks to anyone that comes to their stall. Malaysia is famous for its variety of foods, not only for locals but also for tourists. Visitors from other countries would want to eat a variety of safe and delicious food and drinks in Malaysia. A clean and hygienic foods preparation using WASH attributes would produce safe to eat food and drinks.

Based on this study, we conclude that Serdang's street food vendors have access to piped water, but not at their food stall. They had stored the water so that the water can be used occasionally. They show a good level on the three items assessed, which were the knowledge, attitude and practice towards water, sanitation and hygiene. Although there was a small percent of street food vendors that shows poor practice, as a customer, it can be improved further by a good propagation of policies and measures by the authority. Availability and easy access to clean, safe, and potable water, is one of the things that should be done to improve the working conditions and amenities of

street food stalls. The findings from this study should inspire government authorities to promote street food safety strategies even more.

6.2 Recommendation

Sustainable Development Goals, No 6, is already achievable in Serdang, Selangor, as most of the street Serdang's street food vendors have access to safe water and clean water through the piped system. This achievement was happened all because of the efforts of the Malaysian government. Preventing the use of contaminated water and unsafe water would prevent the prevalence or incidence of food and waterborne disease in the community. Therefore, the government should always try their best in providing a continuous safe water supply and avoid as much water disruption by thinking of alternatives or implementing a recommendation from experts to avoid future water crises in Malaysia. Malaysian should be thankful and grateful and should also show a high level of practice in ensuring that the safe water received through a pipe is stored properly and being treated effectively either via filtration or boiling method before being consumed.

For the next similar study, it is recommended to conduct a KAP assessment on WASH among food handlers at the school canteen or find other races, not only Malays, to be included as a respondent in the study, depends on sociodemographic at the sampling area. In this study, no other races were found eligible to become respondents, as we only found non-Malay vendors who run fruit stalls, sell food on trucks, and sell my car boot. Moreover, Malaysia is a multiracial company, so to have a variety of races involved in the study would be able to assess either race do play a role or not in the

level of knowledge, attitude and practice towards WASH. Street food seller training related to WASH should be emphasised to improve the safety of street food. Other policies and measures should be implemented to help vendors in Serdang, Selangor improve their WASH knowledge, attitudes, and practices.

REFERENCES

Abdul-Mutalib, N. A., Abdul-Rashid, M. F., Mustafa, S., Amin-Nordin, S., Hamat, R. A., & Osman, M. (2012). Knowledge, attitude and practices regarding food hygiene and sanitation of food handlers in Kuala Pilah, Malaysia. *Food Control*, *27*(2), 289–293. https://doi.org/10.1016/j.foodcont.2012.04.001

Babič, M. N., Gunde-Cimerman, N., Vargha, M., Tischner, Z., Magyar, D., Veríssimo, C., Sabino, R., Viegas, C., Meyer, W., & Brandão, J. (2017). Fungal contaminants in drinking water regulation? A tale of ecology, exposure, purification and clinical relevance. *International Journal of Environmental Research and Public Health*, *14*(6). https://doi.org/10.3390/ijerph14060636

Barman, A. (2015). Applied Statistics in Research. *Undefined*.

Berhe, A. A., Aregay, A. D., Abreha, A. A., Aregay, A. B., Gebretsadik, A. W., Negash, D. Z., Gebreegziabher, E. G., Demoz, K. G., Fenta, K. A., & Mamo, N. B. (2020). Knowledge, Attitude, and Practices on Water, Sanitation, and Hygiene among Rural Residents in Tigray Region, Northern Ethiopia. *Journal of Environmental and Public Health*, *2020*. https://doi.org/10.1155/2020/5460168

Cairncross, S., & Valdmanis, V. (2006). *Disease Control Priorities in Developing Countries : Chapter 41*. www.worldbank.org

CDC. (n.d.). *Disease Threats and Global WASH Killers: Cholera, Typhoid, and Other Waterborne Infections | Global Water, Sanitation and Hygiene | Healthy Water | CDC*. Retrieved November 24, 2020, from https://www.cdc.gov/healthywater/global/WASH.html

CDC. (2017). *Sanitation & Hygiene Home | Global Water, Sanitation and Hygiene | Healthy Water | CDC*. https://www.cdc.gov/healthywater/global/sanitation/index.html

CDC. (2021). *Water, Sanitation & Environmentally-related Hygiene | Hygiene | Healthy Water | CDC*. https://www.cdc.gov/healthywater/hygiene/index.html

Cempaka, L., Rizki, A. A., & Asiah, N. (2019). Knowledge, Attitudes and Practices Regarding Food Hygiene and Sanitation of Food Street Handlers in the Public Elementary School at Greater Jakarta, Indonesia. *Asia Pacific Journal of Sustainable Agriculture, Food and Energy*, *7*(2). https://doi.org/10.36782/apjsafe.v7i2.1944

Efendi, F., & Makhfduli. (2009). *Keperawatan Kesehatan Komunitas: Teori dan Praktik dalam Keperawatan - Google Buku*. https://books.google.co.id/books?id=LKpz4vwQyT8C&printsec=frontcover&hl=id#v=onepage&q&f=false

Ezat, S. W. (2013). PAPER REVIEW OF FACTORS, SURVEILLANCE AND BURDEN OF FOOD BORNE DISEASE OUTBREAK IN MALAYSIA. In *Malaysian Journal of Public Health Medicine* (Vol. 13, Issue 2).

FAO. (1990). Street foods. Report of an FAO Expert Consultation, Jogjakarta, Indonesia, 5-9 December 1988. *FAO Food and Nutrition Paper*, *46*, 1–96. https://pubmed.ncbi.nlm.nih.gov/2767251/

Fuller, J. A., & Eisenberg, J. N. S. (2016). Herd protection from drinking water, sanitation, and hygiene interventions. *American Journal of Tropical Medicine and Hygiene*, *95*(5), 1201–1210. https://doi.org/10.4269/ajtmh.15-0677

Goal 6: Clean water and sanitation. (n.d.). Retrieved December 2, 2020, from https://www.my.undp.org/content/malaysia/en/home/sustainable-development-goals/goal-6-clean-water-and-sanitation.html

Google. (n.d.). *Google Maps*. Retrieved June 14, 2021, from https://www.google.com.my/maps/@2.9917025,101.720581,12.5z

Haftu, D., Kassie, G. G., & Hayelom, D. H. (2017). Assessment of Water Handling and Sanitation Practices Among Rural Communities of Farta Woreda, Northwest Ethiopia. *American Journal of Health Research*, *5*(5), 119–124. https://doi.org/10.11648/j.ajhr.20170505.11

Hirschmann. (n.d.). • *Malaysia: food and water borne disease cases 2019 | Statista*. Retrieved June 14, 2021, from https://www.statista.com/statistics/999156/food-and-water-borne-disease-cases-malaysia/

Hoffmann, S., & Scallan, E. (2017). Epidemiology, Cost, and Risk Analysis of Foodborne Disease. In *Foodborne Diseases: Third Edition* (pp. 31–63). Elsevier Inc. https://doi.org/10.1016/B978-0-12-385007-2.00002-4

Hothur, R., Arepalli, S., & Doddoju Veera Bhadreshwara, A. (2019). A KAP study on water, sanitation and hygiene among residents of Parla village, Kurnool district, Andhra Pradesh. *International Journal Of Community Medicine And Public Health*, *6*(5), 2081. https://doi.org/10.18203/2394-6040.ijcmph20191823

Ismail, F. H., Chik, C. T., Muhammad, R., & Yusoff, N. M. (2016). Food Safety Knowledge and Personal Hygiene Practices amongst Mobile Food Handlers in Shah Alam, Selangor. *Procedia - Social and Behavioral Sciences*, *222*, 290–298. https://doi.org/10.1016/j.sbspro.2016.05.162

Iwu, A. C., Uwakwe, K. A., Duru, C. B., Diwe, K. C., Chineke, H. N., Merenu, I. A., Oluoha, U. R., Madubueze, U. C., Ndukwu, E., & Ohale, I. (2017). Knowledge, Attitude and Practices of Food Hygiene among Food Vendors in Owerri, Imo State, Nigeria. *Occupational Diseases and Environmental Medicine*, *5*, 11–25. https://doi.org/10.4236/odem.2017.51002

J. Kurui, E., M. Ogendi, G., N. Moturi, W., & O. Nyawanga, D. (2019). Household Water Handling Practices in the Arid and Semi-Arid Lands in Kenya. In *The Relevance of Hygiene to Health in Developing Countries*. IntechOpen. https://doi.org/10.5772/intechopen.80392

Jores, D., Arif, M. T., & Rahman, M. M. (2018). Factors Associated with Food Hygiene Practices Among Street Food Vendors in Padawan, Sarawak. *Borneo Journal of Resource Science and Technology*, *8*(1), 56–65. https://doi.org/10.33736/bjrst.824.2018

Jung, Y. T., Lou, W., & Cheng, Y. L. (2017). Exposure–response relationship of neighbourhood sanitation and children's diarrhoea. *Tropical Medicine and International Health*, *22*(7), 857–865. https://doi.org/10.1111/tmi.12886

Maes, P., Van den Bergh, R., & Van den Noortgate, J. (2019). Water, sanitation, and hygiene. In *Oxford Handbook of Humanitarian Medicine* (pp. 1031–1050). Oxford University Press. https://doi.org/10.1093/med/9780199565276.003.0056

Meierhofer, R., Wietlisbach, B., & Matiko, C. (2019). Influence of container cleanliness, container disinfection with chlorine, and container handling on recontamination of water collected from a water kiosk in a Kenyan slum. *Journal of Water and Health*, *17*(2), 308–317. https://doi.org/10.2166/wh.2019.282

Mizanur, R., Taha, A. M., Kamaluddin, B., & Zainab, T. (2012). FOOD SAFETY KNOWLEDGE, ATTITUDE AND HYGIENE PRACTICES AMONG THE STREET FOOD VENDORS IN NORTHERN KUCHING CITY, SARAWAK. *Undefined*.

Muzaffar, A. T., Huq, I., & Mallik, B. A. (2009). Entrepreneurs of the Streets: an Analytical Work on the Street Food Vendors of Dhaka City. *International Journal of Business and Management*, *4*(2). https://doi.org/10.5539/ijbm.v4n2p80

Oloruntoba, E. O., Babalola, T. F., Morakinyo, O. M., & Mumuni, A. (2016). Effects of improved storage containers on the bacteriological quality of household drinking water in low-income urban communities in Ibadan, Nigeria. *Water Science and Technology: Water Supply*, *16*(2), 378–387. https://doi.org/10.2166/ws.2015.147

Prüss-Ustün, A., Wolf, J., Bartram, J., Clasen, T., Cumming, O., Freeman, M. C., Gordon, B., Hunter, P. R., Medlicott, K., & Johnston, R. (2019). Burden of disease from inadequate water, sanitation and hygiene for selected adverse health outcomes: An updated analysis with a focus on low- and middle-income countries. *International Journal of Hygiene and Environmental Health*, *222*(5), 765–777. https://doi.org/10.1016/j.ijheh.2019.05.004

Rahman, M., Arif, M. T., Bakar, K., & Bt Tambi, Z. (2016). FOOD SAFETY KNOWLEDGE, ATTITUDE AND HYGIENE PRACTICES AMONG THE STREET FOOD VENDORS IN NORTHERN KUCHING CITY, SARAWAK. In *Borneo Science*. https://jurcon.ums.edu.my/ojums/index.php/borneo-science/article/view/169

Shultz, A., Breiman, R. F., Omollo, J. O., Burke, H., Qassim, M., Ochieng, J. B., Weinberg, M., & Feikin, D. R. (2009). Cholera outbreak in Kenyan refugee camp: Risk factors for illness and importance of sanitation. *American Journal of Tropical Medicine and Hygiene, 80*(4), 640–645. https://doi.org/10.4269/ajtmh.2009.80.640

Soboksa, N. E., Hailu, A. B., Gari, S. R., & Alemu, B. M. (2019). Water supply, sanitation and hygiene interventions and childhood diarrhea in Kersa and Omo Nada districts of Jimma Zone, Ethiopia: A comparative cross-sectional study. *Journal of Health, Population and Nutrition, 38*(1). https://doi.org/10.1186/s41043-019-0205-1

Sridhar, M. K. C., Okareh, O. T., & Mustapha, M. (2020). Assessment of Knowledge, Attitudes, and Practices on Water, Sanitation, and Hygiene in Some Selected LGAs in Kaduna State, Northwestern Nigeria. *Journal of Environmental and Public Health, 2020*. https://doi.org/10.1155/2020/6532512

UNICEF. (2019). *Progress on drinking water, sanitation and hygiene 2000–2017 | UNICEF*. https://www.unicef.org/reports/progress-on-drinking-water-sanitation-and-hygiene-2019

United Nations Human Settlements Programme. (2015). *Knowledge, Attitudes and Practices Survey On WATER, SANITATION AND HYGIENE Wundwin Township MYANMAR KAP Survey on Water, Sanitation and Hygiene in Wundwin Township*.

WASH Advocates. (2013). *Global Food Security: The Critical Role of Water, Sanitation, and Hygiene (WASH) WASH and Food Security*. www.WASHadvocates.org

Wesson. (2006). *Wesson DW. Biostatistics: A Foundation for Analysis in the Health Sciences.* 8th Ed. Lexington, SC: John Wiley and Sons Inc; 2006. https://scholar.google.com/scholar_lookup?title=Biostatistics:+A+Foundation+for+Analysis+in+the+Health+Sciences&author=DW+Wesson&publication_year=2006&

WHO. (2021-a). *Estimating WASH-related burden of disease*. Retrieved June 14, 2021, from https://www.who.int/activities/estimating-WASH-related-burden-of-disease

WHO. (2021-b). *Sanitation*. Retrieved December 2, 2020, from https://www.who.int/news-room/fact-sheets/detail/sanitation

WHO. (2021-c). *Water, sanitation and hygiene (WASH)*. Retrieved December 2, 2020, from https://www.who.int/westernpacific/health-topics/water-sanitation-and-hygiene-wash

WHO. (n.d.-e). *Water Sanitation and Health*. Retrieved June 14, 2021, from https://www.who.int/teams/environment-climate-change-and-health/water-sanitation-and-health/monitoring-and-evidence/water-supply-sanitation-and-hygiene-monitoring

WHO. (1996). WHO | Essential safety requirements for street-vended foods. In *WHO*. World Health Organization.

WHO. (2002). *Managing Water in the Home: Accelerated Health Gains from Improved Water Supply Water, Sanitation and Health Department of Protection of the Human Environment World Health Organization Geneva*.

WHO. (2015). *Module 9 - Water & Foodborne Diseases*.

WHO. (2018). *DEMOGRAPHIC ESTIMATES HEALTH ESTIMATES*. http://www.who.int/water_sanitation_health/glaas/en/

WHO, & UNICEF. (n.d.). *Home | JMP*. Retrieved June 14, 2021, from https://washdata.org/

WHO, & UNICEF. (2015). *2015 Progress On Drinking Water and Sanitation*. www.wssinfo.org

WHO, & UNICEF. (2018). *Hygiene | JMP*. https://washdata.org/monitoring/hygiene

Wolf, J., Hunter, P. R., Freeman, M. C., Cumming, O., Clasen, T., Bartram, J., Higgins, J. P. T., Johnston, R., Medlicott, K., Boisson, S., & Prüss-Ustün, A. (2018). Impact of drinking water, sanitation and handwashing with soap on childhood diarrhoeal disease: updated meta-analysis and meta-regression. In *Tropical Medicine and International Health* (Vol. 23, Issue 5, pp. 508–525). Blackwell Publishing Ltd. https://doi.org/10.1111/tmi.13051

Yusuff, A., … W. J.-J. of A. in, & 2014, U. (2014). *Review on prevalence of waterborne diseases in Nigeria*. Eprints.Abuad.Edu.Ng. http://eprints.abuad.edu.ng/52/

APPENDIX A

Respondents Information Sheet

JAWATANKUASA ETIKA UNIVERSITI UNTUK PENYELIDIKAN MELIBATKAN MANUSIA (JKEUPM)
UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG, SELANGOR, MALAYSIA

BORANG 2.4: PENERANGAN DAN PERSETUJUAN RESPONDEN

Sila baca maklumat berikut dengan teliti. Sekiranya anda mempunyai sebarang pertanyaan, sila kemukakan kepada penyelidik.

1.TAJUK KAJIAN:

PENGETAHUAN, SIKAP DAN PELAKSANAAN TERHADAP AIR, SANITASI DAN KEBERSIHAN DI KALANGAN PENJAJA MAKANAN TEPI JALAN DI SERDANG, SELANGOR.

2. PENGENALAN

Penyertaan anda di dalam penyelidikan ini adalah secara sukarela.

Kajian ini akan mengakses pengetahuan, sikap dan pelaksanaan mengenai air, sanitasi dan kebersihan (WASH) di kalangan penjaja makanan tepi jalan di Serdang, Selanor. Kajian ini memfokuskan masalah berkaitan WASH kerana penjaja makanan tepi jalan tidak mempunyai akses kepada air paip dan menggunakan sistem simpanan air bersih sendiri sebagai alternatif. Kebarangkalian untuk penyakit berkaitan air berlaku adalah tinggi sekiranya isu berkaitan WASH tidak mencukupi dan tidak ditangani.

Soal selidik ini akan mengambil masa lebih kurang sepuluh (10) minit untuk diselesaikan. Kami selaku pihak penyelidik mengucapkan ribuan terima kasih di atas penyertaan anda di dalam soal selidik ini.

3. APAKAH YANG PERLU ANDA LAKUKAN?

Sekiranya anda bersetuju untuk terlibat dalam penyelidikan ini, anda diminta untuk mengisi borang kebenaran menjawab sebelum mula menjawab soalan di dalam soal selidik ini. Setelah anda selesai menjawab semua soalan, anda diminta untuk memulangkan borang soal selidik kepada penyelidik.

4. SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?

Kajian ini merangkumi peserta yang bekerja dan terlibat dengan penjajaan makanan di tepi jalan di Serdang, Selangor. Sekiranya anda tidak tergolong di dalam kriteria ini, anda tidak perlu menjawab soal selidik ini.

5. APAKAH FAEDAH MENYERTAI KAJIAN INI?

(a) KEPADA ANDA SEBAGAI PESERTA?

Anda tidak akan mendapat sebarang faedah dari penyelidikan ini, namun penyertaan anda akan membantu para penyelidik menilai pengetahuan, sikap dan pelaksanaan

berkenaan air, sanitasi, dan kebersihan (WASH) di kalangan penjaja makanan tepi jalan di Serdang, Selangor.

(b) KEPADA PENYELIDIK?

Dari kajian ini, penyelidik akan mengetahui tahap pengetahuan, sikap dan pelaksanaan mengenai air, sanitasi dan kebersihan (WASH) di kalangan penjaja makanan tepi jalan di Serdang, Selangor.

6. ADAKAH IA BERISIKO?

Terdapat risiko bahawa anda mungkin tidak selesa untuk menjawab beberapa soalan di dalam borang soal selidik ini. Sekiranya anda merasa soalan berkenaan membuatkan anda tidak selesa, anda tidak perlu menjawab soalan tersebut.

7. ADAKAH MAKLUMAT DAN IDENTITI SAYA KEKAL RAHSIA?

Maklumat dan data peribadi anda yang diperoleh melalui soal selidik ini adalah rahsia dan tidak akan disertakan di dalam sebarang laporan dan penerbitan. Segala maklumat hanya akan digunakan oleh pasukan penyelidik untuk tujuan penyelidikan sahaja.

8. SIAPA YANG SAYA PERLU HUBUNGI SEKIRANYA SAYA MEMPUNYAI SOALAN TAMBAHAN SEMASA MENGIKUTI PENYELIDIKAN INI?

Sekiranya anda mempunyai sebarang pertanyaan mengenai penyelidikan ini, boleh hubungi:

1. Nur Al Amin bin Abdul Aziz (Penyelidik)

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   Emel: nuralamin.upm@gmail.com

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   Jabatan Kesihatan Persekitaran dan Pekerjaan

   Fakulti Perubatan dan Sains Kesihatan

   Universiti Putra Malaysia

Sila tandatangan di sini sekiranya anda telah membaca dan memahami kandungan halaman ini

_____

9. PERSETUJUAN

Saya…… No Kad Pengenalan. …… beralamat……
……..dengan ini bersetuju untuk mengambil bahagian secara sukarela dalam penyelidikan yang tersebut di atas *(kajian klinikal/percubaan ubat-ubatan/rakaman video/kumpulan sasaran/temuduga/ soal selidik).

Saya telah diberi penjelasan secara menyeluruh mengenai penyelidikan ini dari segi metodologi, risiko dan komplikasi (seperti tertulis pada Helaian Penerangan Responden). Saya memahami bahawa saya berhak menarik diri dari penyelidikan ini pada bila-bila masa tanpa memberi sebarang alasan.Saya juga memahami bahawa sebarang maklumat yang berkaitan identiti saya akan dirahsiakan.

Saya* berminat / tidak berminat untuk mengetahui keputusan kajian yang melibatkan saya.

I setuju/tidak bersetuju untuk imei/gambar/rakaman video/ rakaman suara digunakan dalam apa jua bentuk penerbitan atau pembentangan. (sekiranya berkaitan).

*potong yang tidak berkenaan

Tandatangan ……..…… Tandatangan ……..…….
(*Responden*) (*Saksi*)

Tarikh :…….. Nama :……..

No. K/P: ……..

Saya mengesahkan bahawa saya telah menerangkan kepada responden ini sifat dan tujuan penyelidikan yang tersebut di atas.

Tarikh ……..…… Tandatangan ……..…….
(*Penyelidik*)

Appendix B

Respondents Information Sheets

NO. ID : .....

TARIKH : .....

ARAHAN SOALAN:

1. Borang soal selidik ini mengandungi beberapa bahagian iaitu:

BAHAGIAN A: MAKLUMAT LATAR BELAKANG DIRI
BAHAGIAN B: PENILAIAN PENGETAHUAN
BAHAGIAN C: PENILAIAN SIKAP
BAHAGIAN D: PENILAIAN PELAKSANAAN

2. Anda diminta untuk menjawab semua soalan yang ada di dalam borang soal selidik ini.
3. Untuk menjawab, sila tandakan jawapan di bahagian jawapan yang telah disediakan.
4. Borang soal selidik hendaklah dikembalikan kepada penyelidik setelah selesai menjawab semua soalan.

Kesemua maklumat yang diperolehi dalam kajian ini akan dirahsiakan dan hanyalah untuk kajian sahaja

Untuk kegunaan penyelidik

BAHAGIAN A: MAKLUMAT LATAR BELAKANG DIRI

Sila isikan maklumat dan tandakan (/) pada ruang yang berkenaan.

1.1 Umur : ☐☐ tahun

1.2 Jantina : 1. ☐ Lelaki 2. ☐ Perempuan

1.3 Bangsa : 1. ☐ Melayu 2. ☐ Cina
3. ☐ India 4. ☐ Lain-lain

1.4 Pendidikan : 1. ☐ Tidak Bersekolah
2. ☐ Rendah/UPSR
3. ☐ Menengah/PMR/SPM/STPM
4. ☐ Sijil/Diploma/Ijazah

1.5 Adakah anda mempunyai sijil kursus latihan pemakanan?

1. ☐ Ya 2. ☐ Tidak

BAHAGIAN B: PENILAIAN PENGETAHUAN

Tandakan (/) pada pilihan yang benar.

Anda dibenarkan untuk tanda lebih dari satu pilihan jawapan.

Untuk kegunaan penyelidik

4.1 Berikut adalah sumber air yang selamat digunakan untuk minum:

Air permukaan (sungai, kolam air terjun)	
Air paip	
Air bawah tanah (boring)	
Air tadahan hujan	
Tidak tahu	

4.2 Berikut adalah sumber air yang selamat digunakan untuk basuhan dan kegunaan dapur:

Air permukaan (sungai, kolam air terjun)	
Air paip	
Air bawah tanah (boring)	
Air tadahan hujan	
Tidak tahu	

4.3 Berikut adalah jenis rawatan air yang efektif:

Pendidihan	
Penapisan (seramik, pasir, composit)	
Penapisan (kain)	
Pemendapan sendiri	
Tidak tahu	

4.4 Berikut adalah tujuan merawat air:

Membuatkan air lebih selamat untuk diminum	
Tiada tujuan	

Untuk kegunaan penyelidik

4.5 Air yang selamat digunakan ditentukan berdasarkan:

Air yang tiada warna	
Air yang tiada bau	
Air yang tiada mendapan	
Air yang telah didihkan	
Air yang telah ditapis	
Air yang bebas kuman	
Air yang sejuk	
Air yang telah disimpan semalaman	
Tidak tahu	

4.6 Berikut adalah penyakit yang disebabkan dari minum air yang tidak bersih.

Cirit Birit (*Diarrhoea)*	
Sakit Perut (Stomach pain)	
Kolera (Cholera)	
Disenteri (Dysentery)	
Cacing Pita (Tape-worm)	
Cacing Gelang, Kudis Buta, Kulit Gatal (Ringworm, scabies, itchy skin)	
Demam (Catch fever)	
Malaria	
Selesema (Influenza)	
Tifoid (Typhoid)	
Tidak tahu	

4.7 Berikut adalah pernyataan bagi punca pencemaran di sumber air

Buang sampah berdekatan sumber air	
Sampah atau benda kotor jatuh ke dalam sumber air	
Binatang masuk ke dalam sumber air	
Air yang tidak mengalir	
Air tidak bersih dicampurkan dengan air bersih	
Tidak tahu	

4.8 Berikut adalah pernyataan bagi punca pencemaran semasa mengambil air

Menggunakan baldi, bekas,pencedok air yang tercemar	
Menggunakan bekas pencedok air dengan tangan yang kotor	
Memasukkan tangan atau jari semasa mengambil air	
Menggunakan bekas air yang tiada penutup	
Tidak tahu	

Untuk kegunaan penyelidik

4.9 Berikut adalah pernyataan bagi punca pencemaran semasa air disimpan

Menggunakan bekas simpanan air yang kotor/ tidak dibasuh	
Bekas simpanan air tidak ditutup dengan rapi	
Larvae nyamuk dijumpai di dalam air	
Tidak tahu	

4.10 Berikut adalah pernyataan bagi bekas yang digunakan untuk menyimpan air

Bekas air perlulah ditutup rapi setiap masa	
Penggunaan bekas air yang mempunyai paip dapat mengurangkan risiko pencemaran	
Menuang air secara terus lebih selamat berbanding menggunakan bekas pencedok air	
Bekas simpanan air perlu dibersihkan setiap hari	
Bekas simpanan air perlu dibersihkan setiap minggu	
Tidak tahu	

4.11 Berikut adalah pernyataan bagi pengunaan tandas

Penggunaan tandas bersih mengurangkan risiko pencemaran air di gerai	
Tandas tidak boleh digunakan sewaktu bekalan air terputus	
Tidak tahu	

4.12 Berikut adalah pernyataan bagi keperluan membasuh tangan betul

Sebelum makan	
Bila-bila masa sekiranya tangan kotor	
Selepas menggunakan tandas	

4.13 Berikut adalah kaedah membasuh tangan yang betul

Air sahaja	
Dengan sabun	
Dengan serbuk detergen	
Dengan cecair detergen	

4.14 Berikut adalah kaedah mengeringkan tangan yang betul

Tuala/ napkin	
Apa-apa jenis kain	
Biar kering dengan sendiri	
Kain lembab	
Lap di pakaian	

BAHAGIAN C: PENILAIAN SIKAP

Tandakan (/) pada pendapat anda mengenai pernyataan berikut.

Untuk kegunaan penyelidik

1-Sangat Tidak Setuju
2-Tidak Setuju
3-Tidak Pasti
4-Setuju
5-Sangat Setuju

No	Pernyataan	1	2	3	4	5
	Sumber Air					
1	Saya rasa penting untuk sesebuah kedai mempunyai paip air kerana dapat tingkatkan akses kedai kepada bekalan air bersih					
2	Saya rasa sumber air lain seperti air hujan selamat digunakan secara terus untuk kegunaan dapur dan lain-lain					
3	Saya rasa sumber air lain seperti air dari telaga yang tidak dibina dan air kolam tidak selamat digunakan untuk kegunaan dapur dan lain-lain					
	Rawatan Air					
4	Saya rasa air yang didihkan atau ditapis lebih selamat digunakan untuk penyediaan makanan/minuman berbanding air menggunakan air paip secara terus					
	Kualiti Air					
5	Saya rasa air yang selamat adalah air yang tidak mempunyai warna ataupon kekeruhan					
6	Saya rasa air jernih yang tidak mempunyai bau selamat untuk digunakan untuk penyediaan makanan dan minuman					
	Penyimpanan Air					
7	Saya rasa bekas simpanan air perlu dicuci sekali sekali bagi mengelakkan lumut dan bersih dari kotoran					
	Pencemaran Air					
8	Saya rasa salah satu dari pencemaran air adalah disebabkan mikrob (bakteria, fungi)					
9	Saya rasa salah satu dari pencemaran air adalah disebabkan bahan kimia					

	Tandas						
10	Saya rasa kebersihan tandas yang digunakan mempengaruhi kebersihan diri saya						
11	Saya rasa tandas amat penting untuk membuang air, dan tidak akan menggunakan tempat terpencil sebagai pilihan lain untuk membuang air						
	Kebersihan Diri						
12	Saya rasa tangan yang kotor dapat mencemarkan makanan/minuman						
13	Saya rasa pakaian yang kotor dapat mencemarkan makanan/minuman						
14	Saya rasa penggunaan sabun amat penting untuk mencuci tangan.						
15	Saya rasa tangan yang disabun lebih bersih berbanding tangan yang dicuci menggunakan air sahaja						
	Penyakit						
16	Saya rasa penyakit bawaan air seperti cirit birit, keracunan makanan dapat dielakkan dengan menggunakan air bersih						
17	Saya rasa penyakit parasitologi sepert penyakit cacing dapat dielakkan dengan menggunakan air bersih						

Untuk kegunaan penyelidik

BAHAGIAN D: PENILAIAN PELAKSANAAN

Untuk kegunaan penyelidik

Tandakan (/) pada tindakan yang anda telah lakukan untuk gerai anda.

1-Sangat Tidak Setuju,
2-Tidak Setuju,
3-Tidak Pasti,
4-Setuju,
5-Sangat Setuju

Air dirawat = air yang telah dirawat secara pendidihan atau penapisan; tidak termasuk air paip

No	Pernyataan	1	2	3	4	5
	Sumber Air					
1	Saya menggunakan sumber air bersih seperti air paip, air bawah tanah (boring), atau telaga yang dibina.					
2	Saya tidak menggunalan sumber air seperti air kolam atau air dari telaga yang tidak dibina dan tidak terurus.					
	Rawatan Air					
3	Saya memastikan air yang digunakan untuk minuman adalah dari sumber air yang telah dirawat					
4	Saya menggunakan kaedah rawatan air secara pendidihan atau penapisan					
	Penyimpanan Air					
5	Saya memastikan bekas simpanan air bersih, ditutup rapi dan tidak didatangi binatang dan makhluk perosak					
6	Saya memastikan bekas simpanan air berada jauh dari tempat sampah ataupon tempat kotor					
	Tandas					
7	Saya menggunakan tandas yang bersih dan mempunyai sistem pengurusan petinjaan yang berfungsi					
	Kebersihan Diri					
8	Saya menjaga kebersihan tangan dengan membasuh tangan menggunakan sabun setiap kali selepas menggunakan tandas					
9	Saya menjaga kebersihan diri dengan mandi dua kali ataupon lebih dalam sehari dan menggunakan pakaian yang bersih semasa bekerja.					

SOALAN TAMAT

-TERIMA KASIH ATAS KERJASAMA ANDA-

Appendix C

Ethical Approval