

ORIGINAL ARTICLE

Knowledge, Attitude, and Awareness (KAA) Regarding Water, Sanitation, and Hygiene (WASH) Among Rural Residents in Kerian, Perak

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ABSTRACT

Introduction: To study knowledge, attitude, and awareness (KAA) regarding water, sanitation, and hygiene (WASH) among rural residents in three villages in Kerian, Perak. **Methods:** A cross-sectional study was conducted among 165 residents aged 18 years old and above. All respondents were sampled through cluster sampling. A set of validated questionnaires from previous studies consisting of four sections were used to assess the level of KAA. Data analysis was performed by using SPSS Version 22. **Results:** Overall, the study found that knowledge (40.0%), attitude (76.0%), awareness (59.0%) were at moderate levels. Chi-square analysis showed that there was an association between level of knowledge and household income ($X^2=20.765$, $p=0.004$) and gender ($X^2=7.263$, $p=0.027$). However, there was no association between age and level of knowledge ($X^2=8.599$, $p=0.335$). In addition, there was a significant association between knowledge and attitude ($p=0.006$, $r=0.211$), and knowledge and awareness ($p=0.009$, $r=0.203$). Both associations showed a poor correlation between them. **Conclusion:** This study concludes that as knowledge level improves, so does attitude and awareness. The media plays an important role as a medium for behavioral changes communication among the community. Continuous education through health promotion programs is needed to ensure information regarding WASH is distributed fairly among the community.

Keywords: Knowledge, Attitude, Awareness, Water, Sanitation.

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are categorized as one of the most common diseases and one of the leading causes of mortality in children under five years of age (5). Mortality caused by diarrhea is not just due to insufficient water access, but also related with poor sanitation and hygiene practices.

INTRODUCTION

Safe and clean water is a fundamental human right (1). Safe water is defined as water that poses no significant health risk over a lifetime of consumption (2). Globally, this issue has been addressed as Goal 6 in Sustainable Development Goals (SDGs), which aims to ensure accessibility and sustainable growth, especially water and sanitation administration for all.

According to the World Health Organization (WHO), about 2.1 million of the world's population still lack safe water (3). Inadequate safe water causes a huge burden in the form of waterborne diseases. Often, it spreads through the fecal-oral pathway. The common fecal-oral transmission pathways are as follows: hands, flies, food, drinking water, soil, and fomites (4). Diarrheal diseases

Developing countries are affected as half of the population still lacks adequate sanitation facilities (6). Adequate sanitation facilities are latrines or toilets that are safe, culturally and environmentally appropriate to dispose waste or excreta (7). In addition, increasing the access to sanitation facilities are able to reduce the incidence of diarrheal diseases (8). As for hygiene, washing hands with soap helps to minimize the risk of diarrheal diseases and this practice can save many lives (9, 10).

In Malaysia, water safety and sanitation has been considerably improved. The 2015 WHO/ UNICEF Joint Monitoring Program states that 92% of populations have access to improved water sources, and 82% have access to a better quality of sanitation facilities. However, there are still vulnerable communities that are left behind

especially those who are economically poor, residing in informal settlements and also living in rural areas (11).

Many studies have been done in relation to these three domains: water, sanitation, and hygiene (WASH) (12, 13). All these three aspects are complementing each other. For example, a study illustrated that hygiene is a key that complements water and sanitation services. Environmental health benefits would be lost if it does not include hygiene-based considerations (14). Overall, it protects public health by encouraging people to protect themselves from diseases associated with lack of hygiene.

Knowledge, attitude, and awareness (KAA) is a tool used to gather information about what is understood, believed, concerned, and influenced to WASH. It is crucial as WASH efficacy not only depends on the provision of WASH services but may also depends on the compliance of individuals.

A study on WASH is still new and limited in Malaysia. A study from Beluran, Sabah proved that villages had lower coverage of improved water supplies, latrines at home, and improved sanitation facilities (15). This study focused on determining the level of KAA regarding WASH among rural residents in Kerian district, Perak. The results of the study advises proper, effective, and timely public health intervention for communities.

MATERIALS AND METHODS

Study Design

This was a cross-sectional study. In addition, this study assessed KAA regarding WASH among rural residents in Kerian, Perak.

Study Location

Kerian, Perak is known as a 'rice bowl' district with sweeping paddy fields. The economic activity in this district is mostly related to agriculture as well as natural resources. This district consists of 8 sub-districts. Among all sub-districts, Tanjung Piandang area was chosen as the study area for the study.

Sample Size

The sample size was calculated using a web-based sample size calculator (OpenEpi). The following formula was used to determine the sample size:

$$n = [DEFF * Np(1-p)] / [(d^2 / Z_{1-\alpha/2}^2 * (N-1) + p*(1-p)]$$

where n is the sample size estimate, $DEFF$ is the design effect, p is the prevalence of knowledge and attitudes on sanitation and hygiene, $Z_{1-\alpha/2}^2$ is the standard score corresponding to 95% CI, N is the total population and d is the degree of precision.

Using prevalence of knowledge and attitudes on

sanitation and hygiene, p was chosen to be 75.4%. The design effect was set at 1.5 as the target population was clustered (16). The degree of precision was set at 0.08. The total population of the three villages was obtained from an official of the PerakGIS Unit. After application of the formula, the estimated sample size was adjusted for nonresponse rate of 10%. The resulting sample size used in the study was 165 respondents.

Sampling Method

The method for this study was simple random sampling with cluster sampling. Sampling frames were developed to select sampling units by cluster sampling. The selected sampling elements consisted of three villages, Sungai Baru Darat, Parit Tok Hin, and Jalan Pantai Lama/ Sungai Gedabu villages. Consequently, residents from these villages were chosen as respondents for the study.

Study Instrumentation

A validated pre-tested self-administered questionnaire was used for data collection. The questionnaire used Malay and English languages for convenience. The questions were adapted from several previous studies (12, 14, 22). It consisted of four sections: i) background characteristics (18 items), consists of questions on socio-demographic and residential information; ii) knowledge items regarding WASH (8 items); iii) attitude items regarding WASH (10 items); iv) awareness items regarding WASH (10 items).

Data Collection Procedure

The study was conducted through an online survey. The distribution of the consent forms and questionnaires was through the village heads of the selected villages. Link of the online survey was provided by the researcher, and village heads helped in the distribution among the villagers.

Data Analysis

IBM Statistical Package for Social Sciences (SPSS) Version 22.0 was used to analyze data that have already been entered and coded. Descriptive analysis was done using frequencies, percentages, mean and standard deviation for socio-demographic characteristics questions. Spearman rank correlation test were undertaken to measure the association between knowledge and attitude, and knowledge and awareness. Chi-square test was used to measure the association between socio-demographic data (age, gender, household income) with level of knowledge. Level of significance was set at 0.05.

Ethical consideration

Ethics approval was obtained from the Ethic Committee for Research Involving Human Subjects in Universiti Putra Malaysia with the reference number (Ref No: UPM/TNCPI/RMC/JKEUPM/1.4.18.2 (JKEUPM). Permission to conduct the study in the selected village was obtained from the Village Chief's Office. All respondents were

asked to participate voluntarily in the online survey. Beforehand, they were asked to answer a section of an information sheet and give consent before further answering the rest of the questionnaire. Any of the data gathered were treated as private and confidential, and respondents remained anonymous.

RESULTS

Response rate

A total of 165 respondents participated in the online survey, thus achieving a response rate of 100%.

Socio-demographic characteristics

Majority of respondents were 30 to 39 years old, Malay, while females slightly outnumbered males by 84 (50.9%) to 81 (49.1%). Most of them were married and had formal education until SRP/PMR/SPM.

Knowledge regarding WASH

There were eight questions asked to determine the respondent's knowledge of WASH. Respondents were required to answer the questions through Yes or No options. For scoring of every answer, 1 point for every correct answer and 0 for every wrong answer. The overall score was then converted into three levels which are good, moderate, and poor. The range of scores was between 0 to 8 points. Finally, a mean score for knowledge that is 7.0 and standard deviation of 1.00 was used to classify the subjects into three groups: good level (at 8.0), poor level (less than 6.0), and moderate level falls neither good nor poor.

Majority of respondents had moderate knowledge level, which was 40.0%. Referring to the findings, most respondents knew that drinking unsafe water can cause illness (97.6%) and diarrheal diseases (96.4%). They positively stated that they treated drinking water before consumption (78.8%), and they did specify they had heard about drinking water safety (97.0%). Nine in ten (159 (96.4%)) respondents did agree that children feces may contain germs. They did comprehend the importance of using toilets than open defecation (90.9%). In terms of hygiene practice such as food hygiene, sanitation, and latrine use, most respondents (144(87.3%)) understood that it works to prevent diarrheal diseases. However, approximately half of them (95 (57.6%)) admitted that they received information on WASH only for the past 6 months.

Attitude regarding WASH

To explore attitude towards WASH among respondents, 10 questions were asked on the statements for attitude on this topic. For scoring, for every strongly disagree answer, they will receive 1 point, for disagree 2 points, for not certain 3 points, 4 points for agree and 5 points for strongly agree. The score obtained was summed up and categorized into three levels: good, moderate, and poor attitude. A mean score for knowledge that is 36.5

and standard deviation of 4.7 was used to categorize the subjects into three groups: good level (more than 41.2), poor level (less than 31.8), and moderate level falls neither good nor poor.

Based on the findings, 121 (73.3%) respondents agreed that consumption of safe and enough water can prevent waterborne diseases, while 88 (53.3%) agreed that boiling before water consumption helps to remove diseases causing microorganisms. More than half of respondents (58.8%) agreed that animal waste can cause health problems and waste can be breeding sites for flies and rodents. In addition, 104 (63.0%) respondents considered washing hands after using the latrine to help prevent diarrheal diseases. Moreover, 15 (9.1%) respondents responded that washing hands with water is more sufficient than sanitize hands, and 73 (44.2%) disagreed with the action of washing hands after eating than before eating food. Overall, respondents had moderate attitude regarding WASH which was at 76.0%.

Awareness regarding WASH

For awareness regarding WASH, there were 10 questions asked to the respondents. The questions comprised of never, seldom, frequent, and always. The scoring method was used to classify the awareness level, such as 1 point given for never option answer, 2 points for seldom answer, 3 points for frequent answer and 4 points for always answer. The score then was converted in terms of scoring level and categorized into three levels: good, moderate, and poor awareness. A mean score of 36.6 and a standard deviation of 3.1 were used to classify the subjects into three levels: good level (more than 39.7), poor level (less than 33.5), and moderate level falls neither good nor poor.

Most respondents had moderate awareness regarding WASH which was at 76.0%. The findings revealed that 151 (91.5%) respondents always make sure they drink water suitable for drinking. Majority of them (135 (81.8%)) always make sure piped water is safe for drinking and 151 (91.5%) made sure they treated the water to make it safe. Furthermore, majority of them (133 (80.6%)) were always aware that wastewater should be treated before reentering the environment and 144 (87.3%) respondents were always aware that pollution may arise due to untreated wastewater. Also, 100 (60.6%) respondents were aware to keep clean their hands after housecleaning work or disposing of rubbish. Eight in ten or 138 (83.6%) respondents were aware that diarrhea is a serious illness. However, they had neutral awareness of the relationship between diarrhea to river and beach pollution (55.8%) and hygiene practices (47.3%).

Association between Socio-demographic characteristics with level of knowledge regarding WASH

The association between age, gender, and household income with the level of knowledge was analyzed using

Chi-square test as both data were categorical data (Table I).

It was found that there were significant associations between WASH knowledge and household income ($X^2 = 20.765, p < 0.01$) as well as gender ($X^2 = 7.263, p < 0.01$). However, there was no significant association between WASH knowledge and age ($X^2 = 8.599, p = 0.335$).

Table I: Association between socio-demographic characteristics and level of knowledge

Variable	Knowledge, N (%)			Test statistics	
	Good	Moderate	Poor	X ²	p-value
Age					
18-29	6 (54.5)	2 (18.2)	3 (27.3)	8.599	0.335
30-39	28 (34.1)	32 (39.0)	22 (26.8)		
40-49	12 (26.7)	21 (46.7)	12 (26.7)		
50-59	13 (52.0)	9 (36.0)	3 (12.0)		
>60	1 (50.0)	1 (50.0)	-		
Gender					
Male	36 (44.4)	32 (39.5)	13 (16.0)	7.263 ^a	0.027
Female	24 (28.6)	33 (39.3)	27 (32.1)		
Household Income (RM)					
<1000	19 (26.8)	28 (39.4)	24 (33.8)	0.765	0.004
1001-2500	6 (24.0)	9 (36.0)	10 (40.0)		
2501-5000	17 (44.7)	18 (47.4)	3 (7.9)		
5001-10000	16 (57.1)	9 (32.1)	3 (10.7)		
>10000	2 (66.7)	1 (33.3)	-		

Association between level of knowledge, attitude and awareness regarding WASH

The Spearman’s rank correlation test was used to analyze the association between level of knowledge, attitude, and awareness regarding WASH. This test was chosen as it can determine the association between two ordinal data. This test will explain the strength and significant association of the variables. Level of significance was set at $p < 0.05$. The associations were studied among knowledge and attitude, knowledge and awareness. The data obtained are tabulated in Table II.

Table II: Association between knowledge and attitude on WASH

No	Result association	Correlation ‘r’	p-value
1	Knowledge and attitude	0.211	0.006
2	Knowledge and awareness	0.203	0.009

Results show that there was a significant association between knowledge and attitude since the p-value is < 0.05 [p -value = 0.006], but it was not strong as the correlation coefficient between them was weak [$r_s = 0.211$]. Moreover, the statistical analysis for the association between knowledge and awareness among rural residents regarding WASH was negligible [$r_s = 0.203, p$ -value = 0.009].

DISCUSSION

A cross-sectional study was conducted to assess knowledge, attitude, and awareness (KAA) regarding WASH among rural residents in Kerian, Perak. Respectively, moderate knowledge, moderate attitude and moderate awareness were observed in 40.0%, 76.0%, and 59.0% of the respondents.

Moderate knowledge on WASH was observed in 40.0% of the respondents. Majority of respondents positively agree that drinking unsafe water can cause diarrhea. A study in the Tigray Region of Northern Ethiopia showed that 726 (96.9%) respondents agree with that statement (12). According to WHO, diarrheal diseases are common waterborne diseases that generate a huge burden due to insufficient safe water. In Malaysia, it is mandatory to report those diseases under the Prevention & Control of Infectious Diseases Act 1988 (18). Besides, all respondents also acknowledged the importance of safe drinking water and took the initiative to treat their drinking water. Boiling is a typical domestic water treatment method that helps to kills germs. It is advocated to boil the water for 5 minutes before drinking (19). Respondents in the study area acknowledged the importance of using toilets rather than open defecation. Most of the population in Malaysia had access to better sanitation (20), though a few villages in Sabah still have unimproved sanitation facilities (15). In addition, half of the respondents stated that they received information regarding WASH only in the past six months. This is due to differences in socioeconomic status or health promotion programs.

Moderate attitude was observed in 76.0% of the respondents. Respectively, most of them responded positively that waste could be breeding sites for flies and rodents, and animal wastes can cause health problems if not properly managed. However, they strongly disagree that children’s stool is free from diseases. Child feces are more hazardous to one’s health than adult feces (21). A previous study by Berhe et al. (2020) supported the notion that children’s stool contain germs (12). Finding on this statement were consistent with a study in Northwest Ethiopia (22). Moreover, positive attitude can be seen towards action of washing hands after using the latrine. This was consistent with a study reported by Joshi et al. (2014) in Delhi, India (23). Most respondents showed neutral attitude towards washing and sanitizing hands. According to the Centers for Diseases Control

and Prevention (CDC) in the United States, washing and sanitize hands work in different ways. Soap and water as well as hand sanitisers are able to get rid of germs, but use sanitisers containing at least 60% alcohol for it to be effective (24). Correspondingly, respondents showed neutral attitude for hand washing before or after eating. It is recommended to wash hands before and after eating food as it is more hygienic and protect people from infections (23).

Moderate awareness was observed in 59.0% of the respondents. Most respondents agreed that pipe water is always safe for drinking. Similar findings can be seen in Northern Ethiopia where they prioritized protecting water sources in every household to make sure it safe for consumption (12). They were always aware that diarrhea is a serious illness and it is related to the quality of drinking water. A study showed that there was a significant relationship between poor water quality and diarrheal diseases where *E.coli* was used as an indicator (25). In contrast, another study showed no association between quality of water from point of use and diarrheal diseases (26).

In the present study, significant association were seen for household income and gender with level of knowledge. This may be due to increased household income means better education levels and will lead to better understanding of hygiene. On gender, the male respondents may have been exposed to information on hygiene compared to female respondents. This result was consistent with a previous study (27, 28). A study conducted in Diretiyara, Eastern Ethiopia found that 87.5% of respondents agreed with open defecation as it is something which is normal for them. Majority of them also responded that latrines are only intended for wealthy people (29). Different perceptions might be attributable from different study settings and socioeconomic status.

Besides, the present study found an association between gender and level of knowledge. A previous study in rural areas of Uganda reported that women played an important role at home as major administrators, while males were otherwise (30). In contrast, there was no association between age and level of knowledge regarding WASH. Studies showing similar findings was from Mohd and Malik (2017) while Pai (2016) found results which was opposite to the current research.

Furthermore, the association between knowledge, attitude and awareness was also sought after. Significant association between knowledge and attitude can be seen as people are exposed to factual information through electronic media (27). People that have adequate information may think of only consuming safe water for drinking to avoid any waterborne illnesses (23). As for knowledge and awareness that was significantly associated, it implies that the possible cause of awareness of respondents was due to the influence of information

and knowledge that they perceived (14).

This study finding is useful for public health progress amongst the community. It gives an insight to help develop a framework through which communities can access their environmental health needs. However, the findings cannot be generalized as results were from a small representative group only.

CONCLUSION

Although this country has made significant progress in improving its water and sanitation systems, level of knowledge, attitude and awareness among respondents is in the moderate level and therefore can be further improved. Lower and moderate income groups showed high percentage of moderate to poor knowledge. Knowledge level totally influences the level of attitude and awareness of the respondents.

The media especially electronic media play an important role as a medium for behavioral change communication among the community. It helps to translate community knowledge on WASH into actual attitude and awareness as well as action. Besides, health promotion programs should be conducted continuously among the community to ensure that information is distributed fairly among them.

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