

***Original article:***

**Knowledge, Attitude, and Practice Regarding Cholera among Non-Academic Staff of International Islamic University Malaysia Kuantan Medical Campus**

*Mohd Amir Fitrie Bin Mohd Rosdi<sup>1</sup>, Nor Azlina A Rahman<sup>2</sup>, Mainul Haque<sup>3</sup>*

**Abstract:**

**Background:** Cholera is a water and food-borne infectious disease caused by *Vibrio cholerae*. Cholera usually causes fatality in the case of severe infections. Furthermore, cholera outbreaks are still recurring over time, especially in many developing countries. Cholera outbreak may be due to lack of basic knowledge, awareness and preventive attitude among public. The objectives of this study are to evaluate the knowledge, attitude and practice (KAP) regarding cholera among non-academic staff of IIUM Kuantan community, to find the related factors of KAP regarding cholera and to find the association between KAP regarding cholera. **Methods:** This was a questionnaire-based cross-sectional study. This study used convenience sampling. The sample size for this study is 100 and was analyzed by using SPSS software using various tests. Those tests were independent t-test, Mann-Whitney test, Kruskal Wallis test and correlation test. There are six independent variables affecting knowledge, attitude and practice regarding cholera which are genders, marital statuses, and categories of occupation, different faculties, age-groups and level of education. **Results:** Categories of occupations showed no significant difference between administrative and clinical staff knowledge ( $p=0.360$ ) and practice ( $p=0.437$ ) level. Respondent's attitude however showed significant difference ( $p=0.034$ ) between clerk and clinical staff. As for other sociodemographic variables, the results showed no significant difference for knowledge, attitude and practice level. The results showed low positive correlation between knowledge and practice regarding cholera ( $r=0.338$ ), between attitude and practice regarding cholera ( $r=0.331$ ) and between knowledge and attitude ( $r=0.233$ ). **Conclusions:** KAP practice scores were at an acceptable level.

**Keywords:** Knowledge, Attitude; Practice; Cholera; Non-Academic Staff, International Islamic University Malaysia; Kuantan; Campus.

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**Introduction**

People need to take care of our planet and never Contaminate it. Thereafter, us and future generation can enjoy healthy status to live and exist. Otherwise, many communicable and non-communicable diseases will flourish and endanger human existence, such as cholera may arise due to the polluted environment. "Communicable, or infectious diseases, are caused by microorganisms such as bacteria, viruses, parasites and fungi that can be spread, directly or indirectly,

from one person to another. Some are transmitted through bites from insects while others are caused by ingesting contaminated food or water." <sup>1</sup> People ingested about 2.7-3.7 liter of water a day in every day. <sup>2</sup> Human life on our planet is highly dependent on clean water supply. However, some irresponsible people contaminates natural sources of surface source by pushing industrial waste.<sup>3</sup> Lack of safe drinking water promotes a number of waterborne diseases.<sup>4</sup> Furthermore, WHO reported that "every year more

1. Bachelor Student. Faculty of Allied Health Sciences, International Islamic University Malaysia.  
Email: [nazara71@gmail.com](mailto:nazara71@gmail.com)
2. Assistant Professor, Department of Physical Rehabilitation Sciences, Kulliyyah of Allied Health Sciences, International Islamic University Malaysia, 25200 Kuantan, Malaysia. Email: [nazara@iium.edu.my](mailto:nazara@iium.edu.my)
3. Professor of the Unit of Pharmacology, Faculty of Medicine and Defence Health, Universiti Pertahanan Nasional Malaysia (National Defence University of Malaysia), Kem Perdana Sungai Besi, 57000 Kuala Lumpur, Malaysia.  
Email: [runurono@gmail.com](mailto:runurono@gmail.com)

**Correspondence to:** Mainul Haque, Professor of the Unit of Pharmacology, Faculty of Medicine and Defence Health, Universiti Pertahanan Nasional Malaysia (National Defence University of Malaysia), Kem Perdana Sungai Besi, 57000 Kuala Lumpur, Malaysia. Email: [runurono@gmail.com](mailto:runurono@gmail.com)

than 3.4 million people die because of water related diseases, making it the leading cause of disease and death around the world. Most of the victims are young children, the clear majority of whom die of illnesses caused by organisms that thrive in water sources contaminated by raw sewage.<sup>5</sup> Cholera is one of the top killer of waterborne diseases and often outbreak happen because of poor availability of drinking water.<sup>6</sup> Cholera is an infectious disease that causes severe watery diarrhea, which can lead to dehydration and even death if not properly managed with rehydration. It is caused by eating food or drinking water contaminated with a bacterium called *Vibrio cholerae*. Robert Koch in 1884 identified *Vibrio cholerae* in pure culture from a stool sample originated in Egypt.<sup>7</sup> The existence of cholera toxin was first hypothesized by Koch in 1886. Dr. Koch preached that the symptoms caused by *Vibrio cholerae* were due to a toxic substance produced by *Vibrio cholerae*. However, the discovery of cholera toxin need to till 1959. Indian Scientist Dr. Sambhu Nath De first reported that *Vibrio cholerae* cell-free culture filtrate was capable of eliciting massive accumulation of “rice-water” fluid in the ligated ileal loops of adult rabbits, and explicitly demonstrated the presence of a cholera toxin.<sup>8</sup> Another group of Indian Scientist (Dutta NK, Panse MV, Kulkarni DR) from the Haffkine Institute in Mumbai a few months later in 1959 reported that the production of diarrhea in infant rabbits by a crude protein isolate from *Vibrio cholerae* culture filtrate, thereby strengthening Dr. Sambhu Nath De observation.<sup>9</sup> Thereafter, cholera toxins are considered extremely fatal, and especially when people are not aware of the fatality of dehydration and its’ easy management. It had been reported that cholera killed around 800,000 people during El Tora outbreak in the early 40’s.<sup>10</sup> Therefore, it is important to possess essential general information for prevention of cholera among general population to safeguard their own and community health.

Cholera is a type of communicable disease, with about hundreds of cases, occurs yearly in Malaysia.<sup>11</sup> In 2015, there were approximately 244 cases of cholera reported in Malaysia.<sup>12</sup> The global number of cholera cases fluctuated from 2000-2016, reaching a high of approximately 585,000 in 2011 and then decreasing to 130,000 in 2016.<sup>13</sup> However Kuantan the capital city of Pahang Darul Makmur, a state of Malaysia had only a few suspected cases of cholera infection for the year 2000-2010. Besides that, to the

best of researchers’ knowledge there is no knowledge attitude and practice (KAP) study regarding cholera ever been done in Malaysia, especially in Kuantan community. The current study objectives were the knowledge, attitude and practice level regarding cholera and the related factors of cholera among the non-academic staff of International Islamic University Malaysia (IIUM) Kuantan community that will act as a benchmark for future studies.

### **Materials and methods**

**Study Area:** The study was conducted in IIUM Kuantan Campus at five different faculties, such as Medical, Science, Pharmacy, Allied Health Sciences, Nursing and Dentistry.

**Source of Population:** The population was the non-academic staffs including clerks, administrative assistants, medical laboratory technologists, optometrists, radiologists, administrative science officers, administrative officers, science officers and office secretaries. IIUM Kuantan Campus has 381 non-academic staffs.

**Study Design:** A questionnaire-based cross-sectional study was conducted among non-academic staffs of IIUM Kuantan at five respective faculties. Convenience samplings were used for this study.

**Sample Size and Sample Size Calculation:** Total population for this study is 381 non-academic staffs. Sample size is large enough to be representative of the population. Sample size was calculated using this formula: Sample size,  $n = [Z \alpha/2 / \Delta]^2 p (1-p)$ .  $Z = Z$  value (1.96 for 95% confidence level),  $p =$  proportion in population, expressed as decimal  $\Delta =$  precision of study, expressed as decimal  $n=[1.96/0.09]^2 \cdot 0.7(1-0.7)$ ;  $n=100 (+ 10\% \text{ non-response rate})$ ; and  $n=110$ . The calculation above uses a proportion from an earlier study.<sup>15</sup> Thereafter, actual sample size was 100 and it becomes 110 because to add 10% non-response rate in calculation. The precision used was 0.09 and confidence interval was set at 95%. The confidence interval is a data with the plus-or-minus figure. This study used 95% confidence interval. The confidence level is expressed as a percentage and denotes how frequently the real percentage of the population who would choose a choice of answer contains within the confidence interval. The 95% confidence level shows 95% certainty while the 99% confidence level means shows 99% certainty. This study used 95% confidence level.

**Sampling Method/Strategy:** Convenience sampling

of non-random sampling procedure, 100 subjects were selected among IIUM Kuantan's non-academic staffs according to inclusion and exclusion criteria. Inclusion criteria: Non-academic staff, Male and female staff, Full time staff. Exclusion criteria: Academicians, Students, Part-time staff.

**Data Collection:** This study used self-designed questionnaire. The questionnaire was approved by Kulliyah of Allied Health Sciences Postgraduate and Research Committee. The data had been collected 24<sup>th</sup> March until 10<sup>th</sup> April 2015. A total of 110 sets of written questionnaires were distributed to five faculties. The questionnaire consists of two parts; part A and part B. Part A is the collection of socio-demographic data from the subjects. Part B of the questionnaire consisted of 40 questions. Part B of the questionnaire comprises of a total of three sections which were the sections on knowledge, attitude and practice regarding cholera. The first section, the subjects were inquired to answer questions regarding their general knowledge about cholera. The second section focused on subject's attitude regarding cholera. The third section of questions was prepared by using a five-point Likert-scale ranging from 'never' to 'always'. Pilot study had been done before the actual study to test the validity and reliability of the questionnaire. The content validity of the questionnaire had previously been verified by an expert.

**Statistical Analysis:** The data collected from the questionnaires was compiled, recorded, and analyzed by using SPSS version 21.

**Ethical Consideration and Approval of Study:** This study obtain ethical approval by the Faculty of Allied Health Science Postgraduate and Research Committee (Memo No. IIUM/310/G/13/4/4-170, Dated March 5, 2015).

## Results

**Sociodemographic Characteristics of the Respondents**  
A total of 100 questionnaires were recovered giving the response rate 90.90%. The details socio-demographic characteristics of the respondents of gender, faculty, age, and marital status, level of education and categories of occupation were depicted in Table 1. The findings of the study show that the gender of the respondents comprised of 78 (78.0%) females and 22 (22.0%) males non-academic staff.

**Table 1: Sociodemographic Profile of the Respondents**

Characteristics	Number (n=100)	Percentage (%)
<b>Gender</b>		
Male	22	22.0
Female	78	78.0
<b>Age</b>		
Less than 30 years old	13	13.0
31-35 years old	29	29.0
36-40 years old	28	28.0
41-45 years old	16	16.0
46-50 years old	14	14.0
<b>Faculty</b>		
Science	23	23.0
Allied Health Sciences	20	20.0
Medicine	19	19.0
Pharmacy	18	18.0
Dentistry	20	20.0
<b>Marital Status</b>		
Single	13	13.0
Married	87	87.0
<b>Education Level</b>		
SPM	6	6.0
Diploma	19	19.0
Graduate / Master's Degree	75	75.0
<b>Category of Occupation</b>		
Clerical	40	40.0
Clinical	60	60.0

**Note:** Study sample was 100. So, the percentage was exactly the same as the study sample.

**Knowledge Attitude Practice Regarding Cholera**  
Most of the respondents were unsure of whether cholera is a communicable disease or not. 50% of them were uncertain whether cholera is an infectious disease or not. Only 29% out of 100 respondents knew that cholera is indeed a type of communicable disease and the remaining 21% of them answered "no." The prevention, most of the respondents (83%) opined that cholera is a preventable disease, nevertheless, rest 12% and 5% were unsure and not at all preventable respectively. 87%, 10%, and 3% of respondent opined that cholera can be treated, uncertain, and cannot be treated respectively. Among

respondents, 91%, 92%, and 5% agreed that cholera was transmitted through water, contaminated food, and unsure respectively. The remaining disagreed that cholera was spread through water (4%) or contaminated food (3%). The majority (91%) respondents opined that cholera mode of transmission was not through the air. The other 5% and 4% were unsure and believed that cholera was transmitted through air respectively.

### **Attitude Regarding Cholera**

Attitude related questions were dumping waste into the river is an unethical practice, it is safe to eat without washing hands, good hygiene can prevent cholera transmission, people should never drink water from any river directly, regular well water should be chlorinated, will not eat leftover food with fishy odor, hospitals should regularly change the clothes of cholera patients, good waste disposal facility is important in preventing cholera, and efficient water treatment plant is important in preventing cholera. The current study respondents over on an average 84% correctly answered regarding attitude related questions.

### **Practice Regarding Cholera**

Practice related questions were wash raw food before cooking, wash raw vegetables before cooking, drink filter/boiled/miner al water at home, drink tap water when I do not bring mineral water, wash my hands before eating, wash my hands before eating, wash the top of can or mineral bottle before drinking, wash my hands after playing with my pets, wrap raw food perfectly before storing in the fridge, store raw and leftover food together inside the freeze section of my fridge, and eat at least half cooked meat at restaurant. The current study respondents over on an average 83% correctly answered regarding practice attitude related questions.

### **Factors Associated with Knowledge, Attitude, and Practice Regarding Cholera**

One of the objectives of this study is to determine the factors associated with knowledge, attitude, and practice regarding cholera. The statistical analysis was carried out by using non-parametric

Mann-Whitney test for comparison between marital status and genders. Comparison between categories of occupation, because the normality and equal variance were met for analysis, independent t-test was used. On the other hand, due to the normality assumption was not achieved for the analysis, non-parametric Kruskal Wallis test was used to compare between different faculties, age-groups, and education levels.

### **Factors Associated with Knowledge Regarding Cholera**

Mann-Whitney test was used to compare knowledge scores regarding cholera between sexes and marital status of the respondents. The non-parametric Mann-Whitney test was chosen because normality assumption was not meet for this data ( $n<30$ ). Thus, the median and interquartile range was used. In terms of knowledge, there was no statistically significant difference between sexes ( $p=0.136$ ) and marital status ( $p=0.214$ ). The independent t-test used in comparing knowledge with types of occupation (Administrative and Clinical Staff) among the respondents. All requirements such as normality assumptions and equal variance were checked before proceeding with this test. There was no statistically significant ( $p=0.360$ ) difference in term of knowledge on cholera between the clerk and clinical staff.

### **Comparing knowledge regarding cholera between different faculties, age-groups and education levels (n=100) (Kruskal Wallis test)**

A non-parametric test was chosen generally due to normality assumption was not met for these data. Thus, the median and interquartile range was used. The comparison in terms of knowledge level between different faculties, age, and education level. All these three factors, there were no statistically significant differences observed in term of knowledge regarding cholera between different faculties ( $p=0.564$ ), age-groups ( $p=0.233$ ), and education levels ( $p=0.438$ ).

### **Factors Associated with Attitude Regarding Cholera**

Mann-Whitney test was used to compare attitude scores between males and females and single and married respondents. The non-parametric (Mann-Whitney) test was chosen because normality assumption was not meet for this data ( $n<30$ ). Thus, the median and interquartile range was used. In terms of attitude, there is no significant difference between sexes ( $p=0.053$ ) and marital status ( $p=0.126$ ) of the respondents.

### **Table 2: Comparing attitude scores regarding cholera between administrative and clinical staff (n=100) (Independent t-test)**

Variable	Administrative	Clinical	t-statistic	Mean	p-value
	mean (SD)	mean (SD)	(df)	differences	
	(n=40)	(n=60)		(95% CI)	
Attitude	51.38 (5.20)	52.37 (8.92)	-.980	-0.99	0.034
				(98) (-3.000,1.016)	

The independent t-test used in comparing attitude scores between administrative and clinical respondents. All requirements such as normality assumptions and equal variance were checked before proceeding with this test. Therefore, there was a statistically significant ( $p=0.034$ ) difference in term of attitude regarding cholera between the administrative and clinical respondents (Table 2). There are no statistically significant differences in term of attitude regarding cholera for different faculties ( $p=0.924$ ), age-groups ( $p=0.639$ ), and education levels ( $p=0.310$ ).

#### **Factors Associated with Practice Regarding the Prevention of Cholera**

**Table 3: Comparison of practice scores regarding the prevention of cholera between genders and marital statuses (n=100) (Mann-Whitney test)**

	Variable	Median (IQR)	z-statistics	p-value
<b>Gender</b>	Male (n=22)	48.0 (9)	-0.535	0.593
	Female (n=78)	52.0 (14)		
<b>Marital status</b>	Single (n=13)	50.0 (8)	-1.128	0.259
	Married (n=87)	55.0 (7)		

Mann-Whitney test was used to compare practice scores of different genders and marital statuses. The non-parametric (Mann-Whitney) test was chosen because normality assumption was not meet for this data ( $n<30$ ). In terms of practice regarding the prevention of cholera, there is no statistically significant difference between sexes ( $p=0.593$ ) and marital status ( $p=0.259$ ) of the respondents (Table 3).

**Table 4: Comparing practice scores regarding the prevention of cholera between administrative and clinical staff (n=100) (Independent t-test)**

Variable	Clinical				
Administrative mean (n=40)	mean (n=60)	t-statistic (df)	Mean Differences (95% CI)	p-value	
49.50 (5.57)	50.42 (7.21)	-0.548 (98)	-0.92 (-4.237, 2.403)	0.437	

The independent t-test used in practice between administrative and clinical staff. All requirements such as normality assumptions and equal variance were checked before proceeding with this test. Thus, there was no statistically significant ( $p=0.437$ ) difference in terms of practice towards the practice of cholera prevention between the administrative and clinical respondents (Table 4).

**Table 5: Comparing practice regarding the prevention of cholera between different faculties, age-groups and education levels (n=100) (Kruskal Wallis test)**

Characteristics	N	Median (IQR)	p-value
<b>Kulliyah</b>			
Science	23	55 (40)	
Allied Health Sciences	20	55 (15)	
Medicine	19	55 (9)	0.442
Pharmacy	18	52 (7)	
Dentistry	20	52 (9)	
<b>Age</b>			
< 30 years old	13	55 (8)	
31-35 years old	29	51 (8)	
36-40 years old	28	55 (10)	0.287
41-45 years old	16	55 (7)	
46-50 years old	14	55 (10)	
<b>Education level</b>			
SPM	6	55 (1)	
Diploma	19	50 (15)	
Degree/Master's degree	75	55 (7)	0.062

The comparison in terms of practice scores between different faculties, age groups, and education levels. There were no significant differences with different faculties ( $p=0.442$ ), age-groups ( $p=0.287$ ), and education levels ( $p=0.062$ ) in terms of practice regarding the prevention of cholera (Table 5).

#### **The Relationship between Knowledge, Attitude, and Practice Regarding Cholera**

A correlation test was used to calculate the relationship between knowledge, attitude, and practice regarding cholera. Spearman's Rank Correlation Coefficient is used to define the strength and direction of the interaction between KAP. The  $p=0.020$  was for the relationship between knowledge and attitude (Table 6). Therefore, there was a significant correlation between knowledge and attitude (2 tailed). The value of  $r=0.233$ , thus showing fair, positive correlation. Consequently, interpreting that knowledge is higher, attitude regarding cholera was also higher. The relationship between knowledge and practice ( $p=0.001$ ). Therefore, there were significant correlation between knowledge and practice. The value of  $r=0.338$ , thus showing fair, positive correlation, but higher correlation relationship as compared to knowledge and practice.

Accordingly interpreting the knowledge is higher, the practice regarding the prevention of cholera is also higher. The relationship between attitude and practice ( $p=0.001$ ). Therefore, there was a significant correlation between knowledge and attitude (2 tailed). The value of  $r=0.331$ , thus showing fair, positive correlation. Therefore, the attitude is higher, the practice regarding the prevention of cholera was also higher. In terms of strength of the correlation, the relationship between knowledge and practice shows highest correlation strength with an  $r=0.338$ , follows by the relationship between attitude and practice with an  $r=0.331$ . The lowest strength or lowest positive correlation is shown by the relationship between knowledge and attitude with the  $r=0.233$ . Therefore, in descending order, higher knowledge shows higher practice, higher attitude shows higher practice and higher knowledge shows higher attitude (Table 6).

**Table 6:** The correlation between knowledge, attitude, and practices regarding cholera (n=100).

Items	p-value	r-value
Knowledge- Attitude	0.020	0.233
Attitude- Practice	0.001	0.331
Knowledge- Practice	0.001	0.338

Pearson correlation test  $r$ = sample correlation coefficient

## Discussion

### Sociodemographic Characteristics of the Respondents

The current study participants were predominantly female which was somewhat different from KAP based Malaysian research.<sup>16, 17</sup>

### Level of Knowledge, Attitude, and Practice among IIUM Kuantan Community

Disease such as cholera is often because of man-made contamination and pollution. Cholera is water and food-borne infectious illness caused by *Vibrio cholerae*. Cholera usually causes fatality in the case of severe infections. Furthermore, cholera outbreaks are still recurring over time, especially in many developing countries. This trend of recurring outbreak poses a threat to all developing countries including Malaysia. Cholera outbreak could be due to lack of basic knowledge, awareness and preventive attitude among the public.<sup>18</sup> This study was conducted to investigate the level of knowledge, attitude, and practice of cholera among non-academic staff among IIUM Kuantan community. Thus, it was expected that the level of KAP regarding cholera among non-academic staff among IIUM Kuantan community was high. This may be due to medical health working

culture influence as reported in one Cambodian study.<sup>19</sup> The total mean scores of knowledge, attitude, and practice regarding cholera are acceptable among IIUM Kuantan non-academic staff. Almost all respondents answered well on all questions of the questionnaire. Thus, all respondents have been exposed to proper medical and health sciences environment in their workplace. The results of this study are better than the results of a study done in Iran that examined the KAP of cholera among health workers in two different public health centers.<sup>15</sup> Iranian study reported that the total mean scores of KAP regarding cholera in Iran were low in health workers.<sup>15</sup> Therefore, this shows that IIUM Kuantan community generally has a firm understanding of cholera disease. Association between good hygiene care and prevention of cholera was fully noted by most of the respondents. This finding indicates the useful role of being in a health-aware environment can increase the level of knowledge, as well as attitude and prevention practice. These findings were supported another similar research conducted in South Africa.<sup>20</sup> This South African study revealed that the medical based background would have well to the moderate level of KAP as compared to other communities of different environmental settings and different backgrounds. The same study also said that these mean differences might introduce that, with the low level of knowledge, negative attitude, and weak practice, people become more susceptible to get cholera diseases.<sup>20</sup> Consequently the current study findings indicating KAP study may be a useful tool to find the factors related to cholera disease.

### Comparing Knowledge, Attitude, and Practice of Cholera between Different Genders

One overseas study reported that 83% of the women and 87% of the men had high knowledge about cholera, with no statistically significant differences between sexes.<sup>21</sup> In another earlier study although similarly reported that about 69% of the women and 56% of the men had good knowledge, and there was no statistically significant difference between different sexes.<sup>15</sup> Similarly the current study also found no statistically significant difference on knowledge regarding cholera between sexes. Thereafter, the current study findings were supported multiple study findings.<sup>15, 20, 21</sup> In this study, for attitude and practice sections, the result shows no significant difference between male and female respondents. This result was also consistent with the earlier study findings.<sup>15, 21</sup>

### **Comparing Knowledge, Attitude, and Practice of Cholera between Categories of Occupation**

The result of current study demonstrated that for knowledge and practice regarding cholera, there is no statistically significant difference between administrative and clinical staff. Knowledge regarding cholera is related to the attitude towards preventive measures had been made known by different studies.<sup>22, 23</sup> However, for attitude regarding cholera, there was a significant difference between administrative and clinical staffs of the current study. This may be because as for a medical based university with IIUM Kuantan Campus has an excellent sanitary working culture. Moreover, there is also an active culture of conveying and communicate knowledge and information within working hours. This working culture, even new workers would be influenced and slowly implement them in their daily life. This finding of earlier studies<sup>15, 19</sup> showed a significant difference in term of practice between different categories of occupation in a community of health workers. Furthermore, knowledge had not influenced their practices to manage and prevent the disease.<sup>22</sup> Another Colombian study revealed that although common people possess good knowledge but did not practice the preventive measures in their daily activities as it is still not accustomed.<sup>24</sup>

### **Comparing Knowledge, Attitude, and Practice of Cholera between Age Groups**

The result of this study shows that there is no significant difference between classes of age for KAP of respondents regarding cholera. The result was like of the findings in another earlier study.<sup>23</sup> The mentioned study discussed the factors influencing cholera disease occurrence in a community of poor people in Kolkata, India. The mean scores of KAP are irrelevant with the age of respondents. No statistical significant difference was observed.<sup>23</sup> However, in contrast to the above results, research conducted in Belgium shown that older adults of age 40 years old and above have a higher level of practice on preventive measures regarding cholera.<sup>25</sup> In Belgium there were fewer cases of cholera as compared to Malaysia.<sup>25</sup> Most of the cases in Belgium occur to children of age below 5 years old as children did not yet attain knowledge regarding cholera. Besides that, several instances were low; parents did not practice all the knowledge towards childcare as they believed that such disease would not infect their children. This

observation was also reported in a community being studied in his research.<sup>22</sup>

### **Comparing Knowledge, Attitude, and Practice of Cholera between Different Faculties**

The result of this study shows that there is no significant difference between faculty for KAP of respondents regarding cholera. The five faculties under investigation are Faculty of Science, Allied Health Sciences, Dentistry, Medicine and Pharmacy. However, it was expected that there would be no significant difference. This is because different faculty would not play any part as a factor for this sample population as all respondents come from medical based faculty.

### **Comparing Knowledge, Attitude, and Practice of Cholera between Levels of Education**

The result of this study shows that there is no statistically significant difference between education levels for KAP of respondents regarding cholera. Education is essential mainly and is associated with knowledge regarding cholera prevention. As discussed in a Bangladeshi study finding that higher education level did play a part in better KAP regarding cholera.<sup>26</sup> In fact, in developed countries where the education levels of people are very high, the level of KAP were also high. This was reported in one cholera study in the USA.<sup>27</sup> In contrast to the US study another study revealed that the respondents had low scores of KAP despite having a high level of education.<sup>28</sup> This study has revealed that the educational level of respondents to be comparable to results found in other developing countries which defined a related education system as Malaysia although their level of education has not been as good as this study.<sup>19, 22, 29, 30</sup> This shows that education system standard of a country did influence the level of knowledge of citizens and affected their attitude and practice towards prevention of cholera.

### **Comparing Knowledge, Attitude, and Practice of Cholera between Different Marital Statuses**

The result of this study shows that there was no significant difference between marital statuses for KAP of respondents regarding cholera. This is because the lifestyle of a married person as compared to a single person was not so much varies. However, a study conducted in the USA shows a low significant difference. There was a significant difference regarding the KAP of married couples as compared to single persons.<sup>27</sup> The differences were mostly reported in

terms of attitude and practice of preventive measures, not in terms of knowledge. The reason was that married couples were more responsible and live a healthier lifestyle.<sup>27</sup> Furthermore, it was reported that 87% of married couple and 46% single person tend to avoid drinking uncooked water from river stream during camping.<sup>27</sup>

### **Correlation between Knowledge, Attitude, and Practice Regarding Cholera**

The result of this study shows a weak correlation between KAP regarding cholera. In terms of strength of the correlation, the relationship between knowledge and practice show the highest positive correlation strength. This was supported by a similar study reported a weak positive correlation between knowledge, attitude, and practice of cholera.<sup>15</sup> Furthermore, another study revealed that there was a significant positive correlation between KAP among study participants.<sup>22</sup> The same study further revealed that once respondents receive knowledge regarding cholera, it was usually reflected in their attitude and practice of preventive measure.<sup>22</sup> Although this survey provides important information on the level of KAP among the non-academic staff of IIUM Kuantan communities, certain limitations must be recognized. This survey only included a small sample size of 100 and was performed in IIUM Kuantan only, over a

short time. This was cross-sectional surveys with its inherent limitations. Moreover, as random sampling was not possible added more limitation.

### **Conclusion**

This study was conducted in a community of non-academic university staff confirmed that the level of KAP regarding cholera was acceptable level and all factors influencing KAP regarding cholera. There is a low positive correlation between KAP regarding cholera among the respondents. On the other hand, this study could be applied or used as a benchmark for other studies in the future.

### **Conflict of interest**

Nothing to be declared.

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### **Author's contribution:**

Data gathering and idea owner of this study: Rosdi MAFBM, Rahman NAA, Haque M

Study design: Rosdi MAFBM, Rahman NAA, Haque M

Data gathering: Rosdi MAFBM, Rahman NAA, Haque M

Writing and submitting manuscript: Haque M

Editing and approval of final draft: Rosdi MAFBM, Rahman NAA, Haque M

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