

Knowledge, Attitude and Practice on Bats-Borne Diseases among Village Residents: A Pilot Study

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ABSTRAK

Penyakit Ebola, Sindrom Respiratori Akut Coronavirus (SARS-CoV), rabies dan nipah ensefalitis adalah antara contoh penyakit yang berkaitan dengan kelawar dan telah mengejutkan dunia dengan terjadinya wabak. Kefahaman tentang kelawar yang berpotensi menyebabkan penyakit adalah perlu supaya wabak seterusnya dapat dielakkan. Kajian ini dilakukan untuk mengkaji kesesuaian soal-selidik yang bakal digunakan dalam kajian sebenar. Keputusan kajian ini juga dapat memberi gambaran awal tentang pengetahuan, sikap dan amalan tentang penyakit bawaan kelawar. Penduduk di sebuah kampung telah dipilih untuk menyertai kajian ini. Mereka dipilih secara rawak berdasarkan senarai nama yang diberikan oleh wakil penduduk. Soal-selidik yang mengandungi 56 soalan digunakan. Seratus orang penduduk menyertai kajian ini. Skor Cronbach Alpha adalah 0.817. Kebanyakan responden mempunyai skor yang tinggi untuk pengetahuan, sikap dan amalan berkenaan jangkitan bawaan kelawar. Terdapat kaitan positif antara pengetahuan dan amalan tentang jangkitan bawaan kelawar. Walau bagaimanapun, majoriti responden tidak mengetahui bahawa kelawar juga boleh menyebabkan penyakit rabies dan 84% tidak mengetahui tentang vaksin rabies. Keputusan ujian pilot ini agak terhad tetapi dapat memberikan gambaran tentang penyakit bawaan kelawar. Secara keseluruhan, responden mempunyai skor yang tinggi untuk pengetahun, sikap dan amalan terhadap penyakit bawaan kelawar. Namun, lebih banyak kempen kesedaran harus dilakukan dalam beberapa aspek seperti kaitan antara kelawar dan rabies.

Kata kunci: amalan, jangkitan zoonosis, kelawar, pengetahuan, sikap

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ABSTRACT

Ebola virus disease (EVD), Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV), rabies and Nipah infections were examples of diseases that were related to bats and shook the world with a series of outbreak and epidemic. Through the understanding of bats as potential public health risk, awareness had become vital to prevent another outbreak. This pilot study was done to evaluate the appropriateness of the questionnaires and to determine preliminary data on knowledge, attitude and practices of bats-related infections. Residents of a village were recruited by randomly choosing houses from a list obtained from the local head village. Knowledge, attitude and practice were assessed using a 56-items questionnaire. The study recruited 100 respondents. The questionnaire's Cronbach Alpha score was 0.817. Majority of the respondents were found to have good knowledge (71%), attitude (99%) and practice (64%) relating to bat-related infection. There was a weak positive correlation between knowledge and practice towards bat-related infections among residents of the study population. Majority (80%) of respondents did not aware that bats can cause rabies, and 84% did not know about rabies vaccination. The result of this pilot study provides a limited but valuable insight into bat-related infection. Overall, respondents had good knowledge, attitude and practice scores towards bats-related infection. However, more awareness is needed to key areas lacking such as in educating awareness about rabies in bats.

Keywords: attitudes, bats, knowledge, practice, zoonotic infections

INTRODUCTION

In the year 2014, an outbreak of severe haemorrhagic fever with case fatality rate approaching 90% was seen in West Africa due to Ebola virus disease was debated to have origins in bats (Marí Saéz et al. 2014). This was not the first time that a bat had been behind outbreaks and epidemic. Another example would be the SARS epidemic, which had caused devastating effect on Asian economies between the year 2002 and 2003. It was also thought to be related to bats (Li et al. 2005). Locally, in Malaysia, there was a period when an outbreak resembling

Japanese encephalitis, known as Nipah virus, had suddenly emerged and was known to be deadly in the year 1998 as Japanese encephalitis (JE) virus vaccination had no effect. The virus found among pigs was traced to be originated from bats (Lam & Chua 2002). A more recent outbreak, MERS-CoV, also had links to bats as its natural reservoir and spread to human through intermediary animals (Wang et al. 2015). Looking back at these outbreaks, we began to understand the importance of the concept of one health where we realised that recognising the risk of emerging zoonosis and its link to human infections may be vital in the

realm of public health (Daszak et al. 2000).

Bats had recently been recognised to be a natural reservoir for viruses responsible for severe outbreak yet there are still many knowledge gaps. Even though a lot of work are in place to increase the understanding of how virus utilise bats as nidus, we view that public health awareness of bats as potential risks of emerging zoonosis had become increasingly important. Despite not many reports of infections from direct bat contacts, it is increasingly important for the public to become aware of the risk of bat-related infections (De Serres et al. 2008). However, there is a gap in assessing how far the public is aware of bat-related infection, especially, here in Malaysia. Hence, we decided to conduct a cross-sectional study to determine knowledge, attitudes and practices (KAP) of bat-related infections among residents staying near bat roosts. This pilot study was done to determine the reliability and feasibility of the chosen methodology and questionnaires to be used in the main study.

MATERIALS AND METHODS

This pilot study was carried out from 18th November 2016 to 25th December 2016. Residents of Kampung Melayu Mardi in Kluang, Johor were recruited by randomly choosing houses from a list obtained from the local head village. Data was collected from 100 households (who gave written consent) through face-to-face interview using structured questionnaires. The study

received ethical approval from the Human Research Ethics Committee, Universiti Sains Islam Malaysia (USIM/ JKEP-2016-16, 15th November 2016).

The study was done using a set of closed-ended questionnaire that consists of 5 parts. They are related to socio-demographic profile and exposure to bats, knowledge on the ecology of bats, knowledge about bat-related infections, attitude towards bats and health practices towards bats and bat-related infections. Knowledge on the bats-related infection were assessed on 11 'true or false' questions and 2 'tick box' questions on transmission and prevention of bats related infections. Each question was weighted based on the answers required, participants would get a point in the score for each correct answer; with a maximum score of 51. Attitude towards bats and bat-related infection were assessed using 14 questions that utilises a 5-point Likert scale (1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly agree). Scores were given based on the score ticked by the respondents; with a maximum score of 70. Health practice towards bat-related infection was assessed on four questions which respondents could answer 'true' or 'false'. A point was given for each correct answer given by respondents. Maximum score for this segment was 4. Score above 50% was accepted as 'good' for each segment of the questionnaire.

The data was analysed by using IBM Statistical Program for Social Sciences (SPSS) application version 22.0 to find any relationship between socio-demographic profile and 'good' test

scores. The items were tested by using Chi-square test. This relationship was tested by using Kruskal-Wallis test to look for significant difference between different exposure group. The test was followed by a Bonferroni-Dunnnett's test for pairwise comparison to look for any significant results. The distribution between the test scores were tested by using Spearman correlation coefficient) to investigate for correlation between knowledge-practice, knowledge-attitude and attitude-practice.

RESULTS

The questionnaire's reliability was tested and it was found that the Cronbach Alpha's score was 0.817 based on the analysis of 56 questions asked in the questionnaire.

The mean age of the study sample was 37.15 ± 1.56 years. All of our respondents were of Malay Muslim ethnicity. The respondents were almost equally distributed in terms of gender and marital status. In terms of exposure to bats, majority of the respondents (54%) admitted to being exposed to bats only a few times a year.

KNOWLEDGE ON THE ECOLOGY ON BATS AND BAT-RELATED INFECTIONS

The mean score was 29.7 ± 0.90 with 71 of the respondents achieving scores higher than 25.5 (50% of total knowledge score) and among them, 5 achieved a score greater than 38 (75% of total knowledge score). When 50% was used a point of comparison, no association was found between any

of the socio-demographic factors with good knowledge. In terms of test scores between different exposure groups, statistical test was not significant ($p=0.056$) for any differences across the level of exposure for differences in knowledge. Table 1 summarizes the finding.

On the ecology of bats, respondents did fairly well except in terms of knowing that bats are agents for seed dispersion (39% right) and that they eat mosquitoes (17% right). On knowledge of bat-related infections, majority did not know that bats transmit rabies (20% right), bats were the associated with MERS (29% right) and human are able to get infected through intermediary animals (14% right). In terms of route of infection, respondents managed to answer most of them correctly.

ATTITUDE TOWARDS BATS

The mean score was 51.7 ± 0.53 with an overwhelming number of respondents (99%) obtaining scores above 35 (50% of total attitude score). There was no association between good attitude and socio-demographic factors. Majority of respondents' attitude stem from their view of bats as frightening and unsanitary creatures as these statements drew responses which were almost unanimous. Between different exposure group, Kruskal-Wallis test was significant ($p=0.022$). However, pairwise comparisons revealed no significant differences.

HEALTH PRACTICES AGAINST BATS AND BAT-RELATED INFECTIONS

Table 1: Association between Socio-demographic and Knowledge Score

Variables	N=100, n (%)	Percentage of subjects		p-value
		<50% (Low)	>50% (Good)	
Gender [^]				0.386
Male	52	25	75	
Female	48	33	67	
Educational Level [^]				0.528
Primary School	14	21	79	
Secondary School	46	27	73	
Tertiary	40	35	65	
Marital Status [^]				0.377
Married	56	25	75	
Single/Divorced	44	33	67	
Employment Status [^]				0.116
Working	61	23	77	
Not Working/ Retired	39	38	62	
Exposure to Bats [#]				0.056
Everyday	4	25	75	
4-6 times per week	0	0	0	
2-3 times per week	4	25	75	
Once a week	4	25	75	
Once a fortnight	17	0	100	
Once a month	17	35	65	
Few times in a year	54	37	63	

[^]Pearson Chi-Square test was used to test association between good score and socio-demographic factors: gender, educational level, marital status, employment status.

[#]Kruskal-Wallis test was used to test for difference between the different exposure groups based on total test scores for each segment.

*P<0.05 is deemed as significant in both tests

The mean score was 1.64±0.05 with 64% of respondents able to indicate that they practiced more than two of the health practices asked in the questionnaire (wound washing, medical attention for bite/scratch wound, rabies vaccine prophylaxis, professional advice). Socio-demographic factors are not associated with good practice. Between different exposure groups, Kruskal-Wallis test

was significant (p=0.049) but no significant pair was found in pairwise comparison.

Majority (58%) admitted they would not take rabies vaccine prophylaxis whereas majority had answered ‘yes’ for other health practices. Most of them (84%) had also admitted that they did not know about rabies vaccination. It was also noted that when asked about whether bats can cause rabies, 80% of

the total respondents said 'no'.

CORRELATION BETWEEN KNOWLEDGE, ATTITUDE AND PRACTICE

There was a weak positive correlation ($r_s=0.313$) between total knowledge score and total practice score which was deemed as significant ($p\text{-value}=0.002$). No significant correlations were found between total attitude score and the other two items. We also confirmed that those who had high knowledge scores, had answered better in the practice section of the questionnaire than those who scored lower. Table 2 summarizes the findings.

DISCUSSION

The main aim of this study was to determine the feasibility of the chosen methodology and questionnaires. Several questions were modified to improve clarity. For example, options for question on exposure to bats did not include "never", thus most respondents had to chose the least encounter "few times a year". The final questionnaires were developed and used in the main study. This pilot study does offer some valuable insight into

knowledge, attitude and practices of bat-related infections.

The main finding of this study was that majority of the residents of Kampung Melayu Mardi, Kluang, Johor were found to have good knowledge (71%), attitude (99%) and practice (64%) relating to bat-related infection. There were significant differences between different exposure groups in attitude and practice with regard to bat-related infection, and a weak positive correlation between knowledge and practice towards bat-related infections among residents of the study population. Although the study did not manage to find any significant findings between socio-demographic factors with knowledge, attitude and practice, the study was able to identify a few findings, which may have an impact from a public health perspective. This includes the knowledge and attitude towards rabies and vaccination, which appeared to be lacking among the study population.

To the best of our knowledge, there is paucity of literature relating to knowledge of Malaysians with regard to bat-related infections despite knowing that the Nipah virus carried by bats had caused an outbreak in Malaysia between 1998 to 1999 (Yob et al.

Table 2: Correlation between knowledge, attitude and practice relating to bat-related infection

Variables		<i>p</i>	
Knowledge	Attitude	0.072	0.474
	Practice	0.313	0.002**
Attitude	Practice	0.092	0.363

** $p<0.05$

2001). Hence, no local studies could be referred, specifically on this topic, when this manuscript was written. Majority of respondents had jobs that did not expose them to bats. Therefore, low level of knowledge of bat ecology and health practice when dealing with bats were expected. In this study, it was found that socio-demographic factor had no effect on knowledge of bats and that knowledge was quite adequate for most respondents (71% good) even after adjusting for different educational level seen in the study population. However, respondents were not well equipped with knowing the risk of bats especially their association with rabies and the recent MERS outbreak as well as infection through intermediary animals. Such low awareness could induce low compliance rate in receiving health advice when exposed to bats (Gibbons et al. 2002). Furthermore, the study found that knowledge on bats is correlated with health practice. Further increase the need for better health awareness gearing towards better health practice in bat-related infections.

A study on the public perception on fruit bats in Pakistan showed that respondents admitted to viewing bats as ill omens, useless despite and inflicted heavy economic loss (Mahmood-ul Hassan et al. 2011). In this study, similar belief were found with regard to bats being of no importance in the ecosystem (56%), their conservation was unnecessary (67%), they were fearful (52%), unhygienic (95%), destructive (60%) and a threat to human (61%). It was also noted that most respondents could not associate

bats with any positive aspects such as bats being the predator to mosquitos and that bats aided seed dispersion. Hence, the respondents had taken precautionary practices against bats including proper hand washing after contact and refusing to allow bats to make their roost near the respondents' home. Based on such strong attitude against bats, it could be said that majority of respondents (54%) had very minimal contact with bats due to active avoidance of these nocturnal creatures and their habitats. Although this had led to good hygiene practice among respondents, it is fearful of how this attitude could be against bat conservation in preserving the biodiversity of the ecosystem (Knight 2008). However, majority had stated that they were willing to know more about bats and bat-related infections. Public health awareness of bats and education could balance such negative attitudes towards bat conservation while maintaining good health practice when dealing with these creatures (Prokop et al. 2009).

As mentioned previously, knowledge and practice with regard to taking precautionary step in protecting from rabies were inadequate. This was probably due to rabies being heavily associated with canines as the term rabies in Malay (*'anjing gila'*) literally means 'mad dog' and that the 2015 rabies outbreak was heavily attributed to canines without mention of bats as possible vectors (Bamaiyi 2015). This lack of knowledge of bats as a vector is similar to a study carried out in a neighbouring country, Thailand, where respondents admitted to knowing little

about diseases related to bats and that they would not know the appropriate response to bat bites and scratch despite some of the respondents worked in areas where bat exposure was high (Robertson et al. 2011). The authors concluded that educational outreach was needed to address this problem. In terms of the burden of rabies in Malaysia, due to intervention by health authorities in culling diseased canines and actively educating pet owners of the importance of vaccinating pets, the country has been one of the few Asian countries declared as rabies-free based on prevalence and incidence (Hampson et al. 2015). The lack of knowledge of bats as a vector of rabies may still pose a threat to human living within the vicinity of bats habitat. This included Tioman Island which is popular tourist destination in Malaysia but also had a significant population of bats (Chua et al. 2001). Even though risks were low in most part of the country, in places with high bat exposure, it would be prudent to ensure high level of awareness of post-exposure prophylaxis to rabies from bat bites and scratches.

We predict that bat-related infection may be a potential health problem in Malaysia as there are reports of novel virus found in bats such as the Tioman virus (TioPV) (Chua et al. 2001) and more recently, pteropine orthoreovirus (PRV) (Chua et al. 2011). TioPV, a paramyxovirus, had recently been isolated from urine of fruit bats found in Tioman Island, Malaysia and it was coincidentally found while looking for the natural host of Nipah virus (Chua et al. 2001). Like the Nipah

virus, pigs were also found to act as intermediary animals for the virus and human infections of the virus were suggested through serological studies (Yaiw et al. 2007). However, not much is known about the symptoms caused by the virus in human. PRV, a reovirus, a new mysterious RNA virus of the same family of the virus known to produce recombination with other family as seen in the case of MERS-CoV (Wang et al. 2015). PRV is yet to be studied in depth but already known to cause upper respiratory tract infections in human and its prevalence among human had been documented even in among those who had no direct contacts with bats (Voon et al. 2015). PRV was already known to spread in the south east Asian region as recently, it was found in bats from the Philippines (Taniguchi et al. 2017). From a public health point of view, awareness of bat-related infection still needed to be promoted as new evidence of emerging diseases related to bats are being uncovered.

The sample size was rather small, due to shortage of time and budget. thus further larger study has to be done to confirm the results.

CONCLUSION

In conclusion, this pilot study gave us valuable preliminary results on knowledge, attitude and practices of bats-related infections. This study found that there was good knowledge, attitude and practice towards bat-related infection among residents of Kampung Melayu Mardi. The study also found that despite the 'good'

score, more awareness is needed to key areas lacking such as in educating awareness about rabies in bats. As the first study of its kind, this study could be used to evaluate and compare other demographics in Malaysia while tackling these new infections. For this study, we had interviewed subjects from areas that is not known to have bats infestation and we theorise that subjects from areas closer to bat habitat might behave differently. For our actual main study improvised questionnaires will be used and residents from high-risk area will be enrolled in the bid of improving their lifestyle and minimising their risk.

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