



Knowledge, awareness, and practice (KAP) level of parasite infection among adults in Selangor, Malaysia

Mehru Nisha^{*1}, Nurul Nadiah Ab Talib¹, Naim Khir¹, Intan Sufinaz Daud¹, Fabian Davamani²

¹Universiti Kuala Lumpur, Institute of Medical Science Technology (MESTECH), 43000, Kajang, Selangor, Malaysia

²International Medical University (IMU), Bukit Jalil-57000, Kuala Lumpur, Malaysia

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ABSTRACT

Parasites are live organism that lives in a host to obtain the nutrients for their survival. Parasitic infections are commonly as seen in tropical and subtropical regions of the world. These parasitic infections can be caused by protozoa, helminths and ectoparasites. However, the knowledge of parasitic infections could vary among the adults in urban or semi urban areas where parasitic infections are rare among them. This study was conducted to detect the level of knowledge, awareness and practice of parasite infection among adults in Selangor. The study was conducted using an online questionnaire. Around 59 participants from Selangor district in the age group of 21 to 60 years responded to the questionnaire. The results of this research was analysed by Google Docs software. According to the result obtained, the level of knowledge, awareness and practice of adults towards parasite infection is highly satisfactory. As majority of participants (76.3%, n=45) are familiar with the symptom of intestinal parasitic infection, majority of contributors (93.2%, n=55) practice the correct way in processing the meat by cooking the meat thoroughly, and some of the participants (14.9%, n=9) were aware of malaria as the high risk of being contagious in Selangor district. The level of knowledge, awareness and practice of parasite infection among adults in Selangor is adequately high. However, it is still necessary for these populations to get more exposed the information on parasite infection.



*Corresponding Author

Name: Mehru Nisha

Phone: +6019-4294528

Email: mehrunisha@unikl.edu.my

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INTRODUCTION

Parasites are organism that lives in host and gets the food at the expense of its host for its survival, it can

cause symptomatic or asymptomatic diseases. Parasitic infection is a commonly encountered problem in tropical and subtropical regions of the world. This infection can be caused by protozoa, helminths and ectoparasites. More than half of the human population is at risk of parasites infection with more than 1 billion people being infected causing a global burden of more than 40 million disability-adjusted life years (DALYs) lost every year (Acka *et al.*, 2010).

Earlier studies conducted in Malaysia revealed that most common parasitic infections in the Malaysia are due to amoebiasis, ascariasis, ancylostomiasis and trichuriasis (Norhayati *et al.*, 2003). The impact of parasitic infections on human lives is an important issue in the field of medicine and it remains as a significant public health problem in develop-

ing countries, including Malaysia (Nissapatorn *et al.*, 2005). Many factors could contribute to the transmission of parasites such as inadequate sanitation, poor hygienic living conditions, contaminated water supplies, lack of health education, and failure to control vectors (Zakai, 2007). This study aims to assess the level of knowledge, attitude, and practices towards parasitic infections among adults in Selangor, Malaysia, whom not common to have parasitic infection in Malaysia.

METHODS

Study design

A stratified random sampling technique was carried out among adults in several areas of Selangor, Malaysia. All the data collected were analysed using Microsoft excel to measure the percentage of knowledge, awareness and practice of parasitic infections among working adults in Selangor.

Research instrument and procedure

The instrument used to collect the data was an online questionnaire. Before the online questionnaire started, the questionnaire was constructed with Google Docs platform. A set of questionnaires containing 18 questions were divided into 4 sections which included the following, socio-demographic, knowledge about parasite, practice on overcoming parasite, and awareness among adults in parasitic infection. Some of the questions were adapted and adopted from an article by Al-Abd *et al.* (2014). The link was constructed, verified and shared to the respondents through social media such as WhatsApp. The questionnaire survey was distributed among working adults aged between 21-60 years old via online survey.

RESULT

Demographic data of respondents

As illustrated in Figure 1, a total of 59 respondents around Selangor, Malaysia aged from 21 to 60 years old participated in this online survey. Total respondents of female were 64.4% (n=38), while males were 35.6% (n=21).

We found that majority of the participants were in the age group of 21 to 30 years (88.1%, n=52) followed by 41 to 50 years (10.2%, n=6) and 51 to 60 years (1.7%, n=1).

As for job sector, majority respondents that involved in this project were unemployed 79.6%, (n=47), followed by private sectors employees (8.5%, n=5), government sectors employees (5.1%, n=3) and others (6.8%, n= 4).

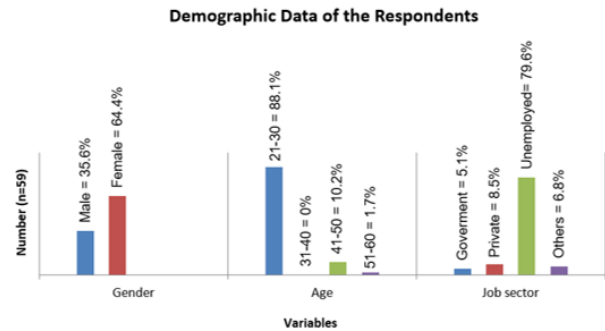


Figure 1: Socio-demographic of participants

Assessment of knowledge

As shown in Table 1, for the assessment on knowledge regarding parasites, adults were primarily verified if they have any previous information on parasites, mode of parasites transmission to human, knowledge on parasites and the consequences and symptoms of parasitic infections. We found majority of the adults had general knowledge regarding existence of parasites (91.5 %, n=54) meanwhile (8.5%, n=5) had no idea about parasites. The next question regarding history of parasitic infection, most of the respondents (25.4%, n=15) answered 'Yes', followed by 'No' (71.2%, n= 42) and 3.4% (n=2) respondent was not willing to answer this question.

For knowledge on the symptom of parasitic diseases, majority of the respondent chose "Diarrhea" (76.3%, n=45) followed by flu (15.2%, n=9), cough (6.8%, n=4) and a few did not answer (1.7%, n=1). It was good to see majority had knowledge malaria is a type of parasitic infection (62.8%, n=37) and while rest did not know or unsure about the answer.

The next question was regarding history of malarial infection, majority of the respondents responded negative (89.8%, n=53.1) followed by positive response (10.2%, n=6). Next, the sources of respondents' information for parasitic infection was identified as Mass media (34.0%, n=20), from School (27.2%, n=16), from Health center (20.4%, n=12), from other people (16.5%, n=10) and no answer was obtained for this question (1.9%, n=1).

Assessment of awareness

As shown in Table 2, for awareness various question were asked. Firstly, it was on if they feel cases will increase each year and majority said Yes (52.5%, n=31) and the rest said "No" (6.8%, n=4).

We also investigated how vector borne parasitic diseases caused by mosquitoes are found in environments, they answered "Dirty environment" (54.2%, n=32), "Water reservoir" (32.2%, n=19), "Artificial water container" (11.9%, n=7) and 'No' answered obtained in (1.7%, n=1) of respondents.

Table 1: Knowledge about parasites

Parameter	Options	Frequency	Percentage (%)
Do you know about parasite?	Yes	54	91.5
	No	5	8.5
Have you been infected with parasitic infection before?	Yes	15	25.4
	No	42	71.2
	No answer	2	3.4
Which of the following symptoms is caused by parasite?	Diarrhea	45	76.3
	Flu	9	15.2
	Cough	4	6.8
	No answer	1	1.7
Did you know that malaria caused by parasite?	Yes	37	62.8
	No	11	18.6
	Maybe	11	18.6
Have you previously been infected with malaria?	Yes	6	10.2
	No	53	89.8
Which are the sources of your information for parasitic infection?	Mass media	35	34.0
	School	28	27.2
	Health centre	21	20.4
	Other people	17	16.5
	No answer	2	1.9

The respondents were asked about the high risk of infectious diseases in the study area, Selangor, Malaysia. Mostly felt it was dengue (67.6%, n=40), followed by malaria (14.9%, n=9), ringworm (10.8%, n=7), Lymphatic filariasis (5.4%, n=3) and no answer was given by (1.3%, n=0.59) of the respondents.

The respondents had good knowledge on effect of helminthes infection. Most agreed it causes diarrhea (47.5%, n=28), "Body weakness" (20.3%, n=12), "Vomiting" (16.9%, n=10), "Rashes" (10.2%, n=6), "Conjunctivitis" (1.7%, n=1), "Pale face" (1.7%, n=1) and (1.7%, n=1) respondents gave no answer.

Assessment of practice

As shown in Table 3, to investigate the adult basic hygiene practices towards overcoming parasitic infection, they were asked on their food hygiene, initiative practice towards preventing malaria disease and, basic sanitation habit.

Interestingly for assessment of food hygiene, drinking boiled water and cooking meat practice, mostly

all answered as 'often' and 'well cooked' respectively ($\geq 90\%$ and above) (Figure 1).

Most of the respondents (n=40) about 67.8% responded "Mosquito spray" as a preferable initiative to prevent malarial disease. Others respondent chose "Mosquito Repellent" (25.4%, n=15), "Mosquito Coil" (5.1%, n=3) and no answer was given from 1.7 percent. Their basic sanitary habit practices, majority does "Frequent hand washing" (64.4%, n=38), followed by "Bottled instant liquid anti-bacterial sanitizer" (18.6%, n=11), Washing on entering houses (15.3%, n=9) and no answer was given by 1.7 percent of respondents.

DISCUSSION

This study was conducted in area of Selangor with the general objective of to identify the level of knowledge, awareness and practice (KAP) towards parasite infection among working adults in Selangor. The study showed that knowledge of participants on parasitic infection is adequate. Despite the lower

Table 2: Awareness among adults in parasitic infection

Parameter	Options	Frequency	Percentage (%)
Do you think the level of parasitic infection cases will increase each year?	Yes	31	52.5
	No	4	6.8
	Maybe	23	39.0
	No answer	1	1.7
Causes of mosquito transmitted infection	Water reservoir	19	32.2
	Dirty environment	32	54.2
	Artificial water container	7	11.9
	No answer	1	1.7
Which of the infectious diseases has high risk of being contagious in Selangor district?	<i>Lymphatic filariasis</i>	4	5.4
	Malaria	11	14.9
	Dengue	50	67.6
	Ringworm	8	10.8
	No answer	1	1.3
Sign and symptoms of helminths parasitic infection	Body weakness	12	20.3
	Conjunctivitis	1	1.7
	Diarrhea	28	47.5
	Pale face	1	1.7
	Rashes	6	10.2
	Vomiting	10	16.9
	No answer	1	1.7

number of respondents had a history of parasitic infection, they were able to recognize major symptom caused by parasites which is diarrhea. This finding is consistent with a study by [Acka et al. \(2010\)](#), reported from the rural community households in Zoutta II who were able to distinguish the signs and symptoms for intestinal worm infections were fatigue, loss of appetite, worms in stool, diarrhea and blood in stool. On the other hand, knowledge on malarial infections was good despite very less had the infection earlier. These findings can be validated by a similar study in southern Ethiopia which finds that the level of knowledge about malaria is high because the population is aware of the clinical manifestations of the disease ([Deressa et al., 2004](#)). Other studies also showed that participants were very familiar with intestinal helminths and they also influence the knowledge of associated illness towards helminths parasitic disease ([Acka et al., 2010](#)). This study also depicts that the major source of obtaining information of parasitic infection is through mass media.

Mass media plays a vital role in providing the community with adequate knowledge on parasitic infection and acts as a crucial part in effective health communication ([Yaya et al., 2018](#)). However, this finding challenges with other published studies. A study conducted in Terengganu found that the main source in obtaining the knowledge of parasite is from school ([Al-Abd et al., 2014](#)). Another study in Pahang discovered that the major reference in gaining knowledge of parasite is from health clinics or hospitals ([Nasr et al., 2013](#)) and also supported by studies that proves health workers as the main source of information on gaining the knowledge ([Acka et al., 2010](#)).

The current study reveals that most of the respondents would cook the meat thoroughly and regularly boil the water before consuming it as a habit in preventing food-borne parasitic diseases. This finding was supported by a study that was conducted in Lusaka, Zambia, which reported that correct meat processing and hygiene inspection is the foundation to the prevention of human infection with *Taenia-*

Table 3: Practices on overcoming parasites

Parameter	Options	Frequency	Percentage (%)
How do you cook your meat?	Rare	0	0
	Medium-rare	2	3.4
	Medium	2	3.4
	Well-cooked	55	93.2
Do you boil the tap water before drink it?	Rare	0	0
	No	1	1.7
	Sometimes	4	6.8
	Often	54	91.5
What initiative do you prefer to use as a caution towards malaria diseases?	Repellent	15	25.4
	Coil	3	5.1
	Mosquito spray	40	67.8
	No answer	1	1.7
Basic sanitary habit	Frequent hand washing	38	64.4
	Bottled instant liquid anti-bacterial sanitizer	11	18.6
	Wash your feet every time you came home	9	15.3
	No answer	1	1.7

sis (Okello and Thomas, 2017). WHO also revealed that by eating raw or improperly cooked meat could lead to Taeniasis (Rogan, 2005). However, our findings differ with a research that was conducted in Jimma, Ethiopia where they found that most of the respondents responded that consuming raw food of animal origin is not a practice followed by farmers on disease prevention and control. This defines that the population has been implementing an incorrect practice that intensify the development of food-borne parasitic infection in the area (Kuma et al., 2013). This was taken as concern matter due to the presence of cysticerci (larvae form) of Taenia in the meat, therefore it is important to properly cook the meat before consuming it (Kuma et al., 2013; Rogan, 2005).

On the other hand, the practice in preventing mosquito-borne parasitic infection is avoiding the mosquito bites. This project bespoke that the preponderance of the participants preferably used mosquito spray rather than coil and repellent to protect from mosquito bites as prevention towards malaria disease. The majority of the respondents also recognized that reduction in mosquito bite practice as a prevention of malaria diseases. This is

supported by a research that was conducted in Nigeria where they found that the mosquito-borne parasitic infection can be eliminated by using Indoor Residual Spraying (IRS). The objective of IRS is to control the mosquito or Anopheles mosquitoes before the parasite in the mosquito evolves into an infective stage (Delmege, 1920). Another research also found that one of the main involvements is in preventing mosquito bites by using spatial repellents by disseminating active ingredients into surrounding air that impede the mosquito potential in finding a host target (Maia et al., 2018). Therefore, this study could indicate that the respondents have adequate knowledge in practicing on preventing parasitic infection.

In this study, the number of female participants is higher than the number of the male participants. There can be gender bias with the results however it does not affect the awareness pattern, the main problem is to observe the awareness among adults to parasite infection. From the result of awareness among adults in parasitic infections, most of the adults were aware to the parasitic infections. This is depicted in the result that 59 percent of the respondents answered "Yes" to the elevation

of parasite cases each year. Most of the respondents (54.2%) answered dirty environment to be the cause for mosquito transmitted diseases, this may be because of the campaign and exposure that have educated the public. The exposure towards the mosquito control is important to prevent various disease spread ([World Health Organization, 2020](#)).

When asked about the parasitic disease that have high risk of being contagious in Selangor district, most of the participants chose dengue as it is the highest in percentage by 67.6%. It is true that Selangor has the highest dengue case in Malaysia based on the report by [Sarawak \(2018\)](#), 18,249 cases recorded for dengue in Selangor and that was the highest number compared to other places. However, dengue is not a parasitic infection, it is a vector borne viral infection ([Syed et al., 2010](#)). Therefore, these responds can be categorized as the wrong answer. The risk of parasitic infection being high in Selangor is then followed by malaria with 14.9 percent, ringworm infection by 10.8 percent, lymphatic filariasis by 5.4 percent and no specific answer were only 1.3 percent. The correct answers for this part of query are malaria and lymphatic filariasis. Next, for mode of transmission of ringworm infection, participants mostly responded soil as a mode of transmission for ringworm infection with the percentage of 52.5 %. This finding was supported by [Mayo Clinic \(2019\)](#) which has stated that ringworm can be transmitted to human by contact with the infected soil. The results then followed by water (39%), air (6.8%) and no specific answer in 1.75 percent. Furthermore, for signs and symptoms of helminths parasitic infection, the results showed that diarrhea got the highest percentage by 47.5 percent followed by body weakness (20.3%), vomiting (16.9%), rashes (10.2%), then conjunctivitis, pale face and no specific answer with 1.7 percent each. Lastly, despite of their small incorrectness, the overall findings showed that awareness among adults in parasitic infection are high.

Overall, more females participated in our study, which could give a potential gender biased data. Despite that, this factor is not expected to influence the findings since both the women and men have equal chances of getting infected ([Al-Abd et al., 2014](#)). However, it is a phenomenon that could not be avoided as the study was conducted solely through online questionnaire.

CONCLUSION

To be concluded, the level of KAP of the population towards parasite infection is adequately high. The study has successfully obtained the stated objective

which to identify the level of knowledge, awareness and practice toward parasite infection among working adults in Selangor. Next, we suggest comprehensive study should be conducted in future involving only working adults.

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Conflict of Interest

The authors declare that there is no conflict of interest.

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