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Knowledge on Monkeypox Among Community in Southern Malaysia: Are We Prepared for The Next Battle?

Suriya Kumareswaran[1*], Siti Umairah Muhadi[2], Bala Murali Sundram[3] Kee Chee Cheong[4], Muhammad Hazim Ismail[5]

[1]Johor State Health Department, Public Health Division, Jalan Persiaran Permai, Kempas Baru, 81200 Johor Bahru, Johor, Malaysia.
Email: Suriya_kumareswaran@hotmail.com
[2]Johor State Health Department, Public Health Division, Jalan Persiaran Permai, Kempas Baru, 81200 Johor Bahru, Johor, Malaysia.
Email: aishahumaira13@yahoo.com
[3]Johor State Health Department, Public Health Division, Jalan Persiaran Permai, Kempas Baru, 81200 Johor Bahru, Johor, Malaysia.
Email: bala.murali@moh.gov.my
[4]National Institutes of Health Persiaran Setia Murni, Setia Alam, 40170 Shah Alam, Selangor, Malaysia.
Email: kee@moh.gov.my
[5]Johor State Health Department, Public Health Division, Jalan Persiaran Permai, Kempas Baru, 81200 Johor Bahru, Johor, Malaysia.
Email: hazimismail@moh.gov.my

CORRESPONDING AUTHOR (*):
Suriya Kumareswaran
(Suriya_kumareswaran@hotmail.com)

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ABSTRACT

Monkeypox is spreading rapidly in countries around the world, thus requiring the global community to be well prepared in order to prevent the infection from becoming the next global pandemic. The purpose of this study was to assess the knowledge of southern Malaysian community regarding their readiness towards a human monkeypox outbreak in 2022.A cross-sectional study was conducted from 15th August to 30th August 2022 by distributing an online survey link to the entire community in southern Malaysia, which was in Johor. The study measured the knowledge of respondents on 18-item scale and gathered explanatory variables. Two-step logistic regression analysis was utilised to determine the participants' knowledge of monkeypox. A total of 484 participants were included. With the application of 80% criteria for knowledge domain, 25.8% of them had adequate knowledge. According to the conducted logistic regression, knowledge score is a significant predictor of occupation, education level, and salary (p value <0.01). Knowledge about monkeypox is relatively poor across all categories among communities in Johor. Improving the ability of the communities to respond towards human monkeypox cases and report them to a disease monitoring system will depend on a greater understanding of monkeypox.

Contribution/Originality: This research contributed to the existing literature on monkeypox, as evidenced by its citations. In addition, this study employs novel estimate techniques to assess the correlation and predictability between

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sociodemographic and monkeypox knowledge. In addition, this is one of the very few studies to evaluate monkeypox knowledge in southern Malaysia.

1. Introduction

In the second half of the 20th century, the population grew faster than ever. People moved around more than ever and cities grew without limits. However, these changes led to an increase in the spread of zoonotic diseases (Jamil et al., 2022). Many of these illnesses begin as zoonotic diseases and subsequently change into human-only strains such as HIV. Other diseases such as the Ebola virus are recurring epidemics. Zoonotic illnesses can be bacterial, viral, or parasitic and can be transmitted to people via water, food or direct contacts (Rahman et al., 2020). The sheer diversity of these illnesses poses a significant threat to public health and must be monitored, investigated, and avoided in advance. Prior to becoming the next global pandemic, knowledge and awareness can be decisive in controlling their spread. Monkeypox, which is a presently circulating zoonotic disease, may represent how our public health system has evolved since the previous pandemic and how physician knowledge has played a major part in this evolution.

Human monkeypox (HMPX) is a zoonotic disease that has been described for over 60 years, with the first human case recorded in 1970 (Ladnyj et al., 1972). The monkeypox virus (MPXV) is the causal agent and it belongs to the genus Orthopoxviral and family Poxviridae. HMPX has arisen as a significant concern among Orthopoxviral members after the successful eradication of the infamous variola virus infection (smallpox) from the human population (Ginevra Lulli et al., 2022). Several outbreaks of the disease occurred primarily in Western and Central Africa such as in the United States (U.S.) and Europe that were linked to imported animals or a history of travel to endemic regions (Parker et al., 2007). In 2022, the prospective threat of HMPX manifested with a gradual increase in cases. The World Health Organization (WHO) characterised HMPX as a multi-country epidemic that exists in non-endemic nations which pose a moderate worldwide risk to public health.

HMPX is mainly spread through direct contact with skin lesions on infected animals or through the respiratory tract/saliva (MacNeil et al., 2009). Prior to the present outbreak, reports of human-to-human transmission mainly involved household contacts or hospital settings (Formenty et al., 2010). Lesions can be extremely irritating or painful. Symptoms can range from minor to severe. Although the animal reservoir of the monkeypox virus remains unknown, it is probable among rodents (Centre for Disease Prevention, 2022a). Recognised risk factors include contact with live and dead animals through hunting and ingestion of wild game or bushmeat (Karem et al., 2007). The clinical signs of the disease resemble but are less severe than those of smallpox. With household attack rates of 3–11%, human-to-human transmission did not seem to happen as frequently as it did in smallpox (Nolen et al., 2016). The prevalence of cases among males who have sex with other men (MSM) raises concerns during the current HMPX outbreak. Certain sexual habits such as having several casual sexual interactions and/or multiple sexual partners that may be prevalent sectors of the MSM community may increase monkeypox transmission (Centre for Disease Prevention, 2022b). Other sexually transmitted illness outbreaks among MSM can be linked to international travel as well as social and mass gathering activities.

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The first incidence of monkeypox in Asia was reported in Singapore in May 2019, when a Nigerian tourist who attended a conference tested positive for the MPXV (Ng et al., 2019). The Singaporean government took steps by isolating the patient, contacting, and quarantining people who had contact with him during his stay in the country, activating the surveillance system, and conducting a risk assessment. After hearing about the first monkeypox case in Singapore, the government of Malaysia began to enhance its surveillance system by establishing stricter screening for visitors, especially Singaporeans and Nigerians (Harapan et al., 2020). Johor, which is the nearest hub in Indonesia to Singapore, was chosen for this screening. The administration of Johor installed a thermal scanning equipment to screen passengers who had fever at five ports that are connected to the island. The rising incidence of human monkeypox underscores the significance of prevention, early detection, prompt reaction, and management by healthcare professionals. According to the World Health Organization (WHO), a report done by one of the obstacles in preventing the re-emergence of monkeypox, was a lack of information, particularly among general community (Kontsevaya et al., 2018). Although monkeypox has not yet been recorded in Malaysia, it is imperative that the community should be vigilant.

Tackling knowledge can be regarded as the initial step in the endeavour in order to change attitudes and behaviour. Mounting knowledge is frequently related with a larger influence of attitudes on conduct. When attitudes are anchored in substantial levels of information, they are more important and are better predictors of behaviours compared to when they are based on inadequate or inaccurate knowledge (McCarthy et al., 2021). Assessment of community's knowledge in developing viral illnesses can be useful for determining how well-prepared and willing they are to work during infectious disease outbreaks as current generation (Santinha et al., 2022). Malaysia is a tourist destination, which can enhance its susceptibility to the importation of human monkeypox. Therefore, it must be educated and prepared for cases of monkeypox. Consequently, this study aimed to evaluate the community's understanding of monkeypox in the southern region of Malaysia.

2. Methods

2.1. Study design and setting

Starting from 15 August 2022 to 30 August 222, a community-based cross-sectional analysis was undertaken in Malaysia. This study recruited participants from all districts in Johor. The sample size was determined via Openepi and was computed using recent statistics to estimate the total number of residents in Johor. Since no prior studies in Johor were conducted to evaluate the knowledge of monkeypox, a cautious estimate of 50% was utilised. Minimum sample size that was needed for a 95% confidence interval with a 5% error margin was 383.The sample size was raised because it was anticipated that many individuals would complete an online questionnaire.

2.2. Study instrument

This study was conducted using a self-administered questionnaire which was modified based on current information from the Centres for Disease Control and Prevention (CDC), Ministry of Health Malaysia, World Health Organisation, and previously published in Alshahrani et al. (2022). Then, the questionnaire was changed to match the aims and scope of the current research. The questions were formulated in the official language of

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Malaysia, Bahasa Malaysia and were evaluated by a small number of medical professionals with an interest in emerging infectious illnesses. In the pilot research that involved 20 medical doctors, the reliability of the questions was evaluated and the questionnaire was finalised based on the results.

2.3. Data collection process

Participants were recruited using the convenience sample method and no monetary compensation was offered. Google Template was used to invite users to participate in the survey and social media channels such as WhatsApp and Twitter were used to interact with participants. The beginning of the questionnaire was a brief description of the research and a request for participation. The completion of the online survey was interpreted as consent for the study.

2.4. Ethical consideration

Participants were informed on an introductory page that they might end the survey at any time and were required to give their consent prior to their enrolment in the survey. Participants' IP addresses were not gathered. Only the lead investigator had access to the survey account in order to protect the participants' identity and confidentiality.

2.5. Study Variables

In this study, the response variable was the community's knowledge of monkeypox in Malaysia. Two major sets of explanatory variables that could plausibly influence knowledge were evaluated, namely sociodemographic traits and monkeypox knowledge. Age, districts, work scope, education level and salary were sociodemographic variables. The second portion contained information about monkeypox. To evaluate the knowledge, 18 questions were employed, with each correct response receiving one point and each erroneous response receiving zero points. The aggregate of the results resulted in a total score ranging from 0 to 18, with higher values indicating greater knowledge. It provides current monkeypox epidemiology, current measures, risk factors, treatment, and preventative methods.

2.6. Statistical analysis

This study was a cross-sectional survey. Frequency distribution was performed for categorical data that were reported in numbers and percentages. For statistical analysis, the levels of knowledge were dichotomised into good and poor based on two modified Bloom's cut-off points: 80% of the total score (i.e., if a participant responded 15 out of 18 questions correctly). The associations between the explanatory variables and the dependent variable were examined using a two-step logistic regression for both cut-off points. Pearson's Chi-square test was used to compare response variables and explanatory variables. *P* value was set at < 0.01 for statistical significance.

3. Results

The final sample of the study was 484. The characteristic of participants is displayed in Table 1. Approximately 72% of the participants belong to the age group of 25-44. Majority of the participants were Malays (86.2%) and most of them are government staff (75.2%). In terms of the education level, majority of the participants completed diploma

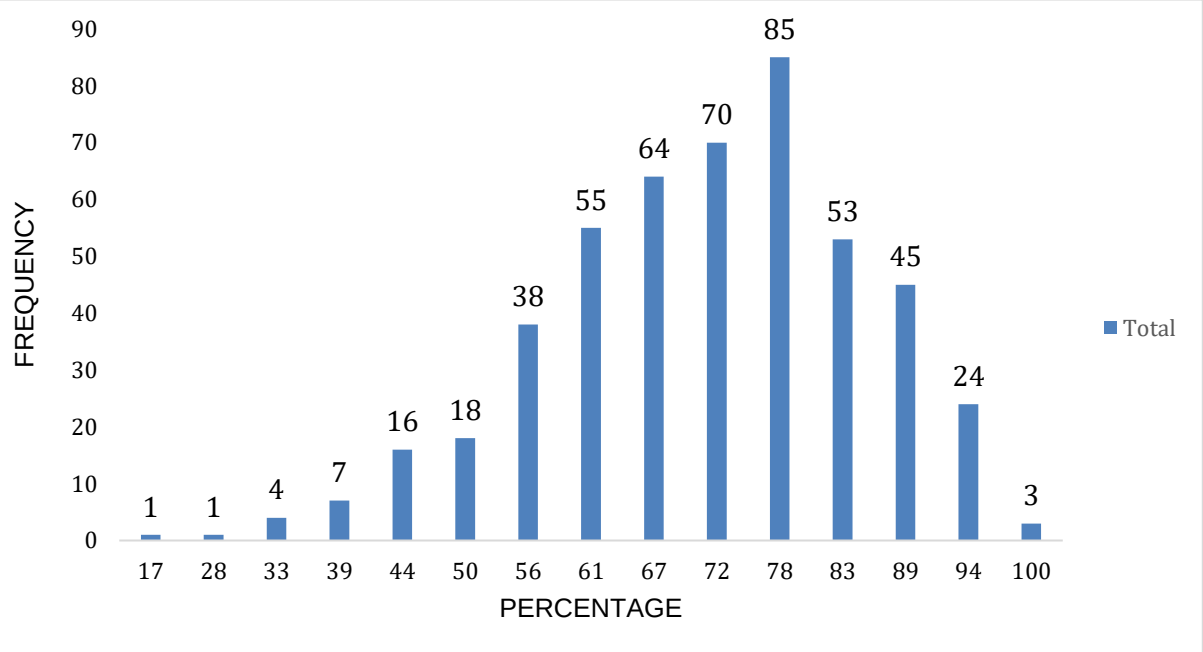
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(37.4%). 177 of the participants (36.6%) earned between RM1500 and RM3000 monthly. Figure 1 shows the percentage scoring of participants.

Table 1: Sociodemographic of Participants

Variables		Frequency	Percent	Mean	SD
Race	Malay	417	86.2	0.6	0.688
	Chinese	19	3.9		
	Indian	38	7.9		
	Others	10	2.1		
Occupation	Government Staff	364	75.2	0.46	1.052
	Private Company	80	16.5		
	Self Employed	12	2.5		
	Unemployed	3	0.6		
	House Wife	16	3.3		
	Student	9	1.9		
Education Level	SPM	108	22.3	1.25	0.887
	Diploma	181	37.4		
	Degree	159	32.9		
	Masters/PHD	36	7.4		
Pay	< RM 1500	41	8.5	1.77	1.046
	RM1500-RM3000	177	36.6		
	RM3001-RM5000	146	30.2		
	RM 5001-RM10000	102	21.1		
	>RM10000	10	2.1		
	Student	8	1.7		
Age	<24	33	6.8	1.16	0.556
	25-44	349	72.1		
	44-59	93	19.2		
	>60	9	1.9		

Figure 1: Percentage scoring of knowledge and frequency (n= 484)



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The association between five domains of explanatory factors was evaluated using both knowledge domain cut-off points (80% of a total of 18 questions). Based on the results, 125 (25.8%) participants had good knowledge on Monkeypox (Table 2). The mean score of knowledge was 71.18 with standard deviation of 14.6. A contingency table was used to investigate the association between socio-demographic and knowledge (Table 3). Using a limit of 80%, crosstab revealed that race, professions, education level and salary were associated with knowledge level. Government staff had higher knowledge compared to non-government staff (OR: 1.294 CL: 1.083-2.745 p<0.01). Participants with secondary education had higher knowledge compared to those with primary education (OR: 1.839 CL: 1.068-3.168 p<0.01). Participants who earned more than RM 3000 had higher knowledge compared to those who earned less than RM3000 (OR: 2.193 CL: 1.425-3.375 p<0.01). However, there is not significant different between age category and race.

Table 2: Level of Knowledge

Level of Knowledge	Frequency	Percent	Mean	Sd
Poor Knowledge	359	74.2	71.18	14.6
Good Knowledge	125	25.8		

Table 3: Association between sociodemographic and knowledge

Variables	n (%)	Good Knowledge n (%)	OR (95% CL)	*P* value
Age cat				
<35	236 (48.8)	55 (23.3)	1.294(0.856-1.949)	0.216
>35	248 (51.2)	70 (28.2)		
Race				
Malay	417 (86.2%)	109 (26.1%)	0.886(0.485-1.619)	0.345
Non-Malay	67 (13.8%)	16 (23.9%)		
Occupations				
government	365 (75.4%)	107 (29.3%)	1.294(1.083-2.745)	0.01
Non-government	119 (24.6%)	18 (15.1%)		
Education level				
Primary	108 (22.3)	19 (17.6)	1.839(1.068-3.168)	0.01
Secondary	376(77.7%)	106 (28.2)		
Salary				
<RM 3000	218 (45)	39 (17.9)	2.193(1.425-3.375)	0.01
>RM 3001	266 (55)	86 (32.3)		

Table 4 shows logistic regression conducted between sociodemographic and scoring of knowledge. The results showed that scoring knowledge was a significant predictor of occupation, education level dan salary. With an increase of knowledge, the odds of

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working in government, having secondary education, and earning >RM 3001 are 1.769, 1.028 and 1.029 respectively.

Table 4: Logistic regression sociodemographic and scoring of knowledge

Variables	S.E.	Wald	OR (95% Cl)	*p*-value
Occupation	0.008	16.996	1.769 (1.955-2.984)	0.000
Race	0.010	0.367	1.006 (0.987-1.025)	0.545
Education Level	0.008	13.012	1.028 (1.013-1.044)	0.000
Salary	0.007	17.093	1.029 (1.015-1.043)	0.000
Age Cat	0.007	0.360	1.004 (0.991-1.017)	0.548

4. Discussion

As the number of monkeypox cases in various nations continues to rise, the Malaysian government and population must be prepared to contain the spread. Although public health and healthcare professionals are responsible for developing methods in order to prevent, manage and treat epidemics, public participation is essential for the success of these efforts. Assessment of the Malaysians' understanding on monkeypox will lay the groundwork for conducting initiatives to educate the public about monkeypox and engage it in control, prevention, and treatment measures, thereby controlling and eradicating the outbreak. Consequently, the researchers assessed the level of monkeypox awareness among the general population in southern region of Malaysia.

Malaysia is also an important global destination for commerce, sports, tourism and religion. Imported cases will then be observed and confirmed over the course of the next few months. As a result, the community in this country must be prepared for clinical and epidemiological features of this developing viral disease. Preparation in many countries and regions is crucial.

72% of responders demonstrated a lack of understanding towards monkeypox infection. The infection of monkeypox, which is abundant in the tropical rainforest region, is not endemic in Malaysia (Luigi Bragazzi et al., 2022). Therefore, the population of Malaysia is not accustomed to it, which might explain why majority of the respondents had lower knowledge towards monkeypox infection. These findings were consistent with the findings of other research which revealed a lack of awareness regarding rare outbreaks in the study locations (Harapan et al., 2018). Exposure to actual cases is essential for gaining knowledge, perception and understanding of a condition.

Most of the participants who only had primary education showed lack of knowledge regarding monkeypox. Only 17.6% (19) of the participants had good knowledge on monkeypox. This indicates that medical education on monkeypox in Malaysia is crucial at this time. As previously demonstrated during prior epidemics and pandemics such as Zika and COVID-19, the spread of disease can be rapid (Ganga et al., 2018). Training and

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knowledge assessment are critical, especially when such studies show considerable increase in related and specific knowledge.

The importance of providing health information to people with poor education should be emphasised. Although new media and mass media are becoming important in health information, health information that is obtained through activities and counselling sessions are still common in Malaysia. Furthermore, health information that is obtained via the Internet should not be used in place of healthcare professionals who are experts in developing infectious diseases (della Polla et al., 2020).

4.1. The effect of health education

A Chinese study found that comprehensive health education and public awareness improved Beijing residents' attitudes toward SARS, increased their awareness of SARS prevention, and dramatically reduced the occurrence rates of tension, anxiety, despair and dread (p value< 0.01). There were also more behavioural changes (p value<0.01) in SARS prevention, demonstrating the effectiveness of comprehensive health education advertising (Li et al., 2020).

Health education has been linked to improved social, emotional, and behavioural outcomes. Prevention of alcohol and substance use as well as health promotion programmes can lessen symptoms of sadness, anxiety and antisocial behaviour (Subramaniam et al., 2021). However, it is critical to tailor health education and intervention in order to match social, emotional, and behavioural requirements of the community. Health education not only influences behaviour and physical health, but it also influences the emotions and attitudes of the community (McGuire, 2015).

Majority of the participants who work as government staff had better knowledge on monkeypox compared to participants who were non-government staff. Government agencies in Malaysia have developed knowledge-sharing initiatives for implementation methods. Omar Sharifuddin–and Rowland (2004) did a study on the availability of a knowledge management strategy inside the Ministry of Entrepreneur Development. It demonstrated that a knowledge management process was available and ingrained. Effective programmes for sharing information have the potential to help government agencies in promoting their missions. To guarantee that government personnel are equipped with the essential information and skills, Malaysian government agencies have placed special emphasis on workplace training to enhance employees' knowledge and foster capacity building.

4.2. Initiative taken during Covid-19 pandemic

The Malaysian government made great efforts to ensure a thorough approach to risk communications and community engagement (RCCE) by working to build public trust and providing transparency regarding the COVID-19 situation with the full support of WHO for a whole of government and whole of society approach. In order to guarantee that the public can have access to timely and accurate information about current COVID-19 developments as well as to reduce the possibility of an outbreak (Yong & Sia, 2021), Malaysian authorities have created and promoted reliable sources of information at the early stage of the COVID-19 pandemic (Izhar et al., 2021). At the peak of the pandemic, top officials held two daily media briefings which were eventually reduced to three

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briefings per week in order to inform the public of the COVID-19 situation in the nation and provide knowledge on the disease.

In addition to providing reliable sources of information, the government concentrated its efforts on developing mass media campaigns, conducting media monitoring and research on public insights and opinion, strengthening coordination with UN agencies and partners, and providing continuous briefings to diplomatic missions (Mustaffa et al., 2019). They also created standard operating procedures for communication and community involvement campaigns and concentrated on strategic communication planning. When combining with innovative content and targeted messaging to reach the culturally varied audience through as many means of communication as possible, social media platforms and mobile applications became a potent medium for RCCE outreach (Ang et al., 2021). The National Security Council (NSC) delivered daily bulk text messages through SMS to all Malaysians in order to provide updates on policies and regulations, reminders on current precautions as well as health advice and suggestions. The NSC has utilised Telegram to provide quick access to breaking news and information on legislations that are related to COVID-19.

5. Conclusion

Human monkeypox knowledge is similarly low across sociodemographic groups in southern Malaysia. Better knowledge was connected with government staff, better income, and higher education. These findings underscore the critical need for public education on monkeypox, which has yet to be reported in Malaysia in order to increase awareness and engage the public in advance of the epidemic. Systematic initiatives for increasing community capacity to learn about human monkeypox will be required in order to prepare for any future outbreak response. National and subnational public health authorities must identify and actively collaborate with relevant civil society organisations, community organisations and stakeholders. Healthcare facilities should be included in preparations to contain monkeypox and become familiar with it through campaigns and consultation from health officials who come from endemic places around the world.

Ethics Approval and Consent to Participate

The Declaration of Helsinki's rules were followed when conducting the study. The public health division of the Johor State Department granted the study approval.

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Conflict of Interests

The authors reported no conflicts of interest for this work and declare that there is no potential conflict of interest with respect to the research, authorship, or publication of this article.

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