PUBLIC HEALTH RESEARCH

Risk Perception of COVID-19 and Its Associated Factors Among Indigenous Population in Malaysia

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ABSTRACT

Introduction	Indigenous people have a higher risk of experiencing the bad impact of COVID-19 once they are infected. This study aimed to identify the risk perception of COVID-19 among indigenous population and its associated factors.
Methods	This is a cross-sectional study with psychometric evaluation of the Malay version of the risk perception of COVID-19 questionnaire.
Results	A total of 408 indigenous adults of the Semai tribe from a remote rural area of Pahang participated in the study. For psychometric evaluation, the item internal consistency reliability was 0.87, while the item separation was 2.57. Descriptively, mean age was 36-year-old (SD ±14), woman (60.8%), mean household income RM170 (SD ± RM355), had informal education (36%) and had job (92.9%). The cross-sectional finding highlighted that those who had job (adj.OR 4, CI: 1.118-14.374), had knowledge on COVID-19 (adj.OR 3.78, CI: 1.247-11.448), higher health literacy score (adj.OR 3.3, CI:1.262-8.852), higher trust on information (adj.OR 2.95, CI:1.071-8.109) and used more frequent information on COVID-19 (adj.OR 5.77, CI:1.228-27.063) had higher risk perception on COVID-19. Those did not agree to lift the government restriction has a protective factor in the level of risk perception on COVID-19 (OR 0.34, CI:0.131-0.879).
Conclusions	The indigenous population in Malaysia has a high-risk perception of COVID-19; however, they need assistance complying with the government policy on preventive and control measures.
Keywords	Risk perception; COVID-19; Indigenous population; Associated factors

Article history
Received: 19 March 2024
Accepted: 5 June 2024

INTRODUCTION

There were approximately 800 million cases of COVID-19 with a cumulative death toll of 6 million reported worldwide World Health Organization.[1] The deadly novel coronavirus SARS-CoV-2 is spread through droplets of saliva at close range, may infect the human respiratory tract, and cause severe infections, such as shortness of breath, lack of oxygen saturation in the blood circulation and can progress into the critical phase of multiorgan failure.[2] Indigenous people have significantly higher risk to experience bad impact of COVID-19 once are infected. In Brazil, there were 9.1% mortality rate reported among indigenous people who contracted COVID-19, while there were 5.2% mortality rate among non-indigenous peopleVan Doren.[3] A similar trend was seen in New Zealand, the case fatality rate was 50% higher among Maori than non-Maori.[4] In Malaysia, there were 15,424 cases of COVID-19 reported in 2021, with 1% case fatality rate recorded Ministry of Health Malaysia.[5] However, the documented actual data were underreporting.

According to Secretariate of Economic and Social Council UN, the indigenous population commonly reported as having health impact, despite encountering inequities such as extreme poverty, overcrowding, lack of potable water, food insecurity, lower life expectancy and lack of health care facility. The factors mentioned above may aggravating the COVID-19 pandemic situation. It is important to understand the indigenous population risk perceptions on the COVID-19 pandemic threat itself.[6] Understanding and digesting information might have been influenced by cultural practice according to preconceptions originating from the standards and customary of individual own background. Emotional fear is associated with one's perception with greater intolerance and punitive attitude toward out-groups.[7] The indigenous population remained resilience with traditional lifestyles, and they have their own perception and methods in preventing the coronavirus infections. As they are lacking so many resources to prevent the spread of the COVID-19, indigenous population preferably seek their own way of preventing the exposure by sealing off their territories.[8]

The indigenous community in remote areas have remained largely unaffected by the COVID-19 panic as they are still unalarmed about the extent of the outbreak. It was reported that they only know about the developments of the disease from social media, however, the remoteness delays the spread of the information. Nearest and accessible healthcare facilities for indigenous are often under-equipped and under-staffed. Health authorities would face great challenges if this population is exposed and infected with the deadly threat coronavirus, as complication may worsen the disease further if it was diagnosed at later stage.[8] Therefore, it is important to measure health literacy and risk perception on COVID-19 among this vulnerable group.

This study observing the fact on risk perception on COVID-19 that might linger different perception than the rest of the population. Identifying and monitoring specific epidemiological, sociodemographic and psychological dimensions as specific information of indigenous is a key aspect in designing the effective prevention and control measures of COVID-19.[9] This study aimed to identify the risk perception of COVID-19 among indigenous population and its associated factors.

METHODOLOGY

This study applied a cross-sectional study design. Prior to the study, the questionnaire was translated into Malay language using the forward backward translation, and was validated. This study was approved by the National Medical Research Registry (NMRR), Ministry of Health Malaysia (NMRR ID-21-02201-Q0N (IIR) and the research and ethics committee of National University of Malaysia (JEP-2021-636). All respondents in this study granted their permission through written informed consent.

Questionaire validation

The tool used in the study was adopted from the original English version of the questionnaire, which is the WHO Survey tool and guidance: Rapid, Simple, Flexible Behavioural Insights on COVID-19.[10] This tool consisted of five constructs, 16 domains and 100 items. Each item was presented as 7-Likert scale. The tool was translated from English version to Malay version, and then back to English version by four language experts. Cognitive debriefing was achieved from the experts discussion. Two items were removed due to duplicate items with the same meaning.

The Malay-version of the questionnaire was later proceeded with the content validity. The questionnaire was then submitted to the seven expert panels in the form of Expert Validation Rubric for Content Validity Index (CVI) evaluation. The expert panels comprised of one Family Physician, one Emergency Physician, one Epidemiology Specialist, two Medical Officers (experienced in dealing with indigenous clinic), one Clinical Psychologist and one Environment Health Officers. The researcher then gather all seven Expert Validation Rubric forms in an excel format to calculate I-CVI value. Items with I-CVI value less than 0.80 was removed.[11] Here, the average I-CVI obtained was 0.97. Two domains, which were conspiracy theory and vaccination, both total nine items, were removed during the process to avoid cultural belief argument in future. Therefore, the Malay version questionaire was produced with five constructs, 14 domains and 89 items.

Further, the questionaire was then proceeded with face validity. 15 indigenous adults were invited as expert committee.[12] The comprehension in every single item was checked and commented accordingly, to achieve the harmonisation and understanding of the targeted respondents. A total of 18 items which were irrelevant and difficult to understand were removed during the final consensus of the meeting.

In the final stage of validation, pre-testing was performed on 30 remote indigenous respondents.[13] The adult respondents with good historian and able to communicate in Malay language was selected. The data of pre-testing was recorded in SPSS software version 23. Rasch analysis was used to analyse data as it is more sensitive to get the reliability value.[14](Table 1).

Pre-testing stage showed the final result of validation. It was concluded that a total of five constructs and 14 domains were examined and validated, consisting of 59 items. 12 items were removed during the process.

Table 1 The summary result for pre-testing validation using Rasch Model Analysis

	Reliability	Separation	Infit		Outfit		Polarity
			MNSQ	ZSTD	MNSQ	ZSTD	
Item	0.87	2.57	1.04	-0.10	1.10	0.00	0.0
Person	0.68	1.47	1.03	-0.1	1.10	0.1	-2.4

Reliability and separation items and respondents

According to Bond and Fox (2007), the reliability within the range of 0.71 to 0.99 and is considered as the best reliability, whereby the separation is best at > 2.[15] In this study, the item reliability based on Cronbach-alpha was 0.87, while the item separation was 2.57. These results showed that the items used in the questionnaire had satisfactory level of internal consistency and effective for instrument purpose with highly acceptable ability to divide the sample into two distinct strata.[16] However, the person reliability showed 0.7, representing acceptable level of reliability with 1.47 separation index considered as minimum requirement to divide the samples into two distinct strata.[16]

Polarity item

The positive direction showed the overall items of Point Measure Correlation value appropriately measured the construct.

Item fit measure construct

The mean square (MNSQ) acceptable range is between 0.6 to 1.4. The value 1.4 is considered confusing while value <0.6 is too easily anticipated. Here, the overall item Infit MNSQ was 1.04, showing the items were fit to measure the constructs (Table 1).

Cross-sectional study

The data collection was conducted for six-months duration among the Semai tribe that resides in three remote settlements in Lipis district, Pahang, from June 2022 till December 2022. We used cluster sampling to choose the hamlet and convenience sampling to select the respondents. The inclusion criteria in this study was indigenous adult, age 18 years old and above, living in the remote area, and able to understand and communicate in Malay language.

The data was collected using a set of questionnaire, and documented in SPSS software version 23. Data entry and cleaning was performed. Every construct was cumulated and scored into dichotomous variable. The level of risk perception of COVID-19 was a cumulative score (in percentage) of 10-domains, namely: [17] probability,[17] severity, (3) self-efficacy,[17] prevention behaviours,[17] affect, (6) trust to institution,[17] policy intervention,[17] resilience, (9) fairness, and (10) wellbeing. The high level of risk perception was considered >50%, and the low level was ≤50%.[18]

In this study, univariable analysis was carried out to describe the characteristics of the respondents, and bivariable analysis was carried out to find the significant association between factors being studied and score of risk perception. Subsequently, the significant associated factors were proceeded with multivariable analysis using simple logistic regression and multiple logistic regression.

RESULTS

The descriptive profile of the respondents are summarised in Table 2 and Table 3. The total respondents in this study was 408, and the response rate was 97.0%. Most of the respondents were women (60.8%) in reproductive age, 20 to 30 years old (31.6%), with mean age 36 (SD 14) years old. Majority of the respondents were extremely poor, with mean household income of RM170 per month (SD: 355), which income below than poverty level RM580[19] (referred to year 2014). A total of 36.0% of the respondents received informal education, and 93.0% had jobs. Majority of the respondents claimed that their financial status was worsen during and after the COVID-19 pandemic. A large number of them (90.0%) had knowledge on COVID-19. The descriptive results were summarised in Table 2.

Table 2 The descriptive profile of socio-demographic factors

Sociodemographic factor		Total (N=408)	Percentage (%)
Age [20]	Mean±SD: 36.0±14.0		
	< 20	44	10.8
	20-30	129	31.6
	31-40	97	23.8
	41-50	62	15.2
	51-60	51	12.5
	61-70	15	3.7
	More than 70	10	2.4
Sex	Male	160	39.2
	Female	248	60.8
Household number	≤ 5	177	43.4
	>5	231	56.6
Household income (RM)[19]	Mean±SD: 170±355		
	None	29	7.1
	≤RM580*	358	87.7
	>RM580	21	5.2
Financial status	Poor	343	84.0
	Sufficient	65	16.0
Education	Informal	147	36.0
	Primary	126	30.9
	Secondary	129	31.6
	Tertiary	6	1.5
Having a job	No	29	7.1
	Yes	379	92.9
Have co-morbidities	Yes	8	2.0
	No	395	96.8
	Don't know	5	1.2
Knowledge on COVID-19	Know	370	90.7
	Do not know	38	9.3

**RM580 is income poverty level in Malaysia referring year 2014[19]*

There were 5 constructs consisting of 14 domains and 59 items that were thoroughly examined during the validation process. The summary of domains and constructs were shown in Table 3. The respondents had a higher health literacy score (80.9%), higher information trust (87.3%), but fair information usage (50.7%). Majority respondents (94.0%) had a higher level of risk perception on COVID-19 and 63.2% did not agree if the government restriction was lifted.

We examined the association of the sociodemographic factors and construct factors with the level of risk perception of COVID-19 using the chi-squared test. The summary of the bivariate analysis were shown in Table 3. We used p-value < 0.05 as significant value for this study. There was no significant association of age group, gender, number of household members and household income with the level of risk perception on COVID-19. We found that financial status, having job, and knowing the presence of COVID-19, were significantly associated with the level of risk perception of COVID-19. There was also a significant association between health literacy construct, information trust construct, information usage construct and recommendation of restriction lift, with the level of risk perception of COVID-19.

We then proceeded with multivariate analysis using Simple Logistic Regression (SLR) and Multiple Logistic Regression (MLR). The summary of the study results were shown in Table 4. Our finding highlighted that those who had job has odds of 4 times higher in the level of risk perception on COVID-19. Knowing the presence of COVID-19 had odds of 3.78 times higher in the level of risk perception of COVID-19. Higher health literacy score had odds of 3.3 times higher in the level of risk perception of COVID-19. Those who had higher trust on information had odds of 2.95 times higher in the level of risk perception of COVID-19. Those who used more frequent information on COVID-19 had 5.77 times higher odds in the level of risk perception of COVID-19. Those who did not agree to lift the government restriction had a protective factor in the level of risk perception on COVID-19 (OR 0.34). The summary of multivariate analysis were explained in Table 4.

Table 3 Bivariable analysis showed factors associated with level of risk perception on COVID-19

Variables		Level of risk perception		Chi-square value (χ^2)	p-value
		High N(%)	Low N(%)		
Sociodemographic factor					
Age [20]	Less than 50	307 (93.9)	20 (6.1)	0.000	1.000
	50 and above	76 (93.8)	5 (6.2)		
Sex	Male	150 (93.8)	10 (6.3)	0.007	0.934
	Female	233 (94.0)	15 (6.0)		
Education	No education	136 (92.5)	11 (7.5)	0.734	0.392
	Had education	247 (94.6)	14 (5.4)		
Household income	<RM580	362 (93.5)	25 (6.1)	0.54	0.462
	≥RM580	21 (100.0)	0 (0)		
Financial status	Worsen	57 (93.9)	8 (6.1)	3.936	0.047*
	Better	326 (95.0)	17 (5.0)		
Having a job	No	23 (79.3)	6 (20.7)	8.945	0.003*
	Yes	360 (95.0)	19 (5.0)		
Household number	≤5	163 (92.1)	14 (7.9)	1.726	0.189
	>5	220 (95.2)	11 (4.8)		
Presence of COVID-19	Do not know	30 (93.9)	8 (21.1)	13.493	<0.001*
	Know	353 (95.4)	17 (4.6)		
Health Literacy	Low	64 (82.1)	14 (17.9)	20.957	<0.001*
	High	319 (96.7)	11 (3.3)		
Information trust	Low	40 (76.9)	12 (23.1)	26.484	<0.001*
	High	343 (93.9)	25 (6.1)		
Information usage	Less frequent	178 (88.6)	23 (11.4)	19.459	<0.001*
	Frequent	205 (99.0)	2 (1.0)		
Lifting restriction recommendation	Did not agree	248 (96.1)	10 (3.9)	6.185	0.013*
	Agree	135 (90.0)	15 (10.0)		

**Significant at p<0.05*

Table 4 Multivariate analysis showing the predictors of high level of risk perception on COVID-19

Variables	Simple Logistic Regression (SLR)					Multiple Logistic Regression (MLR)				
	Beta	Wald	p-value	Crude OR	95% CI	Beta	Wald	p-value	Adjusted OR	95% CI
Having a job										
Yes	1.598	9.615	0.002*	4.943	1.80-13.57	1.389	4.544	0.033*	4.009	1.118-14.374
No (Reference)				1.000					1.000	
Presence of COVID-19										
Know	1.711	13.315	<0.001*	5.537	2.208-13.885	1.329	5.523	0.019*	3.778	1.247-11.448
Do not know (Reference)				1.000					1.000	
Financial status										
Worsen	0.99	4.795	0.029*	2.691	1.109-6.529	-0.01	0.00	0.987	0.990	0.297-3.298
Better (Reference)				1.000						
Health Literacy										
High	1.847	18.847	<0.001*	6.344	2.755-14.608	1.207	5.899	0.015*	3.343	1.262-8.852
Low (Reference)				1.000					1.000	
Information trust										
High	2.069	22.745	<0.001*	7.915	3.382-18.523	1.081	4.380	0.036*	2.947	1.071-8.109
Low (Reference)				1.000					1.000	
Information usage										
Frequent	2.584	12.049	0.001*	13.244	3.080-56.96	1.752	4.932	0.026*	5.766	1.228-27.063
Less frequent (Reference)				1.000					1.000	
Did not agree	-1.014	5.769	0.017*	0.363	0.159-0.830	-1.079	4.952	0.026*	0.340	0.131-0.879
Agree (Reference)				1.000					1.000	

**Significant at p-value <0.05*

DISCUSSION

This study was conducted after the Movement Control Order (MCO) was lifted, and travelling is possible with strict Standard Operating Procedure (SOP) is applied (Majlis Keselamatan Negara.[21] Parallel with previous study, having a job is significantly associated with higher risk perception of COVID-19.[18] In Malaysia, indigenous population are practicing sustainable agriculture, forestry, and hand-crafts. The economic transaction is present between rural-urban community, therefore, the trading activities are becoming crucial as financial resources for the indigenous community.[22] Hence, there is an evidence that indigenous population had somehow connected with the general population, whereby the presence of disease transmission is possible.

The claim by the indigenous population that they know about the presence of COVID-19 became an essential mind-opener in this study. This justifies the need to identify the level of risk perception of COVID-19 among them. Equivalent to a previous study in Malaysia, the indigenous population understands the COVID-19 symptoms, however failed to describe the transmission process. It, somehow, exposed them towards the risk of getting infected[23]. COVID-19 does not stop at giving bad health outcome, it also severely affected the traditional way of life, culture, economic and educational activities of the indigenous community.[24]

Our study revealed that worsen financial status has an association with higher risk perception of COVID-19. This finding is aligned with a study among the Indonesian general population whereby financial literacy has a significant effect on risk perception and enterpreneurship during pandemic COVID-19[25]. Financial constraints also affected the coping mechanism in individuals during the surge of pandemic in high-income country like the United States.[26]

Having a proper education also has a strong association with risk perception on COVID-19 United Nation.[8,18] Our study showed a dose-response relationship in which the higher the level of education, the higher the risk perception of COVID-19, however, the association was not significant. A previous study has shown that individuals with lower education level had a lower risk perception of COVID-19 than those with higher education level.[27] Education was proven as an important asset in a civilisation that it could increase the health literacy rate and understandings, so that the population could curb the disease spread by practicing preventive measures.[8]

Our findings also showed that health literacy supports higher level of risk perception of COVID-19. This finding is comparable with others, whereby health literacy is a subset to health information seeking behaviour and critical evaluation of information resources.[28] A good understanding on pandemic situation by the indigenous community also helped decision making towards the acceptance of vaccination in their isolated community.[29]

This study also showed that higher information trust and more frequent information usage are associated with higher level of risk perception of COVID-19. This finding was in line with the indigenous community in Alaska in which all the information spread through media and individuals were all trusted, eventhough they were living in remote areas Van Doren.[30] It is in line with studies in the general population whereby those who positively utilised the information from social media could increase their risk perception of COVID-19 and anxiety level[31]. Through the social media and information that the indigenous community received and adopted, the government's action on restriction order was also being complied at their own capacity.[30]

However, this study has some limitations. The study adopted a questionaire from WHO online database, in which the questionaire was meant for online survey among the general population. Based on the provided domain and construct, essential points on indigenous issues was not highlighted, such as cultural values, traditional medical practice, holistic approach of medicine, challenges in tribal living, food insecurity, and many more, that needs to be addressed in future studies.

Our methods of approaching the targeted respondents and community engagement may not be adequate as cluster and convenience sampling was applied during the data collection, in view of our limited time and resources. Since we only cater those who were reachable and willing to give full participation during our data collection, individuals who were not interviewed may have a different perspective and varied in their risk perception. Therefore, in future studies, we suggest to obtain namelist of the community and identified the respondents via random sampling.

CONCLUSION

The indigenous population in Malaysia have high risk perception on COVID-19. Their good health literacy, their knowledge on COVID-19, and having a job are credentials to their risk perception of COVID-19. Thus, they can accept the government's recommendation on preventive measures eventhough it is a challenging task to comply.

The results of this study may apply to the current policy specifically addressing the indigenous population needs. The preventive measures and interventions may be applied differently with regards to this special marginalised group. Therefore, it is imperative to public health authorities to carry out appropriate prevention, treatment, and management of the COVID-19

among the indigenous community by exploring their risk perceptions of COVID-19.

ACKNOWLEDGMENT

We would like to thank the Faculty of Medicine, National University of Malaysia for the financial support via the Fundamental Grant (FF-2021-464). We are also grateful to the Lipis District Health Office, the Department of Orang Asli Development, and the Ministry of Forestry for the assistance and permission to enter indigenous settlements in reserved forest in Pahang, Malaysia.

DECLARATION OF CONFLICTING INTEREST

The Authors declare that there is no conflict of interest.

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