Med & Health Dec 2020; 15(2): 262-275 https://doi.org/10.17576/MH.2020.1502.23

ORIGINAL ARTICLE

Development of Knowledge, Attitudes, and Practices (KAP) Towards COVID-19 Pandemic in Malaysia

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ABSTRAK

Dalam situasi wabak COVID-19 ketika ini, maklumat yang tidak disahkan telah membanjiri platform media sosial, lalu meningkatkan tahap kegelisahan dan gejala kemurungan di kalangan orang ramai. Penyelidikan ini bertujuan untuk menilai hubungan antara pengetahuan, sikap, dan amalan (KAP) yang berkaitan dengan COVID-19 dan kesan psikologinya, seperti kegelisahan dan gejala kemurungan pada rakyat Malaysia. Tinjauan dalam talian telah dilaksanakan dari 8-22 April 2020, yang melibatkan 227 responden. Set soal selidik tersebut merangkumi ciri-ciri sosiodemografi, soal selidik KAP - 11 soalan mengenai pengetahuan (K1-K11), 3 soalan mengenai sikap (A1-A3), 4 soalan mengenai amalan (P1-P4), bersama dengan Soal Selidik 'Patient Health Questionnaire (PHQ-9)' dan 'Generalized Anxiety Disorder (GAD-7) Scale'. Untuk mentafsir hasil penyelidikan, analisis deskriptif, ujian chi-square dan analisis teori respons barang telah dilaksanakan. Peratusan responden yang menjawab soalan penyataan benar dari komponen Pengetahuan (K1-K3) dengan betul adalah hampir 100%. Walau bagaimanapun, item yang menguji maklumat palsu COVID-19 (K4-K11) berkisar dari 38.8% hingga 95.2%. Satu-satunya item dari komponen Sikap yang kurang dari 95% dijawab dengan betul adalah A1 (78.9%), mengenai penggunaan topeng muka. Dari komponen Latihan, lebih daripada 80% responden mengenal pasti bahawa mereka menggunakan media sosial untuk mendapatkan kemas kini mengenai

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COVID-19 sepanjang masa. Ini merupakan sesuatu yang membimbangkan kerana kebanyakan maklumat yang beredar di media sosial belum disahkan oleh pihak berwajib, yang mungkin menyebabkan, dan terus-menerus memperkuat maklumat palsu yang menimbulkan kegelisahan. Kajian ini menunjukkan bahawa skor KAP keseluruhan yang lebih rendah, terutamanya untuk item komponen Pengetahuan, berkaitan langsung dengan tahap kegelisahan dan kemurungan yang lebih tinggi.

Kata kunci: amalan, COVID-19, Malaysia, pengetahuan, sikap

ABSTRACT

During this COVID-19 pandemic, massive unverified information has flooded the social media platforms, causing heightened levels of anxiety and depressive symptoms among public. This study aimed to investigate the relationship between the COVID-19 related knowledge, attitude, and practice (KAP) and its psychological impact, such as anxiety and depressive symptoms in Malaysia population. A cross-sectional online survey was conducted from 8th to 22nd April 2020, involving 227 respondents. The set of questionnaire included sociodemographic characteristics, the KAP questionnaire – 11 items on knowledge (K1-K11), 3 items on attitude (A1-A3), 4 items on practice (P1-P4), together with Patient Health Questionnaire (PHQ-9) and Generalised Anxiety Disorder (GAD-7) Scale. To evaluate the data, descriptive analysis, Chi-square test and item response theory analysis were implemented. The percentage of respondents who answered the true statements items from Knowledge component (K1-K3) correctly was almost 100%. However, that of items testing on COVID-19 myths (K4-K11) ranged from 38.8% to 95.2%. The only item from Attitude component which had less than 95% being answered correctly was A1 (78.9%), regarding face masks usage. From the Practice component, over 80% of respondents identified that they used social media to obtain updates on COVID-19 all the time. This is alarming as most of the information circulating on social media have not been verified by relevant authorities, which might lead to, and continuously reinforce anxiety-inducing myths. This study showed that lower overall KAP scores, particularly for Knowledge component items, are related to higher anxiety levels and more depressive symptoms.

Keywords: attitude, COVID-19, knowledge, Malaysia, practice

INTRODUCTION

In December 2019, coronavirus disease 2019 (COVID-19) was identified as an emerging respiratory tract infection in Wuhan city, China. Its rapid spread resulted in an epidemic throughout China which eventually led to a global pandemic, declared by the World Health Organisation (WHO) on 11th

March 2020. At that point of time, there were over 118,000 cases in 110 countries in addition to the ongoing threat of further global spread (World Health Organisation 2020).

The first COVID-19 case was detected in Malaysia on 25th January 2020 involving three tourists from China (Reuters Staff 2020), which then drastically spiked to a total number of 9946 cases till date, with 128 deaths and 9203 recoveries (Ministry of Health 2020). Various control measures including movement control order, social distancing, and enforcement of hand hygiene were implemented by the Malaysian government as part of the outbreak management.

However, adequate knowledge, attitudes and practices (KAP) among the public are crucial for these interventions to take place effectively. The KAP is a representative study of a specific population to collect information on what is known (knowledge), what is believed (attitude) and what is done (practices) in relation to a particular topic (World Health Organisation 2014). A systematic review done by Sørensen et al. has demonstrated that better acquisition of health knowledge and positive health behaviours are directly related to increased health outcomes (Sørensen et al. 2012). In this context, understanding the KAP in terms of COVID-19 among Malaysians would provide insight regarding the knowledge and belief gaps, thus supporting the control measures for current pandemic as well as development of preventive approaches in future.

A pandemic disease outbreak could induce a considerable amount of anxiety and stress in the community, in addition to extensive socioeconomic disruptions (Smith et al. 2019). For instance, a 62 years-old male who was under investigation for COVID-19 at Serdang Hospital, Selangor had committed suicide due to depression (Zolkepli 2020). In addition, due to the vague nature of novel coronavirus in the beginning, there has been a lot of confusion in the public, which are further intensified due to massive unfiltered, misleading information that are circulating on social media platforms (Kleis Nielsen et al. 2020).

In the present study, a structured questionnaire was developed to address and investigate the relationship between levels of disease-related KAP and psychological outcomes, such as anxiety and depressive symptoms, in the Malaysia population. It is anticipated that the higher respondents score on answering this questionnaire, the lower the manifestation of anxiety and depressive symptoms would be, and vice versa (Zarocostas 2020).

MATERIALS AND METHODS

This is a quantitative cross-sectional study, conducted from 8th of April 2020 to 22nd April 2020. In the beginning, focus group discussions were held among four psychiatrists, three psychiatrist trainees and one clinical oncology trainee. All datas were collected through an online survey as it was not feasible to do a community-based sampling survey during the Movement Control Order (MCO) period.

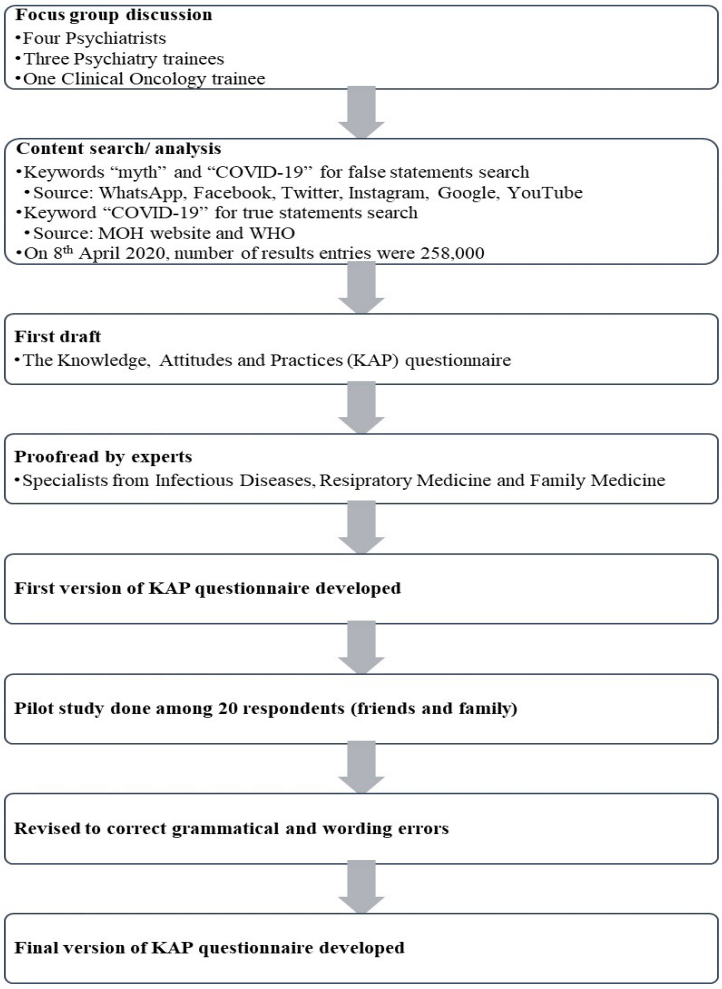

Figure 1: Flowchart of KAP questionnaire development.

This KAP questionnaire was developed to identify the false beliefs and attitudes regarding COVID-19 among Malaysians, with its development flowchart presented in Figure 1. Keywords, such as "Myth and COVID-19" were used to search for the false statements via Social media platforms, namely 'WhatsApp', 'Facebook', 'Twitter', 'Instagram', 'Google' and 'Youtube'. Whereas, for the true statements search, key word "COVID-19" was used in the Ministry of Health Malaysia (MOH) and World Health Organisation (WHO) websites. The number of results from this keyword searches were 258,000. Based on the content search and analysis of results, the KAP was created following these criteria i.e. (i) widely circulated false knowledge and information regarding COVID-19; (ii) common myths surrounding COVID-19 pandemic and its origin; (iii) correct knowledge

and information regarding COVID-19 pandemic from reliable sources; and (iv) exclusion of duplications in search results.

With the information obtained, a KAP questionnaire draft was prepared in both Bahasa Melayu and the English language. A forward-translation approach was used to translate the items from English to Bahasa Melayu, and the outcomes were validated by bilingual researchers to ensure both sets of questions were conceptually equivalent. The questionnaires were then proofread by experts from different specialties, including a Professor in the Infectious Diseases field, a Respiratory Medicine Physician and a Family Medicine Specialist on the accuracy of items. After carrying out a pilot study among 20 respondents consisting of family and friends, the questionnaire items was revised for any wording or grammatical errors to present the final questionnaire.

The final KAP questionnaire consists of three components, which are Knowledge, Attitude and Practice. Across all components, greater proportion of false statements were included as these are the myths that might exacerbate COVID-related psychological impact among public. There were 11 items in the knowledge component (K1-K11), with the first three items (K1-K3) assessing knowledge on true statements, and the subsequent eight (K4-K11) on false statements. For the Attitude component, all three items (A1-A3) were assessing negative disease-related attitude during the COVID-19 pandemic. While in the Practice component, all four items (P1-P4) were assessing the negative health behaviours regarding COVID-19. For the knowledge component, the response options available were "True/Benar", "False/Salah" and "I don't know/Tidak tahu", while for Attitude and Practice component, the response options consisted of " Yes/Ya" , "No/Tidak" and "I don't know/Tidak Tahu".

Along with the KAP questionnaire, Patient Health Questionnaire (PHQ-9), Generalised Anxiety Disorder (GAD-7) Scale and sociodemographic questionnaire were distributed to the respondents. The PHQ-9 is a self-administered diagnostic instrument for depression. It has 9 items which could be scored from "0" (not at all) to "3" (nearly every day). On the other hand, GAD-7 scale is a self-administered questionnaire used as a screening and severity measuring tool for generalised anxiety disorder. It has 7 items that measure severity of various signs of GAD according to reported response categories, with assigned points of 0 to 3. Lastly, the sociodemographic characteristics obtained from the respondents included their age, gender, ethnicity, marital status, education level and employment status.

The questionnaires were disseminated via google form invitations to 227 respondents, consisting of family, friends and public. The data was then collected and analysed using SPSS version 21.0 (IBM Corp., Armonk, USA).

Statistical Analyses

Descriptive analysis was done for the sociodemographic characteristics

of respondents in this study. The frequency of each answer for the KAP was presented and the score for total correct answer for the KAP was calculated for each respondents. The association of the between KAP with GAD-7 and PHQ-9 was examined using Spearman correlation test. The association of the socio-demographic variables with the results of KAP was examined with Chi-square analysis. All tests were two-tailed with significant value of 0.05.

Item Response Theory Analyses

Prior to carrying out the dimensionality and local dependency analytical tests, three respondents who answered K1 and K3 wrongly were removed to prevent downstream estimation bias. Through the dimensionality test, a questionnaire is deemed unidimensional as the eigenvalue in the unexplained variances (contrasts) lower than 2.0. Besides, the local dependency is considered achieved when there is no strong positive correlation between the standardised residual on the item scores. Next, person and item reliability, person and item separation and Cronbach alpha (KR-20) were computed together with log-likelihood Chi-square test with p value >0.05 indicated the data adequately fits into the model. Also, item fit statistic was calculated on each item, where items are considered appropriate when fulfilling outfit mean square between 0.50 and 1.50; outfit Z standardised value between -2 and 2 and point measure correlation value >0 (Bond & Fox 2007; Boone et al. 2013).

In addition, an item-person map was constructed to distribute the person (respondents) and item (questions) logit score for comparison purposes. For example, individuals with lower logit score compared to an item have a higher likelihood of disagreeing with the item, and vice versa. This map allowed researchers to identify those "difficult" or "confusing" items perceived by the respondents. All Rasch modelling calculations are done using WINSTEPS Version 3.73.

RESULTS

A total number of 227 respondents completed the online questionnaire, as showed in Table 1. Among the respondents, the average age was 35 years (standard deviation [SD]: 7.2, range 12-65). A total of 119 (52.4%) respondents were females and 108 (47.6%) were males. Other sociodemographic data can be found in Table 1.

The percentage of questions being answered correctly for the first three knowledge items (K1-K3), which were the true statements, was close to 100% (Table 2). The subsequent items from K4 to K11 were testing the respondents on misleading false statements about COVID-19. The percentage of correct answers ranged from 38.8% (K11) to 95.2% (K5) (Table 2). Meanwhile, percentage of items answered correctly in the Attitude component were greater than 95% for A2 and A3. A1 has the lowest percentage of correct answers at 78.9%. For the Practice component, percentage of items being answered

Table 1: Sociodemographic characteristics of the study respondents (N= 227).

Variable	Number of respondents	Percentage of respondents
Age, mean (sd)	34.97 (7.20)	-
Gender, n (%)		
- Male	108	47.58
- Female	119	52.42
Ethnicity, n (%)		
- Malay	111	48.9
- Chinese	55	24.2
- Indian	58	25.6
- Others	3	1.3
Marital status, n (%)		
- Single	89	39.2
- Married	131	57.7
- Divorced	1	0.4
- Stable partner	1	0.4
- Others	5	2.2
Education level, n (%)		
- Non-SPM	2	0.9
- SPM	2	0.9
- Diploma	24	10.6
- Degree	45	19.8
-Masters	90	39.6
-Doctor of Philosophy (PhD)	62	27.3
-Others	2	0.9
Employment Status, n (%)		
- Working	205	90.3
- Retired	2	0.9
- Not working	17	7.5
- Others	3	1.3

correctly in P1, P3 and P4 ranged from 84.6-94.7%. It is noteworthy that for P2 ("During COVID-19 pandemic, do you use social media to obtain updates on COVID-19 all the time?"), only 19.8% (45 out of 227) respondents answered correctly as "No/Tidak".

Table 3 shows the correlation between KAP questionnaire and Patient Health Questionnaires (PHQ-9) and Generalised Anxiety Disorder Scale (GAD-7). There was a significant correlation between total KAP with GAD-7 and PHQ-9. The higher the correct knowledge and the correct practices, the lesser the anxiety and depressive symptoms. However, there was no significant correlation seen in positive disease-related attitude with GAD-7, unlike the PHQ-9 which is

Table 2: Frequency and percentage of the correct answers for Knowledge, Attitudes and Practices (KAP) among respondents.

Question	Frequency (n)	Percentage (%)
K1 – COVID-19 is an infectious disease caused by coronavirus.	226	99.6
K2 – Symptoms for COVID-19 are fever, cough, sore throat and breathing difficulty.	227	100
K3 – Washing hands frequently with soap and water or hand sanitizer can reduce the risk of COVID-19 infection.	225	99.1
K4 – Everyone who has been infected with COVID-19 will die.	215	94.7
K5 – You have to be with someone infected with COVID-19 for 10 minutes to get infected.	146	95.2
K6 – Antibiotics can kill COVID-19.	175	76.7
K7 – Packages/ goods from China can spread COVID-19.	160	70.5
K8 – Traditional Home remedies (vitamin C, garlic, neem, essential oils, sesame oil, and drinking hot water) had been proven by research that it can cure and protect against COVID-19.	148	65.2
K9 – COVID-19 will be eliminated only by exposing yourself to the sunlight.	180	79.3
K10 – Surgical masks as good as N95 masks to protect from COVID-19.	109	48
K11 – COVID-19 came from drinking or eating bat soup.	88	38.8
A1 – Do you use the same mask repeatedly on the same day, during the COVID-19 pandemic?	179	78.9
A2 – Do you think we should continue mass gathering during the COVID-19 pandemic?	223	98.2
A3 – Do you think Ramadhan Bazaar should be allowed during COVID-19 pandemic?	218	96
P1 – During COVID-19 pandemic are you still going out to buy food or groceries on a daily basis?	200	88.1
P2 – During COVID-19 pandemic do you use social media to obtain updates on COVID-19 all the time?	45	19.8
P3 – During COVID-19 pandemic, do you try to keep the information to yourself when you are probably exposed to high risk COVID-19 individuals?	215	94.7
P4 – During COVID-19 pandemic, do you buy a lot of food supplies fearing that there will be food shortage?	192	84.6

Table 3: Correlation between Knowledge, Attitudes and Practices (KAP), with Patient Health Questionnaires (PHQ-9) and Generalized Anxiety Disorder Scale (GAD-7) among respondents.

Variables	GAD-7	PHQ-9
Knowledge (K)	- 0.137*	-0.141*
Attitudes (A)	0.105	-0.134*
Practices (P)	-0.127*	-0.152*
Total KAP	-0.191*	-0.217*
* p value < 0.05		

clearly associated with the KAP scores across all components.

The association analysis of Knowledge, Attitudes and Practices (KAP) with sociodemographic variables among the respondents is tabulated in Table 4. Based on the Chi-square test, there was no association between age, gender, ethnicity, marital status, education levels or employment status and the KAP scores.

The dimensionality analysis showed that the COVID-19 pandemic questionnaire measuring knowledge, attitude and practice was unidimensional (Table 5). Besides, there were only low positive standardised residual correlations (<0.8) analyses on all items, which suggests that no items violated the local dependency criterion for Rasch modelling. The collected data was deemed to be analysed for model fitting in downstream analyses given that both criteria above were fulfilled.

The final statistics corresponding to knowledge, attitude and practice showed that all 18 items of the COVID-19 questionnaire were reliable, based on the person reliability (0.44) and item reliability (0.95). Besides, the K-20 reliability index was 0.5, which is considered acceptable given the items are designed to answer dichotomously

Table 4: Analysis of association between Knowledge, Attitudes and Practices (KAP) and sociodemographic variables among the respondents based on Chi-square test.

Variables	KAP score by respondents		Chi-square	Odds ratio	P value	95% CI	
	13 and less n (%)	more than 13 n (%)				Lower	Upper
Age			0.08	0.77	0.77	0.64	1.82
- 35 and below	65 (52.4)	59 (47.6)					
- more than 35	52 (50.5)	51 (49.5)					
Gender			0.13	0.72	0.72	0.65	1.85
- Male	57 (2.8)	51 (47.2)					
- Female	60 (50.4)	59 (49.6)					
Ethnicity			0.55	0.46	0.46	0.72	2.05
- Malay	60 (54.1)	51 (45.9)					
- Non-Malay	57 (49.1)	59 (50.9)					
Marital status			0.02	0.89	0.89	0.57	1.63
- Married	67 (51.1)	64 (48.9)					
- Non Married	50 (52.1)	46 (47.9)					
Education level			0.05	0.82	0.82	0.50	2.43
- Lower	15 (53.6)	13 (46.4)					
- Higher	102 (51.3)	97 (48.7)					
Employment Status			0.56	0.46	0.46	0.30	1.71
- Working	104 (50.7)	101 (49.3)					
- Not working	13 (59.1)	9 (40.9)					

Table 5: Dimensionality analysis on the domains (Knowledge, Attitude and Practice) on COVID-19 pandemic developed in University Malaya Medical Centre (UMMC).

Domain	Raw variances	Eigen value	Percentages
Knowledge, Attitude and Practice	Total (Explained & unexplained)	24.1	100.0
	Measure (Persons + Items)	9.1	37.9
	Persons	2.0	8.3
	Items	7.1	29.6
	Unexplained variances (Summation of all contrasts)	15.0	62.1
	In 1st contrast	1.7	7.2
	In 2nd contrast	1.5	6.1
	In 3rd contrast	1.4	5.6
	In 4th contrast	1.3	5.5
	In 5th contrast	1.2	5.1

Note: Eigen value on each contrast < 2.0 indicates no evidence of multi-dimensionality corresponding to the respective domains (Linacre, n.d.).

(Boone et al. 2013) and Chi-square global index measurement showed that the items fit into the model perfectly, p=1.000 (Table 6).

It is noteworthy that after removing the outliers (n=3) for items K1-K3, there was no discrepancy in scores for these three items, hence, considered fit. All other items (Table 7) fit into the model agreeably except for item P3, which was slightly above the cut-off of 1.50. However, since the value did not exceed the extreme range (>2.0) (Boone et al. 2013), it was still included in the Rasch model for downstream analysis.

According to the Figure 2 and Table 8, most items were answered correctly, with an exception of a few items. The items were K10: "Surgical masks are as good as N95 masks to protect from COVID-19"; K11: "COVID-19 came from drinking or eating bat soup"; and lastly P2: "During COVID-19

Table 6: Summary statistics on KAP towards COVID-19 pandemic.

	Person	Item
N	224	18
Measure		
Mean (Logit)	-1.67	-1.46
SE	0.79	0.49
Separation	0.89	4.50
Reliability	0.44	0.95
Cronbach alpha (KR-20)	0.50	
Log likelihood Chi-square (p value)	1.000	

n = Sample size; Logit = Log odds unit; SE = Standard Error.

Table 7: Item fit statistics on KAP towards COVID-19 pandemic

Item	Logit measure	Logit SE	Outfit MNSQ	Outfit ZSTD	Point measure correlation
K1$	-8.74	1.83	1.00	0.00	0.00
K2$	-8.74	1.83	1.00	0.00	0.00
K3$	-8.74	1.83	1.00	0.00	0.00
K4	1.8	0.32	0.62	-0.76	0.26
K5	-0.85	0.16	1.20	1.83	0.35
K6	-0.17	0.17	0.71	-1.95	0.48
K7	-0.58	0.16	1.15	1.18	0.33
K8	-0.88	0.16	0.78	-2.26	0.55
K9	0.02	0.18	0.61	-2.49	0.52
K10	-1.75	0.15	0.98	-0.26	0.46
K11	-2.21	0.15	0.99	-0.07	0.47
A1	0.02	0.18	1.35	1.80	0.19
A2	2.89	0.51	0.93	0.12	0.13
A3	2.15	0.37	0.94	0.07	0.15
P1	0.84	0.22	0.86	-0.43	0.29
P2	-3.44	0.19	1.37	1.71	0.36
P3	1.7	0.31	1.83	1.62	0.17
P4	0.48	0.2	1.38	1.51	0.19

Logit = Log odds unit; SE = Standard Error.
$ = All respondents answered these questions correctly, hence no discrepancy in term of score among respondents.

pandemic, do you use social media to obtain updates on COVID-19 all the time?". This suggests the possibility of respondents acquiring their knowledge about COVID-19 from unreliable sources.

DISCUSSION

Prior to this, a similar study has been done by Azlan et al. to examine the KAP of Malaysians towards COVID-19, which showed that Malaysians had an acceptable level of COVID-19 related knowledge, and generally share a positive outlook on overcoming the pandemic (Azlan et al. 2020). However, the potential psychological impact among the community had not been explored and correlated with the KAP findings. The questionnaire items were adapted from a survey that has been developed and utilised in China, which might not be as well-tailored to represent the KAP of Malaysians regarding COVID-19.

From the knowledge component of the KAP questionnaire, it is evident that the study respondents have a good level of COVID-19 related knowledge, consistent with results from previous studies. However the percentages of correct answers for item K10 (52.0%) shown that over half of respondents

Table 8: Item-person interpretation on KAP towards COVID-19 pandemic

Items and Respondent score	Logit	Respondents' answer	Correct answer
A2	2.89	FALSE	FALSE
A3	2.15	FALSE	FALSE
K4	1.8	FALSE	FALSE
P3	1.7	FALSE	FALSE
P1	0.84	FALSE	FALSE
P4	0.48	FALSE	FALSE
K9	0.02	FALSE	FALSE
A1	0.02	FALSE	FALSE
K6	-0.17	FALSE	FALSE
K7	-0.58	FALSE	FALSE
K5	-0.85	FALSE	FALSE
K8	-0.88	FALSE	FALSE
Average Respondent score	-1.67		
K10*	-1.75	TRUE	FALSE
K11*	-2.21	TRUE	FALSE
P2*	-3.44	TRUE	FALSE
K1	-8.74	TRUE	TRUE
K2	-8.74	TRUE	TRUE
K3	-8.74	TRUE	TRUE

* Respondent answered these items incorrectly (in average).

lack knowledge of the difference in protection levels between disposable surgical face masks and N95 face masks (K10). For item K11 (61.2%), the myth about COVID-19 is originating from consumption of bat soup has not been evidently debunked in the beginning of COVID-19, which caused confusion among respondents.

Findings from the attitude component have further unveiled the effect of inadequate knowledge regarding protection levels of different masks types on the attitude of respondents, with over 20% of respondents think that repeated usage of face masks is a safe practice. In contrast, over 95% of respondents were well aware of the negative implications of mass gatherings on exacerbating the COVID-19 spread, which was assessed in item A2 and A3.

Remarkably, item P2 from the practice component of KAP questionnaire showed that only 19.8% of respondents were not completely relying on social media platforms to receive COVID-19 related news updates. In the Malaysian context, this could be explained by the habits of Malaysian internet users, with 85.6% spending their online time on social media platforms (Malaysian Communications and Multimedia

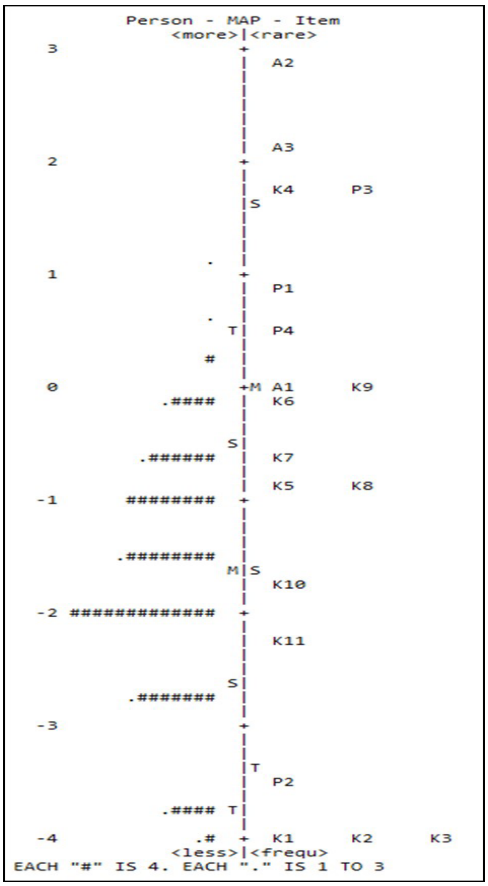

Figure 2: Item-person map on KAP towards COVID-19 pandemic in Malaysia.

Commission 2018). Also, being confined at home most of the time during this MCO makes it likely for Internet users to spend even longer time daily browsing social media.

However, across all components in the KAP questionnaire, there was no significant correlation seen between positive disease-related attitudes with GAD-7. We seemed to have overlooked that the GAD-7 scale could be directly correlated to the negative disease-related attitudes instead.

As with all studies, there are several limitations identified in this study. Firstly, due to resources and logistics limitations secondary to the MCO in Malaysia during data collection period, the sample size was relatively small, with 227 respondents who had completed the online questionnaires. This has potentially increased the margin of errors for the data collected to represent the entire Malaysia population. Second, due to its cross-sectional study nature, we are unable to establish a direct, causal relationship between the KAP scores and psychological impact levels of respondents. However, the results obtained would act as a strong basis for acquiring its causal hypothesis in future studies.

Also, as this study collects self-reported data through Google Forms, there is a possibility of response bias among the respondents. Individuals tend to portray oneself positively, especially in the Attitude and Practice components to give answers that seemed to be more socially acceptable. Nonetheless, we have provided an opt-out option in both of these components in order to minimise the response bias.

CONCLUSION

To summarise, the results showed that lower overall KAP scores, precisely for items in the Knowledge component, were related to higher anxiety levels and more depressive symptoms. This study highlights the importance of clarifying misleading myths, in conjunction with providing accurate information as a part of public health education, which would effectively dampen the level of perceived threats among Malaysians

regarding pandemic disease outbreaks such as COVID-19.

ACKNOWLEDGEMENT

The authors would like to thank all the patients, friends and colleagues who have participated in the study.

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Received: 20 Sep 2020
Accepted: 23 Oct 2020