BORNEO EPIDEMIOLOGY JOURNAL | **BEJ**

| **RESEARCH ARTICLE** | **Open Access** |

Perceived Status towards COVID-19 Mitigation Measures among Medical Students in Malaysian Borneo

Marieanne Florence[1], Ateeqah Abdul Said[1], Chong Wen Jing[1], Jaya Dhaarshini Sundara Rajan[1], Karrthigeyan Ramachandaran[1], Muhamad Luqman Hakim Mohd Yamin[1], Nur Syahierra Azmi[1], Yeap Jia Han[1], Azman Atil[1,*], Awang Setia Musleh[1], Azizan Omar[1], Mohd Yusof Ibrahim[1]

Abstract

Introduction: Mitigation measures are important in curbing COVID-19 infection. However, people's adherence to the control measures is depending upon their knowledge, attitudes and practices (KAP) towards the disease. This study aims to determine the KAP on COVID-19 and its associated factors among medical students in Malaysian Borneo during the period of the pandemic.

Methods: A cross-sectional online survey of 248 medical students from University Malaysia Sabah was conducted from August to September 2020. The survey instrument was adapted from a previously validated questionnaire on COVID-19. Descriptive statistics and simple logistic regression were conducted.

Results: The mean age of respondents was 22.0 (SD 1.4) years. Majority (65.7%, n= 163) were clinical students, female gender (70.6%, n= 175), and Bumiputera ethnic (46.8%, n= 116). 211 (85.1%), 191 (77.0%) and 163 (65.7%) of the respondents have good level of knowledge, positive attitude and good practice respectively.

Conclusion: The medical students are updated with the current health issues especially on COVID-19. They are aware of the attributes of the disease and have concerns in taking good care of themselves. Further study needs to be implemented among the groups of non-medical student of the same institution to compare their KAP on COVID-19.

Keywords: KAP, COVID-19, Medical Students, Malaysian Borneo.

*Correspondence Email: azman.azmi.atil@ums.edu.my

[1]*Department of Community and Family Medicine, Faculty of Medicine and Health Sciences, Universiti Malaysia Sabah, Kota Kinabalu 88400, Malaysia*

Introduction

Coronavirus disease 2019 (COVID-19), is an infectious disease caused by a newly discovered strain of coronavirus, a type of virus known to cause respiratory tract infections in humans (Bulut, C. *et al.,* 2020). The first case of COVID-19 in Malaysia was detected on 24th of January 2020. As of 4th September 2020, there have been total of more than ten thousand confirmed COVID-19 cases in Malaysia including more than a hundred deaths with a recovery rate of 95% (WHO, 2020).

In the merge of outbreak, the government of Malaysia enforced a Movement Control Order (MCO) to break the transmission chain of the virus, safeguard citizens and ensure their well-being (Ganasegeran, K. *et al.,* 2020). Residents were required to be compliant to Standard Operating Procedures (SOP) and to practice the "new norms" such as wearing protective masks when out in public, frequent hand-washing, working from home and avoiding mass gathering (Karim, W, *et al.,* 2020). People's acceptance to government's rules and regulations has received recognition in a global survey where Malaysia was ranked among the top five countries to have highest public approval (Abdullah, J.M. *et al.,* 2020).

Knowledge, attitudes and practices (KAP) on COVID-19 plays an important role among university's students during period of the pandemic as it may affect the adherence to the implemented control measures in an effort to reduce and prevent the rapid spread of this disease (Azlan, A.A. *et al.,* 2020). The knowledge regarding the new outbreak of the disease are fundamental in helping the students to understand thus enhancing their awareness regarding this pandemic. The attitudes toward the disease are fundamental to measure the students' positive thinking regarding this pandemic. On the other hand, the students' practices towards this pandemic also contribute to the effectiveness in mitigating this outbreak. The findings in this research can provide the baseline data supporting the roles of medical students in curbing this pandemic. Hence, this study aims to govern the KAP on COVID-19 & its associated factors among medical students in Malaysian Borneo during pandemic times.

Methods

Study design and population

A cross-sectional study was conducted among 248 students in UMS which consists of Year 1 to Year 5 medical students. Medical students were chosen as the sample because they are supposed to be the key persons in disseminating information and more updated regarding COVID-19 than other students from different faculty. UMS is located in Kota Kinabalu Sabah, Malaysian Borneo and had about thirteen thousand students at a time. According to the proportion of good knowledge towards COVID-19 done in India, 241 samples required for this study (Maheshwari, S. *et al.,* 2020). The samples were chosen conveniently and students who consented to be a part of this study were included. Meanwhile, those who have contracted COVID-19 infection were excluded. This study took approximately one month to complete, from August to September 2020.

Tools and data collection

This study utilized an online questionnaire delivered to participants through WhatsApp application due to difficulty of movements during the pandemic. The online questionnaire was adapted and modified from a previous study done in China (Zhong, B.L. *et al.,* 2020). The questionnaire was converted into a Google Form and posted on official WhatsApp group of each batch from Year 1 to Year 5 in which are easily accessible by the respective medical

students. Besides that, class representatives for each academic year were involved in distributing the questionnaire links to students directly. Independent variables are age, gender, ethnic, religion, year of study, hometown residence and family income. Dependent variables in this study were knowledge, attitudes and practices towards COVID–19. The questionnaire consisted of four main sections; 1) demographics (7 items); 2) knowledge about COVID-19 (12 items); 3) attitudes toward COVID-19 (2 items); and 4) practices relevant to COVID-19 (2 items). Scores of ten and above for knowledge, two of attitude and two of practices were taken as good knowledge, positive attitude and good practice respectively. The cut of points was adapted from study done in China (Zhong, B.L. *et al.,* 2020).

Data analysis

Data entry and analysis were done by using Statistical Package for Social Science (SPSS), version 26.0. Descriptive analysis was conducted using frequencies and percentages for categorical variables, whereas mean and standard deviation for numerical variables. Logistic regression was used to determine the association between independent and dependent variables. Statistically significant data were determined by a p-value of less than 0.05 with an odds ratio and 95% confidence interval.

Results

1. Descriptive analysis

Demographic Characteristics

A total of 248 out of 250 medical students being approached participated in the study (response rate 99.2%). The mean (SD) age of respondents was 22.0 (1.4) years. Out of the total participants, 163 (65.7%) were clinical students, 175 (70.6%) were female, 116 (46.8%) were Bumiputera ethnic, 114 (46.0%) were Muslim religions, 129 (52.0%) were from M40 group of family income and 136 (54.8%) were from hometown residence in East Malaysia. **Table 1** summarizes the sociodemographic characteristics of respondents.

Assessment of Knowledge

The mean (SD) knowledge score was 10.59 (0.99). Majority (85.1%, n=211) of the respondents have good general knowledge on COVID-19 as shown in **Table 1**. There were 12 questions asked to measure the level of knowledge on the COVID-19 **(Table 2)**. 99.6% (n= 247) of the respondents believed that people who have contact with someone infected with the COVID-19 virus should be immediately isolated in a proper place and the observation period is 14 days. 99.2% (n= 246) among them also aware that isolation and treatment of people who are infected with the COVID-19 virus are effective ways to reduce the spread of the virus. However, 31.9% (n= 79) were confused that stuffy nose or runny nose, and sneezing are less common in persons infected with the COVID-19 virus as compared to common cold. Generally, majority of the medical students has good knowledge on the presentation, transmission and control measures for COVID-19.

Assessment of Attitudes

Students were asked two questions in assessment of attitudes **(Table 3)**. Most of the students agreed that COVID-19 will finally be successfully controlled (77.8%, n= 193). Nonetheless, they are also confident that Malaysia can win the battle against the COVID-19 virus (94.4%, n= 234).

Table 1: Characteristics of respondents (N= 248)

Variables	Frequency (%)	Mean (SD)
Age (years) 19 - 20 21 – 22 23 – 24	47 (19.0) 101 (40.7) 100 (40.3)	22.0 (1.4)
Gender Male Female	73 (29.4) 175 (70.6)	
Ethnic Malay Chinese Indian Bumiputera Others	46 (18.5) 38 (15.3) 38 (15.3) 116 (46.8) 10 (4.0)	
Religion Muslim Christian Buddhist Hindu Others	114 (46.0) 58 (23.4) 37 (14.9) 37 (14.9) 2 (0.8)	
Year of study Pre-clinical (Year 1-2) Clinical (Year 3-5)	85 (34.3) 163 (65.7)	
Hometown residence West Malaysia East Malaysia	112 (45.2) 136 (54.8)	
Family income B40 (< RM4849) M40 (RM4850-RM10,959) T20 (> RM10,960)	94 (37.9) 129 (52.0) 25 (10.1)	
Knowledge on COVID-19 (score) Good Poor	211 (85.1) 37 (14.9)	10.59 (0.99)
Attitude on COVID-19 Positive Negative	191 (77.0) 57 (23.0)	
Practice on COVID-19 Good Poor	163 (65.7) 85 (34.3)	

Table 2: KAP assessments on COVID-19 ('+' Indicates Correct or Positive Answers)

S.No.	Type of Questions — Questions on Knowledge	Answers — True	False	I don't know
1.	The main clinical symptoms of COVID-19 are fever, fatigue, dry cough, and myalgia.	213 (85.9%)[+]	34 (13.7%)	1 (0.04%)
2.	Unlike the common cold, stuffy nose, runny nose, and sneezing are less common in persons infected with the COVID-19 virus.	130 (52.4%)[+]	79 (31.9%)	39 (15.7%)
3.	There currently is no effective cure for COVID-19, but early symptomatic and supportive treatment can help most patients recover from the infection.	241 (97.2%)[+]	1 (0.04%)	6 (2.4%)
4.	Not all persons with COVID-19 will develop to severe cases. Only those who are elderly, have chronic illnesses, and are obese are more likely to be severe cases.	233 (94.0%)[+]	10 (4.0%)	5 (2.0%)
5.	Eating or contacting wild animals would result in the infection by the COVID-19 virus.	63 (25.4%)	141 (56.9%)[+]	44 (17.7%)
6.	Persons with COVID-19 cannot infect the virus to others when a fever is not present.	12 (4.8%)	228 (91.9%)[+]	8 (3.2%)
7.	The COVID-19 virus spreads via respiratory droplets of infected individuals.	243 (98.0%)[+]	3 (1.2%)	2 (0.8%)
8.	Ordinary residents can wear general medical masks to prevent the infection by the COVID-19 virus.	220 (88.7%)[+]	16 (6.5%)	12 (4.8%)
9.	It is not necessary for children and young adults to take measures to prevent the infection by the COVID-19 virus.	6 (2.4%)	242 (97.6%)[+]	0
10.	To prevent the infection by COVID-19, individuals should avoid going to crowded places such as train stations and avoid taking public transportations.	243 (98.0%)[+]	4 (1.6%)	1 (0.4%)
11.	Isolation and treatment of people who are infected with the COVID-19 virus are effective ways to reduce the spread of the virus.	246 (99.2%)[+]	2 (0.8%)	0
12.	People who have contact with someone infected with the COVID-19 virus should be immediately isolated in a proper place. In general, the observation period is 14 days.	247 (99.6%)[+]	1 (0.4%)	0

Table 3: KAP assessments on COVID-19 ('+' Indicates Correct or Positive Answers)

S.No.	Type of Questions	Answers		
	Questions on Attitude	Yes/Agree	No/Disagree	I don't know
1.	Do you agree that COVID-19 will finally be successfully controlled?	193 (77.8%)[+]	28 (11.3%)	27 (10.9%)
2.	Do you have confidence that Malaysia can win the battle against the COVID-19 virus?	234 (94.4%)[+]	14 (5.6%)	-

Table 4: KAP assessments on COVID-19 ('+' Indicates Correct or Positive Answers)

S.No.	Type of Questions	Answers		
	Questions on Practice	Yes	No/Disagree	I don't know
1.	In recent days, have you gone to any crowded place?	85 (34.3%)	163 (65.7%)[+]	-
2.	In recent days, have you worn a mask when leaving home?	246 (99.2%)[+]	2 (0.8%)	-

Assessment of Practices

Practices toward COVID-19 were also measured using two questions **(Table 4)**. Majority of the participants reported wearing a face mask when going out in public (99.2%, n= 246). Whereas only 65.7% (n=163) of the students reported that they were avoiding crowded places recently. There were more than a third of respondents still taking risk in the crowd.

2. Univariate analysis

Simple logistic regression was used in univariate analysis to determine the association between variables under study. The younger age group has better knowledge on COVID-19 compared to the older age group (mean difference: 0.35, p= 0.146). Female gender has slightly better knowledge compared to the male counterpart, 86.3% and 82.2% respectively (OR: 1.36, p= 0.411). However, both findings show statistically not significant. Similarly, there were no association between ethnic, religion, hometown residence, year of study and family income towards good level of knowledge on COVID-19 **(Table 5, 6 & 7)**. Meanwhile, the male gender has more positive attitude towards COVID-19 as compared to the female counterpart, 82.2% and 74.9% respectively (OR 0.65, p= 0.213). However this finding is also statistically not significant. The rest of the variables also show no significant association towards positive attitude on COVID-19. The older age group has poorer practice towards COVID-19 compared to the younger age group (mean difference: 0.33, p= 0.069). However this finding is also not statistically significant. Unfortunately, all other variables also show similar findings of no significant associations towards good practice on COVID-19. Hence, multivariate analysis was not preceded.

Table 5: Factors associated with good knowledge towards COVID-19

Variables	Knowledge		Crude OR (95% CI)	*p*-value
	Good (n= 211) No.(%)	Poor (n= 37) No. (%)		
Age	21.9 (1.3)[a]	22.3 (1.5)[a]	0.35 (-0.12, 0.83)[b]	0.146
Gender				
Male	60 (82.2)	13 (17.8)		
Female[c]	151 (86.3)	24 (13.7)	1.36 (0.65, 2.85)	0.411
Ethnic				
Bumiputera	142 (86.1)	23 (13.9)		
Non-Bumiputera[c]	69 (83.1)	14 (16.9)	0.80 (0.39, 1.65)	0.542
Religion				
Muslim	97 (85.1)	17 (14.9)		
Non-Muslim[c]	114 (85.1)	20 (14.9)	0.99 (0.50, 2.01)	0.998
Hometown residence				
West Malaysia	90 (82.6)	19 (17.4)		
East Malaysia[c]	121 (87.1)	18 (12.9)	1.42 (0.71, 2.86)	0.327
Year of study				
Pre-clinical	73 (85.9)	12 (14.1)		
Clinical[c]	138 (84.7)	25 (15.3)	0.91 (0.43, 1.91)	0.798
Family income				
B40	83 (88.3)	11 (11.7)		
M40/T20[c]	128 (83.1)	26 (16.9)	0.65 (0.31, 1.39)	0.269

[a]Mean (SD); [b]Mean difference (95% CI); [c]Reference group; OR: Odds Ratio; CI: Confidence Interval; B40: Below 40; M40: Middle 40; T20: Top 20; *Significant at p <0.05.

Table 6: Factors associated with positive attitudes towards COVID-19

Variables	Attitude		Crude OR (95% CI)	*p*-value
	Positive (n=191) No.(%)	Negative (n=57) No.(%)		
Age	22.0 (1.4)[a]	22.0 (1.4)[a]	0.03 (-0.37, 0.44)[b]	0.877
Gender				
Male	60 (82.2)	13 (17.8)	0.65 (0.32, 1.29)	0.213
Female[c]	131 (74.9)	44 (25.1)		
Ethnic				
Bumiputera	127 (77.0)	38 (23.0)	1.01 (0.54, 1.89)	0.980
Non-Bumiputera[c]	64 (77.1)	19 (22.9)		
				(Continued…)

Variables	Attitude		Crude OR (95% CI)	*p*-value
	Positive (n=191) No.(%)	Positive (n=191) No.(%)		
Religion				
Muslim	92 (80.7)	22 (19.3)	0.68 (0.37, 1.24)	0.205
Non-Muslim[c]	99 (73.9)	35 (26.1)		
Hometown residence				
West Malaysia	81 (74.3)	28 (25.7)	1.31 (0.72, 2.37)	0.371
East Malaysia[c]	110 (79.1)	29 (20.9)		
Year of study				
Pre-clinical	66 (77.6)	19 (22.4)	0.95 (0.51, 1.77)	0.865
Clinical[c]	125 (76.7)	38 (23.3)		
Family income				
B40	70 (74.5)	24 (25.5)	1.26 (0.69, 2.30)	0.475
M40/T20[c]	121 (78.6)	33 (21.4)		

[a]Mean (SD); [b]Mean difference (95% CI); [c]Reference group; OR: Odds Ratio; CI: Confidence Interval; B40: Below 40; M40: Middle 40; T20: Top 20; *Significant at p <0.05.

Table 7: Factors associated with good practices towards COVID-19

Variables	Practice		Crude OR (95% CI)	*p*-value
	Good (n= 163) No. (%)	Poor (n= 85) No. (%)		
Age	21.9 (1.3)[a]	22.2 (1.4)[a]	0.33 (-0.03, 0.68)[b]	0.069
Gender				
Male	51 (69.9)	22 (30.1)	0.77 (0.43, 1.38)	0.376
Female[c]	112 (64.0)	63 (36.0)		
Ethnic				
Bumiputera	105 (63.6)	60 (36.4)	1.33 (0.75, 2.34)	0.329
Non-Bumiputera[c]	58 (69.8)	25 (30.1)		
Religion				
Muslim	74 (64.9)	40 (35.1)	1.07 (0.63, 1.81)	0.803
Non-Muslim[c]	89 (66.4)	45 (33.6)		
Hometown residence				
West Malaysia	72 (66.1)	37 (33.9)	0.97 (0.57, 1.65)	0.923
East Malaysia[c]	91 (65.5)	48 (34.5)		
Year of study				
Pre-clinical	59 (69.4)	26 (30.6)	0.78 (0.44, 1.36)	0.378
Clinical[c]	104 (63.8)	59 (36.2)		
Family income				
B40	61 (64.9)	33 (35.1)	1.06 (0.62, 1.82)	0.829
M40/T20[c]	102 (66.2)	52 (33.8)		

[a]Mean (SD); [b]Mean difference (95% CI); [c]Reference group; OR: Odds Ratio; CI: Confidence Interval; B40: Below 40; M40: Middle 40; T20: Top 20; *Significant at p <0.05.

Discussion

A lack of adequate knowledge is probably the driving force for the public panic and spreading of diseases in an uncontrolled situation, particularly at the early stages of the outbreak; highlighting the fact that proper information is crucial because misunderstandings make the situation worst (Azlan, A.A. *et al.,* 2020). According to the results obtained, 85.1% of the medical students have good level of knowledge. This result is comparable with the studies done in India and Iran (Maheshwari, S. *et al.,* 2020 & Taghrir, M.H. *et al.,* 2020). Being a medical student, they are technically equipped with the fundamental knowledge of COVID-19 pathogenesis, transmission and control measures as compared to other students. The study done among the general population in Malaysia revealed a knowledge rate of 80.5% which was lower compared to our study (Azlan, A.A. *et al.,* 2020). This proves that the medical students are more knowledgeable compared to the general population. However, the usage of different set of questionnaires probably gives the variant results. Nonetheless, this result is slightly lower as compared to among the public in China which recorded knowledge rate of 90% (Zhong, B.L. *et al.,* 2020). The reason being would be due to the heightened awareness among China's residents as they were the initial population being affected by the COVID-19.

This study found that majority of the participant had great positive attitudes towards COVID-19. Most of them agree that COVID-19 will finally be successfully controlled in near future, provided the mitigation measures are well implemented and fully practiced by the public. This finding is in line with the study done among the community in China and hospital staff in Italy (Zhong, B.L. *et al.,* 2020 & Moro, M. *et al.,* 2020). The knowledge directly affects the attitude, and these may have a greater impact in flattening the curve (Puspitasari, I.M. *et al.,* 2020).

In this study, most participants reported taking precautions by practicing mask-wearing and avoiding crowded places in order to fight COVID-19. This is similar with the findings of studies done in Iran and Indonesia among the university students (Taghrir, M.H. *et al.,* 2020 & Saefi, M. *et al.,* 2020). This indicates a general willingness for students to make behavioural changes in facing COVID-19 pandemic. Most students are aware with the current situation and practicing good fundamental preventive measures to cut the chain of disease transmission. However, there are quite a few participants that willing to take the risk in the crowded places. Better explanation for this is the requirement for the students to go outside for necessities which makes it almost difficult to avoid crowded places all the time. Moreover, despite having a good basic knowledge about COVID-19, reluctancy and ignorance of the student still become one of the critical issues (Saefi, M. *et al.,* 2020). Despite that, majority of the students have adapted the current new norm of mask-wearing whenever going outside. Ministry of Health of Malaysia had urged the public to wear masks, as it is a powerful tool that can help control the spread of infection. They act as a barrier to keep virus-containing particles from escaping an infected individual and landing on another person which can further be improved with the aid of a face shield.

On a side note, countries where the pandemic is hitting hard should implement strategies to keep their medical students updated about emerging public health and medical emergencies. Students should be equipped with medical knowledge, proper attitude, and good precautionary measures. Given the current global situation, more frequent utilization of social media by medical schools to spread knowledge become a necessity and plans should be placed to implement such dissemination in early stages of medical and public health

emergencies. Students should also be properly guided to proper sources of information during these times. This study may provide an effective approach to deliver the proper information and relieve the public panic and timely publication of trustworthy research.

This study has several limitations. Firstly, the participants are all medically equipped with the basic knowledge which ultimately governs the results into a positive way. Secondly, the sampling of participants was through a non-probability method which results in the inability to generalize the findings to other population. Thirdly, the nature of the study design did not permit the cause-effect relationship. Fourthly, the use of an online dissemination of questionnaire limits the opportunity of participant to get help and ask if they do not understand and later affects the quality of the answers. Finally, no questions about vaccination were asked in the questionnaire, which depletes the important points on prevention practice among the students.

Conclusion

In summary, medical students in UMS have good level of knowledge about COVID-19 and the students showed positive attitudes and have good practices which are at par with other students or populations throughout the world. Further study needs to be implemented among the groups of non-medical student of the same institution to compare their KAP on COVID-19.

Conflicts of Interest

The authors have nothing to declare.

Ethical Approval

Ethical approval to conduct the study was obtained from the Faculty Medicine and Health Science, UMS. Consent form was distributed along with the questionnaires provided with concise information regarding the purpose of the study, right to refuse and also how confidentiality will be handled. Participants were well informed that the information they had share will not be disclosed to the third party and will only be used for study purpose only.

Acknowledgements

References

Bulut, C., Kato, Y. (2020). Epidemiology of COVID-19. *Turk. J. Med. Sci.*, 50(SI-1), 563-570. https://doi.org/10.3906/sag-2004-172

WHO (World Health Organization). (2020). COVID-19 Situation Reports in Malaysia. https://www.who.int/malaysia/emergencies/coronavirus-disease-(covid-19)-in-malaysia/covid-19-situation-reports-in-malaysia

Ganasegeran, K., Ch'ng, A.S.H., Looi, I. (2020). COVID-19 in Malaysia: Crucial Measures in Critical Times. *J. Glob. Health,* 10(2), 020333(1-4). https://doi.org/10.7189/jogh.10.020333

Karim, W., Haque, A., Anis, Z., Ulfy, M.A. (2020). The Movement Control Order (MCO) for COVID-19 Crisis and its Impact on Tourism and Hospitality Sector in Malaysia. *Int. Tour. Hosp. J.*, 3(2), 1-7. https://doi.org/10.37227/ithj-2020-02-09

Abdullah, J.M., Ismail, W.F., Mohamad, I., Ab Razak, A., Harun, A., Musa, K.I., Lee, Y.Y. (2020). A Critical Appraisal of COVID-19 in Malaysia and Beyond. *Malays. J. Med. Sci.,*27(2), 1-9. https://doi.org/10.21315/mjms2020.27.2.1

Azlan, A.A., Hamzah, M.R., Sern, T.J., Ayub, S.H., Mohamad, E. (2020). Public Knowledge, Attitudes and Practices towards COVID-19: A Cross-Sectional Study in Malaysia. PLOS One. 15(5), e0233668(1-15). https://doi.org/10.1371/journal.pone.0233668

Maheshwari, S., Gupta, P.K., Sinha, R., Rawat, P. (2020) Knowledge, Attitude and Practice towards Coronavirus Disease 2019 (COVID-19) among Medical Students: A Cross-Sectional Study, *J. Acute Dis.*, 2020; 9(3), 100-104. http://www.jadweb.org/text.asp?2020/9/3/100/283886

Zhong, B.L., Luo, W., Li, H.M., Zhang, Q.Q., Liu, X.G., Li, W.T., Li, Y. (2020). Knowledge, Attitudes, and Practices towards COVID-19 among Chinese Residents during the Rapid Rise Period of the COVID-19 Outbreak: A Quick Online Cross-Sectional Survey. *Int. J. Biol. Sci.*, 16(10), 1745-1752. https://doi.org/10.7150/ijbs.45221

Taghrir, M.H., Borazjani, R., Shiraly, R. (2020) COVID-19 and Iranian Medical Students: A Survey on their Related-Knowledge, Preventive Behaviors and Risk Perceptions. *Arch Iran Med*. 23(4), 249-254. https://doi.org/10.34172/aim.2020.06

Moro, M., Vigezzi, G.P., Capraro, M., Biancardi, A., Nizzero, P., Signorelli, C., Odone, A. (2020). 2019-Novel Coronavirus Survey: Knowledge and Attitudes of Hospital Staff of a Large Italian Teaching Hospital. *Acta Biomed.*, 91(11), 29-34. https://doi.org/10.23750/abm.v91i3-s.9419

Puspitasari, I.M., Yusuf, L., Sinuraya, R.K., Abdulah, R., Koyama, H. (2020). Knowledge, Attitude, and Practice during the COVID-19 Pandemic: A Review. *J. Multidiscip. Healthc.*, 13, 727-733. https://doi.org/10.2147/JMDH.S265527

Saefi, M., Fauzi, A., Kristiana, E., Adi, W.C., Muchson, M., Setiawan, M.E., Islami, N.N., Ningrum, D.E., Ikhsan, M.A., Ramadhani, M. (2020). Survey data of COVID-19-Related Knowledge, Attitude, and Practices among Indonesian Undergraduate Students. *Data in brief*., 31, 105855(1-10). https://doi.org/10.1016/j.dib.2020.105855