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ORIGINAL ARTICLE

Knowledge, Attitude, and Practices towards Face Mask usage among Undergraduate Medical and Para-medical Sciences Students: A Cross-Sectional Study.

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Abstract

Background: A face mask serves the purpose of providing a physical barrier against respiratory infections via respiratory droplets. Recognizing the knowledge, attitude, and practice of university students regarding face mask usage is important to identify gaps and intervene immediately to manage the spread of the infection. Thus, our objective in this study is to identify the knowledge, attitude, and practise of face mask usage and to determine the associated factors of proper practice of face mask usage among the University of Cyberjaya (UoC) medical undergraduate and para-medical sciences students.
Methods: One hundred and sixty participants from UoC's undergraduate programmes in medical and paramedical sciences participated in a cross-sectional survey using an online questionaire from July 2021 to October 2021. The questionnaire used was from a study in Ethiopia which consisted of basic sociodemographic characteristics, and the knowledge, attitude, and practices regarding face mask usage for limiting COVID-19 exposure. A logistic regression model was used to determine the factors associated with the proper practice of face mask usage.
Results: The study showed that the percentage of good knowledge, attitude, and practice of the healthcare providers toward proper face mask utilization were 32.5% (n=52), 64.0% (n=103), and 88.1% (n=141) respectively. Factors associated with proper utilization of face masks were age, ethnicity, the field of study, marital status, and good knowledge about face mask use.
Conclusion: In our study, majority of the students had poor knowledge however they still possess a good attitude and practice toward face mask usage. We hope that this will prompt the public to increase their knowledge about the proper usage of face masks especially in combating the COVID-19 pandemic.
Keywords: *Medical sciences students, knowledge, attitude, practices, proper face mask usage, Malaysia, COVID-19.*

Introduction

Since Wells first hypothesised droplet nuclei transmission of airborne infections in the 1930s, many pathogens have been identified as transmittable through airborne routes. When a contagious person coughs or sneezes, droplets containing infectious particles such as bacteria and viruses are released.[1]

Respiratory mask are protective devices covering a part of the face to protect both the person who wears them and the immediate environment from breathable pollutants such as respiratory bacterial/viral pathogenic organisms.[2] As evidence suggests, COVID-19 could be transmitted before symptom onset, and community transmission might be reduced if everyone, including people who have been infected but were asymptomatic and contagious, wore face masks.[3] Previous studies have shown that face mask use has been effective in reducing the community spread of the 2003 SARS infection.[4] The World Health Organization (WHO) advised the usage of masks as part of prevention and control measures to limit the spread of SARS-CoV-2, the virus that causes COVID-19. For any mask type, appropriate use, storage, and cleaning or disposal are essential to ensure that they are as effective as possible and to avoid an increased transmission risk.[5]

In reality, usage by each individual varies as the mask may not fully cover the mouth and nose, or it may be used and reused too frequently causing a huge variation in mask performance outcomes.[6]

Aside from the general public, healthcare workers are at the most risk of contracting COVID-19 hence they have to follow strict guidelines of prevention to maximize protection.[7] However, in several studies ranging from Pakistan, India, and Ethiopia, they were shown to have inadequate knowledge, attitude, and practice of face mask usage.[8] This endangered the frontliners and also set a poor example to the public. Furthermore, there was evidence that showed an association between sociodemographic factors with the KAP of face mask usages such as sex, education level, profession [9], and even religion.[10]

This study aimed to assess the degree of knowledge, attitude, and practices regarding face mask usage among medical and para-medical students at UoC. Despite a transition to online learning in universities, some hospitals have reopened their doors to students. This has helped many medical sciences students to resume their clinical attachments. Many are also actively volunteering in their communities and local hospitals to provide medical assistance and guidance to the public. Therefore, we propose to test our current medical and para-medical sciences undergraduate students of the UoC, as we are interested to see whether there are differences between sociodemographic factors, knowledge, and attitude associated with proper face mask practices.

Materials and methods

Study area, period, design

A cross-sectional study utilising an online questionnaire was conducted on the campus of UoC starting from July 2021 until October 2021.

Population

The study population was from the UoC undergraduate medical and paramedical programmes. Students recruited must be at least 18 years old and students with mental or physical disabilities, students who failed to respond after 3 times, and students from non-sciences programs such as Information Technology (IT), and Business and Accounting, were excluded. The total number of students from the medical sciences undergraduate program was 1752. The sample size was calculated using the 0.07 margin of error and 95% confidence interval with a target sample size of 198. There were 7 undergraduate programs which include a Bachelor of Medicine and Bachelor of Surgery (MBBS), Bachelor of Pharmacy (BPHARM), Bachelor of Psychology (BPSY), Bachelor of Occupational Safety and

Health (BOSH), Bachelor of Homeopathy (BHOMS), Bachelor of Physiotherapy (BPHYSIO), and Bachelor of Biomedical Engineering (BBET). The sampling method used was proportional sampling by the program.

Data Collection Tool and Method

The study instrument utilized a questionnaire from the previous study.[10] The data were collected through online social media platforms such as WhatsApp, and Email. Consent was obtained from all respondents before participating in the questionnaire.

The questionnaire contained 4 sections; sociodemographic, knowledge, attitude and practice.

Sociodemographic data

For the sociodemographic data, the factors include sex, age (18-20, 21-23, ≥24), ethnicity (Malays and Non-Malays), the field of study (MBBS, BPHARM, BPSY, BBET, BOSH+BHOMS+BPHYSIO), and marital status.

Knowledge About Face Mask and Its Use

This section consists of nine questions. For convenience of analyses, each correct response in the knowledge category is scored 1, and each incorrect response is scored 0. The final score is calculated and labelled based on the score (out of 9). The correct response of >7 out of 9 questions (>80%) is considered good knowledge and ≤7 (≤80%) is considered poor knowledge.

The Attitude of Face Mask Utilization

Respondents were asked eight questions and describe their level of agreement in a 5-point Likert scale response from "strongly disagree" to "strongly agree". The average score for attitude is 28, and ≥28 means having a good attitude, while <28 means having a poor attitude.

Proper Practice of Face Mask Utilization

This section consisted of seventeen questions. For convenience of analyses, each correct response in the practice category is scored 1, and each incorrect response is scored 0. The correct response of >13 out of 17 questions (>80%) was considered good practice and ≤12 (≤80%) is considered poor practice.

Data Analysis

JASP Statistics version 0.16 was used for the statistical analysis of the data gained from this study. The frequency, percent, average, and standard deviation of given data for each variable were calculated depending on the type of variable. A logistic regression model was used to measure the association between the outcome of knowledge, attitude and practice of proper face mask utilisation and the associated factors. Direction and strength of association were expressed using the Odds Ratio and Chi-square. Statistical significance was declared at p-value<0.05.

Ethical Consideration

The proposal was approved by the University of Cyberjaya Research Ethics Review Committee with the CRERC Reference number: UOC/CRERC/ER/307

Results

A total of 160 students have agreed and participated in this study with a response rate of 80%.

Our findings reported there were more female than male respondents (n=118; 73.7%). The majority of the students, 113 (70.6%), are in the 21- to 23-year-old age group. 95 (59.4%) students were Malay, which was the highest frequency. The most frequent group of students was from the MBBS programme, with 91 (56.1%) of them. The non-married students have a frequency of 156 (97.5%), which was the highest (Table 1).

Prevalence of Good/ Poor Knowledge, Attitude, Practice

Out of 160 participants, (67.5% n=108) of them have poor knowledge on proper face mask usage, (64.4%,n=103) of them have good attitude on

proper face mask usage, and (88.1%,n=141) of them have good practice on proper face mask usage (Table 2, Table 3, Table 4 and Table 5)

Most of the students have poor knowledge (67.5%,n=108) however the majority of the students possess good attitude (69.4%,n=103) and good practice (88.1%,n=141) (Table 2).

Descriptive analysis of the questionnaire

Out of 160 respondents, majority (67.0%,n=108) of the respondents answered incorrectly concerning the type of mask for protecting against COVID-19 and most (65.0% ,n=104)of them did not know the correct duration of surgical mask usage. However, most (98.0%,n=156) of them were aware that wearing a surgical mask can protect against COVID-19 and also understand the purpose of the metal strip on a surgical mask (Table 3).

All the 160 participants had a good attitude towards face mask usage with the majority of the answers on the "Agree - Strongly agree" scale (Table 4).

All of the 160 respondents agreed to wear a surgical mask within hospital premises. However, only a few (31.0%,n=49) of them do not store their masks for later use (Table 5).

Our findings reported that the female respondents were 1.28 times more knowledgeable compared to male respondents. The respondents from the age group 21-23 years old were 1.26 times more knowledgeable compared to the respondents that are aged 18-20. The Malay respondents were 1.07 times more knowledgeable compared to the respondents from the Non-Malay ethnicity. Respondents from the BOSH + BHOMS + BPHYSIO were 1.82 times more knowledgeable compared to BPSY. Married respondents were 2.12 times more knowledgeable. P. value is > 0.05, hence the findings were not significant (Table 6).

Our findings reported that the female respondents had 1.83 times the odds of having good attitude compared to males.. Respondents from the 21-23 age group were 1.71 times more likely to have a good attitude compared to those who are 18-20 years old.. The non-malay respondents had 1.27 times the odds of having good attitude compared to the Malay ethnicity respondents.. BPHARM students had.4.40 times the odds of having good attitude compared to BBET.. Married respondents had 1.333 times the odds of having good attitude compared to not married respondents. P-value were > 0.005, hence there were not significant. (Table 7)

Our findings reported that the female respondents had similar levels of good practice using the masks as the male respondents. The respondents aged 21-23 years old had 2.016 times the odds of having good practice compared to the respondents aged 18-20. P-value is >0.005, hence it is not significant. There was a significant association between ethnicity and practice ($p<0.05$) where respondents who are Non-Malays have 4.19 times the odds of having good practice compared to the Malay respondents BOSH + BHOMS + BPHARM students had 3.56 times the odds of possessing good practice compared to BBET students.[4] Respondents who are not married had 2.556 times the odds of having good practice compared to married respondents. P-value is >0.005, hence it is not significant (Table 8).

Discussion

Prevalence of Good/ Poor Knowledge, Attitude, Practice

Based on our study most of the students have poor knowledge (67.5%) but the majority of the students possess a good attitude (69.4%) and good practice (88.1%). However, this is still an improvement when compared to a study by Tadesse et al., (2020) concluded the overall knowledge, attitude, and practice of the healthcare provider toward proper face mask utilization were 33.5%, 45.3%, and 33.3% respectively.[10] This difference may be explained

by people's attitudes and practices on usage of face masks do improved over time.

Association between Sociodemographic Factors and Knowledge

There is no significant association between sociodemographic factors and knowledge. However, female respondents have a 1.28 times higher odds of having good knowledge compared to males. This supports and contradicts some of the studies by Azlan et al., and Okello et al., respectively.[12,13] Currently, our study shows that BOSH + BHOMS and BPHYSIO have 1.82 times higher odds of having good knowledge compared to BPSY which is higher than when MBBS students (1.72 times) compared to BPSY. This contradicts a study conducted among Italian undergraduates [14], in which medical students scored higher for COVID-19 knowledge. However, p-value > 0.005, hence this is non-significance finding.

Association between Sociodemographic Factors and Attitude

From the results of our study, the P-value is more than 0.05 meaning there is no significant association between sociodemographic factors and attitude. The majority of participants are able to have a good attitude regardless of age, gender, race, marital status, and field of study. BPHARM students had the highest odds ratio of 4.40 of having a good attitude compared to BBET.

A study from Saudi Arabia by Alrasheedy et. al. (2021) showed the majority of pharmacy students believed COVID-19 is a serious disease and poses a health threat to the community.[15] It is believed due to their training in pharmacy, they feel obliged and responsible to contribute to the control of this pandemic as future health professionals encourage them to have proactive practices during this pandemic as shown in a study from Vietnam by Duong et. al. (2021).[16]

The non-Malay respondents had 1.27 times the odds of having a good attitude compared to the Malay ethnicity respondents. A study from Singapore by Yap et. al. (2010) **17** showed that non-Malay respondents are highly likely to make recommended changes during a pandemic. It was believed that worry and avoidance behaviours were more common among non-Malay groups, suggesting that this effect may be due to shared perceptions of vulnerability, increasing to having a better attitude. Married people had 1.3 times better attitudes than unmarried. A study from Indonesia by Muslih et. al., (2021) showed that married people had a good attitude regarding the COVID-19 pandemic possibly because they are responsible to care for both themselves and their family members.[18]

Association between Sociodemographic Factors and Practice

We found that good face mask practice was similar between males and females, however, this contradicts the findings of a study conducted by Duong et al., (2021) who reported that males were significantly less likely to have the knowledge and appropriate or safe practices toward COVID-19 in Vietnam and also in other countries including Saudi Arabia and China.[16] This is consistent with another study by Ferdous M, et. al (2020) shows that, in response to COVID-19, men were significantly less likely to take preventive and protective measures than women.[19]

Our findings demonstrate a significant association between ethnicity and practice ($p<0.05$) that shows that Non-Malay respondents included in this study were more likely to report wearing a mask during this time period. This is consistent with Shargunan et al., (2020) who reported that a significantly high number of Malay ethnicity respondents had incorrect facemask use ($p<0.05$).[20] Incorrect facemask use among this group raises concerns as although the current rate of mortality due to COVID-19 among Malay ethnicity is unknown, comorbidity among Malay ethnicity may predisposed them to increased mortality.

Association between Knowledge and Practice

Respondents in our study with good knowledge, 90.4% have good practice, Nevertheless, among those with poor knowledge, 87.0% of them have good practice as well. This can be attributed to the strict prevention and control measures implemented by Malaysia government. Our results did not correspond with a study done by Zhong et al., (2020) on knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak.[21] The study showed that respondents with poor practice (3.6% residents went to crowded places and 2.0% did not wear masks when leaving homes) had a significant relation to poor COVID-19 knowledge. Therefore, Malaysia should focus not just on the written laws such as Strict Operating Procedure (SOP), but also on improving public awareness of COVID-19 through health intervention programs.

Conclusion

In conclusion, our study identified the knowledge, attitude, and practice toward face mask usage among the UoC medical and para-medical sciences undergraduate students. Our findings stated that almost ⅔ or majority of the students had poor knowledge however they still possess good attitude and practice toward face mask usage. This may be due to excellent efforts of the Malaysia Ministry of Health in spreading awareness. The enforcement of the law, Prevention and Control of Infectious Diseases Act(PCID 1988; Act 342) by the government may have contributed to the good attitude and practice of face mask usage among Malaysians.

The present study had certain limitations. Firstly, this study was limited by not obtaining the the target sample size to find a significant association between the sociodemographic factors with the knowledge, attitude, and practice of face mask usage. Secondly, we would like to address some of the biases in online surveys which include non-response bias where almost ½ or half of our respondents consist of mainly students from MBBS programme. Another bias that arises from online surveys is response bias in which the respondents are dishonest with their answers to cater to the interviewer's expectations.

We strongly recommend that a more extensive study be undertaken in the future. We hope that this study will prompt the public to increase their knowledge about the proper usage of face masks especially in combating the COVID-19 pandemic.

Table 1. Sociodemographic data

Variables	Category	Frequency	Percentage
Sex	**Male**	42	26.3
	Female	118	73.7
Age	**18-20**	28	17.5
	21-23	113	70.6
	>24	19	11.9
Ethnicity	**Malay**	95	59.4
	Non-Malays	65	40.6
Field of Study	**Bachelor of Medicine and Bachelor of Surgery (MBBS)**	91	56.9
	Bachelor Degree of Pharmacy (BPHARM)	28	17.5
	Bachelor Degree of Psychology (BPSY)	13	8.1
	Bachelor Degree of Biomedical Engineering (BBET)	11	6.9
	Bachelor of Occupational Safety and Health (BOSH) + Bachelor of Homeopathy (BHOMS) + Bachelor of Physiotherapy (BPHYSIO)	17	10.6
Marital Status	**Married**	4	2.5
	Non-Married	156	97.5

Table 2. Prevalence of good / poor knowledge, attitude, and practice

Variables	Category	Frequency	Percentage
Knowledge	**Good**	52	32.5
	Poor	108	67.5
Attitude	**Good**	103	64.4
	Poor	57	35.6
Practice	**Good**	141	88.1
	Poor	19	11.9

Table 3. Knowledge

Questions	Answers	
	Correct/ %	**Incorrect/ %**
Does wearing a surgical mask protect you from COVID-19	**156 (98.0)**	4 (2.0)
Which is the correct way of using a surgical face mask to protect against COVID-19	**149 (93.0)**	11 (7.0)
How many layers are there in a surgical mask	**127 (79.0)**	33 (21.0)
Which layer acts as a filter media barrier	**117 (73.0)**	43 (27.0)
Which type of masks actually protect against COVID-19	52 (33.0)	**108 (67.0)**
How long can you wear a surgical mask	56 (35.0)	**104 (65.0)**
For proper wearing, to which extent the surgical mask should cover?	**147 (92.0)**	13 (8.0)
What is the purpose of the metal strip on a surgical mask	**157 (98.0)**	3 (2.0)
Is the cloth facial mask as effective as a regular surgical facial mask	**149 (93.0)**	11 (7.0)

Table 4. Attitude

Questions	Mean	Standard Deviation	Scale
Q1 - Willingness to know the correct steps of wearing a face mask	4.7	0.61	Agree - Strongly agree
Q2 - The face mask needs to be carefully put on and taken-off	4.7	0.67	Agree - Strongly agree
Q3 - The face mask keeps individual from touching mucous membrane (Eg: Mouth, Nose)	4.7	0.60	Agree - Strongly agree
Q4 - Face masks are very effective at preventing infectious droplets from spreading	4.6	0.60	Agree - Strongly agree
Q5 - It is necessary to wear a face mask as I am afraid of getting COVID-19	4.7	0.52	Agree - Strongly agree
Q6 - It is necessary to wear a face mask as infected with COVID-19 is the worst thing that could happen to me	4.5	0.74	Agree - Strongly agree

Table 5. Practice

Questions	Answer Correct/ %	Incorrect/ %
1. Do not remove his/her mask if there is a need to talk to patient	**146 (91.0)**	14 (9.0)
2. If you are not sick, do you store the used mask in a bag for later use	**111 (69.0)**	49 (31.0)
3. Wearing a mask in public places	**159 (99.0)**	1 (1.0)
4. Wearing a mask in hospital premises	**160 (100.0)**	0 (0.0)
5. Before wearing a mask, clean/sanitize your hands	**143 (89.0)**	17 (11.0)
6. Before wearing a mask, identify the inner and outer side of the mask	**159 (99.0)**	1 (1.0)
7. Confirm the metal noseband on the top	**159 (99.0)**	1 (1.0)
8. Place the loop around the ear	**157 (98.0)**	3 (2.0)
9. Pull the top and bottom of mask to extend the folds	**154 (96.0)**	6 (4.0)
10. Press the noseband	**159 (99.0)**	1 (1.0)
11. Do not touch the mask	**140 (88.0)**	20 (12.0)
12. Do not eat/drink/smoke while wearing a mask	**132 (83.0)**	28 (17.0)
13. Remove the mask from the face by only touching the bands	**141 (88.0)**	19 (12.0)
14. Avoid pulling the mask up over the forehead or down to the chin	**142 (89.0)**	18 (11.0)
15. Dispose the mask when soiled/wet	**155 (97.0)**	5 (3.0)
16. Clean/sanitize hands after taking off	**148 (93.0)**	12 (7.0)
17. Do not reuse single-use mask	**153 (96.0)**	7 (4.0)

Table 6. Association between sociodemographic factors and knowledge among students

Sociodemographic Factors		Knowledge		Total (%)	Chi square (df)	Odd ratio	P-Value
		Poor	Good				
Sex	**Male**	30 (71.4)	12 (28.6)	42 (26.3)	0.40 (1)	1.00	0.527
	Female	78 (66.1)	40 (33.9)	118 (73.7)		1.28	
Age	**18-20**	20 (71.4)	8 (28.6)	28 (17.5)	0.27 (2)	1.00	0.874
	21-23	75 (66.4)	38 (33.6)	113 (70.6)		1.26	
	≥24	13 (68.4)	6 (31.6)	19 (11.9)		1.15	
Ethnicity	**Malay**	61 (64.2)	34 (35.8)	95 (59.4)	1.15 (1)	1.07	0.283
	Non-Malay	47 (72.3)	18 (27.7)	65 (40.6)		1.00	
Field of Study	**MBBS**	60 (65.9)	31 (34.1)	91 (56.9)	0.83 (4)	1.72	0.935
	BPHARM	19 (67.9)	9 (32.1)	28 (17.5)		1.58	
	BPSY	10 (76.9)	3 (23.1)	13 (8.1)		1.00	
	BBET	8 (72.7)	3 (27.3)	11 (6.9)		1.25	
	BOSH + BHOMS + BPHYSIO	11 (64.7)	6 (35.3)	17 (10.6)		1.82	
Marital Status	**Married**	2 (50.0)	2 (50.0)	4 (2.5)	0.57 (1)	2.12	0.449
	Not Married	106 (67.9)	50 (32.1)	156 (97.5)		1.00	

Table 7. Association between sociodemographic factors and attitude among students

Sociodemographic Factors		Attitude		Total (%)	Chi square (df)	Odd ratio	P-Value
		Poor(%)	Good (%)				
Sex	**Male**	17 (40.5)	25 (59.5)	42 (26.3)	2.60 (1)	1.00	0.107
	Female	32 (27.1)	86 (72.9)	118 (73.8)		1.83	
Age	**18-20**	11 (39.3)	17 (60.7)	28 (17.5)	1.88 (2)	1. 00	0.391
	21-23	31 (27.4)	82 (72.6)	113 (70.6)		1.71	
	≥24	7 (36.8)	12 (63.2)	19 (11.9)		1.10	
Ethnicity	**Malay**	31 (32.6)	64 (67.4)	92 (59.4)	0.44 (1)	1.00	0.506
	Non Malay	18 (25)	47 (75)	65 (15)		1.27	
Field of Study	**MBBS**	27 (29.7)	64 (70.3)	91 (56.9)	5.99 (4)	2.84	0.200
	BPHARM	6 (21.5)	22 (78.6)	28 (17.5)		4.40	
	BPSY	6 (46.2)	7 (53.8)	13 (8.1)		1.40	
	BBET	6 (54.5)	5 (45.5)	11 (6.9)		1.00	
	BOSH + BHOMS + BPHYSIO	4 (23.5)	13 (76.5)	17 (10.6)		3.90	
Marital Status	**Married**	1 (25.0)	3 (75.0)	4 (2.5)	0.06 (1)	1.33	0.805
	Not Married	48 (30.8)	108 (69.2)	156 (97.5)		1.00	

Table 8. Association between sociodemographic factors and practice among students

Sociodemographic Factors		Practice		Total (%)	Chi square (df)	Odd ratio	P-Value
		Poor (%)	Good (%)				
Sex	Male	5 (11.9)	37 (88.1)	42 (26.3)	0.00 (1)	1.00	0.994
	Female	14 (11.9)	104 (88.1)	118 (73.8)		1.00	
Age	18-20	5(17.9)	23 (82.1)	28 (2.5)	1.73 (2)	1.00	0.421
	21-23	11 (9.7)	102 (90.3)	113 (70.6)		2.02	
	≥24	3 (15.8)	16 (84.2)	19 (11.9)		1.16	
Ethnicity	Malay	16 (16.8)	79 83.2)	95 (59.4)	5.51(1)	1.00	0.019
	Non-malays	3 (4.6)	62 (95.4)	65 (40.6)		4.19	
Field of Study	MBBS	11 (12.1)	80 (87.9)	91 (56.9)	1.19 (4)	1.62	0.879
	BPHARM	3 (10.7)	25 (89.3)	28 (17.5)		1.85	
	BPSY	2 (15.4)	11 (84.6)	13 (8.1)		1.22	
	BBET	2 (18.2)	9 (81.8)	11 (6.9)		1.00	
	BOSH + BHOMS + BPHYSIO	1 (5.9)	16 (94.1)	17 (11.3)		3.56	
Marital Status	Married	1 (25.0)	3 (75.0)	4 (2.5)	0.68 (1)	1.00	0.463
	Not Married	18 (11.5)	138 (88.5)	156 (97.5)		2.56	

Table 9. Association between knowledge and practice

Knowledge	Practice		Total	Chi-square (df)	Odd ratio	P-Value
	Poor	Good				
Poor	14 (13.0)	94 (87.0)	108	0.38	1.00	0.540
Good	5 (9.6)	47 (90.4)	52		1.40	

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