

## Original Research Article

# Awareness, perceived risk and protective behaviours of Myanmar adults on COVID-19

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**Received:** 25 March 2020

**Accepted:** 31 March 2020

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## ABSTRACT

**Background:** COVID-19 was originated from Wuhan city, China in December 2019 and spread very fast to all over the world. This study was carried out to assess the awareness, perceived risk and protective behaviours of Myanmar adults on COVID-19.

**Methods:** The cross-sectional study was conducted using face to face interview method among 597 adults from Yangon and Bago regions. Binary logistic regression analysis was done to determine the factors influencing on practicing protective behaviours and the results were described by adjusted odds ratios (aOR) with 95% confidence intervals (CI).

**Results:** Almost all, 584 (98%) of 597 respondents, have heard about COVID-19. Among those 584 respondents, 87% had low knowledge level. Risk perception level towards COVID-19 was moderate to high. Regarding perception to information in social media, about 36% of the respondents agreed on sharing news from social media without verifying the sources. Only 22% reported good protective behaviours. Multivariable analysis revealed that knowledge score (aOR=1.19, 95%CI-1.08,1.30) was significantly and positively influenced the protective behaviours. The odds of protective behaviour of participants from Ayeyarwaddy (aOR=0.41, 95%CI-0.19,0.91) and other states and regions (aOR=0.49, 95%CI-0.24,0.99) were significantly less than those of participants from Yangon.

**Conclusions:** The study concluded that community has no enough knowledge and inadequate protective behaviours to prevent COVID-19. The awareness raising activities and mass media health education should urgently be conducted focusing on hand washing, cough etiquette, social distancing behaviours and responsibility to inform suspected cases to local health authority to prevent COVID-19. Further research using nationally represented sample are warranted.

**Keywords:** COVID-19, Awareness, Perceived risk, Protective behaviour, Adults, Myanmar

## INTRODUCTION

Coronavirus disease 2019 is an infectious disease caused by novel corona virus and World Health Organization (WHO) formally named the disease as "COVID-19".<sup>1</sup> It was firstly identified in late December 2019 in Wuhan,

Republic of China, and then had spread globally.<sup>2,3</sup> On 13<sup>th</sup> January 2020, the first global incidence of lab-confirmed "COVID-19" was found in Thailand and within this month, the other "COVID-19" cases from Wuhan were imported to Japan and Republic of Korea.<sup>4</sup>

On 11<sup>th</sup> March 2020, the WHO declared the 2019-20 coronavirus outbreak as a pandemic as the number of cases of COVID-19 outside China has increased 13-fold, and the number of affected countries became tripled.<sup>3,5,6</sup> After declaring the COVID-19 is pandemic, on 13<sup>th</sup> March, there were 118 infected countries, 125,048 total confirmed cases, 4,613 deaths and CFR 3.6% in globally. Italy, Republic of Korea, Iran, France and Germany still have highest morbidity and mortality rates. According to the data as reported by 18<sup>th</sup> March 2020, infected countries increased to 159 and in these countries 179,112 total confirmed cases, 7,426 deaths and CFR became 4.1% in globally.<sup>7</sup> Up to 21<sup>st</sup> March, Italy faced the highest burden of confirmed cases and mortality outside China followed by the United States of America, Spain, Germany and Iran.<sup>8</sup>

Outbreak potential of COVID-19 in Myanmar is high due to being a neighboring country of China and establishing cross-border trade and migrant workers not only with China but also with other outbreak countries like Thailand, India, Malaysia and Singapore, etc. On 24<sup>th</sup> March, Ministry of Health and Sports (MOHS) announced that there were two confirmed cases in Myanmar and became the last country infected by COVID-19 among ASEAN countries except Laos.<sup>9</sup> The community's knowledge on the aetiological agent, epidemiological parameters like incubation period, mode of transmission, signs and symptoms and preventive measures are essential in prevention of COVID-19. People should be aware on the natural history of COVID-19 and the risk behaviours. Host's protective behaviours such as wearing masks, hand hygiene and social distancing are major options to prevent the infection while no treatment or vaccination is available. Moreover, risk perception on COVID-19 is a main determinant of practicing protective behaviours. Assessing the awareness, perceived risk and personal protective behaviours of each and every individual is crucial to be more effective of current COVID-19 prevention and control activities in this country. Yangon and Bago regions were selected since these areas were densely populated areas and with people in all walks of life are living in these areas. Hence this study was conducted to assess the awareness, perceived risk and personal protective behaviours of Myanmar adults for prevention and control of COVID-19.

## **METHODS**

The cross-sectional study was carried out at Yangon and Bago regions during 3<sup>rd</sup> March to 20<sup>th</sup> March among 597 adults age above 18 years of both sexes using pretested questionnaire by face to face interview method. From Yangon region, Dagon Ayar and Aung Minglar highway bus stations and two factories and from Bago region four urban wards were purposively selected. A total of 446 adults from Yangon region and 151 adults from Bago region were selected consecutively. Awareness and protective behaviour questions were developed based on

the IEC materials disseminated by MOHS and WHO. Perceived risk questions were developed based on the Health Belief Model using four points Likert scale. Pretest was also done to assess the clarity, comprehensibility and the internal consistency of questionnaire was assessed using Cronbach's alpha. Pretested questionnaire was converted into digital data collection form based on open data kit (ODK) platform and data was collected using KoBo Collect data collection tool by mobile devices (Tablets) to assure data quality and validity.

Collected data was checked for missing values, completeness and errors. Data cleaning was done such as removing the incomplete data and missing values. Descriptive statistics was used to describe the background characteristics of study population. Frequency tables were used to describe the awareness, perceived risk and protective behaviours. Participants' knowledge level was assessed using scoring system of 1 point for correct answer based on the questions related to knowledge on causal agent, human to human transmission, identifying neither vaccine nor definitive treatment, preventive measures and high-risk persons, and then the maximum possible score was 16 (see in Annexure). Individual's perceived risk on each item was described by stacked bar charts. Total perceived risk score was calculated by summing the Likert score. There were 18 perceived risk items; hence, the minimum and maximum possible score were 18 and 72. The total knowledge score variable and perceived risk score variable were categorized into high ( $\geq 80\%$ ), moderate (50-79%) and low ( $< 50\%$ ) according to modified Bloom's cut-off value. Associations between practicing protective behaviours and independent variables such as background characteristics, knowledge and perceived risks were assessed by binary logistic regression analysis after testing assumptions and collinearity. All statistical analyses were conducted by STATA version (15.1) and p value was set at  $< 0.05$  as a statistical significance.

## ***Ethical approval***

Ethical approval was obtained from the Institutional Review Board, University of Public Health, Yangon, (UPH-IRB) (2020/IR research/1). Each and every subject was explained about the study, the research purpose and their written consents were obtained. The study did not collect the name of the respondents on the questionnaire form to ensure confidentiality. Voluntary participation and privacy were ensured during data collection.

## ***Funding***

The MOHS supported research grant through 'implementation research, clinical research and public health research funds' for data collection in this study. The funding agency had no role in data collection, analysis, or interpretation of the data, the writing of the report, or the decision to submit for publication. The

manuscript represents the name of the viewed authors only, not the view of UPH, and MOHS.

## RESULTS

### *Knowledge regarding to COVID-19*

The average (SD) age of 597 respondents was 37.1 (14.3) years and their age ranged from 18 years to 84 years.

Most common age group was 21-40 years (54.4%). More than half (56.5%) were females and 63.5% were married. About 43% of participants were from Yangon region, 32% from Bago region, 14% from Ayeyarwaddy region and the rest (12%) from Kayin, Sagaing, Shan, Rakhine and Tanintharyi. Nearly two-third (63%) of respondents were high school and above education level. Among 597 respondents, 77.1% earned money by working outside home (Table 1).

**Table 1: Background characteristics of the study population (n=597).**

Background characteristics	Frequency	Percentage
<b>Age (in years)</b>		
≤20	54	9.1
21-40	325	54.4
41-60	174	29.2
>60	44	7.3
<b>Gender</b>		
Male	260	43.6
Female	337	56.5
<b>Region of residence</b>		
Yangon region	259	43.4
Bago region	188	31.5
Ayeyarwaddy region	81	13.6
Other states and regions	69	11.5
<b>Marital status</b>		
Single	196	32.8
Married	379	63.5
Other	21	3.5
Refused	1	0.2
<b>Education status</b>		
Illiterate	9	1.5
Can read and write	22	3.7
Primary school	77	12.9
Middle school	113	18.9
High school	189	31.7
University/graduated	187	31.3
<b>Occupation</b>		
Dependent	83	13.9
Working (outside home)	460	77.1
Working (inside home)	54	9.1

Among 597 respondents, almost all (97.8%) have heard about COVID-19. Therefore, the following responses regarding knowledge on COVID-19 derived from 584 respondents who have heard about COVID-19. Out of those 584 respondents, 29.3% could mention the COVID-19 is a viral infection and 91.3% answered it can be spread from person to person. Regarding the knowledge on its mode of transmission (MOT), droplet infection was identified as one of MOT by the highest proportion, 66.6%, followed by direct contact by 29.6%. Regarding its symptoms, fever and cough were the most frequently reported answers by 57.4% and 59.4% respectively. More than 70% had knowledge that there was neither vaccine nor definitive treatment for COVID-19. Among 584 respondents, frequent hand washing with soap and water

or alcohol-based hand sanitizer was considered one of preventive measures by 54.8%, the highest proportion, followed by avoiding crowded places by 45.2%. About one third of respondents (35.9%) described 65 years and above aged persons were high risk of contracting COVID-19, in the meanwhile, only 4.8% mentioned smokers.

Two-third of respondents replied they obtained health information about COVID-19 from social media, 12.7% from MOHS source and only 4.6% from healthcare personnel. Then, 42.3% of respondents selected mass media as the most trusted source of information. While asking them the action they should do if they found people with COVID-19 suspected symptoms, 75.5%

respondents replied they would inform to the health authority. While calculating total knowledge score for COVID-19, the mean score (SD) of study participants was 5.3 (2.5) and the total score ranged from 0 to 16.

Most of participants (87%) had low knowledge i.e. less than score 8 and only 1.2% of participants had high knowledge i.e. greater than score 12 (Table 2).

**Table 2: Knowledge on COVID-19 of study population (n=584)<sup>†</sup>.**

Knowledge on COVID-19	Frequency	Percentage
<b>Ever heard about COVID-19 (n=597)</b>		
Yes	584	97.8
No	13	2.2
Respondents who could mention the causal agent of COVID-19 as virus	171	29.3
Respondents who answered COVID-19 can be spread from person to person	533	91.3
<b>Knowledge on mode of transmission*</b>		
Direct contact	173	29.6
Droplet infection	389	66.6
Don't know	71	12.2
<b>Knowledge on signs and symptoms*</b>		
Fever	335	57.4
Cough	347	59.4
Difficulty in breathing	211	36.1
Fatigue	83	14.2
Diarrhea	10	1.7
Don't know	101	17.3
<b>Respondents who answered there is no vaccine</b>	429	73.5
<b>Respondents who answered there is no definitive treatment</b>	448	76.7
<b>Knowledge on preventive measures*</b>		
Frequent hand washing with soap and water/alcohol-based hand sanitizer	320	54.8
Avoid close contact with people who are sick	63	10.8
Avoid touching your eye, nose, mouth with unwashed hands	86	14.7
Avoid crowded place	264	45.2
Avoidance of unnecessary travel	44	7.5
Avoid direct contact with animals	23	3.9
Personal hygiene and sleep well	129	22.1
<b>Knowledge on high risk persons*</b>		
Elderly ( $\geq 65$ years)	208	35.9
Smokers	28	4.8
Chronic respiratory disease	77	13.3
Chronic diseases such as hypertension, diabetes, cancer	141	24.4
People in crowded places	117	20.2
<b>Main source of information*</b>		
Healthcare personnel	27	4.6
Social media (facebook/websites)	377	64.6
MOHS sources	74	12.7
Mass media (radio/television/newspaper)	274	46.9
Friends/family members/relatives	91	15.6
Hearsays	105	18.0
Others	9	1.5
<b>Most trusted source of information</b>		
Healthcare personnel	35	6.0
Social media (facebook/websites)	64	11.0
MOHS sources	147	25.3
Mass media (radio/ television/ newspaper)	246	42.3
Friends/family members/relatives	24	4.1
Hearsays	24	4.1
Others	41	7.1

Continued.

Knowledge on COVID-19	Frequency	Percentage
<b>Knowledge on responsibility if they find the person with suspected symptoms</b>		
Inform to health authority	441	75.5
Others	104	17.8
Nothing done	39	6.7
<b>Total knowledge score</b>		
Low (<8)	506	86.6
Moderate (8-12)	71	12.2
High (>12)	7	1.2
Mean (SD)		5.3 (2.5)

†Excluded 13 cases who never heard of COVID-19, \*Multiple responses.

### Risk perception towards COVID-19

Figure 1, describes perceived susceptibility to COVID-19 among the respondents. About 90% of respondents perceived that susceptibility of disease was higher among people working abroad or working together with foreigners, going to crowded area while almost all respondents (96%) perceived that susceptibility can be reduced by adopting healthy lifestyles. However, some respondents wrongly perceived that susceptibility of disease was low chance among young people (39%) and no chance among healthy people (32%) while about 20% of respondents thought that family members were less likely to get disease from sick person (Figure 1).

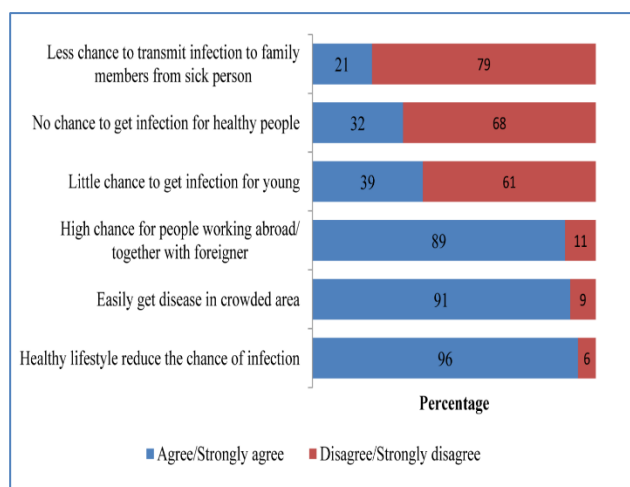


Figure 1: Perceived susceptibility to COVID-19.

Almost all respondents (97%) perceived that disease will be more severe for elderly and people with comorbidities. About 86% perceived that COVID-19 will cause severe signs and symptoms and about 78% thought that infected person could not survive. Three out of four respondents (73%) believed that infection could be occurred without signs and symptoms. More than half of them (61%) disagreed on the statement ‘COVID-19 can be treated’ and 89% also perceived that spontaneous recovery was impossible (Figure 2).

More than 80% of the respondents were confident that they can get access to the reliable health information regarding to COVID-19, they will eat healthy diet and wash their hands frequently to prevent COVID-19 transmission. However about 25% of respondents had no or low confident that they can prevent infection, they will avoid crowded area and use mask if they go to crowded area to prevent COVID-19 (Figure 3).

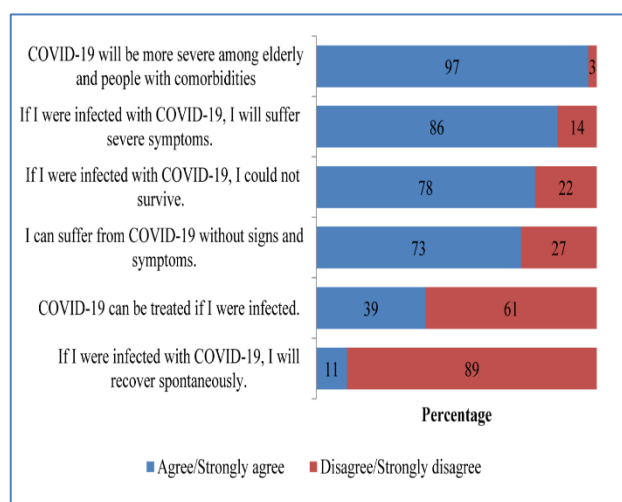


Figure 2: Perceived severity to COVID-19.

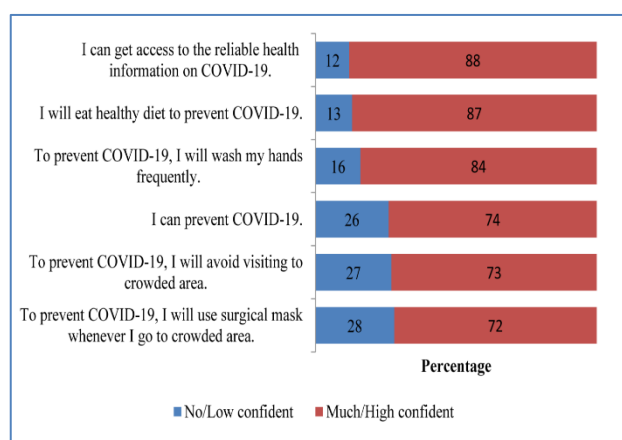
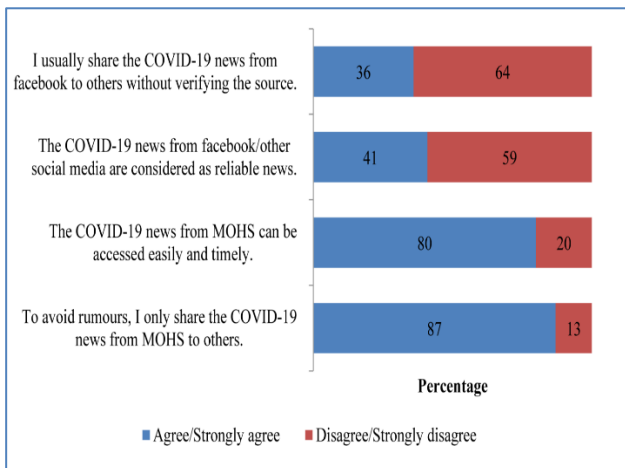


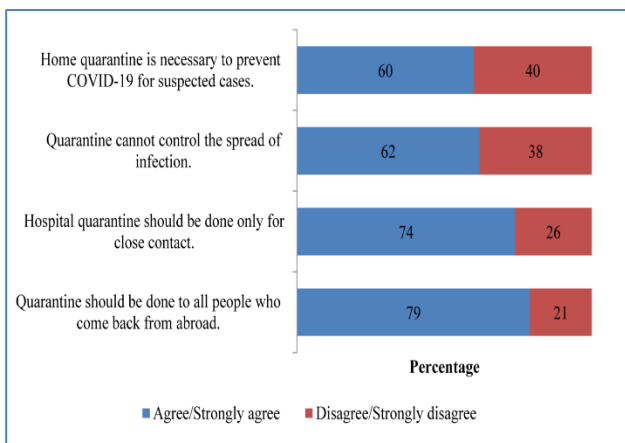
Figure 3: Perceived self-efficacy to COVID-19.

Total perceived risk score was calculated from items regarding to perceived susceptibility (6 items), severity (6 items) and efficacy (6 items). Negative items were score reversely and calculated the sum of all items to get perceived risk score. One point for strongly disagree, two for disagree, 3 for agree and 4 for strongly agree. These scores were categorized according to Bloom's cut off value into low, moderate and high-risk score. The results found that there were no respondents in low risk perception category, 77.2% were in moderate risk perception category and 22.8% in high risk perception category.

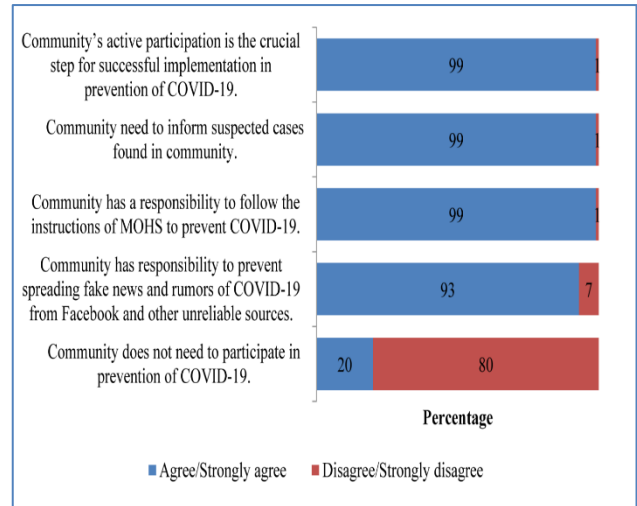
Regarding perception to information in social media, most of the respondents (87%) agreed sharing the COVID-19 news from MOHS to others to avoid rumours and they perceived that the news from this source can be accessed easily and timely (80%). However, some of the respondents replied that they considered the COVID-19 news from Facebook and social media are reliable news (41%) and they used to share information from these media without verifying the source (36%) (Figure 4).



**Figure 4: Perception regarding to information in social media.**



**Figure 5: Perception on quarantine regarding to COVID-19.**



**Figure 6: Perception on role of community involvement in COVID-19 prevention.**

**Table 3: Reported protective behaviours for COVID-19 among participants who heard about COVID-19 (n=584).**

Reported protective behaviours	Frequency	Percentage
<b>Wash hand (&gt;5 times)</b>		
Yes	262	44.9
<b>Completely cover mouth and nose during coughing and sneezing</b>		
Always	276	47.3
Often	249	42.6
Rarely	53	9.1
Never	6	1.0
<b>Discard used mask or tissue into dustbin</b>		
Yes	482	82.7
<b>Avoid travel or trip (n=148)<sup>†</sup></b>		
Yes	50	33.8
<b>Avoid crowded area (n=283)<sup>†</sup></b>		
Yes	164	57.9
<b>Health advice to fever/cough patient*</b>		
Don't know	15	2.6
Advise to go clinic	506	86.6
Avoiding crowded places	41	7.0
Avoid close contact with others	35	6.0
<b>Reported protective practice</b>		
Poor	455	77.9
Good <sup>‡</sup>	129	22.1

<sup>†</sup>Excluded not relevant respondents, \*Multiple responses, <sup>‡</sup>Good was defined if participants wash hands frequently, cover the mouth and nose during coughing and sneezing, discard used masks and tissue in the dustbin.

The study assessed the respondents' perception towards quarantine regarding to prevention of COVID-19. About 40% of respondents had negative perception regarding to the effectiveness of home quarantine for suspected cases.

More than half of respondents (62%) perceived that quarantine cannot control the spread of COVID-19. In contrast, most of the respondents thought that hospital quarantine should be done for close contact (74%) and people who came back from abroad (79%) (Figure 5).

Community's perception towards COVID-19 prevention was assessed and it was found that almost all respondents (99%) agreed the important role of community in prevention of COVID-19 so that they agreed to inform suspected cases to health authority and to follow the instructions of MOHS to prevent disease. More than 90% agreed that community has responsibility to prevent spreading rumors from social media. However, about 20% of respondents thought that community does not need to participate in prevention of COVID-19 (Figure 6).

### **Reported protective behaviours**

Among 584 participants who heard about COVID-19, their reported protective behaviours were as follows: 45% wash hands frequently, 34% avoided travel or trip, 58% avoided crowded areas to prevent COVID-19, about 47% always completely cover the mouth and nose during coughing and sneezing and 83% discarded used masks or tissues into dustbin. The most common reasons for not washing hands were: no need to wash, not a usual habit, wash only before and after eating and after latrine, forget to wash hands and afraid suffering from heat stroke. Regarding to health advice to fever/cough patient, 87% reported they will give advice to go clinic, 7% want to give advice to avoid crowded places while 6% want to give advice to avoid close contact with others. Only 3% said they don't know what advice should be given to fever patients.

Participants' reported practices were categorized into good- if participants wash hands frequently, cover the mouth and nose during coughing and sneezing, discard used masks and tissue in the dustbin and; poor- if participants did not practice previously defined activities. It was found that about 22% of participants were identified as good since they practiced above 3 protective behaviours to prevent COVID-19 (Table 3).

Multivariable binary logistic regression analysis was done to identify the factors influencing the protective behaviour for COVID-19 and the results were presented by adjusted odds ratio (aOR) with 95% confidence intervals in Table 4. It was found that knowledge score (aOR=1.19, 95%CI-1.08, 1.30) was significantly and positively influence the protective behaviours but perceived risk score (aOR=1.03, 95%CI- 0.99, 1.07) was not significant. The protective behaviour of participants from Ayeyarwaddy (aOR=0.41, 95%CI- 0.19, 0.91) and from other states and regions (aOR=0.49, 95%CI-0.24, 0.99) were significantly less than that of participants from Yangon. The protective behaviours of COVID-19 were not influenced by other variables age group, sex, education and occupation (Table 4).

**Table 4: Multivariable binary logistic regression analysis for outcome variable (protective behaviours) using independent variables (knowledge score, perceived risk score, age, sex, resident, education, occupation).**

Variables	aOR (95%CI)
<b>Total knowledge score</b>	1.19*** (1.08, 1.30)
<b>Perceived risk score</b>	1.03 (0.99, 1.07)
<b>Age group (in years)</b>	
≤20	1.0 (Ref.)
21-40	2.30 (0.92, 5.75)
41-60	1.99 (0.75, 5.30)
>60	0.47 (0.10, 2.25)
<b>Sex</b>	
Male	1.0 (Ref.)
Female	1.42 (0.92, 2.21)
<b>Education</b>	
Low	1.0 (Ref.)
Middle	0.85 (0.37, 1.97)
High	1.51 (0.75, 3.04)
<b>Region of residence</b>	
Yangon	1.0 (Ref.)
Bago	0.64 (0.36, 1.13)
Ayeyarwaddy	0.41* (0.19, 0.91)
Other states and regions	0.49* (0.24, 0.99)
<b>Occupation</b>	
Dependent	1.0 (Ref.)
Working (outside home)	0.58 (0.28, 1.21)
Working (inside home)	0.79 (0.31, 2.00)

aOR=Adjusted odds ratio, \*\*\*p<0.001, \*\*p<0.01, \*p<0.05.

## **DISCUSSION**

Almost all respondents ever heard about COVID-19 and among them one third mentioned correctly virus/novel coronavirus as a causal agent. Majority of respondents had low knowledge regarding to aetiology and prevention of COVID-19. Less than one fourth of respondents had high level of risk perception towards COVID-19. Two out of five respondents considered news from social media as a reliable information and shared this news without verifying the source. Most of the respondents believed that they can easily access to the COVID-19 news from MOHS. More than half of the respondents thought that quarantine cannot control the spread of infection while less than half of respondents did not agree home quarantine is necessary for suspected cases. Almost all respondents had positive perception regarding to community participation in prevention of disease. Regarding to protective behaviours, only one out of five respondents had good reported protective behaviours.. Knowledge score and region of residence were significantly influenced the respondents' protective behaviour for COVID-19.

To prevent COVID-19, individual must have adequate knowledge regarding to aetiology, mode of transmission

and preventive measures. This study found that Myanmar adults had low knowledge regarding to causal agents. Only two third realized that it can be transmitted by droplets and one third knew it can be transmitted by close contact. These findings were also consistent with the study conducted by Bhagavathula et al, in which they assessed the awareness and perception of COVID-19 among health care workers and reported that knowledge of transmission (60%) and disease onset (64%) was poor among the health care workers.<sup>10</sup> Being a new emerging disease with not fully understood the natural history might be the possible reason for low knowledge among Myanmar adults. Another possible reason was that even though MOHS timely disseminated information and instructions for COVID-19, they were interested only in the occurrence and mortality but not give much attention to disease aetiology and preventive measures or thought that not necessary to be aware.

Regarding to perceived risk towards COVID-19, all of the respondents had moderate to high level of perceived risk score. However, some of the respondents wrongly perceived that young and healthy people had little chance to get disease and most of them thought that disease was very severe and fatal. Perceived severity of Myanmar adults were lower than the study conducted among community in Hong Kong<sup>11</sup> in which almost all participants perceived that disease was very severe. However, the proportion of response to curability of disease among Myanmar adults were two times more than those in Hong Kong study. Regarding to survivorship if infected, two populations had similar responses i.e. 22% in Myanmar adults vs. 18% in Hong Kong population. Perceived efficacy towards preventive measures such as hand hygiene, cough etiquette and social distancing i.e. avoiding travelling to abroad and crowded area were not too much lower in Myanmar than those of Hong Kong study i.e. about 80% vs. 90%.

Our study found that social media and mass media were main sources of information for Myanmar adults and these findings were more or less similar with Hong Kong study in which their common sources were social platform and websites but different with health care workers study in which their primary sources were not only social media but also official government websites.<sup>10,11</sup> Although both Myanmar adults and people from Hong Kong use social media and websites as the main sources, only about 40% of Myanmar adults and 26% of Hong Kong people perceived these sources as the reliable sources. Some of the Myanmar adults used to share the news from social media such as Facebook without verifying the source and this habitual action might spread the rumours and false alarms which in turn might cause the unnecessary stress and worries in the community.

Myanmar adults' reported hand washing behaviour and cough etiquette were very much lower than Hong Kong study (44.9% vs. 95.8% and 47.3% vs. 97.1%,

respectively). Moreover, social distancing activities such as avoiding to crowded places and travel or trip were also lower in Myanmar compared to Hong Kong study (57.9% vs. 88.1%). The differences in practicing protective behaviours between two studies might be due to the differences in knowledge level and risk perception towards COVID-19. In addition, the outbreak has already been occurred in Hong Kong which increased awareness and practicing more protective behaviours among Hong Kong community. Although many studies mentioned that knowledge and risk perception enhance preventive behaviors, our study found that only knowledge influenced to practice protective behaviours but not risk perception.<sup>12,13</sup>

Moreover, it was found that respondents from Yangon region reported more protective behaviour than other states and regions. Most of the respondents from Yangon were urban population and have better access to internet and other information sources than respondents from other regions. They are more concern about quarantine since Yangon has an international airport and most of the supermarkets and hotels were currently implementing thermal scanning at the main entrance to prevent COVID-19. These activities and easily accessibility of mass media and social media were the possible explanations for doing more protective behaviour among respondents from Yangon region. Moreover, apart from Bago region, the respondents from other states and regions including Ayeyarwaddy might be from rural area and small towns where information accessibility and activities that related to COVID-19 prevention were very much lower than Yangon region.

This study was first study that assessed the awareness, perception and protective behaviours for COVID-19 among Myanmar adults. However, the study has limitations. First, the sample was purposively selected from Yangon and Bago regions using consecutive sampling method; hence, the results cannot be generalized for the whole adult population. Second, we asked their reported behaviour instead of observing their actual practice. As a consequence, the reported practice might be overestimated. Last, we categorized the region of residence generally by regions and that unintentionally included urban respondents in Yangon and Bago regions while we cannot make sure that the respondents from Ayeyarwaddy and other states and regions were only from urban. Rural respondents were less likely to be aware and practicing less protective behaviour. This urban-rural effect might be confounding to the study's results regarding to regional difference.

## CONCLUSION

This study highlights the knowledge, perception and protective behaviour of Myanmar adults currently practicing regarding to COVID-19. The findings point out that community has no enough knowledge and inadequate protective behaviours which can favour infection spread



if the disease might have occurred. Since the study provides enhancing effect of knowledge towards protective behaviours, the awareness raising activities and mass media health education should urgently be conducted focusing on effectiveness of hand washing, cough etiquette, social distancing and responsibility to inform suspected cases to local health authority to prevent COVID-19. Further research using nationally represented sample is warranted.

## ACKNOWLEDGEMENTS

Our deepest appreciation goes to the MOHS, Myanmar for initiation and support in conducting of this research project. We are very grateful to department of medical research for financial support through “implementation research, clinical research and public health research funds”. We would like to acknowledge administrative support of regional health authorities for their kind permission and support for data collection in the community. Last but not least, we would like to express our thanks to master students and faculty members of UPH, Yangon for their active participation in data collection and respondents of this study for their enthusiastic involvement in answering the survey questions.

*Funding: Implementation research, clinical research and public health research funds, Ministry of Health and Sports*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Review Board, University of Public Health, Yangon*

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**Cite this article as:** Mya KS, Aye SM, Hlaing WA, Hlaing SS, Aung T, Lwin SMM, et al. Awareness, perceived risk and protective behaviours of Myanmar adults on COVID-19. *Int J Community Med Public Health* 2020;7:1627-36.

## ANNEXURE

## Scoring system for knowledge questions.

No.	Questions	Response	Marks
1	What is the causal agent of COVID-19?	Any of the following responses is considered as correct response: corona virus, covid/ covid-19, ncov/ ncov-19, or virus.	1
2	Can COVID-19 transmit human-to-human?	Yes	1
3	Is there any vaccine to prevent COVID-19?	No	1
4	Is there any definitive treatment of COVID-19 currently?	No	1
5	What are the simple everyday preventive actions to COVID-19? (more than one answers- Do not probe)	Frequent hand washing with soap and water/ alcohol-based hand sanitizer	1
		Avoid close contact with people who are sick	1
		Avoid touching your eye, nose, mouth with unwashed hands	1
		Avoid crowded place	1
		Avoidance of unnecessary travel	1
		Avoid direct contact with animals	1
6	Do you know the high-risk population of COVID-19? (more than one answers- Do not probe)	Personal hygiene and sleep well	1
		Old age ( $\geq 65$ years)	1
		Smoker	1
		People with chronic respiratory Disease	1
		People with chronic diseases (Diabetes/ Hypertension/ Cancer)	1
People in crowded places/ among a lot of people			1
<b>Maximum possible score</b>			<b>16</b>