Original Research Article

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

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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”.1 It was firstly identified in late December 2019 in Wuhan, Republic of China, and then had spread globally.2,3 On 13th 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.4
On 11th 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. After declaring the COVID-19 is pandemic, on 13th 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 18th 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.7 Up to 21st March, Italy faced the highest burden of confirmed cases and mortality outside China followed by the United States of America, Spain, Germany and Iran.8

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 24th 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.9 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 3rd March to 20th 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 (≥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.

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**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 |
|----------------------------|-----------|------------|
| **Age (in years)**        |           |            |
| ≤20                       | 54        | 9.1        |
| 21-40                     | 325       | 54.4       |
| 41-60                     | 174       | 29.2       |
| >60                       | 44        | 7.3        |
| **Gender**                |           |            |
| Male                      | 260       | 43.6       |
| Female                    | 337       | 56.5       |
| **Region of residence**   |           |            |
| Yangon region             | 259       | 43.4       |
| Bago region               | 188       | 31.5       |
| Ayeyarwaddy region        | 81        | 13.6       |
| Other states and regions  | 69        | 11.5       |
| **Marital status**        |           |            |
| Single                    | 196       | 32.8       |
| Married                   | 379       | 63.5       |
| Other                     | 21        | 3.5        |
| Refused                   | 1         | 0.2        |
| **Education status**      |           |            |
| 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       |
| **Occupation**            |           |            |
| 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 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).

| Knowledge on COVID-19 | Frequency | Percentage |
|-----------------------|-----------|------------|
| **Ever heard about COVID-19 (n=597)** | | |
| 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 |
| **Knowledge on mode of transmission** | | |
| Direct contact | 173 | 29.6 |
| Droplet infection | 389 | 66.6 |
| Don’t know | 71 | 12.2 |
| **Knowledge on signs and symptoms** | | |
| 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 |
| Respondents who answered there is no vaccine | 429 | 73.5 |
| Respondents who answered there is no definitive treatment | 448 | 76.7 |
| **Knowledge on preventive measures** | | |
| 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 |
| **Knowledge on high risk persons** | | |
| Elderly (≥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 |
| **Main source of information** | | |
| 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 |
| **Most trusted source of information** | | |
| 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 |

Table 2: Knowledge on COVID-19 of study population (n=584).
Knowledge on COVID-19 | Frequency | Percentage
--- | --- | ---
Knowledge on responsibility if they find the person with suspected symptoms
Inform to health authority | 441 | 75.5
Others | 104 | 17.8
Nothing done | 39 | 6.7
Total knowledge score
Low (<8) | 506 | 86.6
Moderate (8-12) | 71 | 12.2
High (>12) | 7 | 1.2
Mean (SD) | 5.3 (2.5)

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.](image)

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).

![Figure 2: Perceived severity to COVID-19.](image)

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 3: Perceived self-efficacy to COVID-19.](image)
Total perceived risk score was calculated from items regarding to perceived susceptibility (6 items), severity (6 items) and efficacy (6 items). Negative items were scored 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.](image)

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

| I usually share the COVID-19 news from Facebook to others without verifying the source. | 36 | 64 |
|---|---|---|
| The COVID-19 news from Facebook/other social media are considered as reliable news. | 41 | 59 |
| The COVID-19 news from MOHS can be accessed easily and timely. | 80 | 20 |
| To avoid rumours, I only share the COVID-19 news from MOHS to others. | 87 | 13 |

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

| Community’s active participation is the crucial step for successful implementation in prevention of COVID-19. | 91 |
| Community needs to inform suspected cases found in community. | 91 |
| Community has a responsibility to follow the instructions of MOHS to prevent COVID-19. | 91 |
| Community has responsibility to prevent spreading false news and rumors of COVID-19 from Facebook and other unreliable sources. | 20 | 80 |

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

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.

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

| Reported protective behaviours | Frequency | Percentage |
|-------------------------------|-----------|------------|
| Wash hand (>5 times) | | |
| Yes | 262 | 44.9 |
| **Completely cover mouth and nose during coughing and sneezing** | | |
| Always | 276 | 47.3 |
| Often | 249 | 42.6 |
| Rarely | 53 | 9.1 |
| Never | 6 | 1.0 |
| **Discard used mask or tissue into dustbin** | | |
| Yes | 482 | 82.7 |
| **Avoid travel or trip (n=148)** | | |
| Yes | 50 | 33.8 |
| **Avoid crowded area (n=283)** | | |
| Yes | 164 | 57.9 |
| **Health advice to fever/cough patient** | | |
| 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 |
| **Reported protective practice** | | |
| Poor | 455 | 77.9 |
| Good† | 129 | 22.1 |

†Excluded not relevant respondents, *Multiple responses, †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.
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 follow: 45% wash hands frequently, 34% avoided travel or trip, 58% avoided crowded area to prevent COVID-19, about 47% always completely cover the mouth and nose during coughing and sneezing and 83% discarded used mask 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)       |
|---------------------------|-------------------|
| Total knowledge score     | 1.19*** (1.08, 1.30) |
| Perceived risk score      | 1.03 (0.99, 1.07)  |
| Age group (in years)      |                   |
| ≤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)  |
| Sex                       |                   |
| Male                      | 1.0 (Ref.)        |
| Female                    | 1.42 (0.92, 2.21)  |
| Education                 |                   |
| Low                       | 1.0 (Ref.)        |
| Middle                    | 0.85 (0.37, 1.97)  |
| High                      | 1.51 (0.75, 3.04)  |
| Region of residence       |                   |
| 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) |
| Occupation                |                   |
| 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. 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 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. 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.

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.

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REFERENCES

1. World Health Organization. Naming the coronavirus disease (COVID-19) and the virus that causes it. 2020 Available at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-(covid-2019)-and-the-virus-that-causes-it. Accessed on 23 March 2020.
2. Hui DS, Azhar EI, Madani TA, Nlouni F, Kock R, Dar O, et al. The continuing 2019-nCoV epidemic threat of novel coronaviruses to global health the latest 2019 novel coronavirus outbreak in Wuhan, China. Int J Infect Dis. 2020;91:264-6.
3. World Health Organization, WHO Director-General’s opening remarks at the media briefing on COVID-19 - 11 March 2020. Available at: https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020. Accessed on 23 March 2020.
4. World Health Organization (WHO). Novel Coronavirus (2019-nCoV) Situation Report-1. WHO Bulletin; 2020.
5. World Health Organization. Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV). 2020. Available at: https://www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov). Accessed on 23 March 2020.
6. Maitani S, Berger M, Grady SIM. Hundreds of evacuees to be held on bases in California; Hong Kong and Taiwan restrict travel from mainland China - The Washington Post. 2020. Available at: https://www.washingtonpost.com/world/asia_pacific/coronavirus-china-live-updates/2020/02/05/114eced8a-479c-11ea-bc78-8a18f7afcee7_story.html. Accessed on 23 March 2020.
7. Ministry of Health and Sports. Newspaper COVID-19 news (18.3.20) (8_15 pm); 2020. Available at: http://mohs.gov.mm/Main/content/new/covid-19-...-18-3-2020-8-15pm. Accessed on 24 March 2020.
8. World Health Organization (WHO). Coronavirus Disease 2019 (COVID-19) Situation Report-61. WHO Bulletin; 2020. Available at: https://www.who.int/docs/default-source/coronaviruse/situation-reports/2020-0321-sitrep-61-covid-19.pdf?sfvrsn=ce5ca116_2. Accessed on 24 March 2020.
9. Ministry of Health and Sports. Newspaper COVID-19 news (24.3.20) (8_15 pm); 2020. http://mohs.gov.mm/Main/content/new/covid-19-...-24-3-20-8-15-pm. Accessed on 24 March 2020.
10. Bhagavathula AS, Aldhaleei WA, Rahmani J, Mahabadi MA, Bandari DK. Novel Coronavirus (COVID-19) Knowledge and Perceptions: A Survey on Healthcare workers. MedRxiv. 2020;2020.03.09.20033381.
11. Kwok KO, Li KK, Chan HH, Yi YY, Tang A, Wei WI, et al. Community responses during the early phase of the COVID-19 epidemic in Hong Kong: risk perception, information exposure and preventive measures. medRxiv. Available at: http://medrxiv.org/content/early/2020/02/27/2020.02.26.20028217. Accessed on 22 March 2020.
12. Brug J, Aro AR, Richardus JH. Risk perceptions and behaviour: Towards pandemic control of emerging infectious diseases: Iional research on risk perception in the control of emerging infectious diseases. Int J Behav Med. 2009;16(1):3-6.
13. Varti AM, Oenema A, Schreck M, Utela A, De Zwart O, Brug J, et al. SARS knowledge, perceptions, and behaviors: A comparison between finns and the dutch during the SARS outbreak in 2003. Int J Behav Med. 2009;16(1):41-8.

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## 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                                                                 |
|   | Personal hygiene and sleep well                                | 1                                                                 |

6. **Do you know the high-risk population of COVID-19? (more than one answers- Do not probe)**

|   |                                                                 |                                                                     |
|---|----------------------------------------------------------------|-------------------------------------------------------------------|
|   | Old age (≥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                                                                 |

**Maximum possible score**: 16