



Original Research Article

Knowledge, attitudes, practices and perception towards COVID-19: A cross-sectional survey among Mongolian residents

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Abstract

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On 11th March, 2020, WHO assessed that COVID-19 could be characterized as a pandemic. The prevalence of COVID-19 epidemics directly relates to the general population behavior; therefore, preventive measures against the spread of COVID are vital. Estimation of Knowledge, attitudes, practices, and perception towards COVID-19 in the population will greatly assist in intensifying the government's efforts to prevent it. This cross-sectional study was conducted among the general population of Mongolia using quantitative and qualitative method. Total of 1740 people aged 15-60 years old participated in the study from 3 bordering provinces (Bayan-Ulgii, Selenge and Dornogovi) and two districts of Ulaanbaatar (Songino-khairkhan and Chingeltei). Data analysis was conducted using SPSS version 23. Deviation values of 95% confidence interval (95% CI) were used to assess the difference between the measurement of the accuracy of the results (distribution rate) and the groups (age, sex, location). 47.5% (95% CI: 44.9-49.7) of participants were from Ulaanbaatar, and 52.5% (95% CI: 50.3-55.1) were from rural areas. The participants' average age was 35. Most of the participants were married (72.0 percent, 1252) and women (60.7 percent, 1057). As for living conditions, 34.8% (95% CI: 32.7-37.1) of the participants live in apartments, and 65.2% (95% CI: 62.9-67.3) live in ger areas. Respondents answered an average of 9.23 ± 3.2 (95% CI: 9.09-9.38) out of 14 scored questions for required Knowledge of COVID-19. Knowledge score was higher among female participants (9.43 ± 3.14) than that among male participants ($p = 0.0001$). The score of participants with incomplete secondary education was 8.13 ± 3.24 . However, this score has increased to 8.32 ± 3.44 for those with complete secondary education and 10.08 ± 2.71 for those with higher education ($p = 0.0001$). The majority of participants perceived the COVID-19 pandemic as very dangerous. There was a growing tendency in households of spending a considerable amount of money on face masks and hand sanitizers as preventive measures from COVID-19. The respondents had a positive attitude towards not discriminating against COVID-19 infected people and had good knowledge about were to reach out in case of emergency when their level of Knowledge was high. Good preventive practices in the population were statistically significant concerning about their Knowledge of COVID-19. Despite 81.4 percent of the surveyed population reporting they wear face masks outdoors, quantitative and observational studies have shown that people wear face masks indoors relatively for a long time and handle it incorrectly. Two out of three respondents were not following social distancing guidelines at all. According to the survey result, good hygiene practices towards COVID-19 prevention was insufficient, such as not washing hands properly (58.4%), not possessing hand sanitizer (42.1%), touching your eyes, nose and mouth with unwashed hands (22.1%), and not covering your mouth and nose when you cough or sneeze (23.4%). Knowledge score (9.56-10.35) was high among those who had good hygiene practices such as covering mouth and nose when you cough or sneeze.

Keywords: COVID-19, Knowledge, attitude, practice, public health, wearing a mask, keeping distance.

INTRODUCTION

At the close of 2019, the WHO China Country Office was informed of pneumonia of unknown cause, detected in the city of Wuhan in Hubei province, China (Hu et al., 2020). According to the authorities, some patients were operating dealers or vendors in the Huanan Seafood market. In 11th March, 2020 WHO assessed that COVID-19 can be characterized as a pandemic (WHO. Coronavirus disease (COVID-2019) situation reports(2020).

The COVID-19 pandemic demands health care systems and decision-makers worldwide to take effective preventive measures, policies, and decisions. The pandemic continues to affect individual and social mental health, well-being, lives, relationships, and economic stability. Therefore, we measure individual and social responses in the context of 1) by measuring unexpected events and actions being taken accordingly and 2) by the effectiveness of the organized responses to the pandemic.

The first public precautions introduced by the Ministry of Health on 6th January 2020. The Government of Mongolia initiated precautionary measures at the beginning of January 2020 through the State Emergency Committee (Government of Mongolia, 2008) and enacted the Disaster Protection Law.³The legal enforcement of State Emergency Committee precautionary measures enabled an integrated and focused administration of COVID-19 disaster management.

The National Center for Public Health (NCPH) has been conducted an online survey on COVID-19 Knowledge, attitudes, and practices among the general population since April 2020 and involved 3000 people. However, 80% of those respondents were people with higher education and 32.0% work in health care facilities. In parallel, the NSO is undertaking an online COVID-19 e-socio-economic survey to identify problems facing individuals and organizations and determine government measures. The disadvantage of these online surveys was that information circulated online; thus, representatives of vulnerable population groups were less likely to be involved.

The prevalence of COVID-19 epidemics has a direct relationship with the general population behavior, therefore preventive measures against the spread of COVID is vital. Estimation of Knowledge, Attitudes, Practices, and Perception towards COVID-19 in the population will greatly assist in intensifying the government's efforts to prevent it.

Therefore, identifying the population's awareness, Knowledge, prevention behaviours, attitudes, and information needs about coronavirus infection (COVID-19), is pivotal for further improvement of the responses, risk communications, and surety of public preparedness.

METHODS

Ethics Statement

1. This is to confirm that this specific study was reviewed and approved by Resolution No.170 of the Medical Ethics Review Committee, the Ministry of Health, before the study began.
2. This research involved no collection of plant, animal or other materials from a natural setting.

Written consent was informed and obtained by each participant and was stated in each questionnaire sheet. Medical Ethics Review Committee approved the consent, the Ministry of Health before the study began.

Study Design and population

This cross-sectional study was conducted among the general population of Mongolia using quantitative and qualitative (II & FGD and observation) method and snow ball sampling technique. The study was adapted to the country's specifics, using the research tools and guidelines developed by the WHO Regional Committee for Europe (The Regional Office for Europe of the WHO, 2020), the COVID-19 readiness and response (IFRC, UNICEF, WHO, 2020), and risk information communication planning. Participants aged 15-60 will be representatives of Knowledge, attitudes, practices and perception towards COVID-19: cross-sectional survey among Mongolian residents.

A total of 1740 people aged 15-60 years old participated in the study from 3 bordering provinces (Bayan-Ulgii, Selenge and Dornogovi) and two districts of Ulaanbaatar (Songinokhairkhan and Chingeltei). Provinces and districts surveyed were chosen by target sampling. These include the following:

- The border crossing is still in operation;
- Within Regional representative provinces in Mongolia; Kazakh ethnic group in Bayan-Ulgii province, who make up 3.9 percent of total population, was selected through targeted sampling methodology to determine whether cultural and religious factors influencing attitudes towards spreading COVID-19.

In the quantitative study, a two-stage probabilistic sample model was used. In the first phase, the Songinokhairkhan and Chingeltei districts of Ulaanbaatar and the Bayan-Ulgii, Selenge and Dornogov aimag center in relations to their bags were selected using the proportional sampling method. In the second phase, the surveyed units were selected using a simple random sampling method from the population of 15-60 year olds within sampling range. In the final phase of the sampling, the individual was randomly selected from the selected household population aged 18-60 by the Kish method.

Only one person in the selected household, aged 15-60, was included in the survey.

Measures

The pre-designed questionnaire provided the population's Knowledge, attitudes, practices, and understanding of COVID-19. Individual and group face-to-face interviews, also observation methods were also used. Face-to-face interviews were conducted with health experts and group interview with youth as well as community representatives. Face-to-face interview with health experts/professionals was conducted to assess the ways risk information was delivered at the local level, the main issues of risk information and to identify habitual patterns and behaviors for spreading COVID-19 among general population. The group interview was focused on the population's awareness of COVID-19 and their challenges in preventive measures. Observation method was used to determine whether participants wash their hands with soap for at least 20 seconds, cover their mouths (with elbow) when coughing or sneezing, wear face masks, and practice social distancing properly.

Statistical analysis

Quantitative data analysis was conducted using Statistical Package for Social Sciences (SPSS) version 23. The findings are represented in terms of the percentage of the population's Knowledge and attitudes. Deviation values of 95% confidence interval (95%CI) were used to assess the difference between the measurement of accuracy of the results (distribution rate) and the groups (age, sex, location). The sampling errors that could change the accuracy of the results of this population-based survey were assessed by the dependent variables and the standard error of the results. The findings were presented by urban, rural, ger, apartment area, ethnic and age groups.

Methodology for the classification of qualitative data has been created. A collection of codes was then established in accordance with the assessment criteria and all interviews were coded. The study is evaluated and prepared for reporting on the basis of an interpretive approach based on regular and different variables.

RESULTS

A total of 1740 people were involved in the survey and the coverage was 100%. Table 1 shows the social and demographic parameters of the participants.

47.5% (95%CI: 44.9-49.7) were from Ulaanbaatar and 52.5% (95%CI: 50.3-55.1) were from rural areas. The participants' average age was 35, the youngest was 15,

and the oldest was 60. Most of the participants were married (72.0 percent, 1252), belonged to Khalkh ethnicity (76.7 percent, 1335) and women (60.7 percent, 1057). As for living conditions 34.8% (95%CI: 32.7-37.1) of the participants live in apartments and 65.2% (95%CI: 62.9-67.3) live in ger areas (Table 1). 72.1% (n = 659) of the local participants and 57.5% (n = 475) of the UB participants lived in ger areas.

The average number of family members was 4.23 ± 1.63 , with a minimum of 1 and a maximum of 15 members. Respondents, who have 4-6 members in their family, composed 60.6%. The Khalkh ethnicity represented 76.7% (95%CI: 74.8-78.8) of the total respondents, and 17.6% (95%CI: 15.8-19.4) were from Kazakh ethnicity.

Participants' Knowledge of COVID-19 varied statistically significantly by sex, education level, employment, and the locality where they were surveyed. One participant in the study had an average of 9.23 ± 3.2 (95%CI: 9.09-9.38) knowledge score of coronavirus. The correct knowledge score for women were (9.43 ± 3.14 , 95%CI: 9.23-9.62), which is significantly 0.51 (T = 28.97, p = 0.0011) higher than for men (8.92 ± 3.28 , 95%CI: 8.68-9.17). As the education level of the population increased, the knowledge score on COVID-19 increased and participants with higher education obtained statistically significantly higher knowledge score 10.08 ± 2.71 compared to the average knowledge score. Respondents who worked at government organizations (10.21 ± 2.75) and international organizations (10.18 ± 2.60) were more knowledgeable about COVID-19 and reported higher average score. The average knowledge score of the currently unemployed population in the NGO / pension group was lower than the average score of the surveyed population (9.23 ± 3.23). (Table 2)

The average knowledge score of COVID-19 among respondents in Ulaanbaatar's Songinokhairkhan district (9.57 ± 3.08) and Chingeltei district (9.33 ± 3.42) was similar to total surveyed population (9.23 ± 3.23). While, the average knowledge score of the rural area respondents was lower when it was compared to the average score of the total surveyed population. In particular, Bayan-Ulgii aimag had the lowest average knowledge score of 8.94 ± 2.61 .

80.1 percent of the population (95%CI: 78.0-82.0) have a tendency to consider COVID-19 as "very dangerous". We defined financial and environmental challenges among respondents to prevent infection with coronavirus 61.7 percent of respondents (95%CI: 59.5-64.1) did not have the opportunity to wash their hands in black markets, shopping malls, public service centers, and 31.4 percent (95%CI: 29.1-33.6) did not have adequate supplies for cleaning and disinfecting to prevent coronavirus infection. One in ten people (10.9, 95%CI: 9.5-12.4) have in their homes a shortage of sinks and soap which became a problem in preventing coronavirus

Table 1. The social and demographic parameters of the participants.

№	The social and demographic parameters	Total		Male		Female	
		Num	%	Num	%	Num	%
1.	Location						
	Urban	826	47.5	296	43.3	530	50.1
	Rural	914	52.5	387	56.7	527	49.9
2.	Place of residence						
	Apartment	606	34.8	236	34.6	370	35.0
	Ger	1134	65.2	447	65.4	687	65.0
3.	Age group						
	15-24years	345	19.8	155	22.7	190	18.0
	25-34 years	501	28.8	195	28.6	306	28.9
	35-44 years	389	22.4	144	21.1	245	23.2
	45 and over	505	29.0	189	27.7	316	29.9
4.	Education						
	No education	12	0.7	8	1.2	4	0.4
	Primary school	38	2.2	19	2.8	19	1.8
	Middle primary school	159	9.1	71	10.4	88	8.3
	High school	511	29.4	209	30.6	302	28.6
	College	244	14.0	100	14.6	144	13.6
	High	776	44.6	276	40.4	500	47.3
5.	Nationality						
	Khalkh	1335	76.7	504	73.8	831	78.6
	Kazakh	306	17.6	137	20.1	169	16.0
	Others	99	5.7	42	6.1	57	5.4
6.	Marital status						
	Single	362	20.8	168	24.6	194	18.4
	Married/live in	1252	72.0	485	71.0	767	72.6
	Divorced/widowed	126	7.2	30	4.4	96	9.1
7.	Number of family members						
	1-2	206	11.8	84	12.3	122	11.5
	3-4	869	49.9	358	52.4	511	48.3
	5 or higher	665	38.2	241	35.3	424	40.1
8.	Employment status						
	Government organization	391	22.5	152	22.3	239	22.6
	NGO	111	6.4	41	6.0	70	6.6
	International organization	11	0.6	4	0.6	7	0.7
	Private companies	216	12.4	109	16.0	107	10.1
	Self-employed	397	22.8	152	22.3	245	23.2
	Herder	37	2.1	21	3.1	16	1.5
	Student, student	187	10.7	76	11.1	111	10.5
	Pension/welfare	178	10.2	67	9.8	111	10.5
	Unemployed	146	8.4	41	6.0	105	9.9
	Other	66	3.8	20	2.9	46	4.4
	Total	1740	100.0	683	100.0	1057	100.0

Table 2. Social and demographic characteristics of the study participants.

Selected indicators	Numbers	%	Average knowledge score	SD	P-value
Sex					
Male	683	39.3	8.92	3.28	0.0001

Table 2. Continue.

Female	1057	60.7	9.43	3.14	
Age group					
15-24 age	345	19.8	9.13	3.10	0.06
25-34 age	501	28.8	9.48	3.15	
35-44 age	389	22.4	9.22	3.11	
Above 45 age	505	29.0	9.07	3.39	
Marital status					
Never married	362	20.8	8.89	3.06	0.188
Married / living with a partner	1252	72.0	9.36	3.23	
Divorced / Widowed	126	7.2	9.05	3.38	
Education level					
No education	12	0.7	6.08	4.25	0.001
Primary education	38	2.2	6.57	3.73	
Lower secondary education	159	9.1	8.13	3.24	
Upper secondary education	511	29.4	8.32	3.44	
College	244	14.0	9.78	2.96	
Higher education	779	44.6	10.08	2.71	
Work status					
Government employee	391	22.5	10.21	2.75	0.0001
Non-government employee	111	6.4	8.94	3.27	
International organization	11	0.6	10.18	2.60	
Private company,enterprises	216	12.4	9.48	3.10	
Self-employed	397	22.8	9.00	3.33	
Herder	37	2.1	7.40	3.70	
Student	187	10.7	9.12	2.94	
Retiree	178	10.2	8.93	3.32	
Unemployed	146	8.4	8.37	3.41	
Other	66	3.8	8.56	3.46	
Region					
Urban	826	47.5	9.44	3.27	0.005
Rural	914	52.5	9.05	3.14	
Apartment type					
Apartment	606	34.8	9.55	3.19	0.001
Ger districts	1134	65.2	9.07	3.21	
Ethnicity					
Khakh	1335	76.7	9.27	3.29	0.0001
Kazak	306	17.6	8.97	2.69	
Other	99	5.7	9.61	3.47	
By survey area					
Songinokharikhan district	372	21.4	9.57	3.08	0.0001
Chingeltei district	454	26.1	9.33	3.42	
Selenge province	328	18.9	9.18	3.50	
Dorni-gobi province	273	15.7	9.02	3.24	
Bayan-Ulgii province	313	18.0	8.94	2.61	
Total	1740	100.0	9.23	3.23	

infection. 46.5 percent (95%CI: 44.0-48.7) of the participants have said the masks are expensive, 43.3 percent (95%CI: 40.8-45.6) of them also said the hand sanitizer was expensive and they were challenged with

COVID-19 prevention issues.

In the last two weeks, 69.8 percent of the population (95%CI: 67.5-71.9) reported protecting themselves from COVID-19. (Table 3)

Table 3. In the last two weeks, population prevented themselves from COVID-19, by percentage of participants.

№	Selected parameters	Prevented themselves from COVID-19		
		Yes, % (n)	No, % (n)	Not sure, % (n)
1.	Gender, $\chi^2=0.83$, $p=0.659$			
	Male	38.7 (470)	41.9 (96)	39.4 (117)
	Female	61.3 (744)	58.1(133)	60.6 (180)
2.	Age group, $\chi^2=64.78$, $p=0.0001$			
	15-24 years	19.4 (235)	21.0 (48)	20.9 (62)
	25-34 years	28.1 (341)	33.6 (77)	27.9 (83)
	35-44 years	21.7 (264)	21.4 (49)	25.6 (76)
	45 year and older	30.8 (374)	24.0 (55)	25.6 (76)
3.	Nationality, $\chi^2=64.78$, $p=0.0001$			
	Khalkh	79.4 (964)	59.0 (135)	79.5 (236)
	Kazakh	15.1 (183)	36.2 (83)	13.5 (40)
	Other	5.5 (67)	4.8 (11)	7.1 (21)
4.	Education level $\chi^2=18.65$, $p=0.045$			
	No education	0.6 (7)	1.7 (4)	0.3 (1)
	Primary school	1.7 (21)	5.2 (12)	1.7 (5)
	Middle primary school	9.5 (115)	7.4 (17)	9.1 (27)
	High school	29.2 (354)	30.1 (69)	29.6 (88)
	College	14.3 (174)	10.9 (25)	15.2 (45)
	High	44.7 (543)	44.5 (102)	44.1 (131)
5.	Location, $\chi^2=16.81$, $p=0.0001$			
	Urban	49.1 (596)	34.9 (80)	50.5 (150)
	Rural	50.9 (618)	65.1 (149)	49.5 (147)
	Total	1214 (100.0)	229 (100.0)	297 (100.0)

The majority of respondents said they were protected against COVID-19 were 45 years old or older (30.8%, 374) and those who said they're not protected were 25-34 years of age (33.6%, 77) and there was no statistically significant difference in two groups ($p = 0.186$). Ethnicity has a statistically important impact on whether participants have been able to prevent COVID-19 in the last two weeks. For example, the percentage of Kazakhs who prevented themselves against COVID-19 was 15.1%, while 36.2% said that they could not prevent infection ($p = 0.0001$). The level of education did not matter whether one can protect oneself against COVID-19. The majority of the population answered as not able, unwilling or uncertain about preventing themselves from COVID-19 were those with high level of education ($p = 0.45$).

In the 14 days prior to the survey, the majority of the population who reported not being able to prevent COVID-19 were residing in rural areas ($p = 0.0001$). The practice of preventing COVID-19 is described in three sub-chapters: wearing a mask, keeping distance, and hygiene. The score of the population with a change in hand washing practice is statistically higher than the population without change in hand washing practice ($p = 0.001$). (Table 4)

The population score of alcohol-based hand sanitizers

was 10.35 ± 2.79 , compared to 8.66 ± 3.26 for absent participants. This shows that high levels of Knowledge affect a person's habits ($p = 0.001$). Participants who "can" (9.56 ± 3.14) to avoid touching their eyes and mouth with dirty hands had a statistically significant score 1 point higher than those who "couldn't" (8.55 ± 3.23) ($p = 0.001$).

The mean knowledge score of the population who wore masks when using public transport and entering public service places was higher with statistical significance of ($p = 0.04$). Keeping distance habits had no statistically significant correlation with COVID-19 knowledge scores in the study ($p = 0.623$). The score of the population with a change in hand washing practice is statistically higher than the population without change in hand washing practice ($p = 0.001$). (Table 5)

The population score who have alcohol-based hand sanitizers was 10.35 ± 2.79 , compared to 8.66 ± 3.26 for absent participants. This shows that high levels of Knowledge affect a person's habits ($p = 0.001$). Participants who "can" (9.56 ± 3.14) to avoid touching their eyes and mouth with dirty hands had a statistically significant score 1 point higher than those who "couldn't" (8.55 ± 3.23) ($p = 0.001$). (Table 6)

The number of female respondents who indicated that

Table 4. Prevention practice of COVID-19, by knowledge score.

Population practice	n	%	Average knowledge score	Standard deviation	P value
Hygiene practice					
Hand washing habits					
Washing hands properly	724	41.6	9.75	2.98	0.001
There was no change in hand washing habits	211	12.1	8.83	3.54	
Increased hand washing frequency	879	50.5	10.05	2.82	
Washing hands right order	372	21.4	10.31	2.85	
Regularly washing hand with soap	453	26.0	10.26	2.91	
Washing hand extended timer	280	16.1	10.22	3.02	
Started using hand sanitizer	591	34.0	10.35	2.79	
Have hand sanitizer right now					
Have	1008	57.9	10.35	2.79	0.001
Hasn't	732	42.1	8.66	3.26	
Avoid touching your eyes, mouth and nose with dirty hands					
Can	1165	67.0	9.56	3.14	0.001
Cant	384	22.1	8.55	3.23	
Coughing and sneezing on the napkin or elbow					
Practiced	1333	76.6	9.59	3.06	0.001
No	407	23.4	8.07	3.41	
Practice on wearing mask					
When go outside	1416	81.4	9.47	3.15	0.04
When using public transport	1061	61.0	10.02	2.85	
At the entrance to the shopping centre	1144	65.7	9.92	2.88	
Not used at all	149	8.6	8.32	3.41	
Keep distance					
Public transport	537	30.9	8.82	3.25	0.623
Shops	685	39.4	9.11	3.25	
Supermarket, malls	579	33.3	8.78	3.27	
Bank, state service places	1015	58.4	9.45	3.09	
Streets	819	47.1	9.41	3.16	

Table 5. Prevention practice of COVID-19, by knowledge score.

Population practice	n	%	Average knowledge score	Standard deviation	P value
Hygiene practice					
Hand washing habits					
Washing hands properly	724	41.6	9.75	2.98	0.001
There was no change in hand washing habits	211	12.1	8.83	3.54	
Increased hand washing frequency	879	50.5	10.05	2.82	
Washing hands right order	372	21.4	10.31	2.85	
Regularly washing hand with soap	453	26.0	10.26	2.91	
Washing hand extended timer	280	16.1	10.22	3.02	
Started using hand sanitizer	591	34.0	10.35	2.79	
Have hand sanitizer right now					
Have	1008	57.9	10.35	2.79	0.001
Hasn't	732	42.1	8.66	3.26	
Avoid touching your eyes, mouth and nose with dirty hands					
Can	1165	67.0	9.56	3.14	0.001
Cant	384	22.1	8.55	3.23	

Table 5. Continue.

Coughing and sneezing on the napkin or elbow					
Practiced	1333	76.6	9.59	3.06	0.001
No	407	23.4	8.07	3.41	
Practice on wearing mask					
When go outside	1416	81.4	9.47	3.15	0.04
When using public transport	1061	61.0	10.02	2.85	
At the entrance to the shopping center	1144	65.7	9.92	2.88	
Not used at all	149	8.6	8.32	3.41	
Keep distance					
Public transport	537	30.9	8.82	3.25	0.623
Shops	685	39.4	9.11	3.25	
Supermarket, malls	579	33.3	8.78	3.27	
Bank, state service places	1015	58.4	9.45	3.09	
Streets	819	47.1	9.41	3.16	

Table 6. Issues that have negatively affected in their lives of participants in the last 6 months due to COVID-19.

No	Factors that negatively affected the study participants	Male	Female	P value
1.	Household income	66.3 (453)	72.1 (762)	0.014
2.	Job opportunity	53.6 (366)	58.3 (616)	0.091
3.	Stress	50.4 (344)	55.6 (588)	0.035
4.	Health	28.7 (196)	32.0 (338)	0.089
5.	Family relationship	24.2 (164)	27.7 (289)	0.065
6.	Other	4.9 (15)	0.6 (16)	0.185
	Total	100.0 (309)	100.0 (522)	

pandemic has affected their losing job opportunity (53.6% for men and 58.3% for women), health (27.7% for men, 32.0% for women), and family relationship (24.2% for men and 27.7% for women) was higher as compared to men, however, this result was not statistically significant.

The percentage of women who have expressed that they had to deal with stress due to pandemic over the last 6 months was more than for men, which was statistically significant. ($p=0.035$) The percentage of participants who indicated that the operations of small and medium sized enterprises were stagnant was found statistically significant difference between urban and rural areas. For example, the proportion of participants who reported that small and medium-sized businesses were stagnant, that household incomes were declining, and that they were at high risk for COVID-19, was higher among the urban population ($p = 0.0001$). There was no statistically significant difference in gender relevance among participants who feared that hospitals would be overcrowded ($p = 0.885$). The proportion of women participants was high in terms of following aspects: closing of schools and universities (male 64.8%, female

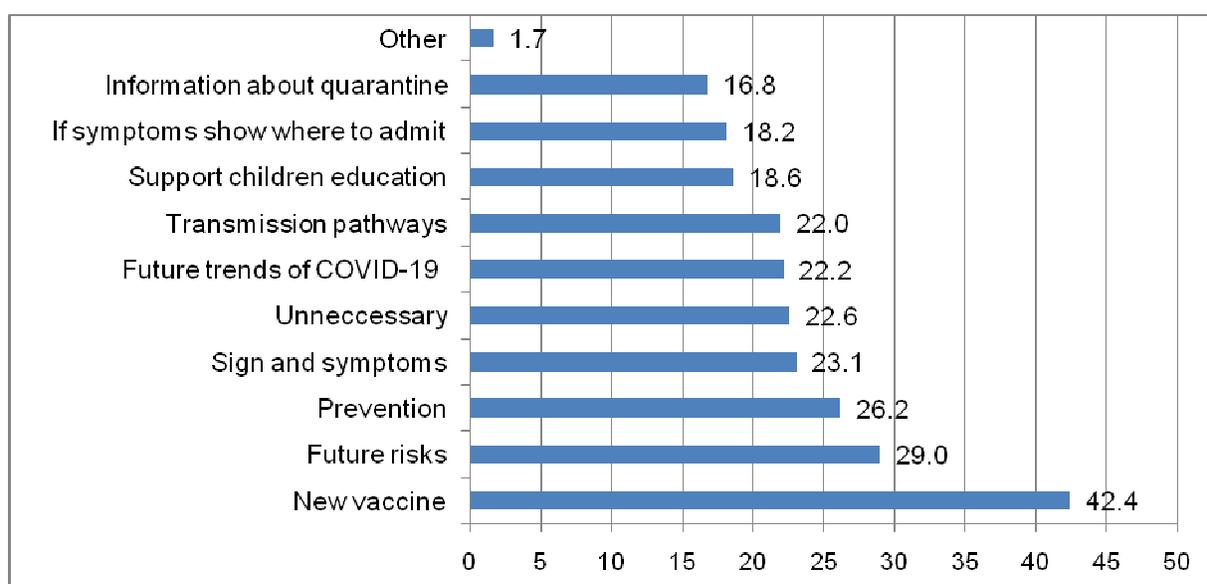
68.1%) and business interruption for MSMEs (male 69.4%, female 72.1%), and lack of food supply among vulnerable group (male 66.8%, female 69.5%), losing job opportunities (62.7% for men and 63.4% for women), and high risk of contracting COVID-19 (68.8% for men and 73.5% for women).

Participants assessed as measures taken by government was excellent on following aspects: 93.0% (95%CI: 90.8-95.0) on closing the border, 90.1% (95%CI: 87.4-92.4) on wearing mask and it's fine, and 89.1 % (95%CI: 86.6-91.6) on school and kindergarten closure. 84.6% of participants (95%CI: 81.9-87.2) responded that putting the time limit / closure of service centers was the right move. 79.9% of the surveyed population (95%CI: 76.8-83.1) responded that transporting citizens from abroad was the right measure while one in ten respondents (9.9%, 95%CI: 7.7-12.2) considered it was a wrong decision.

According to the results, 52.5 % (95%CI: 53.9-58.7) of the participants received COVID-19 information from social networks (www.facebook.com) and 47.7% from mobile messages. Only a few percent of participants

Table 7. The main sources of information, by age group.

No	Source of information	15-24	25-34	35-44	45 <	P value
1.	TV	82.6	80.2	85.3	85.5	0.093
2.	Social network	16.8	17.8	15.5	15.4	0.727
3.	SMS	64.9	66.1	56.2	40.6	0.001**
4.	MOH news 11:00	29.0	37.9	29.9	28.3	0.004**
5.	MOH web	48.4	46.9	46.1	49.1	0.747
6.	SEC news 12:00	9.0	8.6	11.3	12.1	0.223
7.	Newspaper/magazine	4.6	9.4	7.7	10.1	0.027**
8.	Family, friends and colleagues	20.9	14.2	16.8	13.5	0.019**
9.	Brochure, handbook	11.0	8.2	8.5	7.7	0.364
10.	Total	345	501	388	505	

**Figure 1.** Necessary information about COVID-19, by percentage of participants.

COVID-19 information got from manuals, brochures, and newspapers that is due to the lack of information packages. COVID-19 information in newspapers and manuals was low. (Table 7)

With age, access to information about COVID-19 on social media has decreased. 64.9% of young people aged 15-24 received information about COVID-19 on social media, while this number decreased to 56.2% for 35-44 year olds and 40.6% for those over 45 years old.

In general, there was only a few participants responded that they received information on COVID-19 from manuals, brochures, and radio was low and most of them were over 45 years old. 42.3% of survey respondents (95%CI: 40.0-44.7) demanded more information on the new vaccine development. 29.0% (95%CI: 26.9-31.1) on the risks of COVID-19 in Mongolia, and 26.2% (95%CI: 24.0-28.3) on prevention measures. (Figure 1)

22.6% of respondents (95%CI: 20.6-24.7) indicated that they no longer needed information about COVID-19. The majority of participants in the qualitative study indicated that they are willing to get information on COVID-19 vaccine development.

DISCUSSION

Our study found that the knowledge level of COVID-19 in the population differed by sex, education level, employment status, and locality where they were surveyed. Therefore, during this airborne caused epidemic, there is a need to increase awareness by disseminating information for the entire population. In particular, Knowledge of COVID-19 needs to be disseminated to people with primary and secondary education through their media resource.

An online survey of Hubei and Henan provinces in China found that women, undergraduates (such as college students) and those with higher education had higher levels of Knowledge on COVID-19 ($p < 0.05$) and this result was similar to our findings. Good Knowledge of COVID-19 among women and married people indicated that women felt responsible for preventing the spread of the disease in the family (Hager et al., 2020; Reuben et al., 2020 and Hu et al., 2020).

Most Malaysians were aware of preventive measures such as avoiding public gatherings (83.4%) and practicing hygiene (washing hands) (87.8%). This trend also found in our study that the majority of the population had a reduced their visits to households and outdoor activities (Chen et al., 2020).

Cross-action survey of 2,045 people over the age of 16 in Bangladesh, 54.8% of participants had a good knowledge of COVID-19. This Knowledge varied greatly depending on age, sex, education level, place of residence, income level, and marital status (Kotian et al., 2020). It was concluded that the reasons for the poor attitudes and behaviors of the population may be related to poor Knowledge and religious beliefs. Studies in Mongolia have shown that lack of Knowledge has a direct impact on attitudes and COVID-19 preventive behaviors. For example, participants who had improved their hand washing practice scored 10, while participants did not adopt to this behavior scored 8.

According to a survey of 2,038 participants in northeastern Syria, more than half participants replied that lack of money to purchase sanitary ware (65%) and unemployment (51%) were the major barriers to undertaking preventive measures (Lin et al., 2020). The majority of the participants in our survey responded that face masks and hand sanitizers are considerably expensive and that hand washing facilities are not available (installed sufficiently) in markets and shopping malls.

A study in Iran found that although overall the Knowledge of COVID-19 was about 90% among participants, single men has shown significantly low score¹² similar to our findings.

CONCLUSION

Respondents had answered to an average of 9.23 ± 3.2 (95%CI: 9.09-9.38) out of 14 scored questions for required Knowledge of COVID-19. Participants' Knowledge of COVID-19 varied statistically significantly by sex, education level, employment, and the locality where they were surveyed. Knowledge score was higher among female participants (9.43 ± 3.14) than that among male participants ($p = 0.0001$). The score of participants with incomplete secondary education was 8.13 ± 3.24 , however this score has increased to 8.32 ± 3.44 for those with complete secondary education and 10.08 ± 2.71 for

those with higher education ($p = 0.0001$). Respondents who worked at government organizations (10.21 ± 2.75) and international organizations (10.18 ± 2.60) were more knowledgeable about COVID-19 as compared to unemployed population in the NGO / pension group people and participants work at other sectors ($p=0.0001$). In particular, Bayan-Ulgii aimag had the lowest average knowledge score compared to other study areas. The majority of participants perceived COVID-19 pandemic as very dangerous. There was a growing tendency in households of spending considerable amount of money on face masks and hand sanitizers as preventive measures from COVID-19. The respondents had a positive attitude towards not discriminating against COVID-19 infected people and had a good knowledge as where to reach out in case of emergency when their level of Knowledge was high. Good preventive practices in the population were statistically significant in relation to their Knowledge of COVID-19. Despite to 81.4 percent of the surveyed population reported they wear face masks outdoors, quantitative and observational studies have shown that people wear face masks indoors relatively for a long period of time and handle it incorrectly. Two out of three respondents were not following social distancing guidelines at all. According to the survey result, good hygiene practices towards COVID-19 prevention was insufficient such as not washing hands properly (58.4 %), not possessing hand sanitizer (42.1 %), touching your eyes, nose and mouth with unwashed hands (22.1 %), and not covering your mouth and nose when you cough or sneeze (23.4 %). Knowledge score was high among those who were accustomed to good hand washing behaviors. Knowledge score (9.56-10.35) was high among those who had good hygiene practices such as covering mouth and nose when you cough or sneeze. Regardless of location or gender, the majority of respondents were concerned that hospitals would be overcrowded during epidemic. Quantitative and qualitative studies have shown that some medical services were not provided for the patients since COVID-19 incidence. More than 80 % of the participants considered the government's action between January and June 2020 against COVID-19 were the right measures. This included border closures, wearing face masks rules, the closure of schools and kindergartens, and the time limit / closure of service outlets. The survey found that the majority of the population received information on pandemic from TV.

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