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Research Article

Knowledge, Attitudes, and Practices in Adapting to COVID-19 Pandemic Conditions: A Cross-sectional Survey among Mongolian Residents

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Abstract

This survey aims to compare the level of knowledge, attitudes, and practices of the population towards coronavirus infection with the results of the baseline survey result; to define the challenges faced by the participants and the behavioral changes when they have overcome and are adapting to the new style; to develop and disseminate evidence-based recommendations for decision-makers who are dealing with the pandemic. A total of 1896 people aged 15-60 years old participated in the study. The survey data were collected using quantitative (questionnaire) and qualitative (observation) methods. The survey questionnaire consisted of 45 questions of 6 chapters: demographic, knowledge, attitude and adaptation practice towards coronavirus infection, patient satisfaction with health care service delivery, and information demand. Using the previously developed guideline, the in-depth interview was conducted among three specific groups (specialists, general population, and teenagers). There are positive changes in personnel hygiene, wearing masks, and ventilation that were practiced while implementing preventive measures against coronavirus infection. Most of the qualitative survey participants correctly understood that adaptation means following strictly preventive measures and continuing everyday life.

Keywords: COVID-19 pandemic; Attitude; Knowledge; Practice; Mongolia

Introduction

The first internal incidence of COVID-19 was reported on 11 November 2020 in Mongolia. At this moment, we conducted a knowledge, attitude, and practice survey on Coronavirus infection among the general population. The survey has found that 41.7 percent of the population wore masks incorrectly or exposed noses worn under the chin, 83.3 percent wore one mask throughout the day, one in two did not wash their hands properly, and two out of three participants did not use spacing at all. In addition, knowledge about coronavirus infection in rural areas was generally poor, especially in Bayan-Ulgii aimag, indicating that targeted public health prevention activities may not have been adequately implemented [1]. As of September 21, 2021, 65.3 percent of Mongolia's population was vaccinated at full dose. However, as of COVID-19 confirmed cases, Mongolia is in the top five countries in the West Pacific [2]. This indicates that there is a lack of practice in the prevention of coronavirus infection in the population. Therefore, during this time when the spreading of coronavirus infection continues, it is needed to improve the prevention, response, and risk communication of Mongolians and ensure the adaptability of citizens. This survey will define how the existing situation has changed and the need to continue or further improve risk information communication strategy. Knowing what kind of information people receive, how much they have been perceived, their attitudes and attitudes, and how they adapt is essential for policymakers, health sector decision-makers, and public health professionals to develop and disseminate effective and targeted information for the population. Hence, it will be evidence of the need to change and adopt proper disease prevention practices.

Methods

This cross-sectional survey data collection was conducted using qualitative (in-depth interview, focus group discussion, and desk review) and qualitative survey methods. In the baseline survey, we used the contextualized country context of the COVID-19 Readiness and Response Guidelines [3] and Risk Information Communication Planning strategy [4], which was developed by the WHO European region as a survey tool. In the follow-up study, we have been using the tools of the baseline study, such as questionnaires, interview guidelines, and an observations checklist to incorporate new knowledge and insights into the world, current vaccines, and coronavirus variants.

Data collectors were researchers and had trained in ethical issues during the data collection. The research methodology was approved at the Scientific Committee of the National Center for Public Health on November 9, 2021 (Protocol № 5) and the Medical Ethics Review Committee of the Ministry of Health on January 20, 2022 (Resolution №261) was issued the Ethical permission of the survey.

The sampling frame of this survey is residents of ger and apartment area of Songinokhairkhan, Chingeltei districts of Ulaanbaatar city, and indigenous people of representatives of Bayan-Ulgii aimag, border area residents of Selenge and Dornogobi aimag. The survey data were collected using quantitative (questionnaire) and qualitative (observation) methods. Using the previously developed guideline, the in-depth interview was conducted among three specific groups (specialists, general population, and teenagers). Observations were performed on the population's handwashing situation, duration, use of soap, wearing and removing masks, frequency, and social distancing behavior of people.

A total of 1896 people aged 15-60 years old participated in the study from 3 bordering provinces. Kazakh ethnic group in Bayan-Ulgii province, which make up 3.9 percent of the total population, was selected through targeted sampling methodology to determine whether cultural and religious factors influence attitudes towards spreading COVID-19.

The sample size was determined based on the assumption that the population's knowledge, attitudes, and practices on COVID-19 is 50.0% and calculated as 95% actual probability (Z=1.96), error limit (p=0.05), complex sampling coefficient (1.5). Considering the principles of gender balance in each age group, a total of 1,740 people participated in the survey, with an estimated 10 percent probability be that those selected would be excluded from the survey. The formula for calculating the sample size: The sample size of the two-stage household-population sample survey for a particular area or group of the population was calculated according to the following formula:

$$n = \frac{z^2 \mathrm{P}(1-\mathrm{P})\mathrm{N}}{\mathrm{N}e^2 + z^2 P(1-P)}$$

Herein,

Z = 95% confidence interval (1.96).

P= baseline indicator prevalence percentage (= 0.50)

E= acceptable margin of error (0.05)

N= Population aged 15-60 in Songinokhairkhan and Chingeltei districts of Ulaanbaatar and Bayan-Ulgii, Selenge and Dornogovi aimag centers.

The sample size, which can be used to determine the purpose of the study, is performed according to the above conditions: The sample size was sampled using the previously given formula with the parameters z=1.96, P=0.5, and e=0.05. The sample size

in the Primary Sampling Unit (PRS) was estimated to 40, which is an optimal option in terms of distribution and representation. The total sample size for each population group is 1,896 for a population aged 15-60 years.

20 individuals responded to the face-to-face interviews, including health sector specialists (Ministry of Health Director, Specialist, Director/Specialist, Aimag Special Committee Officer, Governor's Office staff, etc.) and 100 people aged 15-59 were interviewed. Also, 100 people of 20 households for observation responded to the qualitative survey.

In the second phase, the surveyed units were selected using a simple random sampling method from the population of 15-60-year-olds within the sampling range. In the final sampling phase, the Kish method randomly chose the individual from the selected household population aged 18-60. Only one person in the selected household, aged 15-60, was included in the survey. Individual and group discussions and observations were conducted to clarify issues raised in compiling survey data. The key informants of the qualitative survey were the head of the SEC, the directors of the Ministry of Health, the head of the NCCD/specialist, the relevant staff of the Aimag Emergency Commission, the governor's office, the health department, the NCCD and patients who covered from the COVID-19.

The data were collected using a previously developed questionnaire for face-to-face interviews with selected individuals from the target population. In qualitative research, data were collected through face-to-face interviews with key informants. The observation method determined whether participants washed their hands with soap for at least 20 seconds, covered their mouths (with elbow) when coughing or sneezing, wore facemasks, and properly practiced social distancing. To maintain the high quality of data, a few measures were taken, such as minimizing coverage errors by preparing a complete list of sampling units and including selected units in the survey, minimizing errors in the information collected by gathering information with questionnaires and from selected areas and by consulting with the research supervisor and resolve any issues or difficulties encountered during the data collection process. The data collection was started after introducing the purpose and activities of the survey. After introducing the survey's purpose, effectiveness, and timing, a questionnaire and an interview with the person who agreed to participate were initiated.

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. Quantitative data analysis was conducted using 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 the 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.

Results

Social and Demographic Characteristics of Participants

A total of 1896 people were involved in the survey, and the coverage was 100%. 56.6% of total participants (95%CI: 54.4-58.9) were from Ulaanbaatar and 43.4% (95%CI: 41.1-45.6) were from rural areas. The participants' average age was 35.1±12.4, the youngest was 15, and the oldest was 60.

Most of the participants were married (66.7%, 1265), belonged to the Khalkh ethnicity (79.3%, 1503), and were women (60.0%, 1137). As for living conditions, 37.9% (95%CI: 35.8-40.1) of the participants live in apartments, and 62.1% (95%CI: 59.9-64.2) live in ger areas (Table 1). 67.9% (n=558) of the local participants and 57.7% (n=620) of the UB participants lived in ger areas.

№	The social and demographic parameters	Total		Male		Female	
		Num	%	Num	%	Num	%
1.	**Location**						
	Urban	1074	56.6	385	50.7	689	60.6
	Rural	822	43.4	374	49.3	448	36.3
2.	**Place of residence**						
	Apartment	718	37.9	306	40.3	412	36.2
	Ger	1178	62.1	453	59.7	725	63..8
3.	**Age group**						
	15-24 years	458	24.2	184	24.2	274	24.1
	25-34 years	530	28.0	234	30.8	296	26.0
	35-44 years	406	21.4	155	20.4	251	22.1
	45 and over	502	26.5	186	24.5	316	27.8
4.	**Education**						
	No education	26	1.4	9	1.2	17	1.5
	Primary school	37	2.0	13	1.7	24	2.1
	Middle primary school	166	8.8	77	10.1	89	7.8
	High school	546	28.8	240	31.6	306	26.9
	College	263	13.9	117	15.4	146	12.8
	High	858	45.3	303	39.9	555	48.8
5.	**Nationality**						
	Khalkh	1503	79.3	602	79.3	901	79.2
	Kazakh	313	16.5	134	17.7	179	15.7
	Others	80	4.2	23	3.0	57	5.0
6.	**Marital status**						
	Single	512	27.0	222	29.2	290	25.5
	Married/live in	1265	66.7	515	67.9	750	66.0
	Divorced/widowed	119	6.3	22	2.9	97	8.5
7.	**Number of family members**						
	1-2	288	15.2	112	14.8	176	15.5
	3-4	927	48.9	380	50.1	547	48.1
	5 or higher	681	35.9	267	35.2	414	36.4

№	The social and demographic parameters	Total		Male		Female	
		Num	%	Num	%	Num	%
8.	**Employment status**						
	Government organization	502	26.5	134	17.7	368	32.4
	NGO	64	3.4	28	3.7	36	3.2
	Private companies	225	11.9	147	19.4	78	6.9
	Self-employed	379	20.0	167	22.0	212	18.6
	Herder	171	9.0	96	12.6	75	6.6
	Student, student	289	15.2	103	13.6	186	16.4
	Pension/welfare	143	7.5	48	6.3	95	8.4
	Unemployed	123	6.5	36	4.7	87	7.7
	Total	1896	100.0	759	100.0	1137	100.0

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

The average number of family members was 4.06 ± 1.52, with a minimum of 1 and a maximum of 16 members. Respondents who have 3-4 members in their family composed 48.9%. The study participants were from 15 various ethnical groups. However, the Khalkh ethnicity represented 79.3% (95%CI: 77.5-81.2) of the total respondents, and 16.5% (95%CI: 14.7-18.2) were from the Kazakh ethnicity. If 20.0% of the respondents were self-employed, 26.5% worked in government organizations and 15.2% were students.

In the baseline survey, 2.1 percent of the total participants were herders, and 10.7 percent were students, while in the follow-up survey, the number of these participants increased (herders 9.0%, 171, students 15.2%, 289). According to other participants, the representing number remained similar to the population of the baseline survey. 59.4 percent (1127) of the respondents said that the average household income has decreased, and 3.1 percent (59) remain the same. Of the total participants, 39.2 percent (95% CI: 37.0-41.3) were from Songinokhairkhan district, 17.4 percent (95% CI: 15.6-19.1) were from Chingeltei district, and 15.8 percent (95% CI: 14.2-17.4) were from Bayan-Ulgii aimag.

The majority of participants from Ulaanbaatar city were aged 25-34 and had a higher level of education. In terms of location, 57.7% (620) of them resided in the ger area. While participants of age 25-34 years in rural areas comprised 27.7% and 67.9% of them lived in ger areas.

The survey participants' socipatternsgraphic pattern was similar to Mongolia's statistics, demonstrating that survey sampling has the power of the Mongolian population aged between 15-60.

Knowledge of COVID-19

Out of 14 knowledge questions that should be known about coronavirus infection, survey participants had known in an average of 8.27 ± 3.73 (95%CI: 8.12-8.43) correct answers, which was lower than the results of the baseline study.

It has been defined statistically significant differences in knowledge of coronavirus infection on the location, gender, age group, marital status, education level, employment status, and type of housing of the surveyed participants. The average knowledge score for the urban population is approximately 8.44±3.69, which is 4 points higher than for the rural participants. The mean knowledge score for surveyed women (8.55±3.62, 95%CI: 8.34-8.77) was statistically significant 0.7 points higher than that of men (7.85±3.85, 95%CI: 8.10-8.77). Average correct answers of knowledge scores on coronavirus infection were higher among 15-24-year-olds (8.75±3.54) and over 45 years of age group (8.35±3.72). As the population's level of education increased, the average knowledge score on the coronavirus infection increased, and the statistically significant high of the participant with higher education levels was 8.81±3.53. The average knowledge score of infection was significantly high among employees of Government, Non-Government, private entities, and students were higher than the self-employer, herders, pensioners groups, and the unemployed participants. The knowledge score of the participants living in apartments (8.88±3.50) was found to be 1.0 points higher than in the ger areas residents (Table 2).

Selected indicators	Number	%	Average knowledge score, ± SD 95%CI			P value
			Average	Min	Max	
Region						
Urban	1074	56.6	8.44 ± 3.69	8.24±3.58	8.67±3.80	0.003
Rural	822	43.4	8.04 ± 3.77	7.80±3.64	8.31±3.89	
Sex						
Male	759	40.0	7.85 ± 3.85	7.56±3.73	8.10±3.97	0.008
Female	1137	60.0	8.55 ± 3.62	8.34±3.50	8.77±3.73	
Age group						
15-24 age	458	24.2	8.75 ± 3.54	8.41±3.33	9.09±3.71	0.007
25-34 age	530	28.0	7.97 ± 3.79	7.65±3.64	8.31±3.93	
35-44 age	406	21.4	8.01 ± 3.83	7.63±3.66	8.37±3.99	
Above 45 age	502	26.5	8.35 ± 3.72	8.03±3.56	8.67±3.87	
Marital status						
Never married	512	27.0	8.49 ± 3.67	8.17±3.51	8.80±3.85	0.003
Married / living with a partner	1265	66.7	8.13 ± 3.74	7.92±3.64	8.35±3.82	
Divorced / Widowed	119	6.3	8.78 ± 3.81	8.10±3.35	9.47±4.14	
Education level						
No education	26	1.4	6.27 ± 4.04	4.77±3.40	7.83±4.52	0.023
Primary education	37	2.0	7.16 ± 4.20	5.77±3.53	8.37±4.72	
Lower secondary education	166	8.8	7.29 ± 3.89	6.71±3.62	7.86±4.14	
Upper secondary education	546	28.8	8.01 ± 3.76	7.69±3.61	8.32±3.91	
College	263	13.9	8.01 ± 3.81	7.51±3.58	8.48±4.01	
Higher education	858	45.3	8.81 ± 3.53	8.57±3.39	9.05±3.67	
Work status						
Government employee	502	26.5	8.92 ± 3.55	8.59±3.37	9.21±3.72	0.026
Non-government employee	64	3.4	8.47 ± 3.77	7.51±3.24	9.32±4.22	
A private company, enterprises	225	11.9	8.40 ± 3.83	7.88±3.56	8.90±4.06	
Self-employed	379	20.0	7.72 ± 3.64	7.39±3.62	8.07±3.69	
Herder	171	9.0	7.20 ± 4.12	6.57±3.84	7.83±4.34	
Student	289	15.2	8.79 ± 3.59	8.39±3.33	9.19±3.82	
Retiree	143	7.5	7.80 ± 3.85	7.17±3.55	8.44±4.12	
Unemployed	123	6.5	7.73 ± 3.82	7.07±3.48	8.39±4.12	
Ethnicity						

Selected indicators	Number	%	Average knowledge score, ± SD 95%CI			P value
			Average	Min	Max	
Khakh	1503	79.3	8.47 ± 3.66	8.29±3.56	8.64±3.75	0.023
Kazak	313	16.5	6.96 ± 3.85	6.50±3.63	7.38±4.04	
Other	80	4.2	8.27 ± 3.73	8.09±3.64	8.44±3.81	
Apartment type						
Apartment	718	37.9	8.88 ± 3.50	8.60±3.35	9.15±3.63	0.016
Ger districts	1178	62.1	7.89 ± 3.82	7.68±3.71	8.12±3.92	
Total	1896	100.0	8.27 ± 3.73	8.12±3.65	8.43±3.82	

Table 2: Social and demographic characteristics of the study participants, by average knowledge score.

Although the percentage of the surveyed participants is aware of the symptoms and prevention measures of COVID-19, the knowledge of the incubation period, the high-risk population and the transmission route are poor (Table 3).

№	Knowledge questions	Answer's version	Percentage of participants, 95%CI		P value
			Baseline 2020	Follow-up, 2021	
1.	How is COVID-19 transmitted?	When an infected person coughing, sneezing, and close contact with an infected person	58.1	47.8	0.000
			55.8-60.4	45.5-50.4	
2.	Do you know the duration of COVID-19 incubation period?	Yes, I know	25.6	64.3	0.000
			23.5-27.6	62.1-66.4	
3.	How is the most risky for COVID-19?	Elders, chronically ill person (heart, lung, diabetes, kidney)	41.9	37.3	0.005
			39.6-44.2	35.1-39.5	

Table 3: Comparison of the first and follow-up survey results of knowledge of coronavirus infection.

Attitude towards COVID-19

54.5 percent of surveyed participants believed that the pandemic is "very dangerous". However, it has decreased by 25.6 percent compared to the baseline survey. The inadequate facilities for handwashing in markets and public centers, poor hand-washing facilities in large shopping malls, and additional funding for households to purchase masks and hand sanitizers are making trouble facing coronavirus infection prevention measures. Positive attitudes toward the right place at the onset of symptoms of COVID-19 and non-discrimination against infected people are more prevalent in a population with a high average knowledge score.

Adaptation Practices toward COVID-19

Despite health care service demand, 23.2% of the survey participants (95% CI: 21.3-25.1) did not receive health care service in the last 6 months. Participants who did not receive medical care mentioned a fear of getting infected with COVID-19 (37.9%, 95%CI: 33.3-42.5) and hospital overcrowding (33.5%, 95% CI: 28.9-38.1). According to the location of surveyed participants infected with a COVID-19, their marital and employment status were statistically significant. For example, participants who had COVID-19 living in urban areas were employees of government organizations, or self-employed. Whereas this indicator in rural areas was high among herders and employees of governmental organizations.

On average, 61.98 (95% CI: 57.8-66.02) days after the last vaccination, people had been infected. 18.2 percent of the participants who had a COVID-19 (95% CI: 15.4-21.4) became infected within 14 days of the last vaccination.

Of the participants who did not receive one, two, or three vaccine doses, 1,843 responded why they didn't get vaccinated. 47.5 percent of them said, "I got sick after taking....the dose", 19.9 percent said they did not get the vaccine due to negative

information about the vaccine, and 12.0 percent did not get vaccinated due to their busy schedule. One in 10 surveyed participants (95% CI: 8.8-11.4) said they did not have personal hygiene hand sanitizers, wet wipes, paper tissue, and replacement facial masks.

According to the findings of the follow-up survey, hands washing frequency (50.5% to 83.2%), washing hands in the correct steps (21.4% to 39.1%), using soap regularly (26.0% to 53.2%), and spending 20 seconds when washing their hands (16.1% - 33.5%) were found that changes in handwashing behavior compare with the results of the baseline study (Figure 1). The practice of coughing and sneezing was defined by the observation method, and no changes in the baseline study results were observed in the follow-up survey. The frequency of cleaning and disinfection of the home and disinfectants (chloramine, javelin) has increased compared to the baseline survey results. The practice of wearing masks in the crowding places and outdoors increased by 6.8 percent from the baseline survey. Compared to the baseline survey results, the follow-up survey (73.0%) had a better practice of wearing masks in the workplace or indoor space.

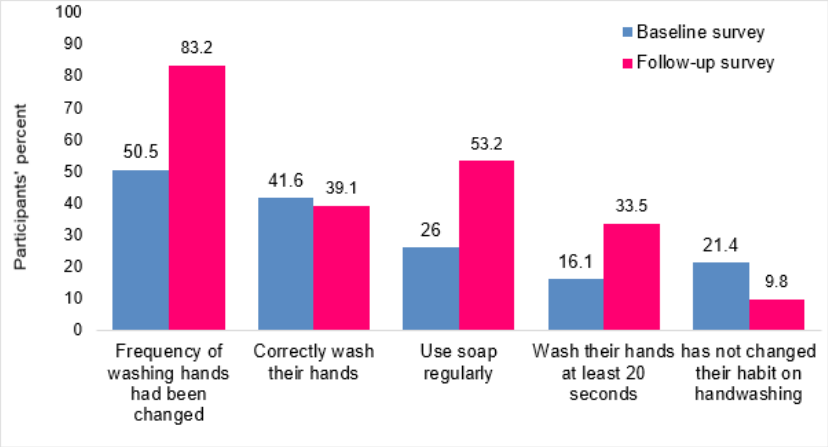

Figure 1: Changing habit on handwashing of participants, by percentage.

In the baseline study, the average duration to wear a mask was 29 hours, while in the follow-up survey, it was 4.2 hours, which shows improvement in the correct behavior. Compared to the baseline survey results, the frequency of cleaning and disinfection of the home and disinfectants (chloramine, javelin) has increased. Of those 63.9 percent of the surveyed participants (95% CI: 59.0-63.1) had declined frequent outings, 18.4 percent did not go out at all, 61.1 percent had been spent less time going to public entertainment and services, and 22.0 percent did not go to shows at all. Of those, 77.5 percent of participants (95%CI: 75.5-79.3) received information about the infection from television and 60.8 percent from social media. The lack of information on the infection in manuals, brochures, and newspapers is due to not developing information packages. Information on coronavirus infection was rarely available in newspapers and manuals (Table 4).

No	Information sources	15-24	25-34	35-44	45 <	P value
1.	Television	71.6	75.1	80.3	83.1	0.001**
2.	Newspaper/magazine	14.2	13.4	14.8	19.7	0.025
3.	Social network	73.6	72.1	55.4	41.6	0.001**
4.	Brochure, handbook	10.9	14.2	15.3	16.5	0.084
5.	Radio	10.7	13.0	14.8	18.9	0.003**
6.	Family, friends and colleagues	39.5	40.2	37.4	32.9	0.071
7.	Didn't get	1.7	2.3	3.0	1.6	0.492
	Total	458	530	406	502	
**Statistically significant						

Table 4. The main sources of information, by age group.

43.6% of survey respondents (95%CI: 41.3-45.8) demanded more information on the new vaccine. 41.2% (95%CI: 39.1-43.5) on the adaptation, and 40.1% (95%CI: 37.7-42.2) new variant of COVID-19. Most of the adolescents surveyed criticized the regular informing of the number of deaths and confirmation cases of COVID-19 as frightening. In the baseline survey, 42.4 percent of participants desired more information about the vaccine, while in the follow-up survey, 34.9 percent said they needed information about the future trend of COVID-19 infection (Figure 2).

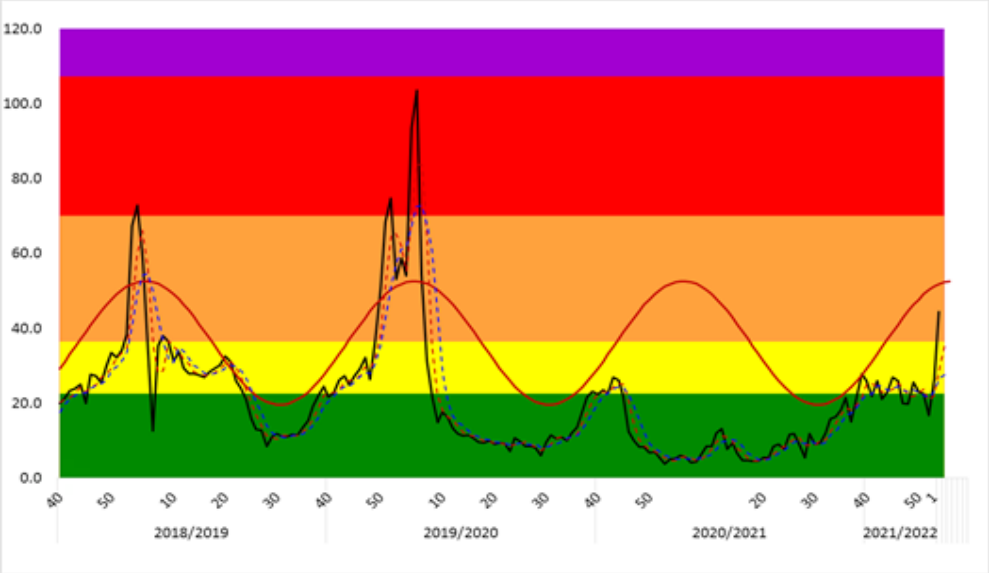

Figure 2: Tendency of influenza and influenza-like illness, by 10000 population.

Discussion

Unprecedented measures have been adopted to control the rapid spread of the ongoing COVID-19 epidemic in China. An online sample of Chinese residents was successfully recruited via in Hubei, China. Among the survey participants (n=6910), 65.7% were women, 63.5% held a bachelor's degree or above, and 56.2% engaged in mental labor. The overall correct rate of the knowledge questionnaire was 90%. Nearly all of the participants (98.0%) wore masks when going out in recent days. In multiple logistic regression analyses, the COVID-19 knowledge score (OR: 0.75-0.90, P<0.001) was significantly associated with a lower likelihood of negative attitudes and preventive practices toward COVID-2019 [5]. According to the results, the majority of respondents (74.8-88.0%) were fairly or very confident about the level of knowledge. As for the attitude scale, the majority of respondents (82.0-92.4%) agreed or strongly agreed to hold a positive attitude toward the COVID-19 pandemic. They held the opinion that the outbreak deserved serious attention and had full confidence in the government's interventions. For the practice scale, there was also a majority of respondents (79.0-97.1%) reporting to be cautious in the prevention. The main reasons for barrier lay in limited knowledge (49.4%), influenced by the surrounding population(40.4%), limited or no access to COVID-19 information (34.8%), and attaching little importance to the outbreak (32.6%) [6]. In Tanzania, 472 adults participated in the survey. The levels of knowledge, attitude, and practices related to COVID-19 were found in 76.5%, 74.8%, and 58.1% of participants respectively. On performing multivariate analysis, odds of having good knowledge regarding COVID-19 were almost 2 folds higher in participants who were females, with high education levels, those without partners, and those with stable income. Females were 1.5 folds more likely to have a good attitude toward COVID-19 and odds of good practice against COVID-19 were 3 folds higher in young adults compared to the elderly [7]. A total of 872 subjects (female, 534; male, 338) were enrolled with ages from 17 to 25 years old of 10 universities in Shaanxi Province, China. Results showed that appropriate knowledge was acquired by 82.34% subjects; the levels were significantly higher in undergraduates from public universities and medical majors than those from private schools and non-medical majors ($p<0.05$). 73.81% of subjects reported positive attitudes; females showed significantly higher levels of positive attitudes than males ($p<0.05$). There was a positive correlation between attitude and practice ($r=0.319$, $p<0.05$) in the whole study group [8]. In Liberia, the male participants, on average, achieved higher knowledge (52%) and attitude scores (72%), in contrast to females (49% and 67%, respectively). Radio (71%) was the most cited source for COVID-19 information, followed by social media (63%). After controlling for sociodemographic variables, adaptive regression modelling revealed that survey mode

achieved 100% importance for predicting knowledge and practice levels with regard to COVID-19 [9]. In Uganda, 83.9% health care workers had sufficient knowledge, 78.4% had a positive attitude, and 37.0% had good practices toward COVID-19. Health care workers in Uganda have good knowledge and positive attitude but poor practices towards COVID-19. Differences in COVID-19 knowledge, attitude and practice between clinical and non-clinical people could affect uptake of COVID-19 interventions including vaccination [10]. In meta-analysis review, 89.87% (95% CI: 67.71-97.40) understood about COVID-19 symptoms, 92.09% (95% CI: 84.32-96.18) knew about how it spreads, and 79.51% (95% CI: 59.38-91.15) knew about how to treat it. The public's perception of controlling COVID-19 is mixed, with only 44.16% (95% CI: 35.74-52.93) and 60.28% (95% CI: 49.22-70.38) believing the country would win the struggle against the pandemic and the infection will be successfully controlled, respectively. Although overall COVID-19 preventative practice was good, subgroup analysis found that men had a poor practice toward controlling the infection. The practice of avoiding crowded places (70.15%) and maintaining social distance (77.17%) was found to be satisfactory in institution-based studies [11].

Of the 2168 respondents, most were young adults (62.7%), females (62.4%), tertiary educated individuals (84%), non-health care workers (85.9%), and individuals who knew someone diagnosed with COVID-19 (75.2%). The mean score for knowledge was 10.0 ± 1.52 (maximum score=12); correct response rate for each question ranged from 54.2% to 99%. The mean score in terms of attitude was 1.3 ± 0.85 (maximum score=2); 68.7% respondents agreed that control over COVID-19 would finally be achieved; and 62.3% believed that Malaysia could conquer COVID-19. The mean score for practices was 5.1±1.10 (maximum score=6); 81.5%, 88.1%, and 74.1% respondents avoided crowded places, confined spaces, and conversations in close physical proximity, respectively. Furthermore, 94.2% wore masks when leaving home; 89.0% practiced hand hygiene; and 83.8% adhering to COVID-19 warnings. Small but significant correlations were found between knowledge and attitude ($r=0.078$, $p<0.001$) as well as between knowledge and practices ($r=0.070$, $p=0.001$) [12].

A study in Iran found that although overall the knowledge of COVID-19 was about 90% among participants, single men has shown significantly low score [13] similar to our findings. 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 study that the majority of the population had a reduced theirs visits to households and outdoor activities [14]. According to our country, the current survey is the second survey on coronavirus infection in Mongolia; it aims to create conditions and practices for the government and public health organizations to implement preventive measures against infectious diseases.

Implications for Behavioral Health

Out of 14 knowledge questions that should be known about coronavirus infection, survey participants had known in an average of 8.27 ± 3.73 (95%CI: 8.12-8.43) correct answers, which was lower than the results of the baseline study. The average knowledge score of the surveyed participants of the follow-up survey (9.23±3.2, 95%CI: 9.09-9.38) was smaller than the baseline survey by 0.96 percent. It might be due to the new variant of coronavirus, and its changes in the incubation period, clinical symptoms, and preventive measures. The mean knowledge score of women in the baseline survey (9.43±3.14) and the follow-up survey (8.55±3.62) of coronavirus infection was significantly higher than that of men ($p=0.0001$). As the population's level of education increased, the average knowledge score on the coronavirus infection increased, and the statistically significant high of the participant with higher education levels was 8.81±3.53 ($p=0.0001$). The average knowledge score of the employed population was statistically higher than that of the herders, the self-employed, the unemployed, and the retired group of people in both surveys. In the first (8.94±2.61) and follow-up (6.96±3.85), survey results show that the average knowledge score of Bayan-Ulgii aimag was 0.29 and 1.31 lower than the average knowledge score of the total surveyed participants. The incubation period has changed due to the new variant of the SARS-CoV-2 virus. Therefore, 66.4 percent of the respondents said they did not know the incubation period, 14.4 percent more than the baseline survey results. In the baseline study, most of the participants said that wearing a mask (93.9%), keeping a distance between people (81.1%), and washing their hands with soap for at least 20 seconds (79.1%) would prevent infection. According to the follow-up survey findings, wearing a mask (75.1%), keeping distance between people (68.8%), and washing hands with soap for at least 20 seconds (64.9%) decreased by 12.3-18.8 percent, respectively, and 83.9 percent were vaccinated.

According to the baseline survey findings, 80.6 percent (95%CI: 78.2-81.9) of surveyed participants believed that pandemic is "very dangerous". It was 54.5 percent (95%CI: 52.2-56.7) has decreased by 26.1 percent compared to the baseline survey.

In addition, 23.0 percent of participants (95% CI: 21.1-24.9) responded that their relationship would change if they found out that someone had been cured of COVID-19, whereas in the baseline survey, it was 90.2 percent (95% CI: 88.8-91.6). This suggests that the baseline survey participants considered the pandemic "very dangerous" and discriminated against those who fell ill and recovered. However, in the follow-up survey result, this decline may be due to the ability of Mongolians to adapt quickly to anything.

Our survey has found that many positive changes in the handwashing practice of the population have been made. In

the baseline study, 1 in 5 participants said there was no change in handwashing habits, but this follow-up survey dropped to 1 in 10 participants. Compared to the baseline survey results, the frequency of handwashing increased by 32.7 percent, washing with soap regularly increased by 27.2 percent, and the time spent on washing hands at least 20 seconds increased by 17.4 percent. There is a tendency among adults to become positive behaviours if they continue to implement IEC/BCC strategies that promote positive change in the practice of handwashing.

The practice of avoiding touching the eyes, nose, and mouth with dirty hands decreased by 16.3 percent from 66.9 percent (95% CI: 64.7-69.2) in the baseline study to 50.6 percent (95% CI: 48.3-52.8) in the second study (p=0.0001). The preventive measure for the infectious intestinal disease is to wash hands with soap and water before preparing food and drink, before eating and drinking, and after using the toilet. Therefore, below shows the incidences of intestinal infectious diseases (salmonellosis, dysentery, hand, foot and mouth disease, food poisoning) registered nationwide in 2018-2021.

In 2021, when the coronavirus infection outbreak was reported, 1,017 cases of intestinal infections were registered, of which 732 (71.9%) were cases of dysentery. Nationwide, 9572 cases were registered in 2018 and 8497 cases in 2019, but in 2020 it reached 5113, which is 1.7 times less than the previous year, and in 2021 it was declined by 5 times. This indicates the positive change in the handwashing behaviour of the population [15].

Of those, 79.2 percent of survey participants (95%CI: 77.4-81.0) reported that coughing and sneezing in their elbows or with paper tissue when they were not covered mouth has been increased by 2.6 percent from the baseline survey (76.6% and 95% CI: 74.6-78.6). There is an increased awareness of the risk of coronavirus infection through coughing and sneezing and improving correct habits.

The importance of wearing masks to prevent coronavirus infection is reflected in the declining incidence of influenza and influenza-like illness reported in Mongolia.

Every year in our country, seasonal influenza is registered as an outbreak among the general population, increasing the workload of hospitals and healthcare service providers by 2-3 times. No influenza outbreaks have been reported in 2020 due to a comprehensive public health measurement taken during the pandemic since December 2019.

In the last 4 years, influenza and influenza-like illnesses were registered in 2016 and the outbreak was prolonged for 5 weeks, B and AH1 virus were registered and was lasted for 20 weeks, AH1 and AH3 virus outbreak was extended for 19 weeks. While in 2020, AH3 and B virus registered, and the outbreak lasted only for 3 days.

During the 2016-2019 flu outbreaks, school holidays were somehow regulated, but there were no outbreaks as in 2020 and 2021. This is a positive impact that everyone is getting used to wearing a mask.

The importance of handwashing, masking, cleaning and using disinfection to prevent coronavirus infection was positively reflected in the declining incidence of intestinal infections, influenza, influenza-like illnesses, and acute respiratory infections in Mongolia.

Conflict of Interest Statement

The authors certify that they have NO affiliations with or involvement in any organization or entity with any financial interest in the subject matter or materials discussed in this manuscript.

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