Mental Health Problems of the People in Isolation Related to SARS-CoV-2 Virus Infection

Munkh Enkhbaatar[1, 2], Oyunsuren Davaasuren[1], Oyungerel Ravjir[3], Naranzul Davaa[4], Khishigsuren Zuunnast[1]

[1]Department of Mental Health, School of Medicine, Mongolian National University of Medical Sciences, Ulaanbaatar, Mongolia; [2]Team of Psychotherapy, National Center for Mental Health, Ulaanbaatar, Mongolia; [3]Department of Infections Diseases, School of Medicine, Mongolian National University of Medical Sciences, Ulaanbaatar, Mongolia; [4]Department of Tuberculosis Surveillance and Research, National Center for Communicable Diseases, Ulaanbaatar, Mongolia

Corresponding Author
Munkh Enkhbaatar MD
Department of Mental Health,
School of Medicine, Mongolian
National University of Medical
Sciences, Team of Psychotherapy,
National Center for Mental Health,
Ulaanbaatar 14210, Mongolia
Tel: +976-9111-1094
E-mail: munkh@gtc.mnums.edu.mn

Objectives: To define the mental health status of people in isolation, and determined the correlation between mental health variables of the respondents. **Methods:** The study design was descriptive cross-actional. Isolated citizens, who were transported by charter flight from different foreign countries to Mongolia from July 1, 2020, to September 1, 2020, and observed by epidemiological reference in the isolation places. **Results:** The majority (38.8%, n = 157) of the 405 total cases aged 17- 97 year-olds, were 25- 34 year-olds and the average age was 34.2 ± 14.6. Majority of respondents (n = 213; 52.6%) were male. When mental health variables were compared with age groups, depression, anxiety, and self-stigma were not statistically significant for age group. However, in any age group of participants, self-stigma was moderately more at 91.8% (p = 0.043), and self-stigma at 93.8% was moderate. 38.1% of the total isolated population had mild to severe depression, and 30.4% had mild to moderate anxiety. **Conclusion:** Respondents who were impacted by strong stressors were more likely to experience depression and anxiety than respondents who were not impacted, and increased levels of depression were caused by strong stressors and anxiety. A moderate level of self-stigma is more present in any age group.

Keywords: Citizen-Isolators, Depression, Anxiety, Severe Stress, COVID-19

Introduction

Quarantine is a method of isolating and restricting the movement of people who may be exposed to an infectious disease to monitor their health, thereby reducing the risk of transmission to others [1,2]. During the SARS outbreak in 2003, quarantine was imposed in some parts of China and Canada throughout the city, and during the Ebola outbreak in 2014, all villages in many West African countries were placed under quarantine [1]. Our daily life is changing dramatically as countries restrict movement to prevent and respond to the new SARS-CoV-2 virus [3]. Mankind has faced seven pandemics in the last 100 years, and it has been found that the pandemic affects the normal life of the population and poses many challenges that require a great deal

of psychological resistance [4].

Quarantine during a pandemic may be effective in reducing the spread of the virus, but social distance or self-isolation is a risk factor for worsening mental health problems [5]. The review of 24 studies in 10 countries during the previous outbreaks (SARS, Ebalo, H1N1, MERS, Equine influenza) found that people in the quarantine may experience many mental symptoms. These negative psychological consequences include anger, anxiety, sadness, confusion, fear, depression, emotional exhaustion, frustration, irritability, and stress, while other negative consequences include avoiding crowds or public places, isolated behavior, posttraumatic stress disorder, heavy alcohol consumption, overexposure to somatic symptoms, discrimination, as well as domestic violence, and lastly suicidal idea or suicidality may be present [1, 6- 12]. During the MERS-CoV outbreak in Korea (2015), 83 hemodialysis patients, and 12 healthcare workers were isolated from one infected patient, and the stress levels of patients undergoing hemodialysis were measured. It has been demonstrated that the medical isolation and subnormal quality of care during the MERS outbreak caused extreme stress in hemodialysis patients [13]. Another study of Al-Rabiaah also revealed that female students had a significantly higher mean stress level than males (P < 0.001) during MERS-CoV. One hundred and thirty-four (77%) reported minimal anxiety, thirty-two (18.4%) reported mild anxiety, 8 (4.6%) reported moderate anxiety, and none of them reported severe anxiety (score >14). The stress level (as reported on a 1- 10 scale) shows significant correlation with the Generalized Anxiety Disorder (GAD-7) score [14].

Nowadays during quarantine due to the outbreak of COVID-19 corovirus infection, depression, anxiety, self-harm behaviors, domestic violence, drug abuse, screen addiction, and loneliness have increased significantly worldwide. The multicenter, multinational cross-sectional study conducted across 63 participating countries showed that female participants had Moderate to High Perceived Stress Scores (MH-PSS) group compared to the Low Perceived Stress Score group (66.0 vs. 52.0%) and a higher proportion of individuals whose marital status was single had MH-PSS (57.1%). Also, individual's religion (Christian, Hindu, and Muslim), no formal education level, being exposed to a confirmed or suspected COVID-19 patient, being forced to be quarantined/isolated, and uncomfortable feelings the during quarantine period may

significantly increase the risk of MH-PSS (p < 0.05) [15]. Zhao et al. investigated the current prevalence of anxiety, depression and PTSD among a self-isolating general population, mainly college students, in the context of COVID-19 from January 26, 2020 to February 2, 2020. A total of 515 self-isolating people were involved and the results showed that prevalence of anxiety, depression and PTSD was 14.4, 29.7, and 5.6%, respectively [16]. Another study investigated the psychological distress, fear and coping strategies as a result of the COVID-19 pandemic and its associated factors among Malaysian residents which revealed that people whose financial situation was impacted due to COVID-19 (AOR 2.16, 95% CIs 1.54- 3.03), people who drank alcohol in the last four weeks (3.43, 1.45- 8.10), people who were a patient (2.02, 1.39- 2.93), or had higher levels of fear of COVID-19 (2.55, 1.70- 3.80) were more likely to have higher levels of psychological distress. Participants who self-isolated due to exposure to COVID-19 (3.12, 1.04- 9.32) and who had a moderate to very high level of psychological distress (2.56, 1.71- 3.83) had higher levels of fear [17].

In the case of Mongolia, according to the decision of the State Emergency Commission on January 30, 2020, and the extraordinary meeting of the Government on January 26, 2020, 31, Mongolian citizens were transported from Wuhan, China, which is the birthplace of infection on February 1, 2020, by charter flight, and was quarenteened in Mongolia to monitor their symptoms [18]. According to the situational report of the Ministry of Health, as of July 10, 2021, a total of 130131 citizens were isolated [19]. Surveying to assess the mental health status of isolated individuals will be an important indicator to support the mental health of citizens in the implementation of further isolation activities. Although, there is much research highlighting the impact of COVID-19 on psychological distresses as well as the imposed isolation on people's lives, sociodemographic variables of the above mentioned studies are significantly different in each individuals' reactions to stress. Therefore, we aimed to study the mental health status of people in isolation in Mongolia during the COVID-19 pandemic, as there has been a lot of frustration, accusations, denials, and attitudes on social media about the isolation of citizens, and government decisions related to it.

Material and Methods

Subjects

A study design was descriptive cross-actional. The sample size is estimated to be 384, a prevalence rate of 50%, 95% confidence level, and a precision of 5%. Isolated citizens were transported by charters from different foreign countries to Mongolia from July 1, 2020, to September 1, 2020, and observed by epidemiological reference in the isolation places (Hotels, such as Centaur, Corporate, Borjigon, Altai, Habu, Alpha hotel, and dormitory of the Mongolian National University) including a total 631 people observed at the Enkhsaran Sanatorium after being treated for a "confirmed case of coronavirus infection". Informed consent was obtained in accordance with infection prevention, and control procedures. A total of 454 cases voluntarily agreed to participate in the study and signed consent forms, however, the data of only 405 eligible cases was incorporated in thee statistical analysis. Due to the pandemic situation, the study data were collected electronically through healthcare workers who were working in isolation and observation places.

Exclusion criteria

Cases of refusal to participate in the study and incomplete or non-compliant questionnaires were excluded from data analysis.

Semi-structured questionnaire

Data were collected from respondents using a semi-structured questionnaire with general demographic questionnaires and standard scales or screening questionnaires to assess mental health status. The general demographic questions aimed at clarifying the information, such as age, gender, education, occupation, marital status, living conditions, household income, period of isolation, isolation environment, fear of infection, and discrimination in a foreign country.

The Impact of Event Scale-revised (Daniel S. Weiss, 2007) [20] was used to assess the exposure to strong stressors. The Patient Health Questionnaire 9 item (Robert J. Spitzer., Janet B.W.Williams., Kurt Kroenke., 1999) [21,22], a semi-structured screening questionnaire, was used to determine the level of depression. The Generalized Anxiety Disorder 7 item (Robert J. Spitzer., Janet B.W.Williams., Kurt Kroenke., 2006) [23], a semi-structured questionnaire which is widely used in the primary health care setting, was used to assess anxiety. Stigmatization

or discrimination was assessed using a semi-structured scale developed by US researcher Annel Van Rie (2008) which consisted of 12 questions to assess social stigma, and 12 questions to assess self-stigma [24, 25]. The reliability of the answers to all of the questionnaires was calculated by the Cronbach coefficient ($\alpha = 0.91$, except for assessing social-stigma $\alpha = 0.90$, and for self-stigma $\alpha = 0.89$).

The Eysenck's Personality Inventory [26] was developed by Hans Eysenck in 1952, and we used the test to determine personality traits. This test provides information about personality, temperament, and mental health. The test consisted of a total of 57 questions, and the test score was calculated in three dimensions, such as verbal expression, neurosis, and response reliability. The reliability of the answers to the questionnaire was calculated by the Cronbach coefficient ($\alpha = 0.81$).

Statistical analysis

The chis-quer test was used for analyzing the association between age group and mental health variables of respondents such as anxiety, depression, and self-stigma. The mean scores for the mental health variables were calculated using the one-way ANOVA. Tukey test was conducted as multiple comparison. Correlation analysis was performed to analyze the relationships among independent variables influencing the mental health variables, and correlation was considered significant at the $p < 0.01$ and $p < 0.05$ levels (2-tailed). All calculations were performed using STATA 15.1, with the level significance set at $p < 0.05$.

Ethical statements

All subjects gave written informed consent. Ethical approval was obtained from the Medical Ethics Committee of the Ministry of Health on July 08, 2020 (№ 172). The data were collected only after the administrative approvals were obtained by signed consent.

Results

Of the 17- 97 year-olds in the study, 25- 34 year-olds accounted for the majority (38.8%, n = 157), and the average age was 34.2 ± 14.6. A majority of thee respondents (n = 213; 52.6%) were male. There were statistically significant differences ($\chi^2 = 15.37$, $p = 0.001$) for the gender of the isolated population, but no

significant differences were observed in education, occupation, marital status, and household income. When mental health variables were compared with age groups (Table 1), depression (p = 0.569), anxiety (p = 0.779), and self-stigma (p = 0.576) were not statistically significant for age group.

Moreover, in any age group of participants, social-stigma was moderate in 91.8% (n = 372) (p = 0.051) and self-stigma in 93.8% (n = 380) was also moderate. The isolated individuals in the study were isolated for an average of 11.8 ± 4.2 (CI 1- 49) days at the time of our study. 14% (n = 56) of the respondents answered that they needed psychological care, and 0.7% (n = 3) answered that it was immediately necessaty.

Table 1. Comparison of mental health variables with age groups.

Variables	Age groups					p-value
	< 25 n = 133	26 - 35 n = 150	36 - 45 n = 43	> 46 n = 79	Total n = 405	
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	
Isolation, days	11.4 ± 4.5	12.1 ± 3.9	11.9 ± 4.3	11.1 ± 4.4	11.8 ± 4.2	0.361
Stigma social[a, b]	33.2 ± 7.2	32.9 ± 7.0	33.1 ± 6.2	31.9 ± 6.2	33.1 ± 6.9	0.051
Stigma self	32.9 ± 6.6	31.7 ± 6.2	32.8 ± 7.1	33.3 ± 6.8	32.5 ± 6.6	0.576
	N(%)	N(%)	N(%)	N(%)	N(%)	
Education						
Middle	78 (59.5)	33 (22.4)	9 (22.5)	28 (35.4)	148 (36.5)	0.000
High	53 (40.5)	114 (77.6)	31 (77.5)	51 (64.6)	249 (63.5)	
Gender						
Male	80 (60.2)	82 (54.7)	25 (58.1)	26 (32.9)	213 (52.6)	0.001
Female	53 (39.8)	68 (45.3)	18 (41.9)	53 (67.1)	192 (47.4)	
Merital status						
Meried	18 (13.5)	82 (54.7)	31 (72.1)	55 (69.6)	186 (45.9)	
Single	115 (86.5)	64 (42.7)	5 (11.6)	3 (37.9)	187 (46.2)	
Divorced	-	4 (2.7)	7 (16.3)	21 (26.6)	32 (7.9)	
Family members						
1-2	11 (8.3)	34 (22.7)	7 (16.3)	32 (40.5)	84 (20.7)	0.000
3-4	61 (52.7)	79 (52.7)	22 (51.2)	31 (39.2)	193 (47.7)	
>5	61 (24.7)	37 (24.7)	14 (32.6)	16 (20.3)	128 (31.6)	
Income, tugrug						
<500.000	38 (28.6)	52 (34.7)	12 (27.9)	16 (20.2)	118 (29.1)	0.264
500.000-1.000.000	18 (13.5)	22 (14.7)	8 (18.6)	7 (8.9)	55 (13.6)	
1.000.000-2.000.000	54 (40.6)	58 (38.7)	18 (41.8)	39 (49.4)	169 (41.7)	
>2.000.000	23 (17.3)	18 (12.0)	5 (11.6)	17 (21.5)	63 (15.6)	
Anxiety						
Yes	41 (30.8)	49 (32.7)	11 (25.6)	22 (27.8)	123 (69.6)	0.779
No	92 (69.2)	101 (67.3)	32 (74.4)	57 (72.2)	282 (30.4)	
Depression						
Yes	57 (42.8)	53 (35.3)	16 (37.2)	28 (35.4)	154 (61.9)	0.569
No	76 (57.1)	97 (64.7)	27 (62.8)	51 (64.6)	251 (38.0)	
Stressors						
Yes	42 (31.6)	50 (33.3)	13 (30.2)	26 (32.9)	131 (32.3)	0.978
No	91 (68.4)	100 (66.7)	30 (69.8)	53 (67.1)	274 (67.7)	

One-way ANOVA, multiple comparison: [a]< 25 vs. > 46, p = 0.041; [b]< 25 vs. 36- 45, p = 0.013.

According to the EPI results, 37.2% (n = 150) of the total respondents were choleric, 34.5% (n = 140) were sanguine, 17% (n = 69) were phlegmatic, and 11.3% (n = 46) were melancholic (Figure 1). No statistically significant differences were observed when comparing the individual psychological patterns of the respondents with the levels of depression, anxiety, and severe stressors.

There were also no significant results from the study of temperament differences in mean test scores of mental health variables. In addition, the One way ANOVA test did not show significant differences in temperament differences in test scores for mental health problems.

To determine the level of depression and anxiety in the respondents, 38.1% (n = 154) of the total isolated population had mild to severe depression, and 30.4% (n = 123) had mild to moderate anxiety (Figure 2).

Comparing the level of depression with the gender of respondents, statistically significant results were obtained (χ^2 = 10.29, p = 0.036). In addition, the mean test scores for anxiety (p = 0.027), and depression (p = 0.007) were statistically significant for men and women, while no differences were observed in the severe stressor's impact, social and self-stigma test (Figure 3).

Anxiety was also statistically significant (χ^2 = 19.43, p = 0.001) when compared to the fear of infection. Depression and anxiety were compared with those under intense stress (Table 2). In the IES-R results, 14.6% (n = 59) had strong stress-induced immunosuppression, 4.7% (n = 19) had high levels of stress, and 13.1% (n = 53) had low levels of strong stress.

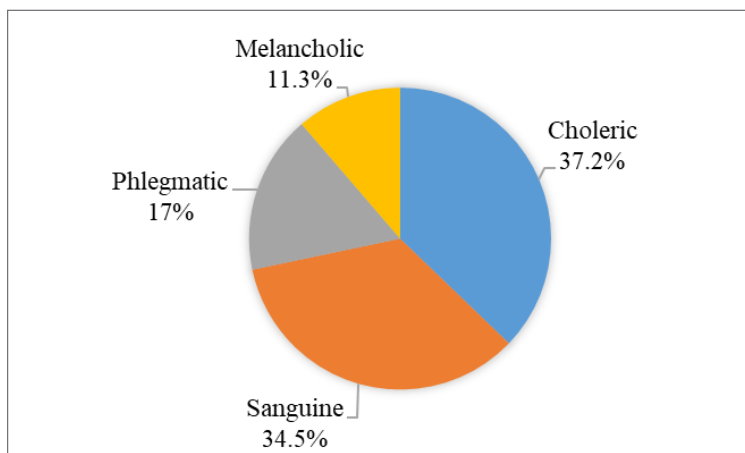The mean of the test scores was 18.4 ± 0.8 (CI 16.8- 20.0).

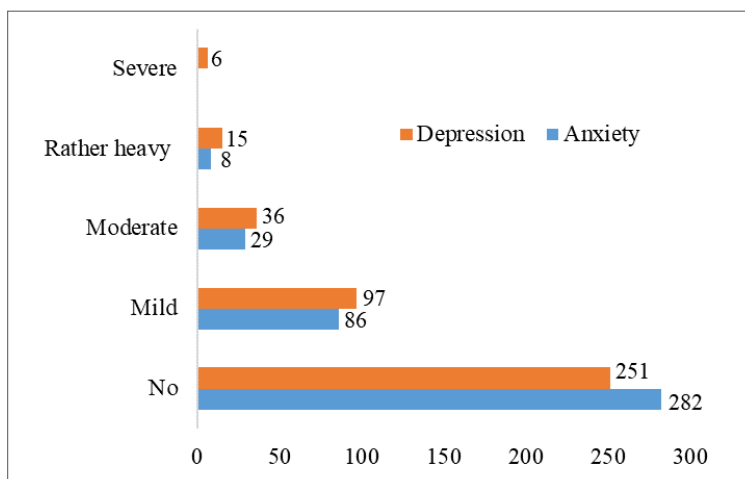**Figure 1.** Personality traits of the respondents.

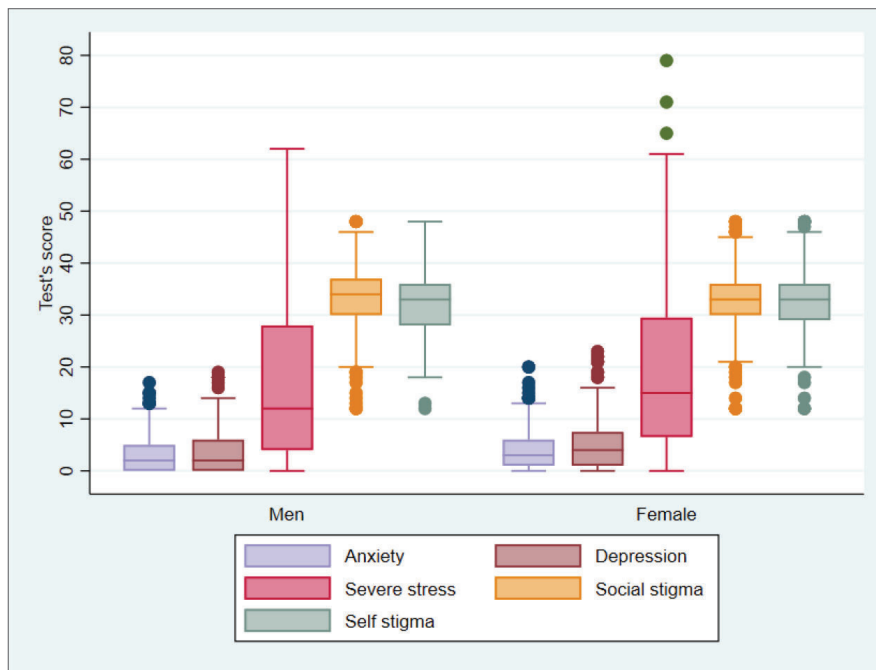**Figure 2.** Levels of depression and anxiety of the respondents.

Figure 3. Comparison of test scores by gender.

The effects of severe stress on depression were compared with 83.1% (n = 49) of 59 cases of immunosuppression due to severe stress, 79% (n = 15) of 19 respondents with high levels of severe stress, and 64.2% (n = 34) of 53 respondents with low levels of severe stress. It was statistically significant that only 20.4% (n = 56) of the 274 respondents who showed no signs of severe stress were depressed (Fisher's exact = 0.001).

Severe stressors were compared with anxiety in 74.6% (n = 44) of 59 respondents with immunosuppression due to strong stressors, 58% (n = 11) of the 19 respondents with high stressors, and 53% (n = 28) of the 53 respondents with low levels of strong stressors, and 14.6% (n = 40) of the 274

respondents, who did not show signs of severe stress in each were affected by anxiety with statistical significants (p = 0.001).

We have identified the relationship between mental health indicators and age and duration of the isolation (Table 3). The duration of isolation was not significantly related to mental health variables, while age was negative very weakly correlated to depression (r = -0.098*, p = 0.048) with statistical significance. However, depression was strongly correlated with strong stressors (r = 0.674*, p = 0.001) and anxiety (r = 0.804*, p = 0.001), but was very weakly correlated to self-stigma (r = 0.121*, p = 0.015) and social stigma (r = 0.100*, p = 0.043).

Also, the level of strong stressors' impact was strongly

Table 2. Comparison of impact to the strong stressors with depression or anxiety.

| Variables | Impact on the strong stressors | | | | |
	Immunosuppressed (n = 59)	High (n = 19)	Low (n = 53)	No (n = 274)	P value
	N (%)	N (%)	N (%)	N (%)	
Depression					
Yes	49 (31.8)	15 (9.7)	34 (22.1)	56 (36.4)	0.001
No	10 (4)	4 (1.6)	19 (7.6)	218 (86.8)	
Anxiety					
Yes	44 (35.8)	11 (8.9)	28 (22.8)	40 (32.5)	0.001
No	15 (5.3)	8 (2.8)	25 (8.9)	234 (83)	

Table 3. Correlation between mental health problems.

Variables	Duration of Isolation	Age	Anxiety	Depression	Strong stress	Social stigma	Self stigma
Duration of isolation	1						
Age	0.021	1					
	0.675						
Anxiety	-0.011	-0.055	1				
	0.826	0.270					
Depression	-0.006	-0.098*	0.804*	1			
	0.911	0.048	0.001				
Strong stress	0.004	0.016	0.665*	0.674*	1		
	0.936	0.745	0.001	0.001			
Social-stigma	-0.047	-0.091	0.088	0.100*	0.155*	1	
	0.341	0.069	0.078	0.043	0.002		
Self-stigma	-0.037	0.052	0.121*	0.121*	0.200*	0.568*	1
	0.451	0.302	0.015	0.015	0.001	0.001	

Table 4. Multivariate linear regression.

Variables	Unadjusted Coefficients				
	β	SE	95%CI	t	VIF
Duration of isolation	0.16	0.02	0.21 - 0.86	10.2	6.11
Age	0.21	0.17	0.19 - 2.45	13.6	3.45
Anxiety	0.11	0.69	-0.61 - 1.59	-2.95	1.49
Depression	0.12	0.14	-1.31 - 0.71	-1.94	4.10
Strong stress	0.23	0.53	0.45 - 2.28	1.06	5.50
Social-stigma	0.10	0.14	-0.36 - 0.91	-3.91	7.41
Self-stigma	0.15	0.42	0.13 - 1.40	7.05	2.50

F-statistics: 68.45, adjusted R^2 = 0.338; *p-value for F-statistics

correlated with anxiety (r = 0.665*, p = 0.001), while had a very weak correlation with social-stigma (r = 0.155*, p = 0.017) and self-stigma (r = 0.200*, p = 0.001). Additionally, a moderate correlation was identified between social stigma and self-stigma (r = 0.568*, p = 0.001). On multivariate analysis (Table 4) there was not significant multicollinearity among all variables. The multivariate analysis showed that anxiety and depression were the variables that had the most influence, but not statistically significant.

165 of the total respondents were victims of stigmatization and discrimination in some way, and of those 165 respondents, 86 cases were more affected by psychological violence. It is also statistically significant (Chi-square = 86.24, p = 0.001) when

comparing discrimination against people of Asian descent to levels of depression. When social and self-stigma rates were compared with personality types, there were no significant differences between sanguine, phlegmatic, and choleric types, while melancholic people had statistically significant levels of self-stigma (Chi-square = 6.84, p = 0.033).

The majority of respondents rated the isolation environment as satisfactory and compared the assessment of the isolation environment with the level of anxiety (Chi-square = 22.16, p = 0.008), and the level of depression (Chi-square = 29.1, p = 0.004). There were significant differences related to good isolation conditions resulting in lower levels of depression and anxiety.

Discussion

It is estimated that at the beginning of the pandemic, about 4 billion people lived in social isolation (Sandford, 2020) [27, 28]. In other words, as a result of the pandemic, countries closed their borders, temporarily withdrew their citizens from abroad, imposed internal curfews, restricted movement, and canceled public activities, leading to widespread isolation. In China, some strict control measures have significantly reduced the spread of the disease (Kraemer et al., 2020) [27, 29]. On February 1, 2020, our country began the process of withdrawing its citizens from Wuhan, the epicenter of the infection, and took measures to isolate the citizens who arrived in the country for 14- 21 days. The results of many studies show that isolation can affect the mental health of citizens. Previous studies on the prevalence of SARS and Ebola have shown by multifactorial logistic regression analysis that the the risk of SARS-related depression increases by being single during an outbreak, being in quarantine during an outbreak, suffering from pre-infectious psychological trauma, and the symptoms of depression were likely to persist even 3 years after the cessation of the spread [30]. Results of international studies in China, Spain, Greece, and Turkey have shown that the risk factors for the development of psychiatric symptoms due to COVID-19 such as, age, gender, and conditions undergoing infection (basic somatic health issues, direct contact with infection); socio-economic indicators (living in rural areas, no fixed income, low level of education); social isolation, and time spent on COVID-19-related information were identified as statistically significant [31- 34].

While the isolation response is an effective measure to reduce the spread, it can exacerbate mental health problems when people's basic needs fail to be met. This is because when supply of needs is lacking, insufficiening or not being met, then negative emotions develope. The American psychologist Abraham Maslow defined human needs on eight levels: physiological needs, safety needs, belonging and love needs, esteem needs, cognitive needs, aesthetic needs, self-actualization, and transcendence [35]. As a result of the global pandemic response, people who have been subjected to quarantine and isolation for a long time may not be able to adequately meet the following five types of needs (physiological, safety, belonging and love, esteem, cognitive needs, and aesthetic). In addition to the need for isolation, there are fears of infection, the high cost of charter

flight, stigmatization or discrimination in foreign countries, lack of access to medical care, and inadequate housing conditions. It seems inevitable that mental health problems will arise.

According to our results, one half of respondents aged under 24 (n = 113; 27.9%) and 45- 54 (n = 31; 7.7%) had depression, which was higher than the other age groups, and of the total (n = 405) isolated people, 38.1% (n = 154) had mild to severe depression, and 30.4% (n = 123) had mild to moderate anxiety. The results of our study are similar to other study results, which included 1074 Chinese (mostly from Hubei province), that 29% of those respondents had various levels of anxiety (mild 10.1%; moderate 6.0%; severe 12.9%); and more than 1/3 (37.1%) had various levels of depression (mild 10.2%; moderate 17.8%; severe 9.1%) when isolated at their home due to COVID-19. The two studies were related to isolation and differed in that they have isolated at home or places under instruction by the government [36]. Our findings did not differentiate between isolated individuals who had previously experienced anxiety and depression, or whether these outcomes were determined by isolation environments only. Therefore in the future when conducting a study to assess the mental health status of people who are isolated by epidemiological indications during a pandemic, it is necessary to assess and compare the psychological state of the epidemic based on a preliminary assessment of the underlying mental state.

While studied a sample of 76 mentally ill patients and 109 healthy participants in Chongqing, China for comparing to the level of acute stress, and severe psychological stress (IES-R) at the peak of the outbreak of COVID-19, the mean score of the tests for assessing IES-R, depression, anxiety, stress, and sleep problems in the case group was statistically higher than that of the control group (p < 0.001). In addition, more than 1/3 of those mental patients have symptoms of PTSD [37]. However, approximately 1/3 of our respondents assessed positive for PTSD symptoms by the IES-R test. In other words, the questionnaire answers showed that 14.6% (n = 59) were immunosuppressed by strong stressors; 4.7% (n = 19) were exposed to high levels of stress, and 13.1% (n = 53) were impacted by low levels of strong stress. The mean score of the IES-R test was 18.4 ± 0.8 (CI 16.8-20.0) in our study, but 17.7 ± 14.2 in the case group, and 11.3 ± 10.1 in the control group of the above Chinese study. According to the results, the variance of mean scores was relatively high and stable in our respondents, but the score variability was high

in all groups of Chinese respondents. This suggests that although the results of the answers to the same questionnaire are similar to those of the Chinese study, it is biased to directly compare the results of the study, including mental patients. While we also compared the impact of strong stressors with depression, and 79-83.1% of cases with immunosuppression due to severe stress (n = 59), or high levels of impact to strong stressors (n = 19) were higher depressed (Fisher's exact = 0.001) than depressed due to low or no symptoms of impact to strong stressors.

Discrimination or stigmatization is a phenomenon that defines a person in a different way than others [38]. Social stigma is often related to race, culture, gender, mental ability, or health [39]. Discrimination against coronavirus (SARS-CoV-2) infection is widespread, and it is more harmful than the disease [40, 41]. In our study, self-stigma was assessed as moderate in all age groups (p = 0.043), and 91.8% (n = 372) of the total respondents felt discrimination by society, and 93.8 % (n = 380) were discriminating themselves. Furthermore, discrimination against people of Asian descent was statistically significant (p = 0.001) compared to depression. Therefore the interventions to prevent discrimination should not be missed, because social stigma can negatively affect someone's physical, mental health, and mental wellbeing, and lead to isolation from society [42, 43].

Limitations of the study

Due to the pandemic situation, we obtained permission from the State Emergency Commission to conduct the study but were unable to meet face-to-face with respondents, through there was resident students working in isolation observation places, and we were unable to recontact the respondents. It was also not possible to fully determine whether the mental health problems identified in the study were related to isolation only. Therefore, future studies should consider several factors such as pre-existing mental health illnesses, individual temperament and living conditions of the survey respondents for dealing with and managing COVID-19 pandemics.

Conclusions

The mental health problems of the respondents were not statistically significantly correlated to the personality traits, but only self-stigma was more presented in people with melancholic personalities. Respondents who were impacted by strong stressors were more likely to experience depression and anxiety than respondents who did not impact; increased levels of depression were caused by strong stressors and anxiety.

Conflict of interest

The authors have no conflict of interest.

Acknowledgments

References

1. Samanta KB, Rebecca KW, Louice ES, Lisa W, Simon W, Neil G, et al. The psychological imfact of quarantine and how to reduce it: rapid review of the evidence. Lancet 2020; 395: 912-20.

2. Centers fo Disease Control and Prevention. Quarantine and isolation [accessed on 30 Jan 2020]. Available at: https://www.cdc.gov/.

3. World Health Organization. Healthy at home-Mental health [accessed on 03 Aug 2021]. Available at: https://www.who.int/.

4. Dubey S, Biswas P, Ghosh R, Chatterjee S, Dubey MJ, Chatterjee Su, et al. Psychosocial impact of COVID-19. Diabetes Metab Syndr 2020; 14: 779-88.

5. Grey I, Arora T, Thomas J, Saneh A, Tomhe P, Abi-Habib R. The role of perceived social support on depression and sleep during the COVID-19 pandemic. Psychiatry Res 2020; 293: 113452: 1-6.

6. Wolters Kluwer. Coronavirus disease 2019 (COVID-19): Psychiatric illness [accessed on 15 Jul 2020]. Available at: https://www.uptodate.com/.

7. Pfefferbaum B, North CS. Mental health end the COVID-19 pandemic. N Engl J Med 2020; 383: 510-2.

8. Marjanovic Z, Greenglas ER, Coffey S. The relevance of psychosocial variebles and working conditions in predicting nurses'coping strategies during the SARS crisii: an online

questionnaire survey. Int J Nurs Stud 2007; 44: 991-8.

9. DiGiovanni C, Conley J, Chui D, Zaborski J. Factors influrncing compliance with quarantine in Toronto during the 2003 SARS outbreak. Biosecur Bioterror 2004; 2: 26-72.

10. Hawryluck L, Gold WL, Robinson S, Pogorski S, Galea S, Styra R. SARS control and psychological effects of quarantine , Toronto, Canada. Emerg Infect Dis 2004; 10: 1206-12.

11. Lee S, Chan LY, Chau AM, Kwok KP, Kleinman A. The experience of SARS-related stigma at Amoy Gardens. Soc Sci Med 2005; 61: 2038-46.

12. Maunder R, Hunter J, Vincent L, Bennett J, Peladeau ML, Sadavoy J, et al. The immediate psychological and occupational imfact of the 2003 SARS outbreak in a teaching hospital. CMAJ 2003; 168: 1245-51.

13. Kim YG, Moon H, Kim SY, Lee YH, Jeong DW, Kim K, et al. Inevitable isolation and the change of stress markers in hemodialysis patients during the 2015 MERS-CoV outbreak in Korea. Sci Rep 2019; 9: 1-10.

14. Al-Rabiaah A, Temsah MH, Al-Eyadhy AA, Hasan GM, Al-Zamil F, Al-Subaie S, et al. Middle east respiratory syndrome-corona virus (MERS-CoV) associated stress among medical students at a university teaching hospital in Saudi Arabia. J Infect Public Health 2020; 13: 687-91.

15. TMGH-Global COVID-19 Collaborative. Perceived stress of quarantine and isolation during COVID-19 pandemic: a global survey. Front Psychiatry 2021; 12: 656-66.

16. Zhao Y, An Y, Tan X, Li X. Mental health and its influencing factors among self-isolating ordinary citizens during the beginning epidemic of covid-19. J Loss Trauma. 2020; 22: 580-93.

17. Bahar AS, Abdullah S, Abdullah MFIL, Kabir MS, Alif SM, Sultana F et al. Psychological distress, fear and coping among Malaysians during the COVID-19 pandemic. PLoS One 2021; 16: e0257304.

18. State Special Commission. Minutes of the meeting [accessed on 30 Jan 2020]. Available at: https://nema.gov.mn/.

19. Unified legal portal site. On some measures to be taken and prevented from the risk of new coronavirus [accessed on 26 Jan 2020]. Available at: https://www.legalinfo.mn/.

20. Ministry of Health. Situation report of COVID-19 [accessed on 10 Jul 2021]. Available at: https://www.moh.gov.mn/.

21. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. J Gen Intern Med 2001; 16: 606-13.

22. Kroenke K, Spitzer RL. The PHQ-9: A new depression and diagnostic severity measure. Psychiatric Annals 2002; 32: 509.

23. Spitzer RL, Kroenke K, Williams JBW, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. Arch Intern Med 2006; 166: 1092–7.

24. Van RA, Sengupta S, Pungrassami P, Balthip Q, Choonuan S, Kasetjaroen Y, et al. Measuring stigma associated with tuberculosis and HIV/AIDS in southern Thailand: exploratory and confirmatory factor analyses of two new scales. Trop Med Int Health 2008; 13: 21-30.

25. Genberg BL, Hlavka Z, Konda KA, Maman S, Chariyalertsak S, Chingono A, et al. A comparison of HIV/AIDS-related stigma in four countries: negative attitudes and perceived acts of discrimination towards people living with HIV/AIDS. Soc Sci Med 2009; 68: 2279-87.

26. Euronews. Coronavirus: Half of humanity now on lockdown as 90 countries call for confinement [accessed on 3 April 2020]. Available at: https://www.euronews.com/.

27. Kraemer MU, Yang CH, Gutierrez B, Wu CH, Klein B, Pigott DM, et al. The effect of human mobility and control measures on the COVID-19 epidemic in China. Science 2020; 368: 493-7.

28. Liu X, Kakade M, Fuller CJ. Depression after exposure to stressful events: lessons learned from the severe acute respiratory syndrome epidemic. Compr Psychiatry 2012; 53: 15-23.

29. Luo M, Guo L, Yu M, Jiang W, Wang H. The psychological and mental impact of coronavirus disease 2019 (COVID-19) on medical staff and general public - A systematic review and meta-analysis. Psychiatry Res 2020; 291: 113190.

30. Voitsidis P, Gliatas I, Bairachtari V, Papadopoulou K, Papageorgiou G, Parlapani E, et al. Insomnia during the COVID-19 pandemic in a Greek population. Psychiatry Res 2020; 289: 113076.

31. Özdin S, Bayrak ÖŞ. Levels and predictors of anxiety, depression and health anxiety during COVID-19 pandemic in Turkish society: The importance of gender. Int J Soc Psychiatry 2020; 66: 504-11.

32. Ahmed MZ, Ahmed O, Aibao Z, Hanbin S, Siyu L, Ahmad A. Epidemic of COVID-19 in China and associated psychological problems. Asian J Psychiatr 2020; 51: 102092.

33. Hao F, Tan W, Jiang L, Zhang L, Zhao X, Zou Y, et al. Do psychiatric patients experience more psychiatric symptoms during COVID-19 pandemic and lockdown? A case-control study with service and research implications for immunopsychiatry. Brain Behav Immun 2020; 87: 100-6.

34. Pescosolido BA. The public stigma of mental illness: What do we think; what do we know; what can we prove? J Health Soc Behav 2013; 54: 1-21.

35. Kane JC, Elafros MA, Murray SM, Mitchell EMH, Augustinavicius JL, Causevic S, et al. A scoping review of health-related stigma outcomes for high-burden diseases in low- and middle-income countries. BMC Med 2019; 17: 2-40.