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The impact of COVID-19 pandemic on mental health & wellbeing among home-quarantined Bangladeshi students: A cross-sectional pilot study

Author(s): Abid Hasan Khan^a, Mst. Sadia Sultana ^a, Sahadat Hossain^{a,*}, M. Tasdik Hasan^b, Helal Uddin Ahmed^c, Md. Tajuddin Sikder ^a,

Affiliation(s):

^aDepartment of Public Health and Informatics, Jahangirnagar University, Savar, Dhaka, Bangladesh

^bDepartment of Psychological Sciences, University of Liverpool, United Kingdom

^cNational Institute of Mental Health, Sher-E-Bangla Nagar, Dhaka, Bangladesh

****Corresponding Author***

Sahadat Hossain

Lecturer

Department of Public Health and Informatics, Jahangirnagar University, Savar, Dhaka, Bangladesh.

ORCID: 0000-0001-9433-202X

Cont. No: +88-01766-305105

Email: sahadat.hossain@juniv.edu

Highlights

- This is the first study focused on COVID-19 associated mental health among the home-quarantined Bangladeshi university and college students.
- University students had greater psychological impact due to COVID-19 than college students.
- Perceived COVID-19 symptoms were significantly associated with higher scores in DASS stress subscale (B=3.71, 95% CI: 1.01 to 6.40), DASS anxiety subscale (B= 3.95, 95% CI: 1.95 to 5.96), DASS depression subscale (B=3.82, 95% CI: 0.97 to 6.67) and IES scores (B=7.52, 95% CI: 3.58 to 11.45).
- Physical exercise was significantly associated in lowering scores of DASS depression subscale (B= -2.10, 95% CI: -4.02 to -0.17)
- Financial uncertainty, fear of COVID-19 infection, inadequate valid information on COVID-19, and excessive exposure to COVID-19 news on social & mass media had significant negative impact on students' mental health.

Abstract

Background: COVID-19 is imposing threat both on physical and mental health since its outbreak. Bangladesh adopted lockdown strategy with potential consequences on day to day life, mental and physical health and this study aims to explore the impact of COVID-19 on mental health and wellbeing among Bangladeshi students.

Methods: A cross-sectional study was conducted between 9th and 23th April 2020 among 505 college and university students. Data was collected by using online questionnaire including DASS 21 and IES. Descriptive analysis and bivariate linear regression were performed to examine the association of variables.

Results: 28.5 % of the respondents had stress, 33.3% anxiety, 46.92% depression from mild to extremely severe, according to DASS 21 and 69.31% had event-specific distress from mild to severe in terms of severity according to IES. Perceiving physical symptoms as COVID-19 was significantly associated with DASS stress subscale ($B=3.71$, 95% CI: 1.01 to 6.40), DASS anxiety subscale ($B= 3.95$, 95% CI: 1.95 to 5.96), DASS depression subscale ($B=3.82$, 95% CI: 0.97 to 6.67) and IES scale ($B=7.52$, 95% CI: 3.58 to 11.45). Additionally, fear of infection, financial uncertainty, inadequate food supply, absence of physical exercise and limited or no recreational activity had significant association with stress, anxiety, depression and post-traumatic symptoms.

Conclusion: This COVID-19 outbreak imposes psychological consequences on people to a great extent which requires attention from the concerned authorities to cope with this situation mentally. The perception about the outbreak can also play a big role in psychological impact.

Key words: COVID-19; Home-quarantine; Mental health & wellbeing; Depression; Anxiety; Stress; Students; Bangladesh.

1. Background

The COVID-19, recent public health crisis of global concern is challenging psychological capacity of the public to deal with ongoing crisis (Wang C, Pan R , Wan X et. al, 2020). This is not applicable to individuals with COVID-19 only but also those who are bound to be in quarantine for a long time during a lockdown. World Health Organization (WHO) declared the emergence of novel coronavirus as global public health emergency of on 30th January, 2020 (WHO, 2020b, 2020c) whilst Institution of Epidemiology, Disease Control and Research (IEDCR), declared the first confirmed case of COVID-19 in Bangladesh on 8th March, 2020. (Hossain A et. al, 2020). With slow increase in cases as days go by, according to IEDCR, the number of cases started to put spikes on graphs almost after a month, on 7th April with 41 new cases, 8th April with 54 new cases, 9th April with 112 new cases and it kept on rising rapidly since then. The pandemic is not only causing deaths worldwide but also creating psychological pressure for persons with COVID-19 and healthy individuals (Xiao, 2020; Duan, 2020). High level of stress and anxiety are natural responses towards any sorts of unnatural situation (Roy D, Tripathy S et. al, 2020).

Quarantine has been used as a preventive measure for centuries to deal with major infectious outbreaks and it proved to be effective in controlling the spread of infectious diseases such as cholera and plague in the past (Brooks et al., 2020; Risse, 1992; Twu et al, 2003; CDC, 2003; Mandavilli, 2003; Barbera et. al, 2001 & Markel, 1995). Quarantine is the separation and restriction of movement of people who have potentially been exposed to a contagious disease to ascertain if they become unwell, for reducing the risk of them infecting others in the community (CDC, 2017). Bangladesh government suspended all educational institutions to function since 18th March and imposed lockdown to restrict public gathering and to encourage staying home since 26th March to prevent the rapid spread of COVID-19 infection (The Daily Star, 2020). Following this procedure people are bound to be home quarantined for the protection of community. This method may succeed or not, but long lockdown period forcing mass quarantine is sure to affect people psychologically with underlying causes such as increased media reporting, escalating number of new cases etc. (Rubin G J & Wessely S, 2020). Another study provides evidence for individuals being in quarantine may experience psychological distress in the form of anxiety, anger, confusion and post-traumatic stress symptoms (Brooks et al., 2020). Health authorities across the globe are currently much more focused on physical protection by advising social distancing and home

quarantine rather than mental health (WHO, 2020) and there is a paucity of research that evaluated the mental health concerns during this pandemic, especially in Bangladesh. Therefore, this pilot study aimed to assess the level of psychological impact of college and university students who are bound to be home-quarantined at their home as widespread lockdown started to take place.

2. Methods

2.1 Study design & participants

A cross-sectional study design was adopted. Being a student of college or university, being home-quarantined, able to speak Bengali and have been residing in Bangladesh during the outbreak were the eligibility criteria for this study.

2.2 Procedure

The survey was completed by participants from 9th April to 23th April, 2020 and it was totally voluntary in nature. Convenient sampling was applied for data collection was via social media with an online questionnaire including DASS 21 and IES as face to face interview had to be avoided considering ongoing health threat. After going through the aims and purpose of the study, respondents provided their informed consent prior to starting the investigation and completed a self-reporting questionnaire. A total 509 respondents completed the survey and 505 respondents were taken for final analysis. No financial incentive was provided to the participants and anonymity was maintained to ensure the confidentiality and reliability of data. It was also informed that participant could withdraw from the survey at any time without providing any justification. This study was conducted online in full compliance with the provisions of the Declaration of Helsinki regarding research on human participants.

2.3 Measures

2.3.1 Socio-demographics

Socio-demographic data of the respondents was obtained through both open and close ended questions involving their age, gender, religion, educational attainment, marital status and number of family members.

2.3.2 Self-reported physical symptoms

Information on physical symptoms were obtained through questions including concerned symptoms to be answered only in “Yes” or “No”. Concerned physical symptoms were chosen on the basis of closeness towards the symptoms of COVID-19 such as fever, difficulty breathing, dry cough and other symptoms like fatigue, diarrhea and sore throat. The respondents were also asked if they perceived the symptoms they have as a sign of COVID-19 infection.

2.3.3 Home-quarantine activities and extra-physical stressors perceived as psychological discomfort

Respondent activities during this quarantine or lockdown period and extra-physical stressors they perceived to be psychologically uncomfortable were obtained using a checklist for each section. Quarantine activity checklist had options such as online social networking, recreational activity (e.g. entertainment show), physical exercise, religious activity, educational activity and a scope to mention any other activities apart from the ones mentioned above. Extra-physical stressors checklist had options such as prolonged home-quarantine, financial uncertainty, inadequate food supply, inadequate valid information on COVID-19, fear of infection and excessive exposure to the news of outbreak & death on social media.

2.3.4 Stress, anxiety & depression

Depression Anxiety and Stress Scale 21 (Lovibond, S.H. & Lovibond, P.F,1995) was used to assess the prevalence of stress, anxiety and depression among students. The scale is also validated in Bangla (Alim, S. A., Kibria, S. M., Islam, M. J., Uddin, M. Z., Nessa, M., Wahab, M. A., & Islam, M. M. ,2017). The scale contains 21 items divided equally with 7 items into 3 subscales of stress, anxiety and depression. Question no. 1, 6, 8, 11, 12, 14, and 18 formed the stress subscale with cut off scores as following: normal (0–14), mild stress (15–18), moderate stress (19–25), severe stress (26–33), and extremely severe stress (34 and above). Question no. 2, 4, 7, 9, 15, 19, and 20 formed the anxiety subscale with cut off scores as following: normal (0–7), mild anxiety (8–9), moderate anxiety (10–14), severe anxiety (15–19), and extremely severe anxiety (20 and above). Question no. 3, 5, 10, 13, 16, 17 and 21 formed the depression subscale with cut off scores

as following: normal (0–9), mild depression (10–13), moderate depression (14–20), severe depression (21–27), and extremely severe depression (28 and above).

2.3.5 Event-specific distress (ESD)

Impact of Event Scale (Horowitz M et. al, 1979) was used to evaluate event-specific distress. It is a 15 item self-reporting assessment tool for measuring amount of distress associated with specific events that is followed by cut off scores: no meaningful impact (0-8) , impact event (9-25) , powerful impact event (26-43) and severe impact event (44 and above) (Reed, 2007).

2.4 Statistical analysis

Descriptive analysis was conducted to obtain the characteristics of the participants and bivariate linear regression was used in combination to examine risk factors associated with psychological measures (DASS subscales score and IES score) The estimates of the strengths of associations were demonstrated by the Beta (Co-efficient) with a 95% confidence interval (CI). A p-value of ≤ 0.05 was considered to be significant. The STATA version 14.1 (StataCorp LP, College Station, TX, USA) and MS Excel were used to carry out all statistical analysis.

3. Results

3.1 Sociodemographic variables and mental health impact

Sociodemographic variables are reported in Table 1. Most of the respondents were male (62.77%), aged 20 to 24 years (78.42%), unmarried (96.63%) either attending a college (14.06%) or university (85.94%). Most of the respondents lived in a family of less than 5 members (51.49%). Age group 20 to 24 was significantly associated with higher IES score ($B=0.28$, 95% CI: 0.06 to 0.50), but age group 25 or more had significant association with even higher IES score ($B=0.53$, 95% CI: 0.21 to 0.84). Students studying in university had significant association with higher DASS stress subscale ($B=2.61$, 95% CI: 0.29 to 4.93) and IES scores ($B=4.07$, 95% CI: 0.67 to 7.48). Other sociodemographic variables including gender, marital status family size had no significant association with higher or lower IES and also any of DASS subscale scores.

3.2 Perceived COVID-19 symptoms and mental health impact

Perceived COVID-19 symptoms are reported in table 2. Most reported symptom was dry cough (13.66%) and was significantly associated with higher scores in DASS stress subscale ($B=2.69$,

95% CI: 0.34 to 5.04) and DASS anxiety subscale scores (B= 2.21 , 95% CI : 0.45 to 3.97). Later comes fatigue (13.47%) that is significantly associated with higher score in DASS stress subscale (B= 7.09 , 95% CI : 4.79 to 9.38) , DASS anxiety subscale (B= 5.40 , 95% CI : 3.68 to 7.11) and DASS depression subscale (B= 7.14 , 95% CI : 4.70 to 9.57). Fever (8.32%) had significant association with increased score of DASS stress subscale (B= 3.98, 95% CI: 0.34 to 5.04) and DASS anxiety subscale scores (B= 4.04, 95% CI: 1.87 to 6.21). Throat pain (6.34%) was significantly associated with higher DASS anxiety subscale scores (B= 3.96, 95% CI: 1.48 to 6.42). Difficulty breathing (4.36%) had significant relationship with higher scores DASS stress subscale (B=6.03, 95% CI : 2.09 to 9.68) , DASS anxiety subscale (B=9.02 , 95% CI : 6.15 to 11.89) and DASS depression subscale (B=5.47 , 95% CI : 1.30 – 9.64). And perceiving these physical symptoms as COVID-19 had significant association with higher scores in DASS stress subscale (B=3.71, 95% CI : 1.01 to 6.40), DASS anxiety subscale (B= 3.95 , 95% CI : 1.95 to 5.96), DASS depression subscale (B=3.82 , 95% CI : 0.97 to 6.67) and IES scores (B=7.52, 95% CI: 3.58 to 11.45).

3.3 Home-quarantine activities and mental health impact

In Table 3, Recreational activity had significant association with lower scores in DASS stress subscale (B= - 1.65 , 95% CI: -3.27 to – 0.003) and DASS anxiety subscale (B= -1.27 , 95% CI: -2.49 to -0.06). Physical exercise was significantly associated in lowering scores of DASS depression subscale (B= -2.10 , 95% CI: -4.02 to -0.17). Similarly, household chores had significant association with lower DASS depression subscale scores (B= -1.76 , 95% CI: -3.48 to -0.04). Other activities including Social networking and educational activities were not significantly associated with IES or any of DASS subscale scores.

3.4 Perceived extra-physical stressors and mental health impact

In table 4, extra-physical stressors to affect the respondents' mental health were reported. Financial uncertainty had significant association with higher scores in DASS stress subscale (B= 3.67, 95% CI: 2.01 to 5.34), DASS anxiety subscale (B=2.15, 95% CI: 0.89 to 3.40) and DASS depression subscale (B=3.37, 95% CI: 1.60 to 5.13). Fear of infection had significant association with higher score in DASS anxiety subscale (B= 1.20 , 95% CI: -0.01 to 2.410 and IES scale (B=6.11 , 95% CI: 3.79 to 8.43). Inadequate food supply had significant relationship with higher scores in DASS stress subscale (B= 2.94 , 95% CI: 0.76 to 5.13) , DASS anxiety subscale (B= 2.63 , 95% CI: 1.00

to 4.26), DASS depression subscale ($B=2.95$, 95% CI: 0.64 to 5.26) and IES scale ($B=5.63$,95% CI: 2.44 to 8.82). Inadequate valid information of COVID-19 had significant association with higher scores in IES scale ($B=2.83$, 95% CI: 0.27 to 5.38). Exposure to COVID-19 news in social and mass media had significant association with higher scores in DASS stress subscale ($B= 2.63$, 95% CI: 0.97 to 4.28), DASS depression subscale ($B=2.68$, 95 % CI: 0.93 to 4.23) and IES scale ($B=5.21$, 95% CI: 2.80 to 7.62). However, prolonged quarantine had no significant association with IES and DASS subscale scores.

4. Discussion

In accordance to the response of college and university students from 9th April, 2020 (since when COVID-19 cases started to soar high after the detection of first confirmed case on 8th March, 2020 in Bangladesh) to 15th April, 2020, the study suggests that, 28.50 % students reported mild to extremely severe stress levels 33.28% students reported mild to extremely severe anxiety levels, 46.92% students reported mild to extremely severe depression levels (Figure 1) which is lower than depression levels in adolescents (Anjum A et. al, 2019) and 69.31% students reported mild to severe level of psychological impact caused by the outbreak (Figure 2). These findings corresponds with a study conducted in China which have higher level of psychological impact compared to stress ,anxiety and depression in general public at initial stage of the epidemic. (Wang C, Pan R , Wan X et. al, 2020). We found that university students had higher psychological impacts than college students. More than 69% of university students experience mental stress (Hossain S et. al, 2018). Also, existing literature has evidence for having increased negative emotion with higher educational attainment (Li et. al, 2020). Educational activity being hampered due to this shut down can be a reason for higher stress in university students which can be solved by necessary arrangements for online classes. Uncertainty regarding academic progression can be a stressor for young minds (Roy D, Tripathy S et. al, 2020).

Considering 92.5% of students involved in online activities in our study, concerned authorities can launch mental health literacy program including psychological interventions via online methods since all educational institutions have been shut down to prevent public gathering. Another reason to consider online interventions is that the young people are very much handfull in smartphone application. (Do, T.T.T., Le, M.D., Van Nguyen, T. et al., 2018) Students in aged above 25 had

higher psychological impact than students in age groups 20 to 24. In fact, this finding corresponds with a previous study that indicates higher IES score for older age (Zhang Y, Ho SMY, 2011). This may also be the reason for university students to have higher IES score. To combat this problem concerned authority can develop web-based education system to keep academic progress ongoing (Zhang, Ho, & Ho, 2014).

This study suggests that 24.36% students had moderate to severe ESD from specific event as the COVID-19 started to spread everywhere in Bangladesh which is approximately twice compared to hospital employees in China following the SARS outbreak in 2003 (Wu P et. al, 2009) . Addition to that, students reported extra-physical stressors such as financial uncertainty (35.64%), fear of infection (50.89%), inadequate food supply (16.24%), lack of information on COVID-19 (31.49%), excessive exposure to COVID-19 news in social and mass media (38.22%) were affecting them psychologically. According to 67.13% respondents, prolonged quarantine was also reported to be a stressor in this outbreak situation. We also found that gender was not associated with COVID19-related distress. This finding is inconsistent with a study conducted on general population of China suggesting males having significant associations with stress, anxiety, depression and ESD (Wang C, Pan R , Wan X et. al, 2020). 10.7% respondents of our study went through severe to extremely severe anxiety. Anxiety reflecting in a large population group may result in panic buying which will eventually lead to exhaustion of necessary daily resources (Roy D, Tripathy S et. al, 2020). This may also create a scope for the market to increase prices for daily goods.

It was found in our study that 8.11% respondents reported severe to extremely severe stress which can potentially have serious psychological consequences. And, 17.02% respondents reported to have severe to extremely severe depression. It is hard to say that being in home quarantine is causing this depression as DASS 21 scale is independent of events but they need the attention of mental health specialists for certain. Moreover the results (Table 4) show no significant relationship between DASS depression subscale score and prolonged duration of home-quarantine complained by the respondents.

In this study, majority of students (70.3%) reported themselves to be in good health without any physical symptoms but 29.7% of students reported to have at least one symptom such as fever, dry cough, throat pain, difficulty breathing, fatigue and stuffy nose. Linear regression in our study showed that physical symptoms (e.g., fever, cough) were significantly associated with higher

DASS stress subscale, DASS anxiety subscale, and sore throat was only associated with DASS depression subscale, while breathing difficulty and fatigue both were associated with higher DASS stress, anxiety and depression subscale scores. Previous study also showed that physical symptoms can have significant impact on psychological response (Wang C, Pan R, Wan X et. al, 2020). Physical symptoms potentially related to the infection are responsible for the additional fear of being infected with COVID-19 which can be the reason for high psychological impacts with having physical symptoms. Most importantly, our findings elucidated that 9.90% of students perceived these symptoms as they are infected with COVID-19 as these symptoms are close to COVID-19. Previous study also demonstrates the relation between perception about physical health and depression (Hossain S et. al, 2019). This finding suggests that medical practitioners should add psychological intervention with treatment for who have those infection related symptoms in any outbreak situation. Another finding of our study showed that students who were involved with various activities like physical exercise (26.73%), recreational activity (54.46%) and household chores (55.45%) have lower negative psychological impact in this quarantine. These findings are consistent with the previous studies that suggests physical activity to have positive effect on mental health and stress-coping capacity (Koo KM, Kim CJ., 2018). For this reason, behavior therapy could be focused on relaxation exercises to minimize anxiety and other negative impacts in the home environment.

16.24% respondents marked inadequate food supplies that showed significant association with stress, anxiety, depression and ESD (Table 4). Similarly a study showed that deprivation from basic supplies such as food, clothes etc. during quarantine period can be a source of frustration and furthermore association with anxiety even after 4 to 6 months of release (Wilken JA, Pordell P, Goode B, et al., 2017; Blendon RJ, Benson JM, DesRoches CM, Raleigh E, TaylorClark K, 2004). Another finding from our study revealed that financial uncertainty was a stressor for 35.64% participants and this factor was very significantly related with higher level of stress, anxiety and depression. The people from lower socio-economic group who work from hand to mouth to manage their livelihood tend to face more problem with financial uncertainty in a quarantine situation and the psychological effects appear to be long lasting even after the quarantine. So, it's also expected that both public and private sectors should come forward in helping them with basic need supply. We found that more than half of our respondents (50.89%) had the fear of infection which was significantly associated with anxiety and higher posttraumatic stress symptoms.

Previously researchers also found in a study that, about 40% of respondents were affected by the thought of contracting COVID-19 infection (Roy D, Tripathy S et. al, 2020) & fear of infection was also associated with anxiety in a study...indicating increasing number of patients and suspected cases as a prime factor (Bao, Y., Sun, Y., Meng, S., Shi, J., Lu, L., 2020) . In our study, 31.49% participants reported inadequate valid information as a stress in quarantine situation which was also associated with higher ESD. Also it was seen that information provided by IEDCR, Bangladesh had mixed reaction among country population (Siddika A, Islam M D, 2020). That shows that people had a lack of transparency from health and government officials about the information of the pandemic. This issue highlights the need for public health officials to provide rapid, clear messages delivered to promote accurate understanding of the situation. The study suggests that 38.22% respondents perceived social media as a stressor which was significantly associated with higher stress, depression and ESD. Previous studies provides evidence of increase of ESD by indirect exposure through mass media (Neria Y, Sullivan GM, 2011). Besides people expressing their negative feelings in social media tends to influence others like a contagion. That's why people need to stay positive in social media. Prolonged home-quarantine may have negative psychological outcome (Brooks et. al, 2020) but our study showed otherwise. The reason can be people were more stressed during the initial days and started coping with their stress with prolongation of quarantine. We determined only ESD, depression, anxiety and stress in our study population as we believe that those are the predominant reason for causing psychological distress in an outbreak situation.

4.1 Strength and limitations of the study

Currently, there is no published research reports examining the psychological impact and response of the general public who are in home quarantine during the peak of the COVID-19 epidemic in Bangladesh. Our study provides information about the risk factors associated with psychological impacts that should be helpful for concerned authorities to plan and adopt appropriate interventions to overcome the negative psychological impacts to ensure sound mental health, especially those in quarantine. The study can further assist in future research on psychological aspects of student population.

This study has several limitations to acknowledge. First, the respondents needed to have access to internet to participate, which suggests that they had higher socioeconomic status than the overall

group. This limits the generalizability of the conclusions. Second, this study is limited by its cross-sectional nature & considering the lockdown situation due to the COVID-19 outbreak, we adopted the online convenience sampling strategy which was not based on a random selection of the sample. Therefore, making causal inferences was not possible and also the possibility of sampling bias should be considered. And finally, this study relied on self-reported answers regarding experience during home-quarantine stay which may not align with clinical diagnosis of a mental health professional.

5. Conclusion

The study findings indicate a substantial portion of population are at high risk of psychological consequences during COVID-19 outbreak. People those are home-quarantined following lockdown measures for preserving their physical health, requires paying attention to their mental health as well. As the study suggests higher level of psychological impact, it is important to improve the delivery of psychological intervention keeping up with the clinical field of the health system. Furthermore, the perception of the population regarding the outbreak plays an important role on mental health. This outlines the importance of having the sufficient information and sound knowledge about the outbreak. However, being involved in healthy activities such as physical exercise can improve the ability to cope with this drastic situation.

Authors' statement

CRediT authorship contribution statement

Abid Hasan Khan: Conceptualization, Methodology, Investigation, Data curation, Formal analysis, Writing - original draft, Writing - review & editing, Validation. **Mst. Sadia Sultana:** Investigation, Data curation, Writing - original draft, Validation. **Sahadat Hossain:** Conceptualization, Supervision, Writing - review & editing, Validation. **M. Tasdik Hasan:** Writing - review & editing, Validation. **Helal Uddin Ahmed:** Writing - review & editing, Validation. **Md. Tajuddin Sikder:** Writing - review & editing, Validation.

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Ethics and consent to participate

Ethical standards were maintained to the highest possible extent whilst the study was conducted. All participants read, understood a consent form and agreed to participate in the study. Furthermore, this research is supported by the Department of Public Health and Informatics, Jahangirnagar University, Bangladesh.

Declaration of competing interest

The authors declare that they have no complicit of interest.

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Figure 1: Prevalence of stress, anxiety and depression related to COVID-19 among home quarantined students in Bangladesh

Figure 2: Event-specific distress (associated with COVID-19) among home-quarantined students in Bangladesh

Table 1: Association among sociodemographic variables and mental health impact

Variables	n (%)	Stress			Anxiety			Depression			Impact of Event		
		R ²	AR ²	B (95% CI)	R ²	AR ²	B (95% CI)	R ²	AR ²	B (95% CI)	R ²	AR ²	B (95% CI)
Age													
19 or less	64 (12.67)	0.003	-0.001	Ref.	0.006	0.002	Ref.	0.001	-0.003	Ref.	0.022	0.018	Ref.
20-24	396 (78.42)			0.16			0.26			0.08			0.28*
				(-0.12-0.43)			(-0.06-0.58)			(-0.26-0.44)			(0.06-0.50)
25 or more	45 (8.91)			0.19			0.34			0.19			0.53**
				(-0.21-0.60)			(-0.13-0.80)			(-0.32-0.70)			(0.21-0.84)
Gender													
Male	317 (62.77)	0.001	-0.001	-0.07	0.005	0.003	-0.17	0.003	0.001	-0.15	0.005	0.003	-0.12
				(-0.25–0.12)			(-0.39 – 0.05)			(-0.39-0.09)			(-0.27-0.03)
Female	188 (37.23)			Ref.			Ref.			Ref.			Ref.
Educational Institute													
College	71 (14.06)	0.010	0.008	Ref.	0.004	0.002	Ref.	0.005	0.003	Ref.	0.011	0.009	Ref.
University	434 (85.94)			2.61*			1.18			2.001			4.07*
				(0.29-4.93)			(-0.56-2.93)			(-0.46-4.46)			(0.67-7.48)
Marital Status													
Unmarried	488 (96.63)	0.004	0.002	-0.36	0.000	-0.002	-0.06	0.0010	-	-0.23	0.003	0.001	-0.26
				(-0.90-0.14)			(-0.65-0.53)		0.001	(-0.88-0.41)			(-0.66-0.15)
Married	17 (3.37)			Ref.			Ref.			Ref.			Ref.
Number of family members													
<5	260 (51.49)	0.006	0.002	Ref.	0.003	-0.001	Ref.	0.005	0.001	Ref.	0.002	-0.002	Ref.
5-7	217			-0.11			-0.12			-0.20			-0.06
	(42.97)			(-0.30-0.07)			(-0.34-0.10)			(-0.44–0.04)			(-0.21- 0.09)
>7	28 (5.54)			-0.03			0.08			-0.05			0.06
				(-0.71-0.11)			(-0.39-0.56)			(-0.57 -0.47)			(-0.27-0.39)

*P-value<0.05,**P-value <0.01,B= Beta

Table 2: Association among perceived COVID-19 symptoms and mental health impact

Symptoms	n (%)	Stress			Anxiety			Depression			Impact of Event		
		R ²	AR ²	B (95% CI)	R ²	AR ²	B (95% CI)	R ²	AR ²	B (95% CI)	R ²	AR ²	B (95% CI)
Fever													
Yes	42 (8.32%)	0.014	0.012	3.98** (1.06-6.90)	0.026	0.024	4.04** (1.87-6.21)	0.006	0.004	2.79 (-0.30-5.89)	0.001	-0.001	1.62 (-2.69 – 5.93)
No	463 (91.68%)			Ref.			Ref.			Ref.			Ref.
Dry cough													
Yes	69 (13.66%)	0.010	0.008	2.69* (0.34-5.04)	0.012	0.010	2.21* (0.45-3.97)	0.001	- 0.001	0.76 (-1.74-3.26)	0.001	-0.001	1.03 (-2.45 – 4.49)
No	436 (86.34%)			Ref.			Ref.			Ref.			Ref.
Fatigue													
Yes	68 (13.47%)	0.068	0.066	7.09 ** (4.79- 9.38)	0.071	0.069	5.40** (3.68 – 7.11)	0.062	0.060	7.14** (4.70-9.57)	0.001	-0.001	1.47 (-2.02 – 4.96)
No	437 (86.53%)			Ref.			Ref.			Ref.			Ref.
Sore throat													
Yes	32 (6.34%)	0.005	0.003	2.77 (-0.55 – 6.09)	0.019	0.017	3.96** (1.48 – 6.42)	<0.0001	- 0.002	0.08 (-3.44-3.60)	0.0002	-0.002	-0.77 (-5.66 – 4.12)
No	473 (93.66%)			Ref.			Ref.			Ref.			Ref.
Difficulty breathing													
Yes	22 (4.36%)	0.018	0.016	6.03** (2.09- 9.68)	0.071	0.069	9.02** (6.15- 11.89)	0.013	0.011	5.47* (1.30 – 9.64)	0.001	-0.001	1.97 (-3.87 – 7.80)
No	483 (95.64%)			Ref.			Ref.			Ref.			Ref.
Perceiving these symptoms as COVID-19													
Yes	50 (9.90%)	0.014	0.012	3.71** (1.01-6.40)	0.029	0.027	3.95** (1.95 – 5.96)	0.014	0.012	3.82** (0.97 – 6.67)	0.027	0.025	7.52** (3.58 – 11.45)
No	455 (90.10%)			Ref.			Ref.			Ref.			Ref.

*P-value<0.05, ** P-value <0.01 , B= Beta

Table 3: Association among home-quarantine activities and mental health impact

Activities	n (%)	Stress			Anxiety			Depression			Impact of Event		
		R ²	AR ²	B (95% CI)	R ²	AR ²	B (95% CI)	R ²	AR ²	B (95% CI)	R ²	AR ²	B (95% CI)
Online Social Networking													
Yes	467 (92.48%)	0.003	0.001	-1.89 (-4.96 – 1.18)	0.004	0.002	-1.62 (-3.94-0.67)	0.006	0.004	-2.97 (-6.21 – 0.27)	0.001	-0.001	-1.53 (-6.04 – 2.98)
No	38 (7.52%)			Ref.			Ref.			Ref.			Ref.
Recreational activity													
Yes	275 (54.46%)	0.008	0.006	-1.65* (-3.27 – -0.003)	0.008	0.006	-1.27* (-2.49 – -0.06)	0.0002	-0.002	-0.31 (-2.03 – 1.42)	0.0003	-0.002	-0.43 (-2.83 – 1.96)
No	230 (45.54%)			Ref.			Ref.			Ref.			Ref.
Physical exercise													
Yes	135 (26.73%)	0.004	0.002	-1.29 (-3.11 – 0.54)	0.001	-0.001	-0.55 (-1.92-0.82)	0.009	0.007	-2.10* (-4.02 – -0.17)	0.003	0.001	1.78 (-0.91 – 4.47)
No	370 (73.27%)			Ref.			Ref.			Ref.			Ref.
Household chores													
Yes	280 (55.45%)	0.0051	0.003	-1.33 (-2.96 –0.29)	0.001	-0.002	-0.31 (-1.53-0.91)	0.008	0.006	-1.76* (-3.48 – -0.04)	0.003	0.001	1.50 (-0.89 – 3.89)
No	225 (44.55%)			Ref.			Ref.			Ref.			Ref.
Educational activities													
Yes	45 (8.91%)	0.003	0.001	1.88 (-0.97 – 4.72)	<0.0001	-0.002	0.09 (-2.04 –2.22)	0.0001	-0.002	0.28 (-2.73 – 3.29)	0.001	-0.001	-1.43 (-5.61 – 2.75)
No	460 (91.09%)			Ref.			Ref.			Ref.			Ref.

*P-value<0.05,**P-value<0.01 , B= Beta

Table 4: Association among perceived extra-physical stressors and mental health impact

Stressors	n (%)	Stress			Anxiety			Depression			Impact of Event		
		R ²	AR ²	B (95% CI)	R ²	AR ²	B (95% CI)	R ²	AR ²	B (95% CI)	R ²	AR ²	B (95% CI)
Prolonged home-quarantine													
Yes	339 (67.13%)	0.004	0.002	1.25 (-0.47 – 2.98)	<0.0001	-0.002	0.09 (-1.20 – 1.38)	0.003	0.001	1.17 (-0.65 – 2.99)	0.001	-0.001	1.03 (-1.51 – 3.56)
No	166 (32.87%)			Ref.			Ref.			Ref.			Ref.
Financial Uncertainty													
Yes	180 (35.64%)	0.036	0.034	3.67** (2.01 – 5.34)	0.022	0.020	2.15** (0.89 – 3.40)	0.027	0.025	3.37** (1.60 – 5.13)	0.006	0.004	2.20 (-0.28 – 4.68)
No	325 (64.36%)			Ref.			Ref.			Ref.			Ref.
Fear of infection													
Yes	257 (50.89%)	0.006	0.004	1.45 (-0.16 – 3.07)	0.008	0.006	1.20* (-0.01 – 2.41)	0.001	-0.001	0.73 (-0.99 – 2.44)	0.050	0.049	6.11** (3.79 – 8.43)
No	248 (49.11%)			Ref.			Ref.			Ref.			Ref.
Inadequate food supply													
Yes	82 (16.24%)	0.014	0.012	2.94** (0.76 – 5.13)	0.020	0.018	2.63** (1.00 – 4.26)	0.012	0.010	2.95** (0.64 – 5.26)	0.023	0.021	5.63** (2.44 – 8.82)
No	423 (83.76%)			Ref.			Ref.			Ref.			Ref.
Inadequate valid information on COVID-19													
Yes	159 (31.49%)	0.001	-0.001	0.64 (-1.10 – 2.39)	0.001	-0.001	0.42 (-0.89 – 1.72)	0.002	-0.001	0.81 (-1.03 – 2.66)	0.009	0.007	2.83* (0.27 – 5.38)
No	346 (68.51%)			Ref.			Ref.			Ref.			Ref.
Exposure to COVID-19 news on social & mass media													
Yes	193 (38.22%)	0.019	0.017	2.63** (0.97 – 4.28)	0.006	0.004	1.10 (-0.14 – 2.35)	0.018	0.016	2.68** (0.93 – 4.23)	0.035	0.033	5.21** (2.80 – 7.62)
No	312 (61.78%)			Ref.			Ref.			Ref.			Ref.

*P-value<0.05,**P-value <0.01 , B= Beta