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Original article

# Psychological well-being during COVID-19 lockdown: Insights from a Saudi State University's Academic Community

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## ABSTRACT

**Objectives:** Measures to control the on-going COVID-19 pandemic such as quarantine and social distancing, together with information overload about the sporadic spread of the disease have negatively impacted many individuals' mental and psychosocial health. This study aimed to investigate the prevalence of self-reported mental health parameters and the coping mechanisms of employees and students in a Saudi State University.

**Methods:** An online survey in both Arabic and English was launched targeting students, staff and faculty of King Saud University from May 11 to June 6, 2020, the peak of Saudi Arabia's nationwide lockdown. A total of 1542 respondents (726 males and 816 females) aged 20–65 years old participated.

**Results:** Majority of the respondents claimed to have suffered from anxiety (58.1%), depression (50.2%) and insomnia (32.2%) during the lockdown. On average, 65.3% respondents agreed that family bond strengthened during lockdown. Those in the highest quartile of family bonding score (Q4) were 41% [odds ratio (OR) and 95% confidence interval (CI) of 0.59 (0.39–0.87),  $p < 0.001$ ] and 59% [OR 0.41 (CI 0.27–0.64),  $p < 0.001$ ] were less likely to be anxious and depressed, respectively, even after adjusting for covariates. This independent and significant inverse association was more apparent in females than males.

**Conclusion:** Self-reported acute mental health disorders were common within the academic community during the COVID-19 lockdown. Strength of family bonding as a coping mechanism was instrumental in preserving mental well-being, especially in females.

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## 1. Introduction

A pneumonia of unknown origin, later identified as the coronavirus disease 19 (COVID-19), was first identified in Wuhan, China last December 2019 (Li et al., 2020a). Within months it has spread globally and had been declared a pandemic by the World Health

Organization (WHO) (Cucinotta and Vanelli, 2020). This zoonotic disease is caused by a novel coronavirus, now known as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) (Mackenzie and Smith, 2020). SARS-CoV-2 appears to follow the same respiratory route as other coronaviruses causing acute respiratory distress syndrome (ARDS) and even multiple organ failure in high risk demographics such as the elderly and those with chronic diseases such as type 2 diabetes mellitus and hypertension (Yan et al., 2020). Earlier outbreaks such as SARS-CoV (2002–2004) and the Middle East Respiratory Syndrome Coronavirus (MERS-CoV, 2012 onwards) were more fatal, but eventually contained with total confirmed cases not exceeding 10,000 (Peeri et al., 2020). In contrast and as of November 22, 2020, >58 million confirmed COVID-19 cases have been reported in 213 countries and territories, with a death toll approaching 1.4 million (John Hopkins University, 2020).

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To curb the sporadic spread, most countries at one point used containment measures like lockdown, restrictions on travel, border closures and sweeping prohibitions on gatherings and non-essential commercial activities. The Kingdom of Saudi Arabia (KSA) is no exception, and has also applied the extraordinary measures to curb the spread, including the suspension of prayers at mosques, Umrah and annual Hajj pilgrimages and strict curfews even during the holy month of Ramadan (Alshammari et al., 2020). A nationwide lockdown was also imposed from March 24 to June 20, 2020 in different phases with varied restrictions (Supplementary Table 1) which helped slow down the spread of COVID-19 cases in Saudi Arabia. Such unparalleled isolation measures on social distancing favoring reduced access to social support systems like extended family, friends, acquaintances, community ties, etc. may impact the mental wellness and causes a feeling of loneliness, anxiety and depression (Leigh-Hunt et al., 2017).

The rapid spread and consequential health effects of COVID-19; the coverage that this disease gets in print and social media; and the associated frightening statistics; are likely to have heightened anxiety with adverse impact on mental health (Galea et al., 2020). Such large-scale disasters, be it natural or man-made, have always had a negative impact in an individual's psychological well-being (e.g. posttraumatic stress disorder (PTSD), suicidal tendencies, domestic violence, etc.) (Neria et al., 2008). Because of the novel nature of COVID-19, people equip themselves with new information from different sources including unverified claims such as conspiracy theories, adding to the already heightened fear and anxiety (Roy et al., 2020). Studies on the psychological effects especially among front liners (Kang et al., 2020; Rajkumar, 2020), and those who self-quarantined due to various reasons (Xiao et al., 2020) may help in identifying healthy practices that may benefit the general public, including those from the academia (Burgess and Sievertsen, 2020).

King Saud University (KSU), in close liaison with various Saudi Ministries and in accordance with recommendations issued by WHO, followed all advisories. Be it work from home; suspension of classes and virtual assistance to students through online models; cleaning, sanitization and surveillance measures; or dissemination of COVID-19 related knowledge via SMSs, e-mails, etc.; KSU has taken steps to ensure the safety and well-being of its students, employees, and community at large. Nevertheless, whatever measures taken by the institution to combat the effects of COVID-19 lockdown, the success and failure of those ultimately depends on the self-adaptive measures and behavior.

Studies have shown that healthy diet, physical activity and other lifestyle adaptations modulate mental health (Gomez-Pinilla, 2008). Since the development of psychiatric disorders involve both genetic and environmental elements and nutrients strongly influence brain structure and function, prevention as well as treatment strategies through lifestyle interventions like changes in dietary and physical activity status may prove to be effective (Matsuoka and Hamazaki, 2016). Reports have suggested that COVID-19 lockdown influenced dietary profiles (Di Renzo et al., 2020; Ruiz-Roso et al., 2020). One of the reasons may be immunity boosting capabilities of healthier anti-inflammatory diets which can influence host's response to infection (Iddir et al., 2020). Interventional programs on knowledge and guidance about the importance of diet, physical activity and ways to motivate the masses at these unprecedented times should be carried out. Similarly, family relationships and communication were reported to substantially affect mental health and this association appears to be bidirectional (Kasalova et al., 2017; Thomas et al., 2017). The present study was thus aimed to investigate the prevalence of self-reported mental health conditions such as anxiety, depression, and insomnia; and its association with family bonding.

## 2. Methodology

### 2.1. Study design and participants

This cross-sectional online survey was designed to study the lifestyle changes and mental wellness of the employees and students of King Saud University (KSU), Riyadh, Saudi Arabia during COVID-19 lockdown. This survey was conducted from May 11 to June 6, 2020. A questionnaire was cascaded to all employees and students through their registered institutional e-mails in the KSU database. One response per email ID was allowed to ensure no duplication of data. The inclusion criteria for the study was the registered students and employees of KSU and the completed surveys were included in the data analysis while the data from those who did not complete the survey was not included in the final analysis. The study design and protocol was approved by the Ethics Committee for Scientific Research and Post Graduate Studies at the College of Science, King Saud University, Saudi Arabia (reference# KSU-HE-20-246). The survey had no risks other than potential inconvenience during participation and the all respondents signed the consent before participating in this survey.

### 2.2. Questionnaire

A pilot study (N = 75 participants) was performed to confirm the reliability and validity of the questionnaire. Content validity was done to ensure clarity of the questions. Several revisions were made to strengthen the reliability and enhance scientific value of the data to be collected. Reliability test through Cronbach's  $\alpha$  coefficient yielded >70% for each section of the questionnaire. The questionnaire included a cover letter in Arabic and English. The final version was transferred to an online link for distribution to the e-mails in KSU database.

The questionnaire consisted of three sections:

- 1) Socio-demographic characteristics including age, sex, marital status, family income, family size, educational qualification, employment status, etc.
- 2) Bonding of participants with their family members (e.g., whether participants felt that the bonding with their family improved during lockdown; whether they and their family members motivated each other to fight against Covid-19; whether they spent more time with their families, eating together, exercising together, etc.).
- 3) Mental wellness of the participants (e.g., if the participants experienced anxiety, depression, and/or insomnia during the lockdown). In this section, the operational definition of these mental health conditions was given before the questions. "Depression" was defined as the condition in which a person experienced low mood and/or loss of interest in most activities for two weeks or longer with symptoms like tiredness, poor concentration, etc. "Anxiety" was defined as the condition in which a person experienced persistent and excessive worry with symptoms ranging from headaches, fast heartbeat, shortness of breath, etc. "Insomnia" was defined as a condition where a notable change in sleep patterns, difficulty in falling or staying asleep was observed. The options were scaled as "constant", "sometimes" and "never".

### 2.3. Data analysis

Analysis was done using SPSS version 16.5 (Chicago, IL, USA). Continuous variables were presented as mean  $\pm$  standard deviation (SD). Categorical variables were presented as frequencies (N) and

percentages (%). Chi-Square and Independent T-tests were used to determine differences between categorical and continuous variables, respectively. The proportion of participants opting different options for the 16 questions asked in the four sections related to dietary change, physical activity, family bonding, and mental wellness during Covid-19 lockdown was presented as N (%). For family bonding scale, the options were scored as 5,4,3,2, and 1 for “strongly agree”, “agree”, “undecided”, “disagree”, and “strongly disagree” respectively. The average score for the five questions of family bonding scale was calculated. Participants were stratified into quartiles based on this average family bonding score value. Multinomial regression analysis was done using family bonding score as dependent variable and self-reported mental health conditions (anxiety, depression, and insomnia) as independent variables. Odds ratio (O.R.) and 95% confidence intervals (95% C.I.) was calculated in the higher family bonding quartiles (Q2, Q3 and Q4) compared to lowest quartile (Q1). Different models were tested: a univariate model without adjustment (model a); adjustment with age (model); adjustment with age + socio-demographic characteristics like family income, educational qualification, marital status, etc. This was done for all participants; and then individually for both genders. P-value was considered significant at  $p < 0.05$ .

### 3. Results

#### 3.1. Socio-demographic characteristics of participants

Table 1 shows that 47% (726) of the study participants were males and 53% (816) were females. A large proportion of participants were from the age-group of 20–45 years (1229, 79.7%) and most were educated either up to graduate or higher level (1434,

93%). A fair representation from low (526,36.2%), moderate (602, 41.5%) and high-income groups (383, 26.4%) could be seen in the study participants and there was no statistical difference between genders. There was a significant difference in the proportion of married participants between males (287, 39.5%) and females (415, 50.9%). The participants’ family sizes with 2–4 members (small family), 5–6 members (average family) and >6 members (large family) were fairly represented with 567 (36.8%), 535 (34.7%) and 440 (28.5%), respectively, and this distribution was not different statistically among genders.

#### 3.2. Family bonding during COVID 19 lockdown

Table 2 shows that 1461 (94.7%) of the participants agreed that they, along with their family members, motivated each other to follow government instructions to fight COVID-19. A large proportion of the participants i.e. 1161 (75.3%) agreed to have spent more time with their family members during this period and 1019 (66.1%) reported that they felt that the relationship with their family got stronger during lockdown. 1023 (66.4%) agreed that their family had an increased interest in healthy home cooked meals together, while only 368 (23.9%) reported that they, along with their family members kept themselves physically fit by walking regularly or exercising together at home gym. The composite average behavior towards familial bond strength during lockdown, calculated from the averages of the five questions in section 2 of the survey was 1007 (65.3%), 470 (64.7%) and 537 (65.8%) in all subjects, males and females respectively. There was no gender difference in their agreement related to change in family bonding during the lockdown of COVID-19.

**Table 1**  
Socio-demographic Characteristics of the Participants.

Parameters	All (1542)	Male (726)	Female (816)	P
Age Group (years)				0.58
20–25	454 (29.4)	221 (30.4)	233 (28.6)	
26–35	438 (28.4)	190 (26.2)	248 (30.4)	
36–45	337 (21.9)	161 (22.2)	176 (21.6)	
46–55	186 (12.1)	92 (12.7)	94 (11.5)	
56–65	127 (8.3)	62 (8.5)	65 (7.9)	
Age (years)	35.2 ± 12.4	35.4 ± 12.6	35.0 ± 12.4	0.57
Weight (kg)	78.5 ± 16.4	77.8 ± 15.7	79.2 ± 16.9	0.09
BMI (kg/m <sup>2</sup> )	28.8 ± 5.1	28.0 ± 4.9	29.5 ± 5.2	0.07
Marital Status				<0.01
Unmarried	777 (50.4)	430 (59.2)	347 (42.5)	
Married	702 (45.5)	287 (39.5)	415 (50.9)	
Divorcee	52 (3.4)	8 (1.1)	44 (5.4)	
Widow	11 (0.7)	1 (0.1)	10 (1.2)	
Family Income (SAR/month)				0.46
Low (<5000)	526 (34.1)	260 (35.8)	266 (32.6)	
Average (5000–<8000)	150 (9.7)	65 (9.0)	85 (10.4)	
Moderate (8000–<16000)	452 (29.3)	206 (28.4)	246 (30.1)	
High (>16000)	383 (24.8)	176 (24.2)	207 (25.4)	
Did not answer	31 (2.0)	19 (2.6)	12 (1.5)	
Education Level				0.51
High School	108 (7.0)	54 (7.4)	54 (6.6)	
Graduate	912 (59.1)	430 (59.2)	482 (59.1)	
Post Graduate and above	522 (33.9)	242 (33.4)	280 (34.3)	
Employment Status				0.55
Student	443 (28.7)	214 (29.5)	229 (28.1)	
Employee	1099 (71.3)	512 (70.5)	507 (71.9)	
Family Size				0.83
2–4 members	567 (36.8)	274 (37.8)	293 (35.9)	
5–6 members	535 (34.7)	244 (33.6)	291 (35.7)	
>6 members	440 (28.5)	208 (28.7)	232 (28.4)	

Note: Data represented as N (%).

**Table 2**  
Family bonding during lockdown of COVID 19.

	Males (726)					Females (816)									
	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree					
All (1542)	587 (38)	610 (40)	305 (19.8)	183 (12)	31 (2.0)	275 (38)	266 (37)	120 (16.5)	43 (5.9)	23 (3.2)	312 (38)	302 (37)	127 (15.6)	51 (6.3)	17 (2.1)
My family relation got stronger during lockdown	432 (28)	587 (38)	362 (23.5)	112 (7.3)	49 (3.2)	196 (27)	274 (38)	120 (16.5)	43 (5.9)	23 (3.2)	236 (29)	302 (37)	127 (15.6)	51 (6.3)	17 (2.1)
I spent more time with my family during lockdown	593 (38)	568 (37)	247 (16.0)	94 (6.1)	40 (2.6)	274 (38)	266 (37)	120 (16.5)	43 (5.9)	23 (3.2)	319 (39)	302 (37)	127 (15.6)	51 (6.3)	17 (2.1)
Me and my family had an increased interest in healthy homemade meals together during lockdown	413 (27)	610 (40)	305 (19.8)	183 (12)	31 (2.0)	292 (40)	292 (40)	149 (20.5)	81 (11.2)	14 (1.9)	223 (27)	318 (39)	156 (19.1)	102 (12)	17 (2.1)
Me along with my family had physical activities like walking, home gym etc. together during lockdown	114 (7.4)	254 (16)	284 (18.4)	457 (30)	433 (28)	128 (18)	128 (18)	131 (18)	229 (32)	193 (27)	69 (8.5)	126 (15)	153 (18.8)	228 (28)	240 (29)
Me and my family motivated each other to follow instructions to fight COVID 19	967 (63)	494 (32)	63 (4.1)	14 (0.9)	4 (0.3)	453 (62)	228 (31)	32 (4.4)	10 (1.4)	3 (0.4)	514 (63)	266 (33)	31 (3.8)	4 (0.5)	1 (0.1)
Composite average behavior towards familial bond strength during lockdown	504 (33)	503 (33)	252 (16.3)	172 (11)	111 (7.2)	232 (32)	238 (33)	123 (16.9)	84 (11.6)	50 (6.9)	272 (33)	265 (32)	130 (15.9)	88 (10.8)	61 (7.5)

Note: Data represented as N (%).

### 3.3. Self-reported mental wellness status among participants

The participants were asked about whether they faced anxiety, depression and/or insomnia to assess their mental wellness status during COVID-19 lockdown and the results were summarized in Table 3. A large proportion of the participants (896, 58.1%) reported being anxious either constantly (349, 22.6%) or sometimes (547, 35.5%) during the lockdown and these were comparable in males and females. Similarly, depression was reported by 773 (50.2%) of the participants, where 260 (16.9%) said they faced it constantly during lockdown while 513 (33.3%) said that there were spells of depression. The third question asked was about insomnia and 496 (32.2%) of the participants reported suffering from it either constantly (233, 15.1%) or sometimes (263, 17.1%) during lockdown. No significant differences were seen in the responses of males and females. The prevalence of self-reported mental health status was also checked separately in students and employees and the results are summarized in Supplementary Table 2.

### 3.4. Association of self-reported mental wellness status according to quartiles of family bonding in participants

The participants were divided into quartiles based on the bonding scores with their family members and the proportion of participants who reported constant occurrence of the three parameters of mental statuses in each quartile was depicted in Table 4. Also, this table depicts the results of a multinomial regression analysis where odds of having anxiety, depression and insomnia were calculated in participants with higher quartiles of family bonding compared to the lowest quartile. Anxiety and depression decreased significantly with increasing quartiles of family bonding and this inverse association was significant even after adjustment with age and socio-demographic characteristics of the participants like marital status, family income, education, and employment status. The O.R. (95% C.I.) of anxiety and depression in Q2, Q3, and Q4 compared to Q1 was respectively 0.8 (0.6–1.1), 0.6 (0.4–0.9) and 0.5 (0.4–0.8) (trend p-value for trend 0.008); and 0.6 (0.4–0.8), 0.5 (0.3–0.7) and 0.4 (0.3–0.6) (p-value for trend < 0.001). Overall, the individuals with highest family bonding quartile (Q4) compared to lowest quartile (Q1) showed 41% and 59% less risk for anxiety and depression respectively in the adjusted model which showed that anxiety and depression being independently related to family bonding. However, when the data was divided between genders, this independent inverse association could only be seen in females and not in males. Females with highest family bonding quartile (Q4) showed 47% and 75% less risk for anxiety and depression respectively compared to the lowest quartile (Q1) in the adjusted model, while in males there was no independent association of their mental statuses with family bonding. Also, the odds of having insomnia in higher quartiles of family bonding scores were statistically not significant compared to the first quartile in either males or females.

## 4. Discussion

This cross-sectional survey observed a high prevalence of self-reported anxiety, depression, and insomnia among Saudi State University students and employees during the COVID-19 lockdown, experiencing these either constantly or occasionally. Also, a sexually dimorphic, significant, independent and inverse association was found between family bonding, anxiety and depression, especially among female respondents. To the best of our knowledge, this is the first study that reports the psychological impact of lockdowns among members of the academic community and



**Table 3**  
Information about self-reported mental wellness status among study participants.

All (1542)			Males (726)			Females (816)			P-Value
Constantly	Occasionally	No	Constantly	Occasionally	No	Constantly	Occasionally	No	
<i>I suffered from anxiety during lockdown</i>									
349 (22.6)	547 (35.5)	646 (41.9)	162 (22.3)	254 (35)	365 (23.7)	187 (22.9)	293 (35.9)	336 (41.2)	0.83
<i>I suffered from depression during lockdown</i>									
260 (16.9)	513 (33.3)	769 (49.9)	122 (16.8)	239 (32.9)	365 (50.3)	138 (16.9)	274 (33.6)	404 (49.5)	0.95
<i>I suffered from insomnia during lockdown</i>									
233 (15.1)	263 (17.1)	1046 (67.8)	111 (15.3)	127 (17.5)	488 (67.2)	122 (15)	136 (16.7)	558 (68.4)	0.88

Note: Data represented as N (%). P calculated by chi-square test to check the differences between males and females. P < 0.05 is considered as significant.

**Table 4**  
Self-reported mental wellness status of the study participants according to the family bonding quartiles.

All Participants (N = 1542)										
Quartiles	Q1 (386)	Q2 (385)	Q3 (385)	Q4 (386)	Model	Q1	Q2	Q3	Q4	P
Score	2.9 ± 0.3    3.5 ± 0.1    3.9 ± 0.1    4.5 ± 0.3				O.R. (95% C.I.)					
Anxiety	105 (27.2)	95 (24.7)	81 (21.0)	68 (17.7)	a	1.0	0.8 (0.6–1.1)	0.6 (0.4–0.9)*	0.5 (0.4–0.8)**	0.008
					b	1.0	0.8 (0.6–1.2)	0.7 (0.5–1.0)*	0.6 (0.4–0.9)**	0.03
					c	1.0	0.9 (0.6–1.2)	0.7 (0.45–1.0)*	0.6 (0.4–0.9)**	0.03
Depression	88 (22.8)	69 (17.9)	54 (14.0)	49 (12.7)	a	1.0	0.6 (0.4–0.8)**	0.5 (0.3–0.7)**	0.4 (0.3–0.6)**	<0.001
					b	1.0	0.6 (0.4–0.8)**	0.5 (0.3–0.8)**	0.4 (0.3–0.6)**	<0.001
					c	1.0	0.6 (0.4–0.9)*	0.5 (0.4–0.8)**	0.4 (0.3–0.6)**	<0.001
Insomnia	73 (18.9)	47 (12.2)	55 (14.3)	58 (15.0)	a	1.0	0.6 (0.4–0.9)*	0.7 (0.5–1.1)	0.8 (0.5–1.1)	0.09
					b	1.0	0.6 (0.4–1.0)*	0.7 (0.5–1.1)	0.8 (0.5–1.2)	0.17
					c	1.0	0.6 (0.4–1.0)*	0.7 (0.5–1.1)	0.8 (0.5–1.2)	0.21
Males (N = 726)										
Quartiles	Q1 (181)	Q2 (182)	Q3 (181)	Q4 (182)	Model	Q1	Q2	Q3	Q4	P
Score	3.0 ± 0.3    3.5 ± 0.1    3.9 ± 0.1    4.5 ± 0.3				O.R. (95% C.I.)					
Anxiety	44 (24.3)	41 (22.7)	47 (25.8)	30 (16.5)	a	1.0	0.7 (0.4–1.2)	0.9 (0.5–1.6)	0.5 (0.3–0.8)*	0.04
					b	1.0	0.8 (0.4–1.3)	0.9 (0.6–1.6)	0.5 (0.3–0.9)*	0.09
					c	1.0	0.8 (0.4–1.4)	0.9 (0.5–1.6)	0.5 (0.3–0.9)*	0.12
Depression	31 (17.1)	29 (16.0)	27 (14.8)	35 (19.2)	a	1.0	0.7 (0.4–1.2)	0.6 (0.3–1.1)	0.99 (0.6–1.8)	0.22
					b	1.0	0.7 (0.4–1.3)	0.7 (0.4–1.2)	1.02 (0.6–1.8)	0.35
					c	1.0	0.8 (0.4–1.4)	0.7 (0.4–1.4)	1.10 (0.6–2.1)	0.47
Insomnia	32 (17.7)	21 (11.5)	24 (13.3)	34 (18.7)	a	1.0	0.6 (0.3–1.0)	0.7 (0.4–1.2)	1.08 (0.6–1.9)	0.10
					b	1.0	0.6 (0.3–1.1)	0.7 (0.4–1.3)	1.09 (0.6–1.9)	0.17
					c	1.0	0.6 (0.3–1.1)	0.7 (0.4–1.3)	1.09 (0.6–2.0)	0.14
Females (N = 816)										
Quartiles	Q1 (204)	Q2 (204)	Q3 (204)	Q4 (204)	Model	Q1	Q2	Q3	Q4	P
Score	2.91 ± 0.3    3.55 ± 0.1    3.95 ± 0.1    4.5 ± 0.2				O.R. (95% C.I.)					
Anxiety	59 (28.9)	55 (27.0)	41 (20.1)	32 (15.7)	a	1.0	1.0 (0.6–1.6)	0.6 (0.4–1.0)	0.5 (0.3–0.8)**	0.02
					b	1.0	1.0 (0.6–1.6)	0.6 (0.4–1.1)	0.5 (0.3–0.9)*	0.03
					c	1.0	1.0 (0.6–1.8)	0.6 (0.4–1.0)	0.5 (0.3–0.9)*	0.03
Depression	55 (27.0)	39 (19.1)	24 (11.8)	20 (9.8)	a	1.0	0.5 (0.3–0.9)*	0.3 (0.2–0.6)**	0.2 (0.1–0.4)**	<0.001
					b	1.0	0.5 (0.3–0.9)*	0.3 (0.2–0.6)**	0.2 (0.1–0.5)**	<0.001
					c	1.0	0.6 (0.3–1.0)	0.4 (0.2–0.6)**	0.2 (0.1–0.5)**	<0.001
Insomnia	39 (19.1)	26 (12.7)	30 (14.7)	27 (13.2)	a	1.0	0.6 (0.4–1.1)	0.8 (0.5–1.4)	0.7 (0.4–1.1)	0.33
					b	1.0	0.7 (0.4–1.1)	0.8 (0.48–1.4)	0.7 (0.4–1.2)	0.40
					c	1.0	0.6 (0.4–1.2)	0.9 (0.49–1.5)	0.7 (0.4–1.2)	0.42

Note: Model (a) unadjusted, (b) adjusted for age, (c) adjusted for age + socio-demographic characteristics; \*denotes significance at 0.05 level; \*\*denotes significance at 0.01 level; Significant at p < 0.05.

also suggests beneficial coping mechanisms such as family bonding.

Several studies have focused on the psychological effects of lockdown and the difficulties in adapting to the new norm during quarantine (Luo et al., 2020; Vindegaard and Benros, 2020). Though lockdown, social distancing and public confinement adopted by various public health institutions were effective in controlling the spread of the virus, it posed a risk for emotional and psychological disorders which needs to be evaluated and addressed. Necessary measures including counseling are being designed for high risk groups such as the front line health workers

and their families (Bao et al., 2020; Xiang et al., 2020). Such measures can be expanded to include the mental wellbeing of other individuals affected psychologically by drastic lockdown policies. Earlier outbreaks like SARS had many psychological effects like anxiety, depression, fear etc., on college students, symptoms of which persisted months after the spread was contained (Peng et al., 2010; Mei et al., 2011).

Accumulating evidences also point out the global perspectives of mental health consequences of COVID-19, often reported but not limited to the most vulnerable class of health care workers (Szczęśniak et al., 2020). Such reports corroborates with the find-

ings of this study where 58.1% and 50.2% were reported being anxious or depressive either more often or in spells during the COVID-19 lockdown and 32.2% reported suffering from insomnia during this period. People are under great psychological stress for multiple reasons such as restrictions and lockdown imposed by the authorities, the media coverage on new cases and deaths, to the fear of losing jobs or getting infected, which may lead to the psychiatric symptoms of anxiety, depression, and insomnia (Rubin and Wessely, 2020). The increase in negative emotions and sensitivity like anxiety, depression and indignation during this pandemic in the general public can be gauged from the results of around 18,000 social media users in China (Li et al., 2020b). In another study from India, >80% perceived the need for mental healthcare even though there was an adequate level of awareness and preparedness towards preventive measures for COVID-19 infection (Roy et al., 2020). One of the main repercussions of social isolation, otherwise effective in controlling the spread of COVID-19, is the development of sense of loneliness in humans which by nature are highly social (Cacioppo et al., 2014; Brooks et al., 2020). The neurobiology of social isolation teaches us that loneliness and negative emotions may entrap persons to a downward cycle of psychological events, which, apart from other consequences, may lead to increased suicidal tendencies (Bzdok and Dunbar, 2020).

Stress and its mental health connotations have far reaching consequences in university students as an example. Lower levels of engagement in campus, low energy levels, poorer relationships with other students and faculty, unable to concentrate on studies and lower average grades, etc. are some of the immediate effects (Regehr et al., 2013), while suicidal ideation and a life-time self-harming behavior may increase as a long term consequence of stress (Downs and Eisenberg, 2012). Surprisingly, not much is available from the literature on the strategies and interventions on how to prevent the mental health consequences of prolonged social isolation and loneliness during and after pandemics such as COVID-19. The results of our study suggests that one way to mitigate such consequences may be in adaptations related to strengthening of the family bonding and family interactions. The respondents who reported highest scores of family bonding like spending more time with family, eating and exercising together, other family interactions, etc. showed 41% and 59% less risk for self-reported anxiety and depression, respectively, favoring females more than males. This can be explained by the qualitative literature on the importance of role of families in easing out the difficulties and challenges encountered by a family member. New challenges bring forth stronger tendencies to adapt and mitigate the disruption due to a systemic framework around family setup (Walsh, 2015). Stronger family rituals and routines are predictive of family attachment and cohesion which may act as a core factor of family resilience during difficult times (Harrist et al., 2019). For example, the role of family relationships in reducing posttraumatic mental disorders has been investigated post tsunami exposure in Sri Lanka (Wickrama and Kaspar, 2007), Hurricane Katrina in United States (Kronenberg et al., 2010), and armed conflicts in the Middle East (Dimitry, 2012).

The family beliefs and the associated emotional security from family relationships are implicated during stress and major life events. Close relationships within the family and maintaining stronger familial bonds, with better coping and resilience, even during unprecedented times can help weather unfavorable circumstances that may arise due to social disruptions during COVID-19 (Prime et al., 2020). A family structure by nature, when faced with difficult times, tends to orient in a more family-centric rather than a self-centric way (Campbell and Manning, 2018). This can also be observed in our results where 94.7% of the respondents agreed that they, along with family members motivated each other during this

lockdown to follow government instructions to fight COVID-19. More people reported utilizing this time of lockdown to improve their familial relationships by spending more time together be it watching their favorite shows or movies together, having home-cooked meals together or just spending time communicating (Cluver et al., 2020). Thus, this enforced togetherness during the lockdown of COVID-19 may strengthen the familial relationships, however, to address specific family processes and the associated mental strain during and aftermath COVID-19, longitudinal studies investigating the ripple effects of the events of these unprecedented times are recommended which may help to generate guidelines to cater the mental health needs of people.

The authors acknowledge several limitations. First, the nature of the study being cross-sectional and self-reported survey limits its findings to at best, suggestive. Second, findings from the academic community may not necessarily apply to the general public who maybe of lower socioeconomic and educational backgrounds, as well as individuals who do not live with their families, both of whom may need a different coping mechanism. Also, a convenient online survey adopted in one university may show bias and larger scale surveys in different universities are needed to add up and validate the findings. Lastly, the self-reported mental health approach adopted in this study, though useful in giving a generalized overview especially when limited data is available, may show bias for valuation into specific mental health disorder and future studies using validated scales for such disorders should be designed.

## 5. Conclusion

The present study supports that coping mechanisms such as strengthening family bonding maybe beneficial to averse the mental health impact of the COVID-19-related isolation measures. The authors also recommended interventional studies especially in institutions like universities where education on the importance of strengthening the family bond, communicating with family members, sharing time with them especially while having meals and exercising together can help mitigate the mental health consequences of COVID-19 lockdown.

In conclusion, there is a high prevalence of self-reported anxiety, depression and insomnia among members of the academic community during the COVID-19 lockdown. Individuals who stayed with their families during the lockdown were less likely to suffer from mental health issues, since developing stronger family appear to be beneficial in mitigating mental health consequences, especially in females. Longitudinal studies and interventions to promote mental well-being in institutions such as universities need to be intensified.

## Author contributions

HAA and NMA contributed to the study design. Data collection was performed by AAA, MGAA, HAA, AAJ and DA. Manuscript draft was done by KW. Statistical analysis was done by KW. Data interpretation was done by KW, SMY, HAA and SS. Manuscript was reviewed by HAA, DA, SS and NMA. All authors have read and approved the final manuscript.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jksus.2020.101262>.

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