The Global COVID-19 Pandemic Quarantining Effect on Mental Health, Sleeping Quality and Life-Style

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Abstract: *Background*: The COVID-19 pandemic is a major public health problem and uncontrollable crisis that has affected the life of billions of peoples globally.

Aim: The aim of this study was to investigate impact of COVID-19 on the prevalence of depression, anxiety, stress, sleeping symptoms and to identify associated risk factors during quarantining in Turkey.

Materials and Methods: This is a cross-sectional survey multi-stage, stratified random sampling based on total of 4,361 participants (80.5%) gave consent male and female and aged 20-65 years in Turkey who completed the 21-item Depression, Anxiety, Stress Scale (DASS-21), Patient Health Questionnaire (PHQ-9) and Pittsburgh Sleep Quality Index (PSQI). The data were analyzed using descriptive and multiple regression analyses.

Results: There were significant differences between males and females with respect to age groups, occupation, income, residence, number of rooms and family members (p<0.001). Using PHQ-9 tools for depression symptom appeared statistically highly significant differences between normal and high severity PHQ-9 ≥ 10 scores regarding age group, gender, educational level, occupational status, co-morbidity, smoking cigarette, lockdown measures and taking COVID-19 test. The findings showed that the prevalence of depression (p<0.001), anxiety (p=0.034), and stress (p=0.019) were significantly higher among the females than males gender. Multiple regression analysis revealed that afraid travel due to COVID-19, educational level, income, taken COVID-19 test and sleeping problem were predictor for depression. Meanwhile, physical distance prevents against COVID-19, feeling fatigue and educational level considered determinant factors for anxiety. Further, mask prevent COVID-19, afraid use public transportation, physical distance, educational level and sleep problem were considered determinant and associated with stress. Finally occupational status, physical activity, feeling fatigue and sleeping problem were considered as the main risk factors associated with patient health after adjusting for age and gender.

Conclusion: This study revealed that more or less one-third of the population have psychological symptoms depression, anxiety and stress during the COVID-19 outbreak. Especially, young females suffer more from depression, anxiety, stress and sleeping problems.

Keywords: Epidemiology, COVID-19, quarantining, sleep quality, mental health, lifestyle.

INTRODUCTION

The global COVID-19 pandemic forced more than billions of people were forced to stay at home due to the implementation of social distancing and lockdown policies. The world experienced the greatest pandemic of the 21st century with the emergence of a new and readily transmissible disease, the coronavirus, first detected on December 12th, 2019 in Wuhan, China [1]. It is a viral disease caused by Severe Acute Respiratory Syndrome Corona virus 2 (SARS-CoV-2) [1-2]. The COVID-19 clinical symptoms include fever, dry cough and shortness of breath or difficulty breathing [1-4]. The World Health Organization (WHO) [1] declared COVID-19 to be a pandemic on March 11th, 2020 [1-4] since then, the virus has spread to more than 210 countries and territories.

At the early period of the pandemic, people with behavioral health disorders [5-8] were struggling with

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higher levels depressive, anxiety, stress and fear symptoms in the general population [5-10].

Evidence reveals that the virus is spread primarily among people who are in close contact with one another through respiratory droplets, coughs or sneezes. Some unprecedented measures have been adopted to control the COVID-19 transmission in most countries, including the suspension of schools, public transportation, air flights, the closing of airports, public spaces, shops, barbers, bars, restaurants, and isolation and care for infected people and suspected cases [11-12]. The COVID-19 risk is greater amongst elders, children, transplant recipients taking immunosuppressive drugs, and patients with the presence of comorbidities like lung diseases, cardiovascular diseases, hypertension, diabetes mellitus, and cancer [1-2, 12]. Complaints of sleep and daytime functioning difficulties during the period of self-isolation are common in over 30% and depend so much on the level and content of depression, anxiety, stress, fear, and fatigue [4, 13-18]. More recently study highlighted an alarming prevalence of demographic, psychological and sleep disturbances during the lockdown. Meanwhile, working from home could play a protective role against the development of sleep disturbances during the current pandemic emergency.

Accordingly, the rapid growth of the COVID-19 world-wide calls for rapid assessments of the population's perceptions by epidemiological survey [7, 13-14]. We hypothesize that the general population is highly psychologically effected by COVID-19 which reflected in symptoms of depression, anxiety, and stress. 1. What are peoples' depression, anxiety, stress, sleeping and sleeping symptoms levels? ;2. What are the factors that affected peoples' depression, anxiety, stress, and sleeping symptoms levels?; 3. Is there a relationship between PHQ-9 levels and their depression, anxiety, and stress levels? The aim of this study was to investigate impact of COVID-19 on the prevalence of depression, anxiety, stress, sleeping symptoms and to identify associated risk factors during quarantining in Turkey.

SUBJECTS AND METHODS

This study was conducted in Istanbul, a transcontinental city located in Eurasia. This is a cross-sectional multi-center-based survey among the Istanbul urban and rural residential population Istanbul consist of 16 million people (50.1% males and 49.9% females) and which 4 million are migrant foreigners. Around 70%

of the population considered more than 20 years old. Sample size calculation is based on the following parameters: margin error = 1.75%, confidence level= 99% (Istanbul population included only 12 million as Turkish citizens), sample proportion likely to be considered 50%. Sample size formula (Sample Size n = N * [Z^2 * p * (1-p)/e^2] / [N – 1 + (Z^2 * p * (1-p)/e^2]) and calculation is based on the following parameters: margin error = 1.75%, Z= confidence level= 99% (Istanbul population included only 12 million as Turkish citizens), sample proportion likely to be considered P= 50%. Finally, computed sample size needed to be 5,500 subjects. A multi-stage a total of 5,500 persons were approached during March to December 2020, and 4,361 (81.6%) participants completed the questionnaire.

A pilot study conducted on 180 individuals was approached to check the reliability of the questionnaire. Based on the results of the pilot study, modifications have been applied to adjust the questionnaire based on the Turkish context. The questionnaire reliability was assessed by calculating the Cronbach's alpha's coefficients, which were acceptable for the three dimensions of the questionnaire (knowledge: Cronbach's alpha = 0.76, attitude: Cronbach's alpha = 0.81 and practices: Cronbach's alpha = 0.79).

The COVID-19 questionnaire consists four sections including socio-demographic information of participants, depression, anxiety and stress 21-items (DASS-21), Pittsburgh Sleep Quality Index (PSQI) and Patients Health Questionnaire - Depression tools (PHQ-9).

Depression Anxiety Stress Scale (DASS-21)

The 21-item DASS-21 was used to assess depression, anxiety, and stress by Lovibond and Lovibond [20]; Luceño-Moreno [21] with three subscales including seven-item. Each item is scored on a four-points scale ranging from 0 to 3. The total score is calculated by summing the scores of each subscale and multiplying by two. In the present study the reliability coefficients of the subscales were all valid for depression (α=.85), anxiety (α=.80) and stress (α=.78). Cronbach alpha internal consistency coefficient for the whole scale was computed as α=0.82. Recommended cut-off scores for the DASS-21 were used to categorize the participants as follows: categorized as normal, mild, moderate, severe and very severe respectively.

Pittsburgh Sleep Quality Index (PSQI)

Buysse *et al*. were developed the PSQI to determine subjective sleep disturbance over the past month. Participants were classified as "Good sleep quality" for the total score of PSQI ≤ 5, "Average sleep quality" for the total score of PSQI between 6 and 8, and "Poor sleep quality" for the total score of PSQI ≥ 9 [22]. In the analysis of internal consistency, the Cronbach's alpha reliability coefficient for the Turkish PSQI was 0.88, demonstrating high reliability.

Patients Health Questionnaire – Depression (PHQ-9)

The patient health questionnaire with 9 items (PHQ-9) was used screening tool to help clinicians making the diagnosis of depression and monitoring the severity [18]. This tool PHQ-9 was valid for used in the context of Turkey. PHQ-9 score ≥10 had a sensitivity of 88% and a specificity of 88% for major depression. The overall PHQ-9 score ranges from 0 to 27. Depression Severity: 0-4 none, 5-9 mild, 10-14 moderate, 15-19 moderately severe, 20-27 severe. Patients were classified as having depression if their PHQ score ≥ 10 [23]. The PHQ-9 demonstrated an excellent internal reliability with a Cronbach's Alpha of 0.86

Data were analyzed using the Statistical Package for Social Sciences (SPSS, version # 25) software. Student-t test was used to ascertain the significance of differences between two means. Chi-square test, Fisher's exact test (two-tailed) were performed to test for differences in proportions of categorical variables between two or more groups. Multivariate stepwise regression analysis was performed to assess the relationship between dependent and independent variables and to predicting potential contributing factors (determinants) for the COVID-19.

RESULTS

Table **1** shows socio-demographic characteristics of subjects COVID-19 by gender. There was a significant difference between males versus females with respect to educational level, occupation status, monthly income, place of residence as urban and rural, number of rooms and number of family members (p<0.001).

Table **2** present participants' characteristics, life-style behavior, and depression using PHQ-9 tools for purpose of the diagnosis of depression, quantifying depression symptom, and monitoring the severity. As can be seen from this table age group, gender, educational level, occupational status, co-morbidity, smoking cigarette, lockdown measures and taking COVID-19 test showed statistical high significant differences between normal and high severity PHQ-9 ≥ 10 scores.

Table **3** gives the prevalence of depression, anxiety and stress symptoms measured by DASS-21 in by gender status. The findings showed that the prevalence of depression (p<0.001), anxiety (p=0.034), and stress (p=0.019) were significantly higher among the females than males' status.

Table **4** gives multivariate regression analyses for depression, anxiety, stress PHQ-9 and associated covariates. As can be seen from this table that afraid travel due to COVID-19, education level, income, taken COVID-19 test and sleeping problem were predictor for depression. Meanwhile, physical distance prevents against COVID-19, feeling fatigue from COVID-19 and educational level considered the risk factors for anxiety. Further, mask prevent COVID-19, afraid use public transportation, physical distance prevent against COVID-19, educational level and sleep problem were considered as the main risk factors associated with stress. Finally occupational status, physical activity, feeling fatigue from COVID-19 and sleeping problem were considered as the main risk factors associated with patient health after adjusting for age and gender.

DISCUSSION

The management and prevention of COVID-19 pandemic have become major public health problems, and studies of the COVID-19 among the public are crucial for providing better insight about the disease and the development of preventive strategies for planning and health promotion programs [2]. The mental health problems might have been increased owing to the COVID-19 pandemic with the commencement of the year 2021. More recently a cross-national study shows that across four countries (Germany, Italy, Russia, and Spain), individuals with enhanced depression symptoms are at risk to experience psychological burden by the current Covid-19 situation [24]. This consistent with the current our study. It should be noted that most of the COVID-19 pandemic guidelines in Turkey are based on the Centre for Disease Control (CDC) [3] and WHO [1, 25].

According to the present study, age groups, occupation and economic status results are consistent with the Pakistani survey [5]. Also, our study are

Table 1:   Socio-Demographic Characteristics of Subjects about COVID-19 by Gender (N = 4,361)

		Male= 2,779	Female= 1,582	*p*-Value Significance
		n (%)	n (%)	
Age Group	<30	947 (34.1)	597 (37.9)	0.018
	30-39	772 (27.8)	369 (23.3)	
	40-49	626 (22.5)	363 (22.9)	
	50-59	272 (9.8)	159 (10.1)	
	=>>60	162 (5.8)	95 (6.0)	
Educational level				
	Preparatory	532 (18.8)	230 (14.6)	0.001
	Secondary	757 (27.2)	372 (23.5)	
	University	1241 (44.7)	754 (47.7)	
	Post graduate M.Sc. / PhD	249 (8.7)	226 (10.9)	
Occupation status				
	Professional / Sedentary	848 (30.5)	362 (22.9)	0.001
	Businessman	178 (6.4)	72 (4.6)	
	Manual Labor	586 (21.1)	276 (17.4)	
	Housewife	0	362 (22.9)	
	Police or / Military	115 (4.0)	35 (2.2)	
	Unskilled	262 (9.4)	128 (8.1)	
	Administrative / Clerical	790 (28.4)	347 (21.9)	
Monthly Income	Low	1278 (46.0)	500 (31.6)	0.001
	Medium	843 (30.3)	538 (34.0)	
	High	658 (23.7)	544 (34.4)	
Place of Residence	Urban	2598 (93.2)	1348 (85.2)	0.001
	Semi-Urban	190 (6.8)	234 (14.8)	
Number of Rooms				
	=< 3 rooms	1774 (63.1)	892 (56.4)	0.001
	> 3 rooms	1005 (36.9)	690 (43.6)	
Number of family members				
	=< 5peoples	996 (35.8)	713 (45.1)	0.001
	> 5 peoples	1783 (64.2)	869 (54.9)	
Smoking cigarette				
	Current	459 (16.5)	174 (11.0)	0.001
	Past	131 (4.7)	93 (5.9)	
	Never	2189 (78.8)	1315 (83.1)	
Lockdown measure				
	Yes	2199 (79.1	1303 (82.4)	0.010
	No	580 (20.9)	279 (17.6)	
Taking the COVID-19 test				
	Yes	959 (34.5)	479 (30.3)	0.004
	No	1820 (65.5)	1103 (69.7)	

Table 2: Participants' Characteristics, Life-Style Behavior, and Depression using PHQ-9 Tools (N = 4,361)

		N =3661; PHQ-9 < 10	N = 700; PHQ -9 ≥ 10	*p*-Value Significance
		n (%)	n (%)	
Age Group	<30	1271 (34.7)	373 (39.0)	0.004
	30-39	974 (26.6)	166 (23.7)	
	40-49	850 (23.2)	139 (19.9)	
	50-59	368 (10.0)	65 (9.3)	
	=>60	171 (4.8)	57 (8.1)	
Gender				
	Males	2298 (62.8)	481 (68.7)	0.003
	Females	1363 (37.2)	219 (31.3)	
Educational level				
	Preparatory	667 (18.2)	95 (13.6)	0.001
	Secondary	993 (27.1)	136 (19.4)	
	University	1607 (43.9)	388 (55.4)	
	Post graduate M.Sc. / PhD	394 (10.8)	81 (11.6)	
Occupational status				
	Professional / Sedentary	893 (24.4)	317 (45.3)	0.001
	Businessman	177 (4.8)	73 (10.4)	
	Manual Labor	693 (18.9)	169 (24.1)	
	Housewife	260 (7.1)	102 (14.8)	
	Police or / Military	146 (4.0)	4 (0.6)	
	Unskilled	364 (10.5)	6 (0.9)	
	Administrative / Clerical	1108 (30.3)	29 (4.1)	
Physical activity				
	Yes	1011 (27.6)	152 (21.7)	0.002
	No	2650 (72.4)	548 (78.3)	
Co-morbidity				
	None	2968 (81.1)	536 (76.6)	0.022
	One	513 (14.0)	120 (11.1)	
	Two	180 (4.9)	44 (6.3)	
Smoking cigarette				
	Current	513 (14.0)	120 (17.1)	0.002
	Past	180 (4.9)	44 (6.3)	
	Never	2968 (81.1)	536 (76.6)	
Lockdown measure				
	Yes	2976 (81.3)	526 (75.1)	0.001
	No	685 (8.7)	174 (24.9)	
Taking the COVID-19 test				
	Yes	1228 (33.5)	220 (30.0)	0.068
	No	2433 (66.5)	490 (70.0)	

Table 3: Prevalence of Depression, Anxiety, Stress Symptoms and Sleeping Disorders by Gender among Studied Subjects (N= 4,361)

Variables and Scores	Males N= 2,779 Yes n (%)	Females N = 1,582 Yes n (%)	p value
Depression			
Normal (0-9)	743 (26.7)	377 (23.8)	0.005
Mild (10-13	758 (27.3)	382 (24.1)	
Moderate (14-20	457 (16.4)	289 (18.3)	
Severe (21-27)	522 (18.8)	332 (21.0)	
Very severe >28	299 (10.8)	202 (12.8)	
Anxiety			
Normal (0-7)	985 (35.4)	526 (32.2)	0.034
Mild (8-9)	728 (26.2)	375 (23.7)	
Moderate (10-14)	377 (13.6)	239 (15.1)	
Severe (15-19)	416 (15.0)	254 (16.1)	
Very severe >20	273 (9.8)	188 (11.9)	
Stress			
Normal (0-14)	916 (33.0)	505 (31.9)	0.019
Mild (15-18)	643 (23.1)	329 (20.8)	
Moderate (19-25)	583 (21.0)	318 (20.1)	
Severe (26-33)	347 (12.5)	220 (13.9)	
Very severe > 34	290 (10.4)	210 (13.3)	
Sleep quality:			
Good sleep (PSQI score < 5)	1047 (37.7)	508 (32.1)	0.001
Average sleep (PSQI score 6-8)	855 (30.8)	533 (33.7)	
Poor sleep (PSQI score > 8)	877 (31.6)	541 (34.2)	

consistent with study in China where residence place, age groups, education and occupation significantly differed with the educational level [3, 11, 15].

Further, depression, anxiety and stress among Indian population during the lockdown has been very prevalent [27]. This is confirmative with our current study. Furthermore, a recent study conducted in China reported [28] age, gender, education, living conditions, exposure to COVID-19 increased mental and physical health condition which is related to depression, and insomnia.

As the biggest emerging pandemic of the 21st century, the COVID-19 has raised a great deal of concern and fear among governments, travelers, economists, and the general public, as well as within the medical community [12-13, 26-29]. Recently, a study conducted in Istanbul revealed a high level of fatigue, stress and fear among the Turkish population due to COVID-19 [4, 30]. A study in China reported [24] the COVID-19 pandemic was associated with mild stressful impact in their sample, even though the COVID-19 pandemic is still ongoing. Governments worldwide now face the common challenge of easing lockdowns and restrictions while balancing various health, social, and economic concerns [12]. Meanwhile Health Policy approaches taken by nine high-income countries and regions that have started to ease COVID-19 restrictions five in the Asia Pacific region and four in Europe.

The impact of the COVID-19 epidemic on the mental health of the general adult Serbian population [26] showed that out of 1057 participants included in the study, 28.9%, 36.9%, and 38.1% reported moderate to severe depression, anxiety, and stress symptoms, respectively. This is consistent and

Table 4: Correlates of COVID-19 with Depression, Anxiety, Stress and PHQ-9 using Multivariate Regression Analysis (N=4,361)

Variables	Regression coefficient	Standard Error	t-test value	p-Value Significance
Depression				
Afraid travel due to COVID-19	0.226	0.069	3.255	0.001
Education level	0.144	0.041	3.494	0.001
Income	0.640	0.250	2.568	0.010
Taken COVID-19 test	-0.910	0.430	-2.081	0.037
Sleeping problem	0.402	0.021	2.038	0.042
Anxiety				
Physical distance prevents against COVID-19	0.199	0.070	2.828	0.005
Feeling fatigue	0.177	0.073	3.080	0.018
Educational level	0.547	0.245	2.230	0.027
Stress				
Mask prevent COVID-19	0.980	0.221	4.518	0.001
Afraid use public transportation	0.030	0.011	-3.170	0.001
Physical distance prevents against COVID-19	0.950	0.289	3.328	0.002
Education level	0.620	0.230	2.709	0.007
Sleep problem	0.579	0.218	2.643	0.012
Patient Health Depression-PHQ-9				
Occupational status	-0.247	0.016	-15.328	0.001
Physical activity	0.267	0.105	2.541	0.011
Feeling fatigue from COVID-19	0.900	0.380	2.389	0.017
Sleeping problem	0.169	0.083	2.043	0.041

confirmative with the current study depression (48.2%), anxiety (40.1%) and stress (45.2%) obtained in Turkish general population).

The current mortality rate is alarming and if disease spread is going to high in coming weeks in Turkey it might go higher number of cases and deaths according to the WHO situation report [1, 20]. In order to predict and decrease economic and psycho-social disruption, reliable and valid high-quality data at the population level are urgently needed as soon as possible to test for past infection becomes available through electronic healthcare records [20, 25].

Furthermore, the travel restrictions stimulate a wave of controversial because many people believe that their freedom of movement also constrained [31]. Travel

restrictions, curfew, social distance and quarantine particularly critical for stress and period of elevated anxiety. Furthermore, it might lead to adverse biopsychosocial consequences in central nervous system [32]. Our results also in the same line with the literature, the fear of travel and keeping the social distance due to COVID-19 risk factor for depression, anxiety and stress. These travel restrictions are supportive and consistent with the current study approach [17, 18, 19].

This study has some limitations. Firstly, the design of current study is a cross-sectional, which does not allow us to derive any cause-effect relation. Second, the study may not reach to the target subject in population as a bias, which is very hard to avoid. Third, the tools used for the assessment of depression,

anxiety and stress in relation to COVID-19. The results were based on self-report measures, and the negative mental health states were not evaluated by clinicians, and therefore must be interpreted with caution. This may have caused recall bias and underreporting.

CONCLUSION

This study revealed that more or less one-third of the population have psychological symptoms during the COVID-19 outbreak. Especially, young females suffer more from depression, anxiety, stress and sleeping problems.

ETHICS COMMITTEE APPROVAL

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PEER-REVIEW

Externally peer-reviewed.

CONTRIBUTORS

AB contributed to conception, design, organized study, collected data, performed statistical analysis and wrote the first draft of the article, and contributed to the to the interpretation of the data and writing, revised critically and approved final version of manuscript.

EY, CCB, TD, are organized study, collected data, wrote the first draft of the article, and contributed to the interpretation of the data and writing, revised critically and approved final version of manuscript. All authors approved the final version.

CONFLICT OF INTEREST

No conflict of interest was declared by the authors.

FINANCIAL DISCLOSURE

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