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Psychiatric distress in family caregivers of patients with COVID-19



Mehdi Jafari-Oori^a, Abbas Ebadi^b, Seyyed Tayeb Moradian^a, Mojtaba Jafari^c, Manijeh Dehi^{d,*}, Fatemeh Ghasemi Fard^e

^a Atherosclerosis research center, Faculty of Nursing, Baqiyatallah University of Medical Sciences, Tehran, Iran

^b Behavioral Sciences Research Center, Life Style Institute, Faculty of Nursing, Baqiyatallah University of Medical Sciences, Tehran, Iran

^c Faculty of Nursing, Bam University of Medical Sciences, Bam, Iran

^d Department of Nursing, Maragheh University of Medical Sciences, Maragheh, Iran

^e Occupational therapy department, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran

ARTICLE INFO	A B S T R A C T
Keywords: Family caregivers Psychiatric distress Outbreak COVID-19	Purpose: Many COVID-19 patients with low to moderate disease severity were cared for at home by family members. Caring for relatives with COVID-19 could have a psychiatric disorder for informal caregivers. Therefore, this study aimed to investigate the psychiatric disorders of family caregivers of relatives with COVID- 19, in Iran. <i>Methods:</i> This online survey was conducted with 350 family caregivers over 18 years from April to July 2020, which was guided by the STROBE checklist. The study survey consisted of socio-demographic items, 7-items fear of COVID-19 scale, and a 21-item version of the depression, anxiety, and stress scales. <i>Results:</i> The mean (standard deviation) scores for depression, anxiety, and stress were 20 (0.40), 19.52 (0.39), and 19.72 (0.35), respectively, moreover for fear of COVID-19 was 20.33 (0.43). Of all family caregivers had fear with moderate to high severity. Being younger, married, having a health-related occupation, not exercising, and high monthly salary were significant predictors of the total score of depression, anxiety, and stress scale (P < 0.05). Further, being married, having a health-related occupation, and not exercising, having comorbidity, high

Introduction

First cases of COVID-19 disease were seen in China in December 2019 and was declared as a pandemic on March 11, 2020 (Tso & Park, 2020). Many experts have predicted that the pandemic will have a deep and long-lasting impact on public mental health around the world (Holmes et al., 2020). In Iran, the virus was spreading rapidly and by March 2020 had an extent to a total of 31 provinces (Raoofi et al., 2020). The hospitals were filled with COVID-19 patients, and many not critically infected patients, who had no underlying disease, took cared by family caregivers (FCs) at home (Raoofi et al., 2020). Then the outbreak, which the world has not seen for more than a century, has become a public health issue and caused an international economic challenge so

that countries decided to quarantine their citizens (Dubey et al., 2020).

There has been no specific treatment for COVID-19 and the patients receive just supportive and symptomatic therapy (Chen et al., 2020). At peak times of the epidemic, severe COVID-19 patients need to be hospitalized. Patients without underlying disease and with mild to moderate severity COVID-19 disease are recommended to be cared for at home by informal caregivers (WHO, 2020; Y. H. Wu et al., 2020).

Informal caregivers are typically family members or close acquaintances who voluntarily care for patients at home (Rosell-Murphy et al., 2014). They bear the burden of complex care and treatment alone (Reinhard, 2019). Caring for patients at home reduces the burden of caring for health care workers (HCWs) (Dixe et al., 2019).

Crowded hospitals, lack of personal protective equipment (PPE) in

* Corresponding author. *E-mail address:* manigehdehister@gmail.com (M. Dehi).

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Received 16 January 2021; Received in revised form 24 June 2021; Accepted 2 July 2021 Available online 12 July 2021 0883-9417/© 2021 Elsevier Inc. All rights reserved. the early days of the epidemic, lack of treatment and vaccines, high hospitalization costs, and high mortality have pushed heavy psychiatric disorder on both HCWs and FCsglobally (Pung et al., 2020; Chew et al., 2020; Gallagher & Wetherell, 2020; Pappa et al., 2020).

A review of the literature indicated that only one study qualitatively explored the experience of FCs of relatives with COVID-19 and suggested the importance of evaluating the mental health of FCs with a quantitative study (Y. H. Wu et al., 2020). FCs face many challenges such as unmet needs, unpleasant physical, psychiatric, and social during caring for their COVID-19 relatives (Y. H. Wu et al., 2020).

To date, most studies have examined the mental health of HCWs, patients, or FCs of non-COVID-19 patients. For example, HCWs suffered from a high rate of depression during the COVID-19 pandemic (Gallagher & Wetherell, 2020; Pappa et al., 2020). Also, FCs of non-COVID-19 patients endured many mental disorders such as anxiety, depression, anger, fear, guilt, irritability (Gallagher & Wetherell, 2020). They have the least opportunity to rest, take care of themselves, or go to work or the community (Czeisler et al., 2020). Because caring for relatives with COVID-19 at home can be a major threat to mental health, and to date, not any study has assessed the degree of psychiatric disorder of FCs, then the present study aimed to investigate the mental health of FCs of COVID-19 patients.

Methods

Study design and participants

This online cross-sectional survey was conducted using the STROBE checklist from April to July 2020 in Iran. The respondents were FCs who had the experience of caregiving of relatives with COVID-19 at home, in Iran. Out of 500 caregivers who viewed the survey by the invited link, 350 FCs were entered into the study using convenience sampling. They volunteered to participate in the study by putting a checkmark to the "Yes" option to the item of "After reading the study objects, are you agree to participate in this study?". All respondents answered the survey online. Inclusion criteria were having care experience of relatives with COVID-19, aged 18 years or over, and having the ability to answer the survey. Disease severity was considered as an exclusion criterion of the study. As severe cases need to be hospitalized and received specialized care.

Procedure

An electronic file of the study survey was created and used by social media and websites its link distributed generally. The anonymity was fully considered, and no identifying information such as name, contact information, and IP address was requested. The average time consumed by participants in the response to the survey was 10 min.

Measures

The survey consisted of three sub-parts including demographic and general data, DASS21, and The 7-items Fear of COVID-19 Scale (FCV-19S). The demographic and general part of the survey was about gender, age, education level, marital status, having child, city, occupation type, being infected with the COVID-19, exercising, smoking a cigarette, drinking alcohol, taking hypnotics medicine, daily sleep quality, comorbidity, and income. We used the 21-item version of the Depression Anxiety Stress Scales (DASS-21) for apprising of the mental health over the past week (Lovibond & Lovibond, 1995; Taouk et al., 2001). Each sub-scale has seven items. Each item is scored low (score = 0), medium (1), high(2), and very high(3), and the final score in each sub-scale is obtained from the sum of the scores of items, which the high score indicated further mental health disorder (Lovibond & Lovibond, 1995). A study by Asghari et al. indicated that the Persian version of the DASS-21 has significant Pearson correlations with BDI and FSAQ (p \leq

<0.0011), with Cronbach alpha of 0.94 and ICC of 95% (Pezirkianidis et al., 2018).

The 7-items Fear of COVID-19 Scale (FCV-19S) with robust psychometric properties (Concurrent validity = 0.51, α = 0.82, and ICC = 0.72) was designed by Ahorsu et al. for Iranian general people(Ahorsu et al., 2020). Each item was scored on a five-point Likert-type scale. The least score for each item is one, and the maximum is five. A total score is estimated by summing each item score (ranging from seven to 35). A higher score indicates a greater fear of the coronavirus.

Statistical analysis

The mean, standard error (SE), and frequency were used to describe the characteristics of the samples and the score of the main variables. The one-sample Kolmogorov-Smirnov test was performed to check the normality of data distribution and the result showed normal distribution of data (p > 0.05). Univariate analysis methods such as *t*-test and ANOVA were used to assess the different scores of the main variables based on the demographic data. The Scheffe test was used for post hoc tests. Additionally, the multivariate linear regression method was used to determine the predictors of participants' psychiatric disorders.

Ethics

The ethics committee of Baqiyatallah University of Medical Sciences (BUMS) approved the proposal of the study (Ethics Code: IR.BMSU. REC.13990.082). All samples participated in the study with consent. The authors of the study also committed that they have not done any plagiarism, fabrication of data, falsification, and repeated publication of findings.

Results

Participant characteristics

Out of 350 FCs, 54.57% were female, 54.86% were in the age range of 21–40 years old, 66.29% were married, 48% had a health-related occupation, 38.86% were infected with COVID-19, 45% did exercise daily, 8.86% and 30.66% consumed anti-stress and hypnotics medication, respectively, 20% suffered from comorbidity, and finally 5.7% and 14.29% were drinking alcohol and smoking cigarettes, respectively. Out of all FCs, 32%, 35%, and 30% of participants always suffered from depression, anxiety, and stress, respectively and 7.32% of them were with very high FCV. Other Characteristics of the FCs are presented in Table 1.

Mental health

Depression, anxiety, stress, and FCV

According to Table 2, the mean (SE) of depression, anxiety, and stress scores were 20 (0.40), 19.52 (0.39), and 19.72 (0.35), respectively. Based on the cut-off scores provided by Lovibond and Lovibond (1995a), of all subjects, 77.75%, 75%, and 80% had depression, anxiety, and stress, respectively. The mean (SE) score of FCV-19 was 20.33 (0.43).

Difference of DAS, and FCV-19 scores based on sociodemographic variables

The results of the univariate analysis of psychiatric disorders of all FCs were indicated in Table 3. Being younger and married, having a child and health-related occupation, not being infected with COVID-19, not taking exercise, taking anti-anxiety medications, poor sleep, having comorbidity, and high income were associated with higher DAS, and FCV-19 scores (P < 0.05). The posthoc Scheffe test revealed that the subjects younger than 20 years had significantly higher DAS and FCV scores compared to other groups (P < 0.05). In addition, the married participants had higher DAS and FCV scores than the single group. Moreover, the never-married group was in more DAS and FCV severity

Table 1

Demographic	characteristics	of the stud	y sample	(n = 350)
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$\begin{array}{cccc} \mbox{Being infected with COVID-19} & Yes & 136 & 38.86 \\ & No & 214 & 61.14 \\ \mbox{Exercising} & Yes & 157 & 44.86 \\ & No & 193 & 55.14 \\ \mbox{Smoking Cigarette} & Yes & 50 & 14.29 \\ & No & 300 & 85.71 \\ \mbox{Drinking Alcohol} & Yes & 20 & 5.71 \\ & No & 330 & 94.29 \\ \mbox{Taking anti-stress medications} & Yes & 31 & 8.86 \\ & No & 319 & 91.14 \\ \mbox{Daily Sleep quality} & Good & 139 & 39.71 \\ & Bad & 211 & 60.29 \\ \mbox{Taking hypnotics medication} & Yes & 107 & 30.66 \\ & No & 242 & 69.34 \\ \mbox{Comorbidity} & Yes & 70 & 20 \\ & No & 280 & 80 \\ \mbox{Income} & 0-2.5 m & 66 & 18.86 \\ 2.6-5 m & 73 & 20.86 \\ 5-7.5 m & 111 & 31.71 \\ & \geq 7.6 m & 100 & 28.57 \\ \mbox{Depression} & Sometimes & 34 & 9.75 \\ & Often & 126 & 36 \\ & Always & 112 & 32 \\ \mbox{Anxiety} & Sometimes & 40 & 11.46 \\ & Often & 136 & 39 \\ & Always & 105 & 30 \\ \mbox{FCV} & Very high & 27 & 7.32 \\ & High & 102 & 29.27 \\ & Moderate & 112 & 32 \\ \end{tabular}$		Unrelated to the health	182	52.00
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No19355.14Smoking CigaretteYes5014.29No30085.71Drinking AlcoholYes205.71No33094.29Taking anti-stress medicationsYes318.86No31991.14Daily Sleep qualityGood13939.71Bad21160.29Taking hypnotics medicationYes10730.66No24269.34ComorbidityYes7020No28080Income0-2.5 m6618.862.6-5 m7320.865-7.5 m11131.71 ≥ 7.6 m10028.57DepressionSometimes349.75Often12636Always11232AnxietySometimes6619Often10229Always10530FCVVery high277.32High10229.27Moderate112Moderate1123232	Exercising	Yes	157	44.86
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		NO	193	55.14
No30085.71Drinking AlcoholYes205.71No33094.29Taking anti-stress medicationsYes318.86No31991.14Daily Sleep qualityGood13939.71Bad21160.29Taking hypnotics medicationYes10730.66No24269.34ComorbidityYes7020No28080Income0-2.5 m6618.862.6-5 m7320.865-7.5 m11131.71 ≥ 7.6 m10028.57DepressionSometimes349.75Often12636Always11232AnxietySometimes6619Often10229Always10530FCVVery high277.32High10229.27Moderate112Moderate1123235	Smoking Cigarette	Yes	50	14.29
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	5 . 1	NO	300	85.71
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Taking anti-stress medications Yes 31 8.86 No 319 91.14 Daily Sleep quality Good 139 39.71 Bad 211 60.29 Taking hypnotics medication Yes 107 30.66 No 242 69.34 Comorbidity Yes 70 20 No 280 80 Income 0-2.5 m 66 18.86 2.6-5 m 73 20.86 5-7.5 m 111 31.71 ≥7.6 m 100 28.57 Depression Sometimes 34 9.75 Often 126 36 Always 112 32 Anxiety Often 102 29 Always 122 35 Stress Sometimes 40 11.46 Often 136 39 Always 105 30 FCV Very high 27 7.32 High 102 29.27 Moderate <	mit at a trat	NO	330	94.29
No 319 91.14 Daily Sleep qualityGood 139 39.71 Bad 211 60.29 Taking hypnotics medicationYes 107 30.66 No 242 69.34 ComorbidityYes 70 20 No 280 80 Income $0-2.5$ m 66 18.86 $2.6-5$ m 73 20.86 $5-7.5$ m 111 31.71 ≥ 7.6 m 100 28.57 DepressionSometimes 34 9.75 Often 126 36 AnxietySometimes 66 19 Often 102 29 Always 122 35 StressSometimes 40 11.46 Often 136 39 Always 105 30 FCVVery high 27 7.32 High 102 29.27 Moderate 112 32	Taking anti-stress medications	Yes	31	8.86
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Deile Class avality	No	319	91.14
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$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Taking humatics modication	Bad	211	60.29
No242693.34ComorbidityYes7020No28080Income $0-2.5 \text{ m}$ 6618.86 $2.6-5 \text{ m}$ 7320.86 $5-7.5 \text{ m}$ 11131.71 $\geq 7.6 \text{ m}$ 10028.57DepressionSometimes349.75Often12636Always11232AnxietySometimes6619Often10229Always12235StressSometimes4011.46Often13639Always10530FCVVery high277.32High10229.27Moderate11232	Taking hyphotics medication	ies	107	30.00
$\begin{array}{cccc} \mbox{res} & 70 & 20 \\ \mbox{No} & 280 & 80 \\ \mbox{lncome} & 0-2.5 \mbox{m} & 66 & 18.86 \\ 2.6-5 \mbox{m} & 73 & 20.86 \\ 5-7.5 \mbox{m} & 111 & 31.71 \\ \geq 7.6 \mbox{m} & 100 & 28.57 \\ \mbox{Depression} & 50 \\ \mbox{often} & 100 & 28.57 \\ \mbox{Often} & 100 & 28.57 \\ \mbox{Often} & 126 & 36 \\ \mbox{Always} & 112 & 32 \\ \mbox{Anxiety} & 50 \\ \mbox{often} & 102 & 29 \\ \mbox{Always} & 122 & 35 \\ \mbox{Stress} & 50 \\ \mbox{ometimes} & 40 & 11.46 \\ \mbox{Often} & 136 & 39 \\ \mbox{Always} & 105 & 30 \\ \mbox{FCV} & Very high & 27 & 7.32 \\ \mbox{High} & 102 & 29.27 \\ \mbox{Moderate} & 112 & 32 \end{array}$	Comorbidity	No	242	09.34
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Comorbianty	No	280	20
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Income	0.25 m	200	18.86
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	income	2 6_5 m	73	20.86
$\begin{array}{c ccccc} & 111 & 111 & 111 \\ \geq 7.6 \text{ m} & 100 & 28.57 \\ \hline \text{Depression} & & & & & & & & \\ & & & & & & \\ & & & & & & & \\ & & & & & & & \\ & & & & & \\ & & & &$		5_7 5 m	111	31 71
Depression Sometimes 34 9.75 Often 126 36 Always 112 32 Anxiety Sometimes 66 19 Often 102 29 Always 122 35 Stress Sometimes 40 11.46 Often 136 39 Always 105 30 FCV Very high 27 7.32 High 102 29.27 Moderate 112 32		>76m	100	28.57
Often 126 36 Always 112 32 Anxiety Sometimes 66 19 Often 102 29 Always 122 35 Stress Sometimes 40 11.46 Often 136 39 Always 105 30 FCV Very high 27 7.32 High 102 29.27 Moderate 112 32	Depression	Sometimes	34	9.75
Always 112 32 Anxiety Sometimes 66 19 Often 102 29 Always 122 35 Stress Sometimes 40 11.46 Often 136 39 Always 105 30 FCV Very high 27 7.32 High 102 29.27 Moderate 112 32	Depression	Often	126	36
Anxiety Sometimes 66 19 Often 102 29 Always 122 35 Stress Sometimes 40 11.46 Often 136 39 Always 105 30 FCV Very high 27 7.32 High 102 29.27 Moderate 112 32		Always	112	32
Often 102 29 Always 122 35 Stress Sometimes 40 11.46 Often 136 39 Always 105 30 FCV Very high 27 7.32 High 102 29.27 Moderate 112 32	Anxiety	Sometimes	66	19
Always 122 35 Stress Sometimes 40 11.46 Often 136 39 Always 105 30 FCV Very high 27 7.32 High 102 29.27 Moderate 112 32		Often	102	29
Stress Sometimes 40 11.46 Often 136 39 Always 105 30 FCV Very high 27 7.32 High 102 29.27 Moderate 112 32		Always	122	35
Often 136 39 Always 105 30 FCV Very high 27 7.32 High 102 29.27 Moderate 112 32	Stress	Sometimes	40	11.46
Always 105 30 FCV Very high 27 7.32 High 102 29.27 Moderate 112 32		Often	136	39
FCV Very high 27 7.32 High 102 29.27 Moderate 112 32		Always	105	30
High 102 29.27 Moderate 112 32	FCV	Very high	27	7.32
Moderate 112 32		High	102	29.27
		Moderate	112	32

compared to the divorced and the other groups (P < 0.05). The group with the income between 5.1 and 7.5 million Tomans had higher DAS and FCV scores than the group with an income between 2.6 and 5 million Tomans (P < 00.05). Gender, drinking, smoking, and using hypnotic medications had no significant association with FCV and DASS.

Predictors of health and mental health status of FCs

Being married, having a health-related occupation, not taking

 Table 2

 Means and standard deviations (SD) for DASS-21 scales the fear scales

means an	a standard	deviations	(SD) for	DA55-21	scales,	the fear so	cales.

Variable	Mean SD	Mean	Std. Err.	95% Con	f. Interval
DASS	Total Score	37.84	1.13	35.60	40.07
	Depression	12.59	0.40	11.82	13.37
	Anxiety	12.52	0.39	11.74	13.30
	Stress		0.35	12.01	13.42
Fear		20.33	0.43	19.47	21.19

exercise, having a high income, and being younger were independent predictors of higher DAS total score (P < 0.05) (F = 180.07 (p < 0.001), R-squared = 0.34, Adj. R-squared = 0.32). Also, being married, having a health-related occupation, not taking exercise, having comorbidity, having a high income, and being younger independently predicted high FCV score (P < 0.05) (F = 140.00 (p < 0.001), R-squared = 0.33, Adj. R-squared = 0.31) (Table 4).

For the depression subscale, being married (p < 0.001), having a health-related occupation (p = 0.005), not taking exercises (p < 0.001), having a high income (p = 0.006), and being younger (p < 0.001) were predictors of high scores of depression. For the anxiety subscale, being married (p < 0.001), having a health-related occupation (p = 0.001), being infected with COVID-19 disease (p = 0.040), not taking exercises (p < 0.001), having comorbidity (p = 0.041), having a high income (p = 0.035), and being younger (p < 0.001) were predictors of high anxiety scores. Finally, for the stress subscale, being married (p < 0.001), having a health-related occupation (p = 0.014), not taking exercises (p < 0.001), having bad sleep (p = 0.025), having a high income (p = 0.050), and being younger (p < 0.001) significantly predicted higher stress scores.

Discussion

Our study aimed to determine the mental health of FCs of relatives with COVID-19. Our study showed important data concerning the effect of the COVID-19 pandemic on the mental health of FCs. Most of the FCs of our study had depression, anxiety, and stress. Furthermore, more than half of them had moderate to very high levels of FCV. A recent study in Iran revealed that the high burden of FCs of COVID-19 patients can greatly endanger their mental health which could be an alarm for mental health policy-makers (Mirzaei et al., 2021). Additionally, our findings were in line with some studies conducted in the UK, US, and Italy. According to a study in Italy, FCs whose children had COVID-19 were more disposed to PTSS, anxiety, and depressive symptoms (Orsini et al., 2021). Another longitudinal study in the UK with data of 1349 caregivers and 6178 non-caregivers demonstrated that the rate of depression in FCs increased during the COVID-19 pandemic (21.6%) than pre-COVID-19 period (16.7%); similarly, for the non-FCs depression rate increased from 12.1% in the pre-COVID-19 period to 17.9% at COVID-19 pandemic, however, FCs had upper rates of depression than non-FCs(Gallagher & Wetherell, 2020). Furthermore, in the United States during COVID-19, FCs mostly suffered from declined mental health, increased stress, and lack of support (Lightfoot et al., 2021; Russell et al., 2020).

Some studies assess the mental health of formal caregivers, FCs of other patients, or the public. For example, Among the 95 FCs of depressed patients, 61.1%, 63.2%, 63% had severe depression, anxiety, stress, retrospectively (El-Bilsha, 2019); Of the 150 informal caregivers of patients living with HIV, the frequency of depression, anxiety, and stress was 46%, 27%, and 8% respectively (Khan et al., 2018). Further, in a study by Sandesh et al. (2020), most of HCWs suffered from DAS in Pakistan (Sandesh et al., 2020). Another study showed that among 1257 HCWs in China, 50.4%, 44.6%, 71.5% were with depression, anxiety and disorder symptoms, respectively(Lai et al., 2020). Also, In the initial period of the outbreak of COVID-19, 64.7%, 51.6%, and 41.2% of physicians in Turkey had depressive, anxiety, and stress symptoms,

Table 3

Difference of DAS, and FCV-19 scores based on sociodemographic variables.

Variables	Categories	Nu	DASS					Fear						
			Depression Anxiety				Stress							
			Mean (SD)	Test	Р	Mean (SD)	Test	Р	Mean (SD)	Test	Р	Mean (SD)	Test	Р
Gender	Male	159	12.46 (7.00)	-0.30	0.761	12.25 (6.93)	-0.61	0.534	12.34 (6.69)	=-0.95	0.34	12.69 (7.70)	-1.51	0.13
	Female	191	12.7 (7.68)			12.74 (7.82)			13.03 (6.72)			14.00 (8.38)		,
Age	$<\!\!20 = g1$	25	15.68 (4.32)	10.31	<.001 ^a	15.2 (4.19)	9.70	<.001 ^b	15.36 (3.96)	12.31	<.001 ^c	17.4 (5.83)	12.20	<.001 ^d
	21 - 40 = g2	192	13.86 (7.30)			13.77 (7.51)			14.04 (6.33)			14.90 (7.89)		
	41-60 = g3	110	10.8 (7.36)			10.92 (7.16)			10.92 (6.97)			11.11 (7.87)		
	$>\!60 = g4$	23	7.26 (6.29)			6.86 (6.47)			7.39 (6.29)			7.56 (7.33)		
Marital status	Not married = g1	112	15.05 (7.25)	35.36	<.001 ^e	14.58 (7.35)	41.58	$< .001^{f}$	15.50 (8.52)	28.51	<.001 ^g	15.77 (8.22)	28.51	$<.001^{h}$
	Married =	232	22.07			22.19			22.04			22.19		
	g2 Divorced =	2	(6.12) 8.21			(5.93) 9.56			(5.25) 9.56			(6.85) 9.56		
	g3	-	(3.82)			(1.41)			(1.12)			(1.32)		
	Others = g4	4	6.56			8.5			8.5			8.5		
Having a child	Yes	197	(2.56) 20.49	2.61	0.009	(1.22) 20.35	2.38	0.017	(1.29) 20.56	2.69	0.007	(1.14) 21.59	3.28	0.001
<u>o</u>			(7.21)			(7.56)			(6.61)			(8.26)		
	No	153	18.43			18.45			18.63			18.74		
Having related	Yes	168	(7.43)	3.42	< 0.001	(7.12) 21.03	3.72	< 0.001	20.83	3.01	0.002	(7.64)	2.93	0.003
Occupation			(6.60)			(6.44)			(6.03)			(6.52)		
	No	182	18.31			18.13			18.69			19.13		
Being infected	Yes	136	(7.82) 18.16	-2.93	0.003	(7.99) 18.38	-2.29	0.022	(7.14)	-3.46	< 0.001	(9.16) 18.57	-3.26	0.001
with COVID-19			(7.71)			(7.51)			(7.24)			(7.69)		
	No	214	20.50			20.24			20.69			21.45 (8.19)		
Exercising	Yes	157	16.23	8.42	< 0.001	16.05	8.70	< 0.001	16.50	8.93	< 0.001	16.37	9.03	< 0.001
			(7.39)			(7.29)			(5.34)			(7.58)		
	No	193	22.33 (6.13)			22.35 (6.25)			22.33 (5.35)			23.51 (7.06)		
Smoking Cigarette	Yes	50	20.98	1.43	0.152	20.78	1.29	0.197	20.74	1.16	0.246	22.00	1.57	0.116
			(7.24)			(7.11)			(6.56)			(7.25)		
	No	300	19.36			19.31 (7.41)			19.55			20.05		
Drinking Alcohol	Yes	20	19.95	0.22	0.825	19.45	-0.04	0.962	19.95	0.15	0.874	20.40	0.03	0.969
	Ne	220	(6.97)			(7.61)			(6.00)			(7.35)		
	NO	330	(7.40)			(7.42)			(6.75)			20.32 (8016)		
Anti-stress and	Yes	31	22.12	2.01	0.045	22.29	2.18	0.029	22.29	2.24	0.025	23.22	2.09	0.037
anti-depressant medications	No	310	(6.81) 19 35			(6.60) 19.25			(5.88) 19 <i>4</i> 7			(7.26) 20.04		
medications	NO	515	(7.38)			(7.45)			(6.74)			(8.14)		
Daily Sleep quality	Yes	136	17.16	5.19	< 0.001	16.97	5.43	< 0.001	17.56	5.03	< 0.001	17.38	5.68	< 0.001
	No	210	(7.17) 21.19			(7.12) 21.20			(6.53) 21.13			(7.70) 22.24		
			(7.07)			(7.14)			(6.45)			(7.80)		
Taking hypnotics	Yes	105	20.19	1.03	0.301	20.02	0.85	0.392	20.02	0.60	0.547	20.53	0.315	0.752
medication	No	240	19.30			(0.14)			(3.89)			20.23		
o 1111			(7.87)			(7.93)			(7.04)			(8.63)	- 10	
Comorbidity	Yes	70	21.44 (7.03)	4.50	<0.001	21.72	5.37	<0.001	21.56 (6.72)	4.96	<0.001	(8.08)	5.48	<0.001
	No	280	17.98			17.60			18.11			18.16		
In come	<0.5 m ol		(7.29)	2.40	0.010	(7.27)	2.04	0.022	(6.22)	2.20	o oppi	(7.51)	0.10	0.000
mcome	<2.5 m = g1	00	(7.74)	3.40	0.018	(7.63)	2.94	0.033	(7.03)	3.20	0.023	(8.90)	2.18	0.090
	2.6-5 m =	73	17.82			17.97			18.09			18.76		
	g2 5 1 7 5	111	(7.65)			(7.61)			(7.02)			(8.22)		
	3.1-7.5 III = g3	111	21.03 (6.83)			20.80 (6.87)			20.90			∠1.54 (7.28)		
	> 7.6 m =	100	19.97			19.93			20.18			20.78		
	g4		(7.23)			(7.52)			(6.53)			(8.21)		

a = S g1&g4 = 8.41 (p = 0.001), g2&g4 = 6.60 (p = 0.001), g1&g3 = 4.88 (p = 0.023), g2&g3 = 3.06 (p value = 0.005); b = S g1&g4 = 8.33 (p = 0.001), g2&g4 = 6.90 (p < 0.001), g2&g3 = 2.84 (p = 0.012); c = S g1&g4 = 7.96 (p < .0.001), g2&g4 = 6.65 (p < .0.001), g1&g3 = 4.43 (p = .0.022), g2&g3 = 3.11 (p < .0.001); d = S g1&g4 = 9.83 (p = 0.001), g2&g4 = 7.22 (p = 0.001), g1&g3 = 6.28 (p = 0.004), g2&g3 = 3.67 (p = 0.002); e = g2&g1 = 7.01 (p value < 0.001), g3&g2 = 13.07 (p = 0.002); e = g2&g1 = 7.01 (p value < 0.001), g3&g2 = 13.07 (p = 0.002); e = g2&g1 = 7.01 (p value < 0.001), g3&g2 = 13.07 (p = 0.002); e = g2&g1 = 7.01 (p value < 0.001), g3&g2 = 13.07 (p = 0.002); e = g2&g1 = 7.01 (p value < 0.001), g3&g2 = 13.07 (p = 0.002); e = g2&g1 = 7.01 (p value < 0.001), g3&g2 = 13.07 (p = 0.002); e = g2&g1 = 7.01 (p value < 0.001), g3&g2 = 13.07 (p = 0.002); e = g2&g1 = 7.01 (p value < 0.001), g3&g2 = 13.07 (p = 0.002); e = g2&g1 = 7.01 (p value < 0.001), g3&g2 = 13.07 (p = 0.002); e = g2&g1 = 7.01 (p value < 0.001), g3&g2 = 13.07 (p = 0.002); e = g2&g1 = 7.01 (p value < 0.001), g3&g2 = 13.07 (p = 0.002); e = g2&g1 = 7.01 (p value < 0.001), g3&g2 = 13.07 (p = 0.002); e = g2&g1 = 7.01 (p value < 0.001), g3&g2 = 13.07 (p = 0.002); e = g2&g1 = 7.01 (p value < 0.001), g3&g2 = 13.07 (p = 0.002); e = g2&g1 = 7.01 (p value < 0.001), g3&g2 = 13.07 (p = 0.002); e = g2&g1 = 7.01 (p value < 0.001), g3&g2 = 13.07 (p = 0.002); e = g2&g1 = 7.01 (p value < 0.001), g3&g2 = 13.07 (p = 0.002); e = g2&g1 = 7.01 (p value < 0.001), g3&g2 = 13.07 (p = 0.002); e = g2&g1 = 7.01 (p value < 0.001), g3&g2 = 13.07 (p = 0.002); e = g2&g1 = 7.01 (p value < 0.001), g3&g2 = 13.07 (p = 0.002); e = g2&g1 = 7.01 (p value < 0.001), g3&g2 = 13.07 (p = 0.002); e = g2&g1 = 7.01 (p value < 0.001), g3&g2 = 13.07 (p = 0.002); e = g2&g1 = 7.01 (p value < 0.001), g3&g2 = 13.07 (p = 0.002); e = 0.001 (p value < 0.001), g3&g2 = 13.07 (p = 0.001); e = 0.001 (p value < 0.001), g3&g2 = 13.07 (p = 0.001); g3&g2 = 13.07 (p = 0.001); g3&g2 = 13.07 (p = 0.001); g3&g

 $0.046), g4\&g2 = 13.57(p = 0.001); \mathbf{f} = g2\&g1 = 7.61 \text{ (p value} < 0.001), g3\&g2 = 13.19 \text{ (} p = 0.039), g4\&g2 = 13.69(p = 0.001), \mathbf{g} = g2\&g1 = 6.53 \text{ (} p value < 0.001), g3\&g2 = 13.54(p = 0.014), g4\&g2 = 13.54 \text{ (} p < 0.001\text{)}; \mathbf{h} = g2\&g1 = 7.06 \text{ (} p value < 0.001\text{)}, g4\&g2 = 14.09 \text{ (} p = 0.002\text{)}, \mathbf{i} = g3\&g2 = 3.21 \text{ (} p = 0.038\text{)}; \mathbf{j} = g3\&g2 = 2.81 \text{ (} p = 0.050\text{)}.$

Table 4

Hierarchical linear regression analysis predicting FCV and DASS.

DAS TOTAL SCORE								FCV				
Variable	β	SE	t	P value	95% CI		β	SE	t	P value	95% CI	
Marital status	-11.10	1.91	5.81	0.000	7.34	14.87	3.47	0.74	4.68	0.000	2.01	4.94
Having child	1.89	2.44	0.78	0.438	-2.90	6.69	1.10	0.95	1.16	0.245	-0.76	2.97
Health-related occupation	5.97	1.89	3.16	0.002	2.25	9.69	1.96	0.73	2.68	0.008	0.52	3.41
Being infected with COVID-19	-3.09	2.16	-1.43	0.153	-7.34	1.15	-0.88	0.83	-1.06	0.290	-2.54	0.76
Exercising	-16.43	3.23	-5.09	0.000	-22.79	-10.08	-6.1	1.24	-4.90	0.000	-8.58	-3.66
taking anti-anxiety medications	-2.47	3.39	-0.73	0.468	-9.15	4.21	-0.63	1.31	-0.48	0.629	-3.22	1.94
Daily Sleep quality	5.59	3.14	1.78	0.076	-0.58	11.77	1.69	1.21	1.39	0.165	-0.70	4.08
Comorbidity	3.32	2.15	1.54	0.124	-0.91	7.57	1.61	0.83	1.93	0.054	-0.03	3.26
Income	1.77	0.87	2.02	0.045	0.04	3.50	0.49	0.34	1.46	0.145	-0.17	1.17
Age	-8.10	1.68	-4.81	0.000	-11.41	-4.79	-2.94	0.65	-4.53	0.000	-4.22	-1.66
_cons	71.00	6.51	10.89	0.000	58.18	83.82	24.89	2.52	9.87	0.000	19.93	29.85

 $SE = Standard error; \beta = Standardized beta coefficient; CI: Confidence Interval.$

respectively (Elbay et al., 2020). Tso and Park in their online survey of psychiatric disorder in the community indicated that, from out of 432 general population, 50.4%, 28.1% and 59.6% had moderate or above levels for depression, anxiety, and stress, respectively (Tso & Park, 2020). During the previous epidemics, studies displayed similar results of a high prevalence of the psychiatric disorder in both HCWs and the general population (Chua et al., 2004; Lee et al., 2007; Lu et al., 2006; Maunder et al., 2003).

A comparison of the findings shows that the rate of mental disorders in different studies are close to each other, but the rate of psychiatric disorders in our study was high. A possible reason could be that family members in our study, unlike other studies, cared for a relative with COVID-19 and were in direct daily contact with the virus. Besides, the virus was novel with high morbidity and mortality, and with limited knowledge about the disease.

Our study indicated that being younger and married, having a child and health-related occupation, not being infected with COVID-19, not taking exercise, having poor night's sleep, taking anti-stress medications, having comorbidity and high monthly salary led to a high level of mental disorder in caregivers. As in line with our study, younger FCs, with high monthly income, in the anti-stress treatment regimen, were more likely to have psychiatric disorders (Cansel et al., 2021). However, contrary to the findings of our study, married or having a child (Elbay et al., 2020), being single or infected by COVID-19 (Cansel et al., 2021) have a direct correlation with high DAS disorder. Our findings did not show a significant relationship between gender and psychiatric disorder and males non-significantly had lower mean scores of DAS and FCV than females, which is consistent with the findings of a recent study (Paz et al., 2020). There were contrary findings related to gender and psychiatric disorder, for example in one study females had a lower psychiatric disorder (Cansel et al., 2021), while in other studies, there were no significant relationships between the DAS and FCV scores with gender (Mertens et al., 2020; Pezirkianidis et al., 2018). Also, There was no difference between smokers and non-smokers in terms of DAS score which is similar to another study (Cansel et al., 2021).

Our regression analysis showed that being younger and married, having a health-related occupation, not taking exercise, and having a high monthly salary were independent predictors of high DAS scores. Also, having comorbidity, being infected with COVID-19, and having poor sleep were predictors of anxiety and stress. In Elbay's study, being young, having a history of psychiatric disorder and working at the forefront were independent predictors of DAS scores in physicians (Elbay et al., 2020). FCs who had a health-related occupation suffered more from psychiatric disorders (Sandesh et al., 2020), which is in line with the findings of our study. Similar to our findings, exercising is a significant predictor of mental health in people living in the community during the COVID-19 pandemic (Malesza & Kaczmarek, 2021; Paz et al., 2020). In another study that assessed the psychiatric impact of SARS outbreaks on HCWs, younger caregivers of the SARS wards were more likely to have symptoms of PTSD(P. Wu et al., 2009). In the prevalence of SARS, being single was associated with high symptoms of depression in hospital staff(Liu et al., 2012), which is contrary to our findings. Our study showed that being married and living with family predicte high psychiatric disorders among caregivers. The probable cause could be fear of transmitting the disease to the other family members.

The prediction rate of psychiatric disorders by the studied variables was 33% for DAS and 34% for FCV scores. This means that about 65% of psychiatric disorder FCS is predicted by other variables. In the study by Paz and et al. (2020) the variables of gender, region, maintaining a regular schedule, exercising, and time spent getting information about the COVID-19 explained 11.8% of the total anxiety score and 17% of depression which was measured by Generalized Anxiety Disorder (GAD-7) and Patient Health Questionnaire (PHQ-9) respectively, respectively (Paz et al., 2020). In another similar study, being female, being older, being married or cohabiting, and having children, comorbidity explored 36% of the variance of anxiety score of the general population during the COVID-19 pandemic(Malesza & Kaczmarek, 2021).

Limitations

This is the first quantitative study in Iran to examine the psychiatric impact of the COVID-19 on FCs. Our study has some limitations; first, we conduct this study by cross-sectional design, however, the findings of prospective and longitudinal studies could be stronger. Because the study was online, the proportion of participants in different cities were not equal. However, most of the participants were from Tehran, and since Tehran is the capital of Iran, it has the largest population compared to other cities; Therefore, its large sample size can be justified. Another limitation of our study was the sampling method, which due to the gender of the study and the unavailability of participants, the convenience sampling method was used to select FCs.

Despite these limitations, the findings of this study provide valuable information about the early psychiatric effects of COVID-19 on FCs across the country, which can be an alarm for community health authorities to facilitate the care condition and reduce the amount of psychiatric disorder to FCs.

Conclusion

Based on our findings, FCs suffer from mental health disorders and

persistent fear of COVID-19. In addition, FCs mostly worry about transmitting the disease to other relatives due to close and constant contact with the COVID-19 patients. Personal characteristics such as younger age, marital status, having chronic underlying diseases, exercising could worsen the severity of psychiatric disorders. The novelty of COVID-19, limited data regarding the disease, its high morbidity, and mortality, and inaccessibility of vaccines or treatment could exacerbate the poor mental health of FCs. Given the reality evidenced in our study, the contribution of psychiatric nursing can help reduce or control mental disorders of FCs by providing support and counseling in person or by phone call.

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Ethics approval

The ethics committee of Baqiyatallah University of Medical Sciences (BUMS) approved the proposal of the study (Ethics Code: IR.BMSU. REC.1399.082). All samples participated in the study with consent. The authors of the study also committed that they have not done any plagiarism, fabrication of data, falsification, and repeated publication of findings.

Declaration of competing interest

The authors mention no any conflict of interest.

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References

- Ahorsu, D. K., Lin, C. Y., Imani, V., Saffari, M., Griffiths, M. D., & Pakpour, A. H. (2020). The fear of COVID-19 scale: Development and initial validation. *International Journal of Mental Health and Addiction.*. https://doi.org/10.1007/s11469-020-00270-8
- Cansel, N., Ucuz, İ., Arslan, A. K., Kayhan Tetik, B., Colak, C., Melez, Ş. N.İ., ... Semra Demir Akca, A. (2021). Prevalence and predictors of psychological response during immediate COVID-19 pandemic. *International Journal of Clinical Practice.*. https:// doi.org/10.1111/ijcp.13996
- Chen, Z. M., Fu, J. F., Shu, Q., Chen, Y. H., Hua, C. Z., Li, F. B., ... Zhang, Y. Y. (2020). Diagnosis and treatment recommendations for pediatric respiratory infection caused by the 2019 novel coronavirus. *World Journal of Pediatrics*, 16, 240–246. https://doi. org/10.1007/s12519-020-00345-5
- Chew, Q. H., Wei, K. C., Vasoo, S., Chua, H. C., & Sim, K. (2020). Narrative synthesis of psychological and coping responses towards emerging infectious disease outbreaks in the general population: Practical considerations for the COVID-19 pandemic. *Singapore Medical Journal* (vol. 61,, 350–356. https://doi.org/10.11622/ SMEDI.2020046
- Chua, S. E., Cheung, V., Cheung, C., McAlonan, G. M., Wong, J. W. S., Cheung, E. P. T., ... Tsang, K. W. T. (2004). Psychological effects of the SARS outbreak in Hong Kong on high-risk health care workers. *Canadian Journal of Psychiatry*, 49(6), 391–393. https://doi.org/10.1177/070674370404900609
- Czeisler, M.É., Lane, R. I., Petrosky, E., Wiley, J. F., Christensen, A., Njai, R., ... Rajaratnam, S. M. W. (2020). Mental health, substance use, and suicidal ideation during the COVID-19 pandemic — United States, June 24–30, 2020. MMWR. Morbidity and Mortality Weekly Report, 69(32), 1049–1057. https://doi.org/ 10.15585/mmwr.mm6932a1
- Dixe, M. D. A. C. R., Da Conceição Teixeira, L. F., Areosa, T. J. T. C. C., Frontini, R. C., De Jesus Almeida Peralta, T., & Querido, A. I. F. (2019). Needs and skills of informal caregivers to care for a dependent person: A cross-sectional study. *BMC Geriatrics*, 19 (1). https://doi.org/10.1186/s12877-019-1274-0
- Dubey, S., Biswas, P., Ghosh, R., Chatterjee, S., Dubey, M. J., Chatterjee, S., ... Lavie, C. J. (2020). Psychosocial impact of COVID-19. *Diabetes and Metabolic Syndrome: Clinical Research and Reviews*, 14(5), 779–788. https://doi.org/10.1016/j.dsx.2020.05.035

- Elbay, R. Y., Kurtulmuş, A., Arpacıoğlu, S., & Karadere, E. (2020). Depression, anxiety, stress levels of physicians and associated factors in Covid-19 pandemics. *Psychiatry Research*, 290. https://doi.org/10.1016/j.psychres.2020.113130
- El-Bilsha, M. A. (2019). Effect of family intervention on family caregivers' burden, depression, anxiety and stress among relatives of depressed patients. *Middle East Journal of Age and Ageing*, 16(1), 3–13. https://doi.org/10.5742/mejaa.2019.93619
- Gallagher, S., & Wetherell, M. A. (2020). Risk of depression in family caregivers: Unintended consequence of COVID-19. *MedRxiv.*, https://doi.org/10.1101/ 2020.06.15.20131532
- Holmes, E. A., O'Connor, R. C., Perry, V. H., Tracey, I., Wessely, S., Arseneault, L., ... Bullmore, E. (2020). Multidisciplinary research priorities for the COVID-19 pandemic: A call for action for mental health science. *The Lancet Psychiatry*, 7, 547–560. https://doi.org/10.1016/S2215-0366(20)30168-1
- Khan, R., Pai, K., Kulkarni, V., & Ramapuram, J. (2018). Depression, anxiety, stress and stigma in informal caregivers of people living with HIV (PLHIV). AIDS Care -Psychological and Socio-Medical Aspects of AIDS/HIV, 30(6), 722–726. https://doi. org/10.1080/09540121.2017.1418831
- Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., ... Hu, S. (2020). Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. JAMA Network Open, 3(3). https://doi.org/10.1001/ jamanetworkopen.2020.3976
- Lee, A. M., Wong, J. G. W. S., McAlonan, G. M., Cheung, V., Cheung, C., Sham, P. C., ... Chua, S. E. (2007). Stress and psychological distress among SARS survivors 1 year after the outbreak. *Canadian Journal of Psychiatry*, 52(4), 233–240. https://doi.org/ 10.1177/070674370705200405
- Lightfoot, E., Moone, R., Suleiman, K., Otis, J., Yun, H., Kutzler, C., & Turck, K. (2021). Concerns of family caregivers during COVID-19: The concerns of caregivers and the surprising silver linings. *Journal of Gerontological Social Work.*. https://doi.org/ 10.1080/01634372.2021.1898512
- Liu, X., Kakade, M., Fuller, C. J., Fan, B., Fang, Y., Kong, J., ... Wu, P. (2012). Depression after exposure to stressful events: Lessons learned from the severe acute respiratory syndrome epidemic. *Comprehensive Psychiatry*, 53(1), 15–23. https://doi.org/ 10.1016/j.comppsych.2011.02.003
- Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck depression and anxiety inventories. *Behaviour Research and Therapy*, 33(3), 335–343. https:// doi.org/10.1016/0005-7967(94)00075-U
- Lu, Y. C., Shu, B. C., Chang, Y. Y., & Lung, F. W. (2006). The mental health of hospital workers dealing with severe acute respiratory syndrome. *Psychotherapy and Psychosomatics*, 75(6), 370–375. https://doi.org/10.1159/000095443
- Malesza, M., & Kaczmarek, M. C. (2021). Predictors of anxiety during the COVID-19 pandemic in Poland. Personality and Individual Differences, 170. https://doi.org/ 10.1016/j.paid.2020.110419
- Maunder, R., Hunter, J., Vincent, L., Bennett, J., Peladeau, N., Leszcz, M., ... Mazzulli, T. (2003). The immediate psychological and occupational impact of the 2003 SARS outbreak in a teaching hospital. *Cmaj*, 168(10), 1245–1251.
- Mertens, G., Gerritsen, L., Duijndam, S., Salemink, E., & Engelhard, I. M. (2020). Fear of the coronavirus (COVID-19): Predictors in an online study conducted in March 2020. *Journal of Anxiety Disorders*, 74. https://doi.org/10.1016/j.janxdis.2020.102258
- Mirzaei, A., Raesi, R., Saghari, S., & Raei, M. (2021). Evaluation of family caregiver burden among COVID-19 patients. *The Open Public Health Journal.*. https://doi.org/ 10.2174/1874944502013010808
- Orsini, A., Corsi, M., Pedrinelli, V., Santangelo, A., Bertelloni, C., Dell'Oste, V., ... Carmassi, C. (2021). Post-traumatic stress, anxiety, and depressive symptoms in caregivers of children tested for COVID-19 in the acute phase of the Italian outbreak. *Journal of Psychiatric Research*. https://doi.org/10.1016/j.jpsychires.2021.01.024
- Pappa, S., Ntella, V., Giannakas, T., Giannakoulis, V. G., Papoutsi, E., & Katsaounou, P. (2020). Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. *Brain, Behavior, and Immunity, 88*, 901–907. https://doi.org/10.1016/j.bbi.2020.05.026
- Paz, C., Mascialino, G., Adana-Díaz, L., Rodríguez-Lorenzana, A., Simbaña-Rivera, K., Gómez-Barreno, L., ... Ortiz-Prado, E. (2020). Behavioral and sociodemographic predictors of anxiety and depression in patients under epidemiological surveillance for COVID-19 in Ecuador. *PLoS ONE, 15*(9 September). https://doi.org/10.1371/ journal.pone.0240008
- Pezirkianidis, C., Karakasidou, E., Lakioti, A., Stalikas, A., & Galanakis, M. (2018). Psychometric properties of the depression, anxiety, stress Scales-21 (DASS-21) in a Greek sample. *Psychology*, 09(15), 2933–2950. https://doi.org/10.4236/ psych.2018.915170
- Pung, R., Chiew, C. J., Young, B. E., Chin, S., Chen, M. I. C., Clapham, H. E., ... Ang, L. W. (2020). Investigation of three clusters of COVID-19 in Singapore: Implications for surveillance and response measures. *The Lancet*, 395(10229), 1039–1046. https:// doi.org/10.1016/S0140-6736(20)30528-6
- Raoofi, A., Takian, A., Sari, A. A., Olyaeemanesh, A., Haghighi, H., & Aarabi, M. (2020). COVID-19 pandemic and comparative health policy learning in Iran. Archives of Iranian Medicine, 23(4), 220–234. https://doi.org/10.34172/aim.2020.02
- Reinhard, S. (2019). Home alone revisited: Family caregivers providing complex care. Innovation in Aging, 3(Supplement_1), S747–S748. https://doi.org/10.1093/geroni/ igz038.2740
- RoseII-Murphy, M., Bonet-Simó, J. M., Baena, E., Prieto, G., Bellerino, E., Solé, F., ... Mimoso, S. (2014). Intervention to improve social and family support for caregivers of dependent patients: ICIAS study protocol. *BMC Family Practice*, 15(1). https://doi. org/10.1186/1471-2296-15-53
- Russell, B. S., Hutchison, M., Tambling, R., Tomkunas, A. J., & Horton, A. L. (2020). Initial challenges of caregiving during COVID-19: Caregiver burden, mental health,

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and the parent-child relationship. *Child Psychiatry and Human Development.*, https://doi.org/10.1007/s10578-020-01037-x

- Sandesh, R., Shahid, W., Dev, K., Mandhan, N., Shankar, P., Shaikh, A., & Rizwan, A. (2020). Impact of COVID-19 on the mental health of healthcare professionals in Pakistan. *Cureus.*. https://doi.org/10.7759/cureus.8974
- Taouk, M., Lovibond, P. F., & Laube, R. (2001). Psychometric properties of a Chinese version of the 21-Item Depression Anxiety Stress Scales (DASS21)(report for New South Wales Transcultural Mental Health Centre). Sydney, New South Wales, Australia: Cumberland Hospital.
- Tso, I. F., & Park, S. (2020). Alarming levels of psychiatric symptoms and the role of loneliness during the COVID-19 epidemic: A case study of Hong Kong. *Psychiatry Research*, 293. https://doi.org/10.1016/j.psychres.2020.113423

WHO. (2020). Home care for patients with suspected novel coronavirus (nCoV) infection presenting with mild symptoms and management of contacts. Who, (January), 4–6.

- Wu, P., Fang, Y., Guan, Z., Fan, B., Kong, J., Yao, Z., ... Hoven, C. W. (2009). The psychological impact of the SARS epidemic on hospital employees in China: Exposure, risk perception, and altruistic acceptance of risk. *Canadian Journal of Psychiatry*, 54(5), 302–311. https://doi.org/10.1177/070674370905400504
- Wu, Y. H., Sun, F. K., & Lee, P. Y. (2020). Family caregivers' lived experiences of caring for epidermolysis bullosa patients: A phenomenological study. *Journal of Clinical Nursing*, 29(9–10), 1552–1560. https://doi.org/10.1111/jocn.15209