



Levels and Predictors of COVID-19-Related Anxiety in Older Adults

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Abstract

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BACKGROUND: Prolonged quarantine during the coronavirus disease 2019 (COVID-19) outbreak is a stressful factor.

AIM: This study aims to analyze the psycho-emotional state of Jordan's older population during the COVID-19 pandemic.

MATERIALS AND METHODS: The study on 620 older adults (mean age, 66.4 ± 5.3 years) was conducted in 2020 in Amman (Jordan). All respondents were asked to complete an online survey on coping strategies, a HUDS questionnaire, and a specially designed questionnaire.

RESULTS: The main associated factors of stress were uncertainty (62%) and a fear of other family members getting ill (60%). Of all the respondents, 15% agreed with the necessity to prolong the quarantine period, 47% had a neutral attitude, and 38% exhibited a negative attitude. High levels of anxiety in older population were associated with the lower use of humor ($H = 11.498$, $p \leq 0.002$). On the other hand, such respondents demonstrated the higher use of planning ($H = 6.227$, $p \leq 0.039$), venting ($H = 11.087$, $p \leq 0.004$), avoidance ($H = 7.457$, $p \leq 0.019$), and active coping ($H = 6.043$, $p \leq 0.037$).

CONCLUSIONS: Most of COVID-19 cases are registered in healthcare institutions and for that reason there is a need to provide psychiatric care to medical workers who do not have the necessary experience in this area. This may also require the state to promote psychiatric care training.

Introduction

One feature of human adaptive behavior during an epidemiological threat is a tendency to reduce interpersonal contacts [1] and increase distance between individuals [2]. These behavioral responses are characteristic not only of humans but also primates as well. For example, great apes are known to deliberately avoid individuals of their species with obvious physical disabilities [3]. Homo sapiens, on the other hand, tend to reduce or avoid communication with people who show signs of disease during the infectious diseases spread [4]. Furthermore, people often react to physical imperfections such as scars or a birthmark on the face, trying to look at the side of the face where these imperfections are not visible, or extending the distance from the other person [5]. Distance and communication style with people with infectious diseases or physical disabilities depends on various factors. These include, but are not limited to, gender, mentality, age, personal beliefs, and whether or not the person is sick when approaching the infected person [5], [6], [7].

The concept of quarantine appeared in the 14th century during an outbreak of plague in the Italian city of Venice. All seafarers arriving in the harbor were required to stay 40 days on ships at sea or in special barracks. Since then, quarantine has undergone

considerable changes with the development of society, but its essence has remained the same – the isolation of persons [1].

In areas where infectious disease epidemics occur on a regular and frequent basis, it affects the psyche of the population, i.e., people become less outgoing and open to communication [8], [9], [10].

Respondent surveys in 42 countries (transcultural study) showed that social distance is important to reduce the likelihood of infectious diseases [11]. During Coronavirus 2019 (coronavirus disease 2019 [COVID-19]), governments in different countries have made various efforts to combat it [12], [13]. These measures range from small restrictions to comprehensive monitoring of social interaction [14], [15], [16]. Such efforts are largely associated with the level of epidemiological risk in a given country. The majority of the recommendations place accountability on the people, with the attitudes of persons who have recently recovered or are immunized against the disease is critical to epidemiologically vulnerable populations [17]. Recent collaborative research between experts from the United Kingdom and the Netherlands has shown that population reactions to advice from their governments and the World Health Organization can be as important as specific actions by national governments in reducing

the COVID-19 disease incidence [18]. Anderson *et al.* [19] have analyzed the COVID-19 pandemic trends, concluding that the pandemic will continue for a minimum of 1 year until total vaccine production is in place. Thus, in the meantime, social distancing remains critical and, by adhering to it, people will be able to reduce the burden on the medical system [20].

Prolonged quarantine during the COVID-19 outbreak is a stressful factor [21], [22]. Seniors and people with certain diseases that increase their vulnerability (cancer, diabetes) are particularly vulnerable [23], [24]. Major risk factors during quarantine include separation from relatives, lack of freedom of movement and visits to service and cultural venues (cinemas, restaurants, religious facilities), boredom in the home environment, and often unclear severity and symptomatology of the illness [25]. All of these factors can result in a dramatic end, culminating in divorce, scandal, and the development of mental illness. Among the consequences expected from a strict quarantine in the population are increased levels of depression and anxiety, excessive use of alcohol and psychoactive drugs, increased isolation from society, and feelings of loneliness [16]. The result is cruelty to children and other family members and domestic violence. Other outcomes include homelessness, massive Internet fraud, unemployment, and financial loss [15].

The psychological impacts of the COVID-19 pandemic are not unique. Similar trends were recorded earlier, in 2012, during the outbreak of the Middle East respiratory syndrome [26], as well as a severe acute respiratory syndrome in 2003 [27], [28]. Statistics are rather disappointing. Thus, the number of suicides among the risk group (people over 65 years) increased by one-third during this period, half of the patients who recovered from pneumonia had elevated anxiety levels, and a third of health care workers demonstrated emotional disorders [29]. At severe conditions, depression and post-traumatic stress disorder of the psyche developed in the future [20]. Negative emotions can have an adverse impact on human health not only during a pandemic but also under normal conditions when there is no threat of mass illness [29].

According to data already directly related to COVID-19 for the Chinese population, one out of every three study participants had high levels of anxiety, and one in five people suffered from depression combined with poor sleep quality [14]. According to other data from colleagues in China, anxiety levels did not exceed 5%, and depression disorders as high as 4% [17]. A comprehensive study covering 10 countries and analyzing the effects of different coronavirus infections that preceded the COVID-19 stated confusion, bad mood, anxiety, memory disorders (in a third of all patients), and insomnia (in almost half of the patients) as the most frequent symptoms of mental disorders during the disease [16]. In the post-illness period, depression, insomnia, anxiety, and irritability

have been shown to occur in patients with a frequency ranging from 12% to 15%, while fatigue was found in 1 out of 5 cases, and trauma in 1 out of 3 cases. Sleep disorders were observed among all patients. The majority were able to return to work only 3 months after their recovery [16].

It follows from the above that the pandemic, particularly COVID-19, which has swept virtually the entire world, can cause irreparable harm to people's mental health. Seniors and people suffering from chronic diseases in the at-risk group (diabetes, etc.) are particularly vulnerable. There are few studies on mental disorders among seniors affected by the COVID-19 epidemic, and most of the work focuses on broader age groups, from children to seniors [14], [16]. At the same time, such works seem to be necessary because older people are an important part of society. Moreover, they are highly sensitive both to the effects of the COVID-19 disease itself, as well as information and hysteria on the Internet and by mass media around the pandemic. All of this adds relevance to this article.

Accordingly, this study aims to perform a comparative analysis of the psycho-emotional status of older people during the COVID-19 pandemic in Jordan. The objectives of the study were: (i) To estimate the level of stress in self-isolated seniors during the COVID-19 pandemic; (ii) to identify how seniors coped with stress; (iii) to estimate how interactions with a spouse affected the psycho-emotional characteristics of married participants (level of anxiety and depression, as well as coping strategies).

Materials and Methods

Participants

The survey was carried out from April to May 2020 in Amman (Jordan). A total of 620 people were involved, of which 514 were women (Group 1), and 106 were men (Group 2). All participants were seniors (mean age, 66.4 ± 5.3 years). The mean age was 69.4 ± 7.8 years for men and 63.2 ± 3.3 years for women. Among them, 446 (72%) respondents were married, 124 (20%) of whom lived separately. Other 174 (28%) respondents were non-married and lived alone. The mean length of the marital relationship was 32.5 ± 6.7 years. Finally, 338 participants were living with their children.

Study design

One of the study objectives was to compare levels of anxiety and depression among seniors during the COVID-19 pandemic by gender. This necessitated the division of respondents into two

groups. Participants were involved voluntarily. Each respondent signed a written informed consent agreement for participation in the study. In addition, respondents expressed their verbal consent to participate in the study. Exclusion criteria were as follows: (i) Being diagnosed with some kind of mental disorder before the COVID-19 pandemic; (ii) having serious physical health problems, such as cancer, diabetes, epilepsy, and cardiovascular system disorders; (iii) refusal to participate. Inclusion criteria were specified as follows: (i) The absence of serious mental/physical health disorders; (ii) a signed written agreement. Participation agreement ensured the anonymity and confidentiality of each participant.

Procedure

For this study, a special questionnaire was created using Google Forms. In total, three questionnaires were used, the main elements of which are described below. The first questionnaire was prepared by the authors and consists of three blocks. The first block was devoted to studying features of marital relations during isolation; the second examined the relationship of parents with their children and coping with stressful situations, as well as how parents are satisfied with their parenting roles towards their children; the third block studied the emotional status of older people in self-isolation. This included such factors as the availability of support from a partner or children, the degree of anxiety about their health, and the strategies used to maintain their emotional and mental state. Furthermore, the third block considered the presence of violence (emotional, mental, or physical) in the family, worries about their insignificance relative to other family members, and worries about prolonged quarantine.

Along with the author's questionnaire, the one by Carver *et al.* [30] was applied to identify coping strategies that respondents use to control stressful situations while self-isolating. There are two types of coping strategies: (i) To actively address the problem, and (ii) to passively avoid the problem. As a result, people may attempt to resolve a stressful situation in a variety of ways. Coping strategies are predictors of preserving a person's mental balance, which is why this paper emphasizes them.

The level of anxiety and depression was determined by using the Hospital Anxiety and Depression Scale [31]. This scale allows identifying the level of emotional stress and consequences of prolonged stress.

Statistical analysis

Information obtained has been entered into a Microsoft Excel 2016 database. Further statistical processing was performed using Statistica v. 7.0

(StatSoft, USA). The arithmetic mean for each of the features was calculated, as well as the standard deviation. Nonparametric statistical methods were used because the distribution was different from normal according to the normality test. Furthermore, a comparative analysis was carried out by calculating Mann-Whitney, Kruskal-Wallis, chi-square, and t-criterion for a single sample. Correlation analysis methods were also employed. The minimal significance level was set at $p \leq 0.05$.

Ethics approval

The author declares that the work is written with due consideration of ethical standards. The study was conducted in accordance with the ethical principles approved by the Human Experiments Ethics Committee of [BLINDED] University (Protocol No 1 of 12 February 2019).

Results

Among the established associated factors of stress, most respondents reported uncertainty (62%) and fear of other family members (partner, children) being ill (60%). Other strong predictors were the unexpected change of plans for the near future (54%), as well as financial difficulties (45%) and emotional challenges (32%). Fewer participants (27%) highlighted dissatisfaction with the actions of external objects and subjects (people or the state) as a stress-forming factor. This particular factor may be contributing to family's actions and encourage family members to establish a better understanding with each other while uniting against the external world. When asked whether the self-isolation period should be expanded during quarantine, most respondents (47%) said they felt neutral about the self-isolation period being extended, fewer (38%) were negative, and a small percentage of participants (15%) responded positively. Despite the high rates of coronavirus infection in 2020, more than a third of participants did not see self-isolation measures as an opportunity to maintain close and trusting relationships with their partners or children. This response can be explained by the cumulative effect of stress-related emotions. When asked about the level of concern about the emotional state and the state of mind, most respondents (69%) admitted that they experienced some kind of shift (Figure 1).

A fifth of respondents (22%) said they went through a serious change in their emotional state and had to receive psychological help. These claims were confirmed with the HUDS scale (Figure 1). The average anxiety score was 5.4 ± 3.5 , while the average depression score was 48.0 ± 3.6 . Hence, one can conclude that emotional struggles, mentioned by 78%

of the respondents (Figure 1), may be indicative of the following two processes. First, feeling these emotions could be a person's norm under stress; secondly, a person could be attracting attention or heighten demands to himself/herself.

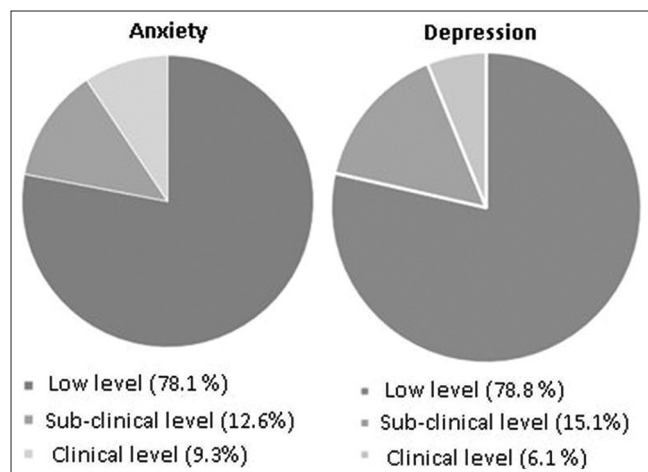


Figure 1: Anxiety and depression levels on the HUDS scale in older populations in self-isolation

The reasons behind an upset emotional state were a change of plans, limited personal space, an almost complete lack of time to take care of their appearance, and a decrease in their status in the family. This indicates that everyday activities took up majority of older people's time, while some important plans were postponed.

A significant difference was found between sexes: women exhibited greater concern about emotional state than men ($\chi^2 = 10.111, p \leq 0.005$). This may be due to the fact that women experience greater fatigue due to a greater burden of daily activities ($U = 5554, p \leq 0.049$). In addition to that, older women were exposed to great tension in their relationships with children ($U = 924, p \leq 0.004$). The level of anxiety was significantly higher in those respondents who experienced financial difficulties due to the loss of a job during quarantine ($H = 13.009, p \leq 0.009$).

In order to analyze how older respondents were able to cope with stressful situations, data on coping strategies for men and women were collected. The average and normal levels are depicted in Tables 1 and 2.

The correlation analysis of copying strategy data via t-test revealed some regularities. For instance, when it comes to the order of frequency, older populations are less likely to exploit distraction ($p \leq 0.03$) and denial tactics ($p \leq 0.005$), use psychogenic substances ($p \leq 0.005$), seek instrumental support ($p \leq 0.01$), avoid problems ($p \leq 0.005$), discharge strong emotions ($p \leq 0.004$), engage in religious activities to escape the situation ($p \leq 0.003$) and blame themselves for problems ($p \leq 0.02$). Other coping strategy indicators were below the norm. This can be explained by the fact that being self-isolated does not imply being active. As it turned out, medium and high levels of anxiety and depression were related to higher use of some coping strategies (Figure 2).

Table 1: Rating of coping strategies (COPE classification)

Coping strategy	Norm		Men		Women		Rating	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Distraction	5.29	1.27	5.19	1.40	5.32	1.39	5.08	5.23
Active coping	5.77	1.32	5.75	1.30	5.76	1.38	5.54	5.69
Denial	2.90	1.20	2.83	1.23	2.91	1.20	1.89	6.00
Substance use	2.84	1.23	3.14	1.35	2.80	1.18	1.70	6.02
Seeking emotional support	5.12	1.53	4.38	1.46	5.35	1.46	4.99	5.62
Seeking instrumental support	4.54	1.40	3.97	1.32	4.73	1.39	4.29	5.80
Avoidance	3.08	1.12	3.00	1.02	3.08	1.10	2.41	5.23
Venting of emotions	4.60	1.33	4.33	1.30	4.68	1.32	4.32	5.77
Positive reframing	6.02	1.21	5.92	1.41	6.02	1.31	6.27	5.54
Planning	5.70	1.32	5.81	1.32	5.61	1.37	5.70	5.69
Humor	5.21	1.23	5.50	1.52	5.11	1.13	5.33	5.11
Acceptance	6.44	1.19	6.31	1.27	6.48	1.17	6.86	5.59
Religion	3.30	1.52	3.07	1.54	3.39	1.51	2.51	6.14
Self-blame	4.15	1.43	4.21	1.46	4.10	1.51	3.31	5.55

Table 2: Minimal, medium and maximum score ranges for each coping strategy (COPE classification)

Coping strategy	Men			Women		
	Minimal	Medium	Maximum	Minimal	Medium	Maximum
Distraction	2.0-3.0	4.0-6.0	7.0-8.0	2.0-3.0	4.0-6.0	7.0-8.0
Active coping	2.0-4.0	5.0-6.0	7.0-8.0	2.0-4.0	5.0-7.0	8.0
Denial	2.0	2.0-4.0	5.0-8.0	2.0	2.0-4.0	5.0-8.0
Substance use	2.0	2.0-4.0	5.0-8.0	2.0	2.0-4.0	5.0-8.0
Seeking emotional support	2.0-3.0	4.0-5.0	6.0-8.0	2.0-3.0	4.0-6.0	7.0-8.0
Seeking instrumental support	2.0	3.0-4.0	5.0-8.0	2.0-3.0	4.0-6.0	7.0-8.0
Avoidance	2.0	2.0-4.0	5.0-8.0	2.0	2.0-4.0	5.0-8.0
Venting of emotions	2.0	3.0-5.0	6.0-8.0	2.0-3.0	4.0-6.0	7.0-8.0
Positive reframing	2.0-4.0	5.0-7.0	8.0	2.0-4.0	5.0-7.0	8.0
Planning	2.0-4.0	5.0-7.0	8.0	2.0-4.0	5.0-6.0	7.0-8.0
Humor	2.0-3.0	4.0-6.0	7.0-8.0	2.0-3.0	4.0-6.0	7.0-8.0
Acceptance	2.0-5.0	6.0-7.0	8.0	2.0-5.0	6.0-7.0	8.0
Religion	2.0	2.0-4.0	5.0-8.0	2.0	2.0-4.0	5.0-8.0
Self-blame	2.0	3.0-5.0	6.0-8.0	2.0	3.0-5.0	6.0-8.0

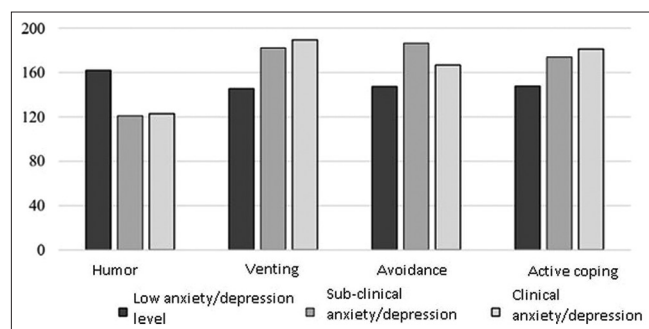


Figure 2: Use of coping strategies among respondents with low, medium, and high levels of anxiety and depression

High anxiety scores were associated with the lower use of humor ($H = 11.498, p \leq 0.002$). Respondents with higher anxiety are more likely to use other coping strategies, such as planning ($H = 6.227, p \leq 0.039$), emotional expression ($H = 11.087, p \leq 0.004$), avoidance ($H = 7.457, p \leq 0.019$), and active coping ($H = 6.043, p \leq 0.037$). Mid anxiety and depression scores were related to the higher use of avoidance ($H = 11.887, p \leq 0.003$), positive reframing ($H = 10.844, p \leq 0.005$), humor ($H = 10.349, p \leq 0.05$), and acceptance ($H = 11.932, p \leq 0.003$). Respondents with mid anxiety and depression also exhibited a negative attitude toward the expansion of the quarantine/self-isolation period.

Living with a spouse turned out to be no less important. Married respondents were less likely to laugh at the situation than their non-married peers ($H = 7.772, p \leq 0.027$). This indicates a greater emotional stress among married couples. Those married were also characterized by higher performance in activities of daily living ($H = 10.911, p \leq 0.005$) and higher use of avoidance ($H = 6.399, p \leq 0.038$). On the other hand, spouses were more prone to substance use ($H = 8.544, p \leq 0.015$) and planning ($H = 10.597, p \leq 0.011$).

Most respondents had difficulties in relationships with their other half and only 9% of all respondents said they had no difficulties. In addition to that, 14% of respondents reported having domestic conflicts and feeling displeasure from having a partner near them. Another 10% said they had difficulties sharing personal space and were dissatisfied with how they partners failed to fully comply with the quarantine/self-isolation rules.

The presence of adult children and their families also had its effect. Older people living together with their adult children exhibited higher levels of anxiety ($U = -2655, p \leq 0.003$). For the majority of older people (81%), it was important to receive partner's support; 57% were seeking support from their adult children and only 10% were seeking support at work. Finally, 12% of respondents said they had no support. Such participants were found to have a higher level of depression ($p \leq 0.0008$). Not following the quarantine recommendations was associated with higher social support ($\chi^2 = 40.221, p \leq 0$). Therefore,

such respondents are more likely to seek some kind of emotional support ($N = 9.117, p \leq 0.03$). Finally, 18% and 5% of the respondents reported being exposed to emotional and physical abuse. This caused the anxiety ($H = 9.949, p \leq 0.001$) depression ($H = 7.557, p \leq 0.003$) levels to grow.

Discussion

A prolonged exposure to negative emotions can negatively affect the functioning and stability of many organs and organ systems. This adverse effect can manifest itself not only in older people but also in students who often experience negative emotions [29]. Different population groups were found to exhibit different capacities to maintain emotional balance during the self-isolation/quarantine period. Namely, older people turned out to be the most sensitive age group [32]. The present and similar studies show that women are more sensitive than men when it comes to self-isolation [33]. In addition to that, women are often targets of verbal and physical violence, especially in patriarchal countries. Other risk groups who may develop or progress mental illness include people with pre-existing mental health problems, survivors of domestic violence, survivors experiencing multiple losses [34], [35], people in lower-income households, loners, and socially excluded populations, such as prisoners, refugees, etc. [36].

The most meaningful actions undertaken to stabilize the mental health of the population in different countries, especially among the risk groups (older people included), were as follows. China provided its residents with an opportunity to get free mental health care, including through the We Chat platform. Such assistance can be provided around the clock [37], [38]. The priority is given to people whose messages signal a higher risk of suicide [39]. Such people they are provided with urgent psychiatric care. In Western countries (USA, UK), people can receive help under an action program for urgent psychiatric interventions. Most of COVID-19 cases are registered in healthcare institutions and for that reason, there is a need to provide psychiatric care to medical workers who do not have the necessary experience in this area. This may also require the state to promote psychiatric care training [40].

Ill-prepared media reports can fuel panic and increase the suicide rate [34]. According to some reports, the suicide statistics may increase by 13% after non-adequate media messages [41]. The present and similar studies show that a prolonged quarantine period can have a substantial negative impact on emotional balance in risk groups, including among the older population. Several months after the illness, patients still had a fear of infecting their spouses or children

with COVID-19 [42]. Stress was largely facilitated by a decline in social connection and a change in the usual way of life. Anxiety resulted from a limited opportunity to meet one's needs in food, water, and clothing. The symptoms of anxiety and anger persisted even 6 months after the end of quarantine [43].

The level of depression can also be influenced by the level of education. The present study did not investigate this aspect, but the previous research suggests that masters are at a higher risk of developing depression than bachelors [43]. Such risks are also one-third higher among representatives of specialized professions (such as IT, art, etc.) than hard-labor workers and service providers [44].

Age is also essential. People over 40 years of age have almost twice as high risks of developing anxiety than younger populations [33]. The present study also shows that women are more prone than men to stress, anxiety, and depression. This finding is consistent with previous research [25].

Jordan had 727,612 COVID-19 cases during the pandemic and 9314 deaths (as of May 19) (<https://www.worldometers.info/coronavirus/country/jordan/>). These are impressive numbers, which certainly could cause anxiety among the older population. The present study is one work among many conducted in the country to investigate the levels of anxiety and depression in students [45] and medical workers [46]. Olaimat *et al.* [45] found that 69% of Jordanian students generally feared COVID-19, but most of them were socially distant and followed quarantine rules. Their study was carried out at the beginning of the pandemic, in March 2020, when the period of social isolation was not extreme.

Alnazly *et al.* [46] found that healthcare workers (mostly nurses, who made up 69% of the study sample) had an average overall score for the Fear of COVID-19 scale of 23.64, which exceeded the mid-point for the total score range (24), indicating elevated level fear of the COVID-19 pandemic. In general, participants exhibited extremely severe depression (40%), extremely severe anxiety (60%), and severe distress (35%). Among the risk factors for depression and anxiety, authors distinguish aged 40 years and older, which coincides with the results of the present study indicating that older adults are generally more vulnerable during a pandemic than other population groups.

Limitations

The present study suffered from some methodological limitations. First, the findings could not be generalized to various cases since the sample size was small and participants were selected from a single geographic region. Second, cross-sectional studies mostly fail to specify a definite reason behind a correlation. This restriction might avoid a deep

understanding of the essence of the causal relationship between study variables. As the third limitation, this study used self-report scales that can only identify the emotions of patients through the assessment and are not able to reflect their real emotions. Hence, it is suggested that future studies should focus on methodological limitations, such as sole reliance on self-report scales due to memory bias and demand characteristics, lack of empirical data, and disregarding ethnic differences.

Conclusions

It was found that during the quarantine/self-isolation period, older married individuals displayed almost normal levels of stress. It can be attributed to appropriate adaptation strategies, which include the acceptance of the pandemic situation and the attempt to positively rethink the current situation. Thus, it can be concluded that older married persons are more mentally resilient to the stresses of quarantine and self-isolation, showing lower levels of anxiety and depression. Vulnerable groups include unattached seniors and people living with adult children or those in financial crisis in quarantine. The most important in preventing the occurrence of stress proved to be the support of the closest relative (spouse), a sense of their importance to the rest of the family, as well as shared views on the principles observed in self-isolation. The opposite factors like violence, own insignificance, lack of support from the partner facilitate the development of stress, increase the level of anxiety and depression, contribute to outbursts of emotional character, reduce trust between family members. Nonetheless, further studies using prospective or longitudinal designs are required to better understand COVID-19-related negative emotions and their associated factors.

Availability of data and material

Data will be available on request.

Ethics approval

The author declares that the work is written with due consideration of ethical standards. The study was conducted in accordance with the ethical principles approved by the Human Experiments Ethics Committee of Philadelphia University (Protocol No 1 of 12.02.2019).

Consent to participate

All the participants gave their written informed consent to the participation in the research.

Consent for publication

All the participants gave their consent to the publication of the research results.

References

- Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, *et al.* The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *Lancet.* 2020;395(10227):912-20. [https://doi.org/10.1016/S0140-6736\(20\)30460-8](https://doi.org/10.1016/S0140-6736(20)30460-8)
PMid:32112714
- Everett JA, Colombatto C, Chituc V, Brady WJ, Crockett M. The Effectiveness of Moral Messages on Public Health Behavioral Intentions during the COVID-19 Pandemic. United States: World Bank; 2020. <https://doi.org/10.31234/osf.io/9yqs8>
- Goodall J. Social rejection, exclusion, and shunning among the Gombe chimpanzees. *Ethol Sociobiol.* 1986;7(3-4):227-36. [https://doi.org/10.1016/0162-3095\(86\)90050-6](https://doi.org/10.1016/0162-3095(86)90050-6)
- Fancourt D, Bu F, WanMak H, Steptoe A. Covid-19 Social Study; 2021. Available from: <https://www.marchnetwork.org/covid19study> [Last accessed on 2021 Sep 25].
- Manderson L, Levine S. COVID-19, risk, fear, and fall-out. *Med Anthropol.* 2020;39(5):367-70. <https://doi.org/10.1080/01459740.2020.1746301>
PMid:32212930
- Brown EE, Kumar S, Rajji TK, Pollock BG, Mulsant BH. Anticipating and mitigating the impact of the COVID-19 pandemic on Alzheimer's disease and related dementias. *Am J Geriatr Psychiatry.* 2020;28(7):712-21. <https://doi.org/10.1016/j.jagp.2020.04.010>
PMid:32331845
- Wang Y, Di Y, Ye J, Wei W. Study on the public psychological states and its related factors during the outbreak of coronavirus disease 2019 (COVID-19) in some regions of China. *Psychol Health Med.* 2021;26(1):13-22. <https://doi.org/10.1080/13548506.2020.1746817>
PMid:32223317
- Holmes EA, O'Connor RC, Perry VH, Tracey I, Wessely S, Arseneault L, *et al.* Multidisciplinary research priorities for the COVID-19 pandemic: A call for action for mental health science. *Lancet Psychiatry.* 2020;7(6):547-60. [https://doi.org/10.1016/S2215-0366\(20\)30168-1](https://doi.org/10.1016/S2215-0366(20)30168-1)
PMid:32304649
- Rubin GJ, Wessely S. The psychological effects of quarantining a city. *BMJ.* 2020;368:313. <https://doi.org/10.1136/bmj.m313>
PMid:31992552
- Schalle M, Murray DR. Pathogens, personality, and culture: Disease prevalence predicts worldwide variability in sociosexuality, extraversion, and openness to experience. *J Pers Soc Psychol.* 2008;95(1):212-21. <https://doi.org/10.1037/0022-3514.95.1.212>
PMid:18605861
- Sorokowska A, Sorokowski P, Hilpert P, Cantarero K, Frackowiak T, Ahmadi K, *et al.* Preferred interpersonal distances: A global comparison. *J Cross Cult Psychol.* 2017;48(4):577-92. <https://doi.org/10.1177/00220222117698039>
- Gunnell D, Appleby L, Arensman E, Hawton K, John A, Kapur N, *et al.* Suicide risk and prevention during the COVID-19 pandemic. *Lancet Psychiatry.* 2020;7(6):468-71. [https://doi.org/10.1016/S2215-0366\(20\)30171-1](https://doi.org/10.1016/S2215-0366(20)30171-1)
PMid:32330430
- Mahase E. Covid-19: Mental health consequences of pandemic need urgent research. *BMJ.* 2020;369:m1515. <https://doi.org/10.1136/bmj.m1515>
PMid:32299806
- Huang Y, Zhao N. Mental health burden for the public affected by the COVID-19 outbreak in China: Who will be the high-risk group? *Psychol Health Med.* 2021;26(1):23-34. <https://doi.org/10.1080/13548506.2020.1754438>
PMid:32286091
- Huang Y, Wang Y, Wang H, Liu Z, Yu X, Yan J, *et al.* Prevalence of mental disorders in China: A cross-sectional epidemiological study. *Lancet Psychiatry.* 2019;6(3):211-24. [https://doi.org/10.1016/S2215-0366\(18\)30511-X](https://doi.org/10.1016/S2215-0366(18)30511-X)
PMid:30792114
- Rogers JP, Chesney E, Oliver D, Pollak TA, McGuire P, Fusar-Poli P, *et al.* Psychiatric and neuropsychiatric presentations associated with severe coronavirus infections: A systematic review and meta-analysis with comparison to the COVID-19 pandemic. *Lancet Psychiatry.* 2020;7(7):611-27. [https://doi.org/10.1016/S2215-0366\(20\)30203-0](https://doi.org/10.1016/S2215-0366(20)30203-0)
PMid:32437679
- Mao L, Jin H, Wang M, Hu Y, Chen S, He Q, *et al.* Neurological manifestations of hospitalized patients with COVID-19 in Wuhan, China: A retrospective case series study. *JAMA Neurol.* 2020;77(6):683-90. <https://doi.org/10.1001/jamaneurol.2020.1127>
PMid:32275288
- Wighton K. Individual Response to COVID-19 "As Important" as Government Action. Imperial College London; 2020. Available from: <https://www.imperial.ac.uk/news/195976/individual-response-covid-19-important-government-action> [Last accessed on 2021 Sep 25].
- Anderson RM, Heesterbeek H, Klinkenberg D, Hollingsworth TD. How will country-based mitigation measures influence the course of the COVID-19 epidemic? *Lancet.* 2020;395(10228):931-4. [https://doi.org/10.1016/S0140-6736\(20\)30567-5](https://doi.org/10.1016/S0140-6736(20)30567-5)
PMid:32164834
- Wang J, Lloyd-Evans B, Giacco D, Forsyth R, Nebo C, Mann F, *et al.* Social isolation in mental health: A conceptual and methodological review. *Soc Psychiatry Psychiatr Epidemiol.* 2017;52(12):1451-61. <https://doi.org/10.1007/s00127-017-1446-1>
PMid:29080941
- Khosravi M. Stress reduction model of COVID-19 pandemic. *Iran J Psychiatry Behav Sci.* 2020;14(2):e103865. <https://doi.org/10.5812/ijpbs.103865>
- Khosravi M. COVID-19 quarantine: Two-way interaction between physical activity and mental health. *Eur J Transl Myol.* 2021;30(4):9509. <https://doi.org/10.4081/ejtm.2020.9509>
PMid:33520149
- Yao H, Chen JH, Xu YF. Patients with mental health disorders in the COVID-19 epidemic. *Lancet Psychiatry.* 2020;7(4):21. [https://doi.org/10.1016/S2215-0366\(20\)30090-0](https://doi.org/10.1016/S2215-0366(20)30090-0)
PMid:32199510
- Khosravi M. Candidate psychotropics against SARS-CoV-2: A narrative review. *Pharmacopsychiatry.* 2021. <https://doi.org/10.1055/a-1551-3756>
PMid:34399430
- Mental health and COVID-19: Change the conversation. *Lancet Psychiatry.* 2020;7(6):463. [https://doi.org/10.1016/S2215-0366\(20\)30194-2](https://doi.org/10.1016/S2215-0366(20)30194-2)
PMid:32380007

26. Li K, Wohlford-Lenane C, Perlman S, Zhao J, Jewell AK, Reznikov LR, *et al.* Middle East respiratory syndrome coronavirus causes multiple organ damage and lethal disease in mice transgenic for human dipeptidyl peptidase 4. *J Infect Dis.* 2016;213(5):712-22. <https://doi.org/10.1093/infdis/jiv499>
PMid:26486634
27. Cheung YT, Chau PH, Yip PS. A revisit on older adults suicides and severe acute respiratory syndrome (SARS) epidemic in Hong Kong. *Int J Geriatr Psychiatry.* 2008;23(12):1231-8. <https://doi.org/10.1002/gps.2056>
PMid:18500689
28. Tsang HW, Scudds RJ, Chan EY. Psychosocial impact of SARS. *Emerg Infect Dis.* 2004;10(7):1326-7. <https://doi.org/10.3201/eid1007.040090>
PMid:15338536
29. Al Majali SA, Ashour LM. The negative consequences of poor emotion management (anger, anxiety and frustration) on the brain and body. *J Talent Deve Excell.* 2020;12(2s):3410-9.
30. Carver CS, Scheier MF, Weintraub JK. Assessing coping strategies: A theoretically based approach. *J Pers Soc Psychol.* 1989;56(2):267-83. <https://doi.org/10.1037/0022-3514.56.2.267>
PMid:2926629
31. Snaith RP. The hospital anxiety and depression scale. *Health Qual Life Outcomes.* 2003;1:29. <https://doi.org/10.1186/1477-7525-1-29>
PMid:12914662
32. Kawohl W, Nord C. COVID-19, unemployment, and suicide. *Lancet Psychiatry.* 2020;7(5):389-90. [https://doi.org/10.1016/S2215-0366\(20\)30141-3](https://doi.org/10.1016/S2215-0366(20)30141-3)
PMid:32353269
33. Sherman AL. Coronavirus anxiety scale: A brief mental health screener for COVID-19 related anxiety. *Death Stud.* 2020;44(7):393-401. <https://doi.org/10.1080/07481187.2020.1748481>
PMid:32299304
34. Khosravi M. Worden's task-based model for treating persistent complex bereavement disorder during the coronavirus disease-19 pandemic: A narrative review. *Open Access Maced J Med Sci.* 2020;8(1):553-9. <https://doi.org/10.3889/oamjms.2020.5502>
35. Khosravi M. Worden's task-based approach for supporting people bereaved by COVID-19. *Curr Psychol.* 2021;40:5735-6. <https://doi.org/10.1007/s12144-020-01292-0>
PMid:33424200
36. Garfin DR, Silver RC, Holman EA. The novel coronavirus (COVID-2019) outbreak: Amplification of public health consequences by media exposure. *Health Psychol.* 2020;39(5):355-7. <https://doi.org/10.1037/hea0000875>
PMid:32202824
37. Chen L, Alston M, Guo W. The influence of social support on loneliness and depression among older elderly people in China: Coping styles as mediators. *J Community Psychol.* 2019;47(5):1235-45. <https://doi.org/10.1002/jcop.22185>
PMid:30912159
38. Duan L, Zhu G. Psychological interventions for people affected by the COVID-19 epidemic. *Lancet Psychiatry.* 2020;7(4):300-2. [https://doi.org/10.1016/S2215-0366\(20\)30073-0](https://doi.org/10.1016/S2215-0366(20)30073-0)
PMid:32085840
39. Turecki G, Brent DA, Gunnell D, O'Connor RC, Oquendo MA, Pirkis J, *et al.* Suicide and suicide risk. *Nat Rev Dis Primers.* 2019;5(1):74. <https://doi.org/10.1038/s41572-019-0121-0>
PMid:31649257
40. Khosravi M, Ghiasi Z, Ganjali A. A narrative review of research on healthcare staff's burnout during the COVID-19 pandemic. *Proc Singapore Healthc.* 2021. <https://doi.org/10.1177/20101058211040575>
41. John A, Glendenning AC, Marchant A, Montgomery P, Stewart A, Wood S, *et al.* Self-harm, suicidal behaviours, and cyberbullying in children and young people: Systematic review. *J Med Internet Res.* 2018;20(4):e129. <https://doi.org/10.2196/jmir.9044>
PMid:29674305
42. Pfefferbaum B, North CS. Mental health and the Covid-19 pandemic. *N Engl J Med.* 2020;383(6):510-2. <https://doi.org/10.1056/NEJMp2008017>
PMid:32283003
43. D'Agostino A, Demartini B, Cavallotti S, Gambini O. Mental health services in Italy during the COVID-19 outbreak. *Lancet Psychiatry.* 2020;7(5):385-7. [https://doi.org/10.1016/S2215-0366\(20\)30133-4](https://doi.org/10.1016/S2215-0366(20)30133-4)
PMid:32353266
44. Klomek AB. Suicide prevention during the COVID-19 outbreak. *Lancet Psychiatry.* 2020;7(5):390. [https://doi.org/10.1016/S2215-0366\(20\)30142-5](https://doi.org/10.1016/S2215-0366(20)30142-5)
PMid:32353271
45. Olaimat AN, Aolymat I, Elshahry N, Shahbaz HM, Holley RA. Attitudes, anxiety, and behavioral practices regarding COVID-19 among university students in Jordan: A cross-sectional study. *Am J Trop Med Hyg.* 2020;103(3):1177-83. <https://doi.org/10.4269/ajtmh.20-0418>
PMid:32662398
46. Alnazly E, Khraisat OM, Al-Bashaireh AM, Bryant CL. Anxiety, depression, stress, fear and social support during COVID-19 pandemic among Jordanian healthcare workers. *PLoS One.* 2021;16(3):e0247679. <https://doi.org/10.1371/journal.pone.0247679>
PMid:33711026