

# Post-traumatic Stress Symptoms, Fear, and Health-Related Quality of Life among Community Dwelling Older Adults during COVID-19 Pandemic in Alexandria, Egypt

<sup>(1)</sup>Mona Metwally El-Sayed, <sup>(2)</sup>Marwa Abd El-Gawad Mousa, <sup>(3)</sup>Manal Mohammed Hawash, <sup>(4)</sup>Heba Ahmed Mohsen

(1,2) Assist. Prof. of Psychiatric Nursing, and Mental Health, Faculty of Nursing, Alexandria University, Egypt.

(3) Assist. Prof. of Gerontological Nursing, Faculty of Nursing, Alexandria University, Egypt.

(4) Lecturer of Gerontological Nursing, Faculty of Nursing, Faculty of Nursing, Alexandria University, Egypt.

## Abstract

**Background:** The outbreak of the COVID-19 pandemic is a public health crisis that largely has affected people worldwide. Since older adults are universally perceived as the most vulnerable group, post-traumatic symptoms and fear produced by this pandemic could have devastating effects on their quality of life. Therefore, this study aimed to assess the prevalence and levels of post-traumatic stress symptoms and fear during COVID-19 pandemic and determine the impact of these psychological symptoms on health-related quality of life among community dwelling older adults. **Methodology:** A descriptive correlational research design was utilized. Participants included a representative sample of 190 community dwelling older adults registered in El-Wafaa club. Online web-based electronic questionnaires were used including Older Adults Socio-Demographic and Clinical Data Questionnaire, PCL-C, FCQ, and SF-12. **Results:** The results of this study revealed that during COVID-19 pandemic 76.9% and 97.4 % of the studied older adults had medium to severe stress and fear levels, respectively. These levels of PTSD symptoms significantly affect their physical and mental health-related quality of life ( $P \leq 0.01$ ). While fear levels affected mental components only ( $P \leq 0.01$ ). **Conclusion:** It can be concluded from this study that more than three-quarters of the studied Egyptian community dwelling older-adults suffered from PTSD symptoms levels ranged from medium to severe post-COVID-19 pandemic outbreak. The majority of them suffered from fear of COVID-19 pandemic with the same levels. The PTSD symptoms and fear levels were the best predictors of the mental components of health-related quality of life. **Recommendations:** Nursing interventions with emotional, spiritual, social, and physical components through online videos and Apps platform for phones and tablets should be made available for elderly people were recommended.

**Keywords:** Post-traumatic Stress Disorder, Fear and Health-Related Quality of Life (HRQoL), COVID-19 Pandemic and Community Dwelling Older Adults.

**Email:** In.heba@yahoo.com.

## Introduction

Since the World Health Organization (WHO) declared the Coronavirus disease of 2019 (COVID-19) as a “public health emergency of international concern”, the new global pandemic was classified by as one of the worst pandemics in the current century (WHO Situation Report-90, 2020). This outbreak is a serious public health adversity which has been severely affect the humanity (Pence, 2020; Torrente et al., 2020; Xiong et al., 2020). The new virus is sharply transmitted worldwide causing high rate of mortality, particularly among older adults (Carriedo, Cecchini,

Fernandez-Rio, & Méndez-Giménez, 2020; Leddy, Weiser, Palar, & Seligman, 2020; Roy, Jain, Golamari, Vunnam, & Sahu, 2020). It was reported that the older population are at a heightened risk of COVID-19 infection, hospitalization, intensive care unit admission and death (Carter et al., 2020). The world has seen more than 20.3 million COVID-19 infections, and more than 741.723 people have died, and the elderly people constitutes more than 95% of deaths (Carriedo et al., 2020). In Egypt, by the beginning of April 2020, there were over 800 confirmed cases, with more than 50 fatalities, and a rapid tendency towards increase (Abdelhafiz et al., 2020; El-Zoghby,

Soltan, & Salama, 2020). Over about one-month, the number of confirmed cases increased tremendously to reach 6465 cases on the 3<sup>rd</sup> of May 2020, with about 430 fatality cases (Medhat & El Kassas, 2020).

In fact, there are numerous risk factors which can increase susceptibility of older-adults to have COVID-19 infection (Ho et al., 2020; Liu et al., 2020; Nidadavolu & Walston, 2020; Zhou et al., 2020b). The physiological changes associated with aging that occur in both innate and adaptive immunity, e.g., an inability to mount antibodies against toxins (Nikolich-Zugich et al., 2020). Decreased nutritional status and swallowing difficulty which increase the chance of aspiration, in addition to decrease mucociliary clear that predispose the older adult to infections (Cunha, Perazzio, Azzi, Cravedi, & Riella, 2020; Nidadavolu & Walston, 2020; Srinivasan et al., 2005). Lifestyle factors such as residence in nursing homes have been demonstrated to increase the risk of infectious disease in the elderly (Bernabeu-Wittel et al., 2020; Fisman, Bogoch, Lapointe-Shaw, McCreedy, & Tuite, 2020; Li, Temkin- Greener, Shan, & Cai, 2020; Ouslander & Grabowski, 2020). Further, presence of previous underlying medical conditions associated with aging, such as hypertension, cardiovascular disease, respiratory disease, type2 diabetes, dementia and cancer which could predispose the older-adults to develop severe complications of COVID-19 (Bektas, Schurman, Franceschi, & Ferrucci, 2020; Fisman et al., 2020; Hägg et al., 2020; Perrotta et al., 2020).

Consequently, many countries have been implemented quarantine and restrict the general people from social interactions (Chtourou et al., 2020; Giallonardo et al., 2020; Guo et al., 2020; Lin, Broström, Griffiths, & Pakpour, 2020; Thu, Ngoc, & Hai, 2020). The preventive protocols were disseminated to the public such as wearing masks, extensive hygiene precautions, travel restriction and keep social distance (Allam et al., 2020; Bielecki et al., 2020; Dalton, Corbett, & Katelaris, 2020). However, these measures which vary from obligatory quarantine to voluntary self-imposed isolation and lockdown that could control the virus transmission, have enormous effects on the physical and psychological health of older

adults (Culhane, Treglia, Steif, Kuhn, & Byrne, 2020; Nussbaumer-Streit et al., 2020). In the same vein, the levels of fear and stress that associated with COVID-19 could potentially have serious mental and physical health consequences, particularly among the elder population (Jiménez-Pavón, Carbonell-Baeza, & Lavie, 2020; Ornell, Schuch, Sordi, & Kessler, 2020).

Undeniably, the elders are estimated to be more susceptible to post COVID-19 pandemic stress and fear (Ornell et al., 2020; Pasion, Paiva, Fernandes, & Barbosa, 2020). Their worries and ferries could be coming from the fact that the contagion could occur from contact with others even without any obvious manifestations (Cecchetti & Schoenholtz, 2020; Nikolich-Zugich et al., 2020; Perrotta et al., 2020; Zhou et al., 2020a). Their vulnerability to complications and high rate of fatalities also contribute to induce feeling of stress and fear of death among them (Lin et al., 2020; Liu et al., 2020; Ornell et al., 2020). All of these could impose them to be more isolated and lonelier beside increase their feelings of hyperarousal, avoidance, uncertainty about the future and helplessness (Forte, Favieri, Tambelli, & Casagrande, 2020; Giallonardo et al., 2020; Zhu, Zhang, Zhou, Li, & Yang, 2020). Furthermore, the unknown fear and high level of stress could trigger multiple mental and physical problems as irritability, insomnia, nightmares, anxiety, hypervigilance, increased startle reactions and cognitive deteriorations (García-Fernández, Romero-Ferreiro, López-Roldán, Padilla, & Rodriguez-Jimenez, 2020; Kaseda & Levine, 2020). Current studies around the world have found that people aged 60 years or above had a higher likelihood of post-traumatic stress disorder, depression, and poor health-related quality of life during the ongoing pandemic (Carriedo et al., 2020; González-Sanguino et al., 2020; Peng et al., 2020).

The Health-related Quality of Life (HRQoL) of older-adults is a concept with multi-dimensional aspects. It is the way that the elders assessed their mental, physical, emotional, and social facets of wellbeing (Lobo, Santos, Carvalho, & Mota, 2008; Pihl, Jacobsson, Fridlund, Strömberg, & Måtensson, 2005; Strine, Chapman, Balluz, Moriarty, &

Mokdad, 2008). Without doubt, in the COVID-19 era, significant changes in the daily routine life of the elderly were happened. It was reported that COVID-19 has direct and indirect negative physical and psychosocial health consequences (Ammar et al., 2020; Pérez-Fuentes, Molero Jurado, Martos Martínez, & Gázquez Linares, 2020; Wang et al., 2020; Xin et al., 2020). Despite the significant spread of stress and fear associated with the new COVID-19 pandemic among elderly, data are scared on their impact on health-related quality of life. Thus, inspecting their debilitating effects on physical and mental Health-related Quality of Life of older-adults are very important. It could help in development of specific preventive interventions to counteract their consequences. In this context, the study aimed to assess the prevalence and levels of post-traumatic stress symptoms and fear during COVID-19 pandemic and determine the impact of these psychological symptoms on health-related quality of life among community dwelling older adults.

#### Research Questions:

- What are the prevalence and levels of post-traumatic stress symptoms and fear during COVID-19 pandemic among community dwelling older adults in Alexandria, Egypt?
- What is the impact of these psychological symptoms on health-related quality of life among community dwelling older adults in Alexandria, Egypt?

## Subjects and Methods

#### Study Design:

A descriptive correlational research design was utilized.

**Setting:** Due to the precautionary measures imposed all over the country to deal with the pandemic, many elderly clubs were closed at the time of data collection, and elderly homes refused to permit the researchers to interview the residents. Thus, this study was carried out in the only setting where the responsible authority permitted to contact its members via their phone numbers. That is El-Wafaa club in Moharram-Bec district. It is affiliated to the Ministry of Social Solidarity in Alexandria, Egypt.

#### Participants:

They included 190 community dwelling older adults, aged 60 years and above, registered in El-Wafaa club, and living in Alexandria during COVID-19 pandemic.

The total number of older adults registered in El-Wafaa club is 400. The EPI INFO 7.0 program was used to estimate the sample size based on using 5% acceptable margin error, 95% confidence coefficient, 50% expected frequency, and total population size of 400 elders. The program revealed a minimum sample size of 188 older adults, and it was increased to the nearest round figure (190).

#### The inclusion criteria:

- Older adults aged 60 years and above, and able to read and write.

#### Tools:

Web-based electronic questionnaires were used as study tools which sent to individuals via online social networks programs such as WhatsApp and E-mails. It was comprised of following four tools.

#### Tool I: Older Adults Socio-Demographic and Clinical Data Questionnaire:

It was constructed by the researchers to identify the socio-demographic and clinical characteristics of the participants. This tool comprises items related to participant's sex, age, marital status, level of education, type of occupation before retirement, current occupation, financial status, social support, and the presence of chronic illness.

#### ▪ Tool II: Posttraumatic Stress Disorder Checklist-Civilian (PCL-C) Arabic Version:

PCL-C Arabic Version is a standardized self-report rating scale comprising 17 items that correspond to the key symptoms of PTSD. It developed by (Weathers, Litz, Herman, Huska, & Keane, 1993) and translated by (Alhalal, Ford Gilboe, Wong, & AlBuhairan, 2017). It was applied generally to any traumatic event such as COVID-19 pandemic outbreak. The respondents are asked how much they have been bothered by each PTSD symptom over the past month on a 5-point severity scale ranging from 1= not at all to 5= extremely stressed. The PCL-C measures the

four clusters of PTSD symptoms (e.g., re-experiencing/intrusive, avoidance/numbing, Amnesia, and hyperarousal). The total score of PCL-C ranges from 17 to 85; with a score ranging from 17-39 indicating mild posttraumatic stress, from 40-62 reflecting moderate posttraumatic stress, and 63-85 indicating severe posttraumatic stress. The scale has been tested for internal consistency and reliability. It demonstrated a high internal consistency with Cronbach's alpha ( $\alpha = .89$ ) (Alhalal et al., 2017).

#### ▪ **Tool III: Fear of the Coronavirus Questionnaire (FCQ):**

It was developed by Mertens et al., (2020) based on the different fear components such as subjective experiences (worrying), attentional biases, and avoidance behaviors. It consisted of eight statements, each statement was rated on a 5-point Likert scale (1 = "Strongly disagree", 5 = "Strongly agree"), e.g. "I am very worried about the coronavirus", "I am taking precautions to prevent infection (e.g., washing hands, avoiding contact with people, avoiding door handles)", and "I am constantly following all news updates regarding the virus". The scale displayed acceptable internal consistency in which Cronbach's alpha was equal to 0.77. The total score ranges from 8-40, with a score from 8-18 is reflected as mild coronavirus fear. Scores ranging from 19-29 is considered moderate coronavirus fear, whereas scores ranging from 30-40 is revealed as severe fear.

#### ▪ **Tool IV: The 12 Items-Short Form Health Survey (SF-12)**

It is a multipurpose valid generic measure of health status/outcomes. It was used to examine subjects' health related quality of life (HRQOL), and to monitor the health of both general and specific population. The 12-items SF version was developed by (Ware, Kosinski, & Keller, 1998). It included 12 questions which measures the physical and mental health-related quality of life through eight health concepts/dimensions. These dimensions involve physical health components (PCS) such as physical functioning, role limitation due to physical health problems, bodily pain, general health, and vitality. The mental health components (MCS) comprise role limitation due to emotional problems, social functioning, and mental health. Arabic version of

the SF-12 questionnaire was used in this study. It was a reliable valid tool which translated from English into Arabic language by (Al-Shehri, Taha, Bahnassy, & Salah, 2008). The Cronbach's alpha was equal to 0.84. Response categories for items ranged from two- to six-point scales, and raw scores for items range from 1 to 6. The Quality Metric Health Outcomes Scoring Software 2 was used after recoding to transform the raw scores of each scale items without standardization or weighing to calculate subscales scores, each ranging from 0 (the worst) to 100 (the best). Then a norm-based scoring algorithm analytically derived from US data of general population survey was applied. The norm-based scores were attained by applying the succeeding formula: Transformed score for each scale = (original score of the scale – the lowest score possible origin) / (range of possible scores for the original scale) \*100. To calculate PCS, and MCS components summary scores, it has been assumed a mean of 50 and an SD of 10 based on US-derived summary scores (Ware et al., 1998).

#### **Method:**

1. Official permissions were obtained from the responsible authorities of the Faculty of Nursing, Alexandria University.
2. The Older Adults Socio-Demographic and Clinical Data Questionnaire (tool I) was developed by the researchers.
3. The Arabic version of tool II and IV (PCL-C and SF-12) was used.
4. Tool III Fear of the Coronavirus Questionnaire (FCQ) was translated into Arabic language. then and then reviewed by bilingual experts in the fields of Gerontological and Psychiatric Mental Health Nursing.
5. The tools were submitted through E-mail to a jury composed of five experts in the field of Gerontological and Psychiatric Nursing and Mental Health (during quarantine period) to test their face validity, comprehensiveness, clarity, relevance, and applicability. Tools proved to be valid.
6. The study tools were transformed to Electronic Questionnaires through the Microsoft form, which facilitate the online sharing and enable the researchers to maintain the confidentiality of the study subjects' data. The researchers tested the

tool link to determine if it renders correctly in various browsers.

7. Informed consent was required from the study subjects who fulfilled the inclusion criteria before including them in the study. They were asked to send a signed consent or record their approval through WhatsApp or E-mail.
8. Before embarking on the actual study, a pilot study was performed on 20 older adults who were not included in the study subjects to assess the applicability, clarity, and feasibility of the study tools. Then the necessary modifications were done accordingly.
9. Reliability of tools III (FCQ) were tested using Cronbach's alpha method on 20 older adults who meet the inclusion criteria. Tools proved to be reliable, tool III ( $\alpha=0.77$ ).

#### **Actual study:**

- The researchers contacted the responsible authority of El-Wafaa club and obtained a list of phone numbers of its members.
- A simple random sampling technique was used to recruit a representative sample of 190 community dwelling older adults. This was done by recruiting study participants by random ballot from a list of phone numbers of the club members.
- Each randomly recruited older adult was contacted individually via a phone call, where the researchers introduced themselves, explained the purpose of the study and reassured the participant about anonymity and confidentiality of his responses, and then instructions regarding answering the study tools were given.
- The researchers sent each participant the electronic informed consent form and web-based electronic tools through the online platforms and social media networks such as WhatsApp, Facebook messenger, and e-mails.
- All participants' responses were retrieved via online communication network programs.
- Data collection was continued for a period of two months from the beginning of May to the end of June 2020.

#### **Statistical Methods:**

The collected data was coded and analyzed for suitable statistical significance with the help

of Microsoft Excel and Statistical Package for Social Sciences (SPSS, Version 25). Descriptive statistics as frequency, mean, standard deviation, median, and coefficient of variation were used to describe different quantitative and qualitative variables. One-sample Kolmogorov Smirnov Test was used to be assured that the SF-12 domains had normal distribution. Pearson coefficient is used to correlate between two normally distributed quantitative variables. Independent-sample t-test is used to determine whether there are any statistically significant differences between the means of two independent groups. The one-way analysis of variance (ANOVA) has been used to know whether there are any statistically significant differences between the means of two or more independent variables or not. The level of significance selected for this study was p-value equal to or less than 0.05 and 0.01.

#### **Ethical considerations & Consent:**

- After adequate explanation of the study aims, an informed electronic consent was obtained to participate in this study.
- The right to participate and to withdraw from the study at any time was emphasized.
- Anonymity and privacy of the study participants were maintained.
- Confidentiality of the collected data was ensured.

#### **Results:**

Table- 1 showed the frequency and distribution of demographic and clinical characteristics of the studied older-adults. It showed that 67.4% of studied older adults were females. Furthermore, 69% of the studied seniors aged between the age of 60 and 69 years old. 65.8% of the studied older adults were married, 48.4% of them have university and postgraduate education. 63.2% of the studied older adults were governmental employees before retirement, while 31.6% of them were non-governmental employees. However, 73.7% of the studied older adults had not current occupation, 7 1.1% of them reported that their economic status was sufficient. Additionally, 98.4% of the studied older adults reported that they had chronic illness.

**Table 1: Frequency and distribution of demographic and clinical characteristics of the studied older adults (n=190):**

Variable	Categories	No	%
Sex	Male	62	32.6
	Female	128	67.4
Age	60-64	63	33.2
	65-69	68	35.8
	70-74	38	20.0
	≥75	21	11.0
Marital Status	Married	125	65.8
	Widow	53	27.9
	Single/ Divorced	12	6.3
Educational Level	Basic education	28	14.8
	Secondary school	70	36.8
	University/ Postgraduate	92	48.4
Pre-retirement occupation	Governmental employees	120	63.2
	Craft/manual work	60	31.6
	Housewife	10	5.3
Current working status	Yes	50	26.3
	No	140	73.7
Monthly income	Not- Enough	135	71.1
	Enough	55	28.9
Presence of chronic illness	Yes	187	98.4
	No	3	1.6

Table (2) denoted the levels of PTSD symptoms and fear among the studied older adults during COVID-19 pandemic. It was noted that 59.5% and 17.4% have moderate and severe levels of PTSD symptoms respectively, with a mean of  $51.86 \pm 6.28$  and  $68.36 \pm 4.70$ , respectively. As well, 60.0% and 37.4% of the participants showed high and moderate levels of fear of COVID-19 respectively, with a mean of  $34.36 \pm 3.13$  and  $25.44 \pm 2.72$ , respectively. The coefficient of variation among PTSD symptoms levels was 32.7% and 21.2% among fear of COVID-19 levels.

**Table (2): Levels of PTSD symptoms and fear among the studied community dwelling older adults during COVID-19 pandemic (n=190):**

Variables		Range	Median	Mean±SD
Fear of COVID-19		10-40	31	$30.53 \pm 5.78$
PTSD symptoms	Re-experiencing/Intrusive	5-25	14.5	$14.30 \pm 4.59$
	Avoidance	2-10	6	$5.72 \pm 1.85$
	Numbing	5-25	15	$15.05 \pm 3.87$
	Hyperarousal	5-25	15	$15.51 \pm 4.43$
Total		20-85	51	$50.58 \pm 12.34$

Table- 3 showed the level of post-traumatic stress symptoms and fear of the studied older-adults during COVID-19 pandemic. It denoted that 60.0% of the studied older adults reported that they had a high level of fear of COVID-19 with mean±SD of  $[34.36 \pm 3.13]$ . Moreover, 59.5% of the

studied older adults reported that they had a moderate level of post-traumatic stress symptoms with mean±SD [51.86± 6.28]. It also showed that the coefficient of variation among fear of COVID-19 levels was 21.2% and the coefficient of variation among PTSD symptoms levels was 32.7%.

**Table 3: Level of post-traumatic stress symptoms and fear of the studied community dwelling older adults during COVID-19 pandemic (n=190):**

Variables	Level	Range	No	%	(Mean±SD)	Coefficient of Variation
Fear of COVID-19	Low	8-18	5	2.6	15.40±3.05	21.2%
	Moderate	19-29	71	37.4	25.44±2.72	
	High	30-40	114	60.0	34.36±3.13	
PTSD symptoms	Low	17-39	44	23.2	33.95±4.52	32.7%
	Moderate	40-62	113	59.5	51.86±6.28	
	High	63-85	33	17.4	68.36±4.70	

Table 4 represented mean scores of post-COVID-19 health-related quality of life status mean scores among the studied older adults. It revealed that the highest mean of HRQOL domains was mental health (55.31±21.31), while the lowest mean of HRQOL domains was role limitation due to emotional problems (16.05±19.73). The mean of PCS of the participants was [31.97 ± 6.66], which was lower than the mean of the MCS [32.54 ± 13.34].

**Table 4: Mean scores of post-COVID-19 Health-related Quality of Life (HRQoL) status among the studied community dwelling older adults (n=190):**

HRQOL as measured by dimensions of SF-12	Range	Median	Mean±SD
General Health (GH)	0-80	40	41.05±20.24
Physical Functioning (PF)	0-66.67	33.33	33.77±20.25
Role-Physical (RP)	0-50	0	18.03±22.87
Role-Emotional (RE)	0-50	0	16.05±19.73
Bodily Pain (BP)	0-80	40	38.74±21.54
Vitality (VT)	0-83.33	50	47.54± 20.43
Social Functioning (SF)	0-80	20	27.26±22.06
Mental Health (MH)	0-83.33	50	49.39±18.50
<b>Physical Component Summary (PCS)</b>	12.12-54.97	31.98	31.97±6.66
<b>Mental Component Summary (MCS)</b>	0-72.90	32.09	32.54±13.34

Table 5 represented the correlation matrix between post-COVID-19 pandemic stress, fear, and health related-quality of life among community-dwelling older-adults. It can be observed from this table that a statistically significant negative relation between post-COVID-19 pandemic stress and PCS and MCS ( $r=-0.212$  and  $-.238$ ,  $p=0.000$ ) respectively. Evermore, post-COVID-19 pandemic stress is negatively related to all domains of health-related quality of life scale GH, PF, RP, RE, BP, VT, and SF at a statistically significant level ( $r=-.184$   $p < 0.05$ ,  $-.231$ ,  $-.262$ ,  $-.394$ ,  $.391$ ,  $-.250$ ,  $-.513$ , and  $-.520$   $p=0.000$ ) respectively. Yet, it was noted from the table that a negative statistically significant relation was found between fear of COVID-19 and MCS ( $r=-.223$ ,  $p=0.000$ ).

**Table (5): Correlation coefficients between PTSD symptoms and fear of COVID-19 and HRQoL among the studied community dwelling older adults during COVID-19 pandemic (n=190):**

HRQoL as measured by dimensions of SF-12	Fear of COVID-19 pandemic	PTSD symptoms				
		Re-experiencing/Intrusive	Avoidance	Numbing	Hyper-Arousal	Total
General Health (GH).	.120	.099	.135	.127	.242**	-.184*
Physical Functioning (PF).	-.060	-.083	-.183*	-.253**	-.260**	-.231**
Role-Physical (RP).	-.056	-.145*	-.175*	-.237**	-.300**	-.262**
Role-Emotional (RE).	-.248**	-.302**	-.243**	-.310**	-.414**	-.394**
Bodily Pain (BP).	-.153*	.250**	.318**	.334**	.407**	-.391**
Vitality (VT).	-.209**	.162*	.098	.190**	.322**	-.250**
Social Functioning (SF).	-.540**	-.520**	-.275**	-.351**	-.468**	-.513**
Mental Health (MH).	-.492**	.509**	.272**	.340**	.510**	-.520**
Physical Component Summary (PCS)	-.104	-.154*	-.102	-.209**	-.206**	-.212**
Mental Component Summary (MCS)	-.223**	.205**	.098	.163*	.270**	-.238**

(r value: Pearson's correlation coefficient; \* Correlation is significant at  $\leq 0.05$  level, \*\* Correlation is significant at 0.01 level).

Table-6 illustrated the linear regression between fear of COVID-19 and health-related quality of life among the studied older-adults. The table denoted that the percentage of variance in health-related quality of life (HRQoL) due to fear of COVID-19 pandemic was (5.1%), which meant that fear could predicate health-related quality of life of community dwelling older-adults. The stepwise technique revealed that the MCS was the best predictor for fear of COVID-19 "T"=2.830 at a statistically significant level (0.005). Meanwhile, PCS is less predictor for fear of COVID-19 pandemic "T"= 0.552, with no statistically significant level. Thus, the multiple regression equation that determined the prediction of Fear of COVID-19 and HRQoL among the studied older-adults can be formulated as follows:

$$\text{Fear of COVID-19} = 25.583 + 0.043 (\text{PCS}) + 0.110 (\text{MCS}).$$

**Table 6: The linear regression between fear of COVID-19, and Health-related Quality of Life among the studied older-adults (n=190)**

Dependent Variable	Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	R Square
		B	Std. Error	Beta			
Fear of COVID-19	(Constant)	25.583	3.426	----	7.468**	.000	5.1%
	PCS	.043	.078	.049	.552	.582	
	MCS	.110	.039	.253	2.830*	.005	

\* Correlation is significant at  $\leq 0.05$  level.

\*\* Correlation is significant at  $\leq 0.01$  level.

Table-7 denoted the linear regression between PTSD symptoms and health-related quality of life among the studied older-adults during COVID-19 pandemic. The table demonstrated that the percentage of variance in HRQoL due to PTSD symptoms was (6.4%), this meant that PTSD symptoms can predicate health-related quality of life of community dwelling older-adults. The stepwise technique revealed that the mental component summery (MCS) was the best predictor of PTSD symptoms during COVID-19 pandemic "T"=1.958 at a statistically significant level (0.052). While physical component summary (PCS) was negatively less predictor of PTSD symptoms "T"=-1.197 but not statistically significant. Thus, the multiple regression equation that determined the prediction of PTSD symptoms and health -related quality of life among the studied older-adults during COVID-19 pandemic can be formulated as follows:

Post-COVID-19 pandemic Stress Disorder = 51.647 - 0.197 (PCS) + 0.161 (MCS).

**Table 7: linear regression between PTSD symptoms and Health-Related Quality of Life among the studied older-Adults during COVID-19 pandemic (n=190)**

Dependent Variable	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	R Square
		B	Std. Error	Beta			
PTSD symptoms	(Constant)	51.647	7.262	---	7.112**	.000	6.4%
	PCS	-.197	.165	-.106	-1.197	.233	
	MCS	.161	.082	.174	1.958*	.052	

\* Correlation is significant at  $\leq 0.05$  level

\*\* Correlation is significant at  $\leq 0.01$  level.

Table -8 depicted the mean and difference among post COVID-19 fear, stress, PCS, MCS, demographic, and clinical characteristics of the studied older adults. It denoted that females scored a significantly higher total mean of COVID-19 stress than males [ $t=2.411$ ]. As well, total mean COVID-19 fear among older subjects who aged  $\geq 60$  years scored significantly higher than other categories of age with a statistically significant difference [ $F =5.364$ ]. Furthermore, the studied single older adults scored a significantly higher mean of post-COVID-19 fear, and stress than other categories of marital status [ $F =3.763$ ], [ $F =3.308$ ] respectively. Seniors subjects scored a significantly higher total mean of post-COVID19 fear, stress, and MCS than other categories of educational level [ $F =15.012$ ], [ $F=4.360$ ], and [ $F=2.706$ ] respectively. Elderly subjects who worked before retirement in non-governmental sector scored a significantly higher total mean of post-COVID-19 fear than other categories of employment [ $F =3.537$ ]. The studied senior participants who had a current employment scored a significantly higher total mean of the measures of post-COVID19 stress than the subjects who did not have a current job [ $F=2.102$ ]. Moreover, the older participants whose monthly family income was insufficient scored a significantly higher total mean of post-traumatic stress symptoms than other categories of economic status [ $t =3.470$ ].

Table 8: The Mean and Difference among post-COVID-19 fear, PTSD symptoms, PCS, MCS, socio-demographic, and clinical characteristics of the studied older adults (n=190)

Older adult socio-demographic and clinical characteristics	Categories	No	%	Fear		Stress		PCS		MCS	
				Mean	SD	Mean	SD	Mean	SD	Mean	SD
Sex	Male	62	32.6	29.81	4.61	47.52	11.94	32.19	6.79	32.81	14.57
	Female	128	67.4	30.88	6.26	52.06	12.30	31.86	6.62	32.40	12.75
t (Value)				1.195		2.411*		0.613		0.200	
Age	60-64	63	33.2	32.13	5.15	51.14	12.76	32.33	6.16	32.08	14.43
	65-69	68	35.8	31.04	5.16	50.28	11.68	32.46	7.34	32.37	13.25
	70-74	38	20.0	28.53	6.06	51.68	12.26	30.40	6.33	33.34	13.13
	≥75	21	11.1	27.67	7.17	47.86	13.72	32.11	6.36	33.00	11.24
F (Value)				5.364**		0.495		0.895		0.081	
Marital Status	Married	125	65.8	31.45	5.34	49.30	11.52	32.02	7.05	31.62	13.40
	Widower	53	27.9	28.38	6.24	51.77	12.98	31.59	6.15	34.34	12.92
	Single	4	2.1	31.75	6.85	66.75	14.10	33.36	2.49	36.94	16.20
	Divorced	8	4.2	29.75	6.04	54.63	14.71	32.84	5.45	32.59	14.79
F (Value)				3.763*		3.308*		0.162		0.660	
Education	Reads & write	10	5.3	31.10	5.22	42.70	10.21	32.94	6.84	36.04	13.75
	Basic education	18	9.5	23.89	4.60	43.61	9.76	32.65	5.78	23.68	12.69
	Secondary	70	36.8	29.19	5.64	50.19	12.70	32.17	7.47	33.64	13.01
	University	74	38.9	32.14	4.85	52.08	11.22	31.80	6.44	32.29	14.00
	Postgraduate	18	9.5	35.44	3.87	57.28	14.19	30.64	5.16	36.15	8.89
F (Value)				15.012**		4.360**		0.304		2.706*	
Previous Occupation	Governmental	120	63.2	31.41	5.53	51.48	12.40	32.21	6.94	32.67	13.37
	Craft work	57	30.0	28.54	6.17	48.61	11.84	31.81	6.51	30.92	13.04
	Private employee	3	1.6	33.33	5.51	53.33	19.66	32.89	4.62	34.81	6.32
	Housewife	10	5.3	30.40	3.98	50.20	13.09	29.71	4.32	39.38	15.34
F (Value)				3.537*		0.742		0.461		1.192	
Current Working	Yes	50	26.3	31.70	5.32	53.70	13.15	31.75	7.19	33.50	14.47
	No	140	73.7	30.11	5.90	49.46	11.89	32.04	6.48	32.19	12.95
t (Value)				1.680		2.102*		t (.263)		0.595	
Monthly Income	Not-enough	135	71.1	31.43	5.27	51.07	12.52	31.52	6.78	33.45	13.49
	Enough	55	28.9	28.31	6.41	49.36	11.91	33.05	6.27	30.29	12.81
t (Value)				3.470 **		0.866		1.436		1.488	
Presence of chronic illness	No	3	1.6	30.00	4.36	52.33	21.83	35.82	1.72	24.71	9.07
	Yes	187	98.4	30.53	5.81	50.55	12.23	31.90	6.69	32.66	13.37
t (Value)				0.158		0.248		1.011		1.024	

F = One-way analysis of variance (ANOVA) test

\* p is significant at 0.05 level

t = Independent sample t- test

\*\* p is significant at 0.01 level)

## Discussion

Post-traumatic stress disorder and fear caused by COVID-19 pandemic have recently evolved into a global crisis affecting the physical and mental health of people around the world (Kontoangelos, Economou, & Papageorgiou, 2020; Torales, O'Higgins, Castaldelli-Maia, & Ventriglio, 2020; Xiong et al., 2020). It is rapid dissemination forced the public to follow certain persecutions and restraints, such as physical distancing, stay-at-home, reduction of social connections, wearing masks and gloves outside homes (Chtourou et al., 2020; Giallonardo et al., 2020; Rehman et al., 2020; Shah et al., 2020). Older adults were ranked as the greatest at-risk segment of the population (Bencivenga, Rengo, & Varricchi, 2020; García-Fernández et al., 2020; Perrotta et al., 2020). Such vulnerable group might have confident negative psychological effects including posttraumatic stress symptoms, anxiety, depression, insomnia, irritability and other emotional disturbance (Roy et al., 2020; Salari et al., 2020). Respectively, it thought that these psychological and emotional disturbances might have a considerable effect on their physical health and mental health related quality of life (Bernabeu-Wittel et al., 2020; Ouslander & Grabowski, 2020; Torales et al., 2020). In this context, special attention should be given to the elderly population during this critical period (Dhama et al., 2020; Jiménez-Pavón et al., 2020). Thus, this study aimed to assess the prevalence and levels of post-traumatic stress symptoms and fear during COVID-19 pandemic and determine the impact of these psychological symptoms on health-related quality of life among community dwelling older adults.

The finding of this study reported that the majority of the studied older adults had a medium-high level of fear post COVID-19 pandemic. This agreed with a recent study of Sultana et al.,(2020) who reported that Bangladeshis had a high prevalence of self-isolation, positive preventive health behaviors related to COVID-19, and moderate to high fear levels among older population. These levels of fear of COVID-19 pandemic among older-adults might be related to their fear of being infected or any loved-one, daily newscast about the disease severity and hundreds of

daily deaths, especially among elderly. High uncertainty about the future, including the consequences and duration of the pandemic. Fear of resources debilitation like basic living needs; food, medications, cleaning, and hygiene supplies. Fear regarding their perceived disability in case of being sick, fear of stigma and discrimination form others beside fear of lack of health care services. Yet, during quarantine period the outpatient clinics of different chronic medical conditions were restricted leading to increase their uncertainty.

The results revealed that fear of COVID-19 level is decreased with increase age of the studied older adults. Similarly, the study of (Torrente et al., 2020) that conducted in Argentina and found that those +65 groups had a lower level of psychological impact of COVID-19 pandemic than expected. The study of Martín-Sánchez et al., (2020) in Spain that documented that old-old experienced less fear and stress related to COVID-19 pandemic and more gratitude ( $F(1, 876) = 3.888, p = .049$ ) and more resilience ( $F(1, 861) = 12.653, p = .001$ ). This could be related to their accumulated previous experiences with different traumatic events and health crises. These past life events help them to acquire more problem-solving skills, learning opportunities and wisdom to face the challenges of the current crisis.

PTSD symptoms level among more than three-quarter of the studied community dwelling older-adults was medium post-COVID-19 pandemic. This result consistent with Wang et al., (2020) who conduct a longitudinal study 4 weeks after the COVID-19 outbreak on Chinese older adults. They reported a significant high level of distress, while reduction in depression and anxiety levels. As well, the findings of El-Zoghby et al., (2020) who studied the impact of the COVID-19 pandemic on mental health and social support among older adult Egyptians. They found that 41.4% of the sample suffered a severe impact, 10.6% moderately affected, while 23.9% mildly affected. In addition, they reported that about a third of the sample (34.1%) had increased stress from work.

This result could be related to aging process which is physiologically associated

with impaired stress response and some cognitive impairment. Where this new health crisis of COVID-19 pandemic is usually associated with new challenges that need learning new skills and get new experiences. The older adults might be more preoccupied with this new pandemic and continuously follow the updated and ongoing news from different sources either electronic or newspapers. Indeed, the older adults lived a many stressful experiences during this quarantine such as loss of social interaction, connection, and support from their significant persons, and loss of income. In fact, closure of restaurants, libraries, sports facilities, community centres for the elderly, cancellation of sporting events, weddings, and funerals predispose more stress. The most stressful experience affecting the elderly is being hospitalized, especially admission to an intensive care unit.

As expected, a significant reduction in mean scores of PCS and MCS among the studied older-adults during the COVID-19 pandemic was demonstrated in this study  $31.97 \pm 6.66$  and  $32.54 \pm 13.34$  respectively. This result agreed with the study of Suzuki et al., (2020) who documented that health-related quality of life mean scores either physical or mental among community-dwelling Japanese older adults during the COVID-19 epidemic were PCS  $36.8 \pm 12.6$  and MCS  $52.7 \pm 10.4$  respectively. The key explanation for this result could be related to the fact that during the COVID-19 pandemic outbreak, older people are inhibited from social interactions, visiting family members, participation in exercise groups and religious or spiritual groups. They are forced to be at home and spending more time watching TV and doing nothing beside staying up late and not getting adequate sleep. Additionally, staying at home could be associated with unhealthy practices like eating unbalanced diet, overeating or undereating and decrease exposure to sufficient sunlight. Such radical changes in their daily life activities can have negative effects on their physical and mental health. Indeed, participation in social activities are considered as a protective factor for the physical and mental health of the elderly. It acts as a stimulus to increase the level of physical activity, cognitive functions,

sensory systems, muscle mass and it also could decrease comorbidities and disability. It contributes to increase their self-esteem, self-worth, self-confidence, emotional and psychological health.

From another perceptive, various studies were documented that physical activities had a positive impact in reducing the risk of functional and cognitive impairment, falls and risk of fractures, depression, disability, risk of geriatrics syndromes, hospitalization rates and mortality in older people (Sepúlveda-Loyola et al., 2020; Strine et al., 2008). Physical activity is a powerful stimulant that exerts a positive and sustained effect on mental health, as witnessed by its use for the treatment of depression and anxiety disorders. Therefore, it can speculate that disruption of important day-to-day activities for older individuals and restrictions on physical activity may have contributed to the observed effects on their psychological well-being and health related quality of life.

The result of the current study reported that, the physical and mental components of HRQoL among the studied older adults were significantly affected with COVID-19 pandemic stress levels. This is congruent with study of Qi et al., (2020) in china during the COVID-19 Pandemic and stated that perceived stress scores were negatively associated with PCS ( $p < 0.001$ ,  $r = 0.4$ ) and MCS ( $p < 0.001$ ,  $r = 0.6$ ). Indeed, the severity of stress that caused by COVID-19 epidemic affecting all physical and mental components like physical functioning, general health, vitality, mental health, and social functioning. In fact, the impact of a stressor depends on how an individual perceives and appraises the stressful events. Consequently, the physiological and psychological arousal provoked to maintain the homeostasis. If the coping resources at this critical time and attempts are not sufficient, and the psychological and physiological arousal remains heightened, then maladaptive physical and psychological outcomes become more likely to occur. The limitations and restrictions that recently forced such as limiting the recreational and public facilities e.g., beaches, parks, swimming pools, playgrounds, training gyms, and elderly clubs. Even the usual daily life activities like walking and going to stores

and markets were restricted which all considered means of stress outlet. From another perspective, this new health crisis and it is associated stress could affect the sleep pattern of older adults in form of hypersomnia or insomnia and difficulty sleeping. Hence, the health-related quality of life is much affected.

The present result indicates that Fear of COVID-19 levels significantly affects the mental component rather than physical components of HRQoL among the studied older adults. This agreed with Islam, et al., (2020) in Bangladesh, and Cellini et al., (2020) in Italy. They found that COVID-19 created fear in most of the respondent's life that affect QOL mental components. This could be related to that fear of COVID-19 affects all the mental components such as social functioning, role emotional and mental health in general. Thus, social contact is much affect through quarantine, even within the family life itself and getting updated news of COVID-19 from multiple sources were aggregate their mental instabilities.

## Conclusion

It can be concluded from this study that more than three-quarters of the studied Egyptian community dwelling older-adults suffered from PTSD symptoms levels ranged from medium to severe post-COVID-19 pandemic outbreak. The majority of them suffered from fear of COVID-19 pandemic with the same levels. The PTSD symptoms and fear levels were the best predictors of the mental components of health-related quality of life.

## Recommendations:

- Tele-mental health program should be developed and implemented for the community dwelling-older adults through online videos and apps platform for phones and tablets as well as, training in the use of technological services should be also provided for elderly people.
- Psychological counselling on how to deal with feelings of fear and stress as well as on how to improve the mental health of elderly population.
- Physical health can be improved via educational videos and recorded physical

activity sessions. Consult the elderly to do at least from 20-30 minutes per day of physical activity beside exposure to sunlight.

- Relaxation techniques such as deep breathing exercise, progressive relaxation, mindfulness, mediation, and mental visualization are particularly useful to improve mental health during COVID-19 pandemic.
- Cognitive reappraisal techniques like post-stressor visualizations, historical parallels and reflections on past resilience.
- Maintaining an active lifestyle at home is important for the health of older adults, especially those with chronic diseases and geriatrics syndromes.
- Obtaining reliable updated news about the pandemic helps avoid unnecessary fear, negative rumination, and stress.
- Understanding factors influencing that the fear and stress levels during COVID-19 pandemic are the key to reduce the overall toll of the event on older adults' psychological well-being and health-related quality of life.

## References

- Abdelhafiz, A. S., Mohammed, Z., Ibrahim, M. E., Ziady, H. H., Alorabi, M., Ayyad, M., & Sultan, E. A. Knowledge, perceptions, and attitude of Egyptians towards the novel coronavirus disease (COVID-19). *Journal of Community Health*, 2020; 59(11): 1-10.
- Al-Shehri, A. H., Taha, A. Z., Bahnassy, A. A., & Salah, M. Health-related quality of life in type 2 diabetic patients. *Annals of Saudi Medicine*, 2008; 28(5): 352-360.
- Alhalal, E., Ford-Gilboe, M., Wong, C., & AlBuhairan, F. Reliability and validity of the Arabic PTSD Checklist Civilian Version (PCL-C) in women survivors of intimate partner violence. *Research in Nursing & Health*, 2017; 40(6): 575-585.
- Allam, M., Cai, S., Ganesh, S., Venkatesan, M., Doodhwala, S., Song, Z., ... Coskun, A. F. COVID-19 diagnostics, tools, and prevention. *Diagnostics*, International

- Journal of Environmental Research and Public Health, 2020;10(6): 409-416.
- Ammar, A., Chtourou, H., Boukhris, O., Trabelsi, K., Masmoudi, L., Brach, M.,... Ahmed, M.** COVID-19 home confinement negatively impacts social participation and life satisfaction: a worldwide multicenter study. *International Journal of Environmental Research and Public Health*, 2020; 17(17): 6237-6244.
- Bektas, A., Schurman, S. H., Franceschi, C., & Ferrucci, L.** A public health perspective of aging: do hyper-inflammatory syndromes such as COVID-19, SARS, ARDS, cytokine storm syndrome, and post-ICU syndrome accelerate short-and long-term inflammaging? *Immunity & Ageing*, 2020; 17(1): 1-10.
- Bencivenga, L., Rengo, G., & Varricchi, G.** Elderly at time of COReNAVirus disease 2019 (COVID-19): possible role of immunosenescence and malnutrition. *GeroScience*, 2020; 42(4): 1089-1092.
- Bernabeu-Wittel, M., Ternero-Vega, J., Díaz-Jiménez, P., Conde-Guzmán, C., Nieto-Martín, M., Moreno-Gaviño, L.,... Navarro-Amuedo, M.** Death risk stratification in elderly patients with covid-19. A comparative cohort study in nursing homes outbreaks. *Archives of Gerontology and Geriatrics*, 2020; 91(10): 104-114.
- Bielecki, M., Patel, D., Hinkelbein, J., Komorowski, M., Kester, J., Ebrahim, S.,... Schlagenhaut, P.** Air travel and COVID-19 prevention in the pandemic and peri-pandemic period: a narrative review. *Travel Medicine and Infectious Disease*, 2020; 11(5): 101-119.
- Carriedo, A., Cecchini, J. A., Fernandez-Rio, J., & Méndez-Giménez, A.** COVID-19, psychological well-being and physical activity levels in older adults during the nationwide lockdown in Spain. *The American Journal of Geriatric Psychiatry*, 2020; 28(11): 1146-1155.
- Carter, B., Collins, J., Barlow-Pay, F., Rickard, F., Bruce, E., Verduri, A.,... Vilches-Moraga, A.** Nosocomial COVID-19 infection: examining the risk of mortality. The COPE-Nosocomial Study (COVID in Older PEople). *Journal of Hospital Infection*, 2020; 106(2): 376-384.
- Cecchetti, S. G., & Schoenholtz, K. L.** 7 Contagion: Bank runs and COVID-19. *Economics in the Time of COVID-19*. *International Journal of Environmental Research and Public Health*, 2020; 14(6): 64-77.
- Chtourou, H., Trabelsi, K., H'mida, C., Boukhris, O., Glenn, J. M., Brach, M.,... Ammar, A.** Staying physically active during the quarantine and self-isolation period for controlling and mitigating the COVID-19 pandemic: a systematic overview of the literature. *Frontiers in Psychology*, 2020;11(2):1487-1496.
- Culhane, D., Treglia, D., Steif, K., Kuhn, R., & Byrne, T.** Estimated emergency and observational/quarantine capacity need for the US homeless population related to COVID-19 exposure by county; projected hospitalizations, intensive care units and mortality. *International Journal of Environmental Research and Public Health*, 2020;14(15): 783-795.
- Cunha, L. L., Perazzio, S. F., Azzi, J., Cravedi, P., & Riella, L. V.** Remodeling of the immune response with aging: immunosenescence and its potential impact on COVID-19 immune response. *Frontiers in Immunology*, 2020;11(23): 47-58.
- Dalton, C. B., Corbett, S. J., & Katelaris, A. L.** Pre-emptive low cost social distancing and enhanced hygiene implemented before local COVID-19 transmission could decrease the number and severity of cases. *The Medical Journal of Australia*, 2020;212(10): 1-14.
- Dhama, K., Patel, S. K., Kumar, R., Rana, J., Yattoo, M. I., Kumar, A.,... Singh, R.** Geriatric population during COVID-19 pandemic: problems, considerations, exigencies and beyond Head Title: Geriatrics during COVID-19 pandemic. *Frontiers in public health*, 2020;8(2): 562-569.

- El-Zoghby, S. M., Soltan, E. M., & Salama, H. M. (2020).** Impact of the COVID-19 Pandemic on Mental Health and Social Support among Adult Egyptians. *Journal of Community Health*, 2020; 1(14): 236-246.
- Fisman, D. N., Bogoch, I., Lapointe-Shaw, L., McCreedy, J., & Tuite, A. R.** Risk factors associated with mortality among residents with coronavirus disease 2019 (COVID-19) in long-term care facilities in Ontario, Canada. *International Journal of Environmental Research and Public Health*, 202; 3(7): 456-468.
- Forte, G., Favieri, F., Tambelli, R., & Casagrande, M.** COVID-19 Pandemic in the Italian Population: Validation of a Post-Traumatic Stress Disorder Questionnaire and Prevalence of PTSD Symptomatology. *International Journal of Environmental Research and Public Health*, 2020;17(11): 4151-4159.
- García-Fernández, L., Romero-Ferreiro, V., López-Roldán, P. D., Padilla, S., & Rodríguez-Jimenez, R.** Mental health in elderly Spanish people in times of COVID-19 outbreak. *The American Journal of Geriatric Psychiatry*, 2020;28(10): 1040-1045.
- Giallonardo, V., Sampogna, G., Del Vecchio, V., Luciano, M., Albert, U., Carmassi, C.,... Nanni, M. G.** The impact of quarantine and physical distancing following COVID-19 on mental health: study protocol of a multicentric Italian population trial. *Frontiers in Psychiatry*, 2020;11(6):987-993.
- González-Sanguino, C., Ausín, B., ÁngelCastellanos, M., Saiz, J., López-Gómez, A., Ugidos, C., & Muñoz, M.** Mental health consequences during the initial stage of the 2020 Coronavirus pandemic (COVID-19) in Spain. *Brain, Behavior, and Immunity J.*, 2020;15(8):187-193.
- Guo, Y., Cheng, C., Zeng, Y., Li, Y., Zhu, M., Yang, W.,... Monroe-Wise, A.** Mental health disorders and associated risk factors in Quarantined adults during the COVID-19 outbreak in China: cross-sectional study. *Journal of Medical Internet Research*, 2020; 22(8):20-32.
- Hägg, S., Jylhävä, J., Wang, Y., Xu, H., Metzner, C., Annetorp, M.,... Kadir, A. (2020).** Age, frailty, and comorbidity as prognostic factors for short-term outcomes in patients with coronavirus disease 2019 in geriatric care. *Journal of the American Medical Directors Association*, 2020;21(11):1555-1559.
- Ho, F. K., Petermann-Rocha, F., Gray, S. R., Jani, B. D., Katikireddi, S. V., Niedzwiedz, C. L.,... Gill, J. M.** Is older age associated with COVID-19 mortality in the absence of other risk factors? General population cohort study of 470,034 participants. *The American Journal of Geriatric Psychiatry*, 2020; 15(11):241-249.
- Jiménez-Pavón, D., Carbonell-Baeza, A., & Lavie, C. J.** Physical exercise as therapy to fight against the mental and physical consequences of COVID-19 quarantine: Special focus in older people. *Progress in Cardiovascular Diseases J.*, 2020; 11(6):287-293.
- Kaseda, E. T., & Levine, A. J.** Post-traumatic stress disorder: a differential diagnostic consideration for COVID-19 survivors. *The Clinical Neuropsychologist*, 2020; 34(7-8): 1498-1514.
- Kontoangelos, K., Economou, M., & Papageorgiou, C.** Mental health effects of COVID-19 pandemic: a review of clinical and psychological traits. *Psychiatry Investigation J.*, 2020;17(6): 491-499.
- Leddy, A. M., Weiser, S. D., Palar, K., & Seligman, H.** A conceptual model for understanding the rapid COVID-19-related increase in food insecurity and its impact on health and healthcare. *The American Journal of Clinical Nutrition*, 2020;112(5): 1162-1169.
- Li, Y., Temkin- Greener, H., Shan, G., & Cai, X.** COVID- 19 infections and deaths among Connecticut nursing home residents: facility correlates. *Journal of the*

- American Geriatrics Society, 2020;68(9):1899-1906.
- Lin, C.-Y., Broström, A., Griffiths, M. D., & Pakpour, A. H.** Investigating mediated effects of fear of COVID-19 and COVID-19 misunderstanding in the association between problematic social media use, psychological distress, and insomnia. *Internet Interventions J.*, 2020; 21(8):100-105.
- Liu, T., Liang, W., Zhong, H., He, J., Chen, Z., He, G.,... Li, J.** Risk factors associated with COVID-19 infection: a retrospective cohort study based on contacts tracing. *Emerging Microbes & Infections*, 2020; 9(1):1546-1553.
- Lobo, A., Santos, P., Carvalho, J., & Mota, J.** Relationship between intensity of physical activity and health-related quality of life in Portuguese institutionalized elderly. *Geriatrics & Gerontology International J.*, 2008;8(4):284-290.
- Medhat, M. A., & El Kassas, M.** COVID-19 in Egypt: Uncovered figures or a different situation? *Journal of Global Health*, 2020;10(1):692-672.
- Nidadavolu, L. S., & Walston, J. D.** Underlying vulnerabilities to the cytokine storm and adverse COVID-19 outcomes in the aging immune system. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, 2020;11(6):987-993.
- Nikolich-Zugich, J., Knox, K. S., Rios, C. T., Natt, B., Bhattacharya, D., & Fain, M. J.** SARS-CoV-2 and COVID-19 in older adults: what we may expect regarding pathogenesis, immune responses, and outcomes. *GeroScience*, 2020;49(6):1-10.
- Nussbaumer-Streit, B., Mayr, V., Dobrescu, A. I., Chapman, A., Persad, E., Klerings, I.,... Zachariah, C.** Quarantine alone or in combination with other public health measures to control COVID-19: a rapid review. *Cochrane Database of Systematic Reviews*, 2020;56(9):23-29.
- Ornell, F., Schuch, J. B., Sordi, A. O., & Kessler, F. H. P.** "Pandemic fear" and COVID-19: mental health burden and strategies. *Brazilian Journal of Psychiatry*, 2020;42(3):232-235.
- Ouslander, J. G., & Grabowski, D. C.** COVID-19 in nursing homes: calming the perfect storm. *Journal of the American Geriatrics Society*, 2020;68(10):2153-2162.
- Pasion, R., Paiva, T. O., Fernandes, C., & Barbosa, F.** The AGE effect on protective behaviors during the COVID-19 outbreak: sociodemographic, perceptions and psychological accounts. *Frontiers in Psychology*, 2020;11(1): 2785-2792.
- Pence, B. D.** Severe COVID-19 and aging: are monocytes the key? *GeroScience*, 2020; 42(4):1051-1061.
- Peng, M., Mo, B., Liu, Y., Xu, M., Song, X., Liu, L.,... Yu, Z.** Prevalence, risk factors and clinical correlates of depression in quarantined population during the COVID-19 outbreak. *Journal of Affective Disorders*, 2020; 275(4):119-124.
- Pérez-Fuentes, M. d. C., Molero Jurado, M. d. M., Martos Martínez, Á., & Gázquez Linares, J. J.** Threat of COVID-19 and emotional state during quarantine: Positive and negative affect as mediators in a cross-sectional study of the Spanish population. *Journal of Community Health*, 2020;15(6):472-483.
- Perrotta, F., Corbi, G., Mazzeo, G., Boccia, M., Aronne, L., D'Agnano, V.,... Bianco, A.** COVID-19 and the elderly: insights into pathogenesis and clinical decision-making. *Aging clinical and Experimental Research*, 2020;49(22):1-10.
- Pihl, E., Jacobsson, A., Fridlund, B., Strömberg, A., & Måtensson, J.** Depression and health related quality of life in elderly patients suffering from heart failure and their spouses: a comparative study. *European Journal of Heart Failure*, 2005;7(4):583-589.
- Rehman, U., Shahnawaz, M. G., Khan, N. H., Kharshiing, K. D., Khursheed, M., Gupta, K.,... Uniyal, R.** Depression, anxiety and stress among Indians in times of Covid-19 lockdown. *Community Mental Health Journal*, 2020; 9(32):1-7.

- Roy, J., Jain, R., Golamari, R., Vunnam, R., & Sahu, N. COVID-19 in the geriatric population. *International Journal of Geriatric Psychiatry*, 2020;35(12):1437-1441.
- Salari, N., Hosseinian-Far, A., Jalali, R., Vaisi-Raygani, A., Rasoulpoor, S., Mohammadi, M.,... Khaledi-Paveh, B. Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. *Globalization and Health J.*,2020;16(1):1-11.
- Sepúlveda-Loyola, W., Rodríguez-Sánchez, I., Pérez-Rodríguez, P., Ganz, F., Torralba, R., Oliveira, D., & Rodríguez-Mañás, L. Impact of social isolation due to COVID-19 on health in older people: Mental and physical effects and recommendations. *The Journal of Nutrition, Health & Aging*, 2020;46(5):1-10.
- Shah, K., Kamrai, D., Mekala, H., Mann, B., Desai, K., & Patel, R. S. Focus on mental health during the coronavirus (COVID-19) pandemic: applying learnings from the past outbreaks. *Journal of Community Health*, 2020; 12(3):397-406.
- Srinivasan, V., Maestroni, G., Cardinali, D., Esquifino, A., Perumal, S. P., & Miller, S. Melatonin, immune function and aging. *Immunity & Ageing J.* 2005; 2(1):17-24.
- Strine, T. W., Chapman, D. P., Balluz, L. S., Moriarty, D. G., & Mokdad, A. H. The associations between life satisfaction and health-related quality of life, chronic illness, and health behaviors among US community-dwelling adults. *Journal of Community Health*, 2008;33(1):40-50.
- Thu, T. P. B., Ngoc, P. N. H., & Hai, N. M. Effect of the social distancing measures on the spread of COVID-19 in 10 highly infected countries. *Science of the Total Environment J.*, 2020;742(8):140-149.
- Torales, J., O'Higgins, M., Castaldelli-Maia, J. M., & Ventriglio, A. The outbreak of COVID-19 coronavirus and its impact on global mental health. *International Journal of Social Psychiatry*, 2020;11(6):987-997.
- Torrente, F., Yoris, A. E., Low, D., Lopez, P., Bekinschtein, P., Cetkovich, M., & Manes, F. Sooner than you think: a very early affective reaction to the COVID-19 pandemic and quarantine in Argentina. *International Journal of Social Psychiatry*, 2020;18(26):187-193.
- Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. S., & Ho, R. C. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *International Journal of Environmental Research and Public Health*, 2020;17(5):1729-1736.
- Ware, J., Kosinski, M., & Keller, S. SF-12. How to score the SF-12 physical and mental health summary scales. *Biological Sciences and Medical Sciences*, 1998;19(95):269-274.
- Weathers, F. W., Litz, B. T., Herman, D. S., Huska, J. A., & Keane, T. M. The PTSD Checklist (PCL): Reliability, Validity, and Diagnostic Utility. *Journal of Global Health*,1993;13(8):287-293.
- Xin, M., Luo, S., She, R., Yu, Y., Li, L., Wang, S.,... Zhao, J. Negative cognitive and psychological correlates of mandatory quarantine during the initial COVID-19 outbreak in China. *American Psychologist J.*, 2020;75(5): 607-611.
- Xiong, J., Lipsitz, O., Nasri, F., Lui, L. M., Gill, H., Phan, L.,... Majeed, A. Impact of COVID-19 pandemic on mental health in the general population: A systematic review. *Journal of Affective Disorders*, 2020;11(6):917-923.
- Zhou, F., Yu, T., Du, R., Fan, G., Liu, Y., Liu, Z.,... Gu, X. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *Journal of Community Health*, 2020;8(16):487-493.
- Zhou, F., Yu, T., Du, R., Fan, G., Liu, Y., Liu, Z.,... Gu, X. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *International*

Journal of Environmental Research and Public Health, 2020; 115(25):1-10.

**Zhu, Y., Zhang, L., Zhou, X., Li, C., & Yang, D.** The Impact of Social Distancing During COVID-19: A Conditional Process Model of Negative Emotions, Alienation, Affective Disorders, and Post-traumatic Stress Disorder. *Journal of Affective Disorders*, 2020;5(36):147-156.