Research Paper

COVID-19 Pandemic and the Mental Health of Caregivers of the Elderly With Chronic Diseases

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ABSTRACT

Objectives: The social support of caregivers is fundamental, and their quality of life, mental health, and the burden of caring are related to the social support they receive during their interaction with people. Because the coronavirus pandemic and related quarantine have affected people's participation and social support, the caregivers' lifestyle has changed, and they have become more isolated and lonely. This study aims to investigate the mediating role of the burden of care in the relationship between social support and mental health of family caregivers of elderly Iranians with chronic diseases of the nervous system during the coronavirus pandemic.

Methods: We recruited a sample of 249 family caregivers of the elderly with Alzheimer, Parkinson, and stroke. The study data were collected by electronic questionnaires of perceived social support of Zimet, Novak care burden, and Goldberg mental health questionnaire. The obtained data were analyzed using the Pearson correlation and structural equation modeling.

Results: This study showed that family caregivers experience high social support, a moderate care load, and their mental health is on the verge of illness during the coronavirus epidemic. The results of the Pearson correlation and structural equation modeling showed a positive and significant relationship between social support perceived by caregivers and their mental health, and the burden of care has a mediating role in this relationship.

Discussion: Finally, because social support is effective in reducing the distress experienced by caregivers and improving their performance and mental health, future plans and interventions are expected to consider strengthening social support as primary prevention to protect caregivers from mental health symptoms.

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Highlights

- Caregivers experienced more caregiving burdens during the COVID-19 pandemic and spent a long time providing care to patients in the pandemic.

- While the caregivers attempt to protect themselves against the infection, they undergo more pressure to prevent the transmission of the virus to those whom they are serving.

- Caregivers' wellbeing, quality of care, and social life can be affected during the pandemic.

- Social support positively affects caregivers' physical and mental performance.

- Providing better social support can raise the quality of care and mental health of caregivers.

Plain Language Summary

Given the importance of caring for the elderly with chronic illness, researchers in this article tried to show how the quality of caregiving and the caregivers' life changed during the COVID-19 pandemic. The results show that the caregiving of patients during this time became more challenging, and caregivers experienced more burden than before. These changes are due to the special situation of the pandemic, i.e., people should take care of their health and be aware of the transmission of the virus to those for whom they are caring. Because of the importance of social life and social support in tolerating the toughness of life, if caregivers receive enough social support and attention, they will have a more healthy mental and physical body and better performance in their caregiving of old patients.

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1. Introduction

Although people live longer today, they are not necessarily healthier, and about a quarter (23%) of the global mortality rate occurs in the population older than 60. This burden is mostly due to long-term chronic diseases [1]. Chronic diseases threatening most old adults are muscular-skeletal diseases, genetic disorders, cancer, mental disorders, chronic respiratory diseases, cardiac diseases, stroke, and nervous system disorders [2]. Chronic nervous system diseases afflicted 5%-55% of people above 55 [3, 4]. Because this disease causes cognitive, behavioral, and physical changes in older adults, it not only disrupts interpersonal communication but also demands more serious care provision [5]. Older adults are highly vulnerable to diseases, especially COVID-19. Besides, there is no definite cure or vaccine for this contagious disease. Thus, to reduce the chances of affliction and prevent the further spread of the disease, older adults are recommended to stay at home [6], and treating chronic diseases and taking care of patients with chronic diseases have been transferred to home [7]. In most cases, taking care of the elderly is done by family members at home [8].

Taking care of patients with chronic diseases is truly challenging for families and caregivers. Moreover, the patient's physical, social, and mental demands are prioritized over the caregiver's needs. Therefore, a chronic disease not only disrupts the patient's life but also disturbs the caregivers' life [9].

A chronic disease exposes caregivers to physical, psychological, and social adverse effects, such as the malfunction of the immune system, sleep disorder, fatigue, problems communicating with the patient or other family members, caregiving burden [10], and mental health issues, such as high levels of anxiety, depression, and stress [11]. Often, caregivers pay less attention to their health and, thus, have lower immunity and more health issues [12]. Moreover, during the COVID-19 pandemic, caregivers might perceive the care-provision task as more demanding and be more at risk of physical and mental problems, such as depression, anxiety, and other psychological disorders [6]. For example, a body of research shows that, during the COVID-19 pandemic, long-term caregivers are more prone to mental health issues than short-term caregivers (31.6% vs 26.5%) and both groups have higher are more prone to mental health issues than non-caregivers (21.5%). Furthermore, long-term and short-term caregivers reported fatigue to a similar degree. Yet, the former experienced more headache, pain in overall body, stomachache, and physical symptoms [13].

Taking care of a diseased family member with a chronic disability is a great challenge. It not only takes much time and energy but also has certain adverse effects, including a high caregiving burden on the family caregiver [14, 15]. Similarly, in a body of research, researchers reported that caregiving burden can basically damage the caregivers' mental health, adversely affect their physical and mental health and reduce them significantly [16-18]. In light of the related literature, the caregivers of patients with chronic diseases and damaged nervous system experience more depression than the caregivers of other older adults. In addition, caregivers who experience a high burden also suffer from more psychological distress, and their depression score is twice as high as non-caregivers [19, 20].

Besides the fact that caregivers experience this burden in their caregiving role [21], the forced quarantine during the pandemic can add to their burden, too, often marked by distress and anxiety [22]. Finally, it can be concluded that coping with chronic and progressive diseases that disrupt the patient's normal performance is not easy for the patients and caregivers. The caregivers' tasks and duties can limit their social life and leisure activities, affecting the wellbeing, quality of care, and the patient's recovery and return to society. Caregivers who enjoy more social support can better manage their personal affairs, which are essential to their continued role [23]. Furthermore, those enjoying a high network of social support tend more to accept their caregiving role, have a more positive attitude toward older adults, and are better aware of the sense of care provision [24]. We can conclude that the family, society, and social support are among the main parts of a caregiver's life [25], and they are essential for promoting a healthy and successful life and persisting in main tasks and duties [26].

Caregivers who are supported enjoy good health too. They also feel more attachment, which helps improve their physical, mental and social wellbeing and performance [27]. According to the literature, social support can directly affect caregivers' mental health [28-30]. Many researchers concluded that people with inadequate social support suffer from depression and more adverse symptoms [28, 30, 31]. Therefore, enhancing social networks can be a non-medical approach to treat caregivers' depression [32]. Researchers also believe that the positive effects of informal social support can reduce caregivers' burden and distress [29]. Thus, the related literature shows that a higher level of perceived social support is associated with a lower level of caregiving burden [21, 28, 30, 33].

Concerning the quarantine during the pandemic, about half of caregivers reported that the pandemic and the quarantine led to a 30.3% reduction in the time spent on personal affairs and a 15.5% increase in psychological engagement within families. These issues all led to a great change in their lifestyle. Besides, these caregivers reported an increase in their anxiety (45.9%), depression (18.6%), irritation (26.2%), and distress (28.9%). Overall, the quarantine was accompanied by more caregiving burden, and was marked by higher levels of anxiety and mental health [22]. Based on what was discussed, the significance of taking care of older adults, the caregivers' mental health, and the effect of perceived social support on caregiver's burden and mental health, especially during the pandemic, we aimed to explore the mediating role of caregiving burden on the relationship between social support and mental health. The suggested model of the relationship between and among variables is shown below (Figure 1).

2. Materials and Methods

Study participants

The research population comprised all family-member caregivers of older adults with a chronic nervous system disease (e.g., Alzheimer, Parkinson, or stroke). The sampling was done by convenience sampling method and included 325 caregivers. The study started on September 22, 2020 and continued to January 19, 2021. The inclusion criteria for the caregivers were as follows: being a family member of the caregiver (upon one's will and to be in complete charge of taking care of the patient); the taken care patient being an older adult >60 years, afflicted with Alzheimer, Parkinson, MS or stroke; willingness

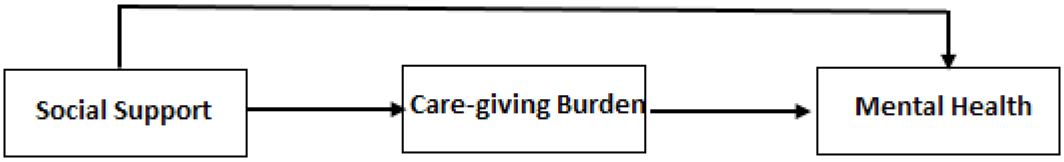

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Figure 1. Suggested model of the relationship between social support and mental health moderated by caregiving burden

to take part in the research; being literate; lacking acute physical or mental disease; not having a history of ecstasy drug abuse; receiving no payment in return for the caregiving act. The exclusion criteria were reluctance to participate or continue with the research.

Study procedure

Initially, the objectives and method of conducting the research were explained to the participants, and their informed consent was received. Then the study instruments were converted to electronic versions and sent to the caregivers through Emails or social network groups and forums (e.g., the Parkinson group and forum), Mehr association and brain attrition chat room, and other relevant groups. A total of 325 questionnaires were filled out, but because of the inclusion/exclusion criteria and the withdrawal of some respondents, 249 questionnaires were accepted for data analysis.

Study instruments

Demographic information questionnaire

This questionnaire included the basic demographic information about the participants, such as their age, gender, occupation, education, marital status, relation to the patient, duration of taking care of the patient (the overall time of caregiving and the mean hours of weekly caregiving), affliction or non-affliction with an acute physical or mental disease, consuming or not consuming ecstasy drugs, receiving or not receiving any payment for the caregiving, the patient's gender and age, the patient's type of disease, the main task of caregiving or decision making for the patient and so on.

Mental health questionnaire

The 28-item mental health questionnaire used in this research was developed in 1998 by Goldberg [34]. It has 4 subscales, each with 7 items exploring the health state (items 1 to 7), anxiety and sleeplessness (items 8-14), one's capability of standing against professional needs or everyday needs (items 15 to 21), and the state of depression or history of suicide (items 22 to 28). In this questionnaire, items 1 and 15 to 21 are scored reversely. The overall questionnaire was rated on a 3-point Likert scale. In each subscale, a score of 0-7 indicates a severe state of the respondent, 7-14 represents a borderline level, and 14-21 indicates a healthy state. Overall, if a respondent receives a total score of 0-28 from the 4-scales, his/her state of mental health is identified as severely low; a score of 28-56 is interpreted as a borderline state of health, and a score between 56 and 84 represents a suitable or desirable state of mental health. The reliability and validity of this questionnaire were acceptable [35, 36]. In this research, the test-retest method was used to check the instrument's reliability, and the r value was estimated at 0.74. With a cutoff score of 6.7, the sensitivity and specificity of the test were estimated at 0.88 and 84.2, respectively. In the present research, the Cronbach α was estimated at 0.83 for the mental health questionnaire. It was found to be between 0.71 and 0.87 for the subscales, which is considered acceptable. Thus, the scale and subscales are adequately valid.

Caregiver burden inventory (CBI)

The short form of the caregiver burden inventory was developed in 1989 by Novak and Guest to measure selfcare [37]. It consists of 24 items and 5 subscales, including time dependence (items 1-5), developmental (items 6 to 10), physical (items 11-14), social (items 15-19), and emotional burden (items 20-24). This questionnaire is rated on a 5-point Likert scale ranging from 0 (not at all disruptive) to 4 (very disruptive). The total score can range from 24 to 120. Scores between 24 and 47 are interpreted as a low burden; 38-71 as a moderate burden; between 72 and 95 as a high burden, and between 96 and 120 as a very high burden [38]. Regarding reliability and validity, researchers showed that the subscales accounted for about 66% of the variance of the caregiving burden. Moreover, the Cronbach α was estimated at 0.85 and 0.87 for the first and second subscales, respectively, and 0.86, 0.73, and 0.77 for the third, fourth, and fifth subscales, respectively [37]. In the present research, the Cronbach α was estimated at 0.94 for the caregiver burden inventory and 0.79 and 0.93 for the subscales, respectively. These values attest to the acceptable reliability of the scale and its subscales.

Perceived social support questionnaire

This questionnaire was developed in 1998 to measure the perceived social and emotional support of three sources: family, friends, and significant others [39]. Items 3, 4, 8, and 11 address the family source; items 6, 7, 9, and 12 explore the friends' source, and items 1, 2, 5, and 10 deal with the significant others. This questionnaire was rated on a 5-point Likert scale from "strongly disagree" to "strongly agree." The scores of each subscale can range between 4 and 12, and the overall score can be between 12 and 60, with an average of 30. A score between 12 and 20 indicates low perceived social support; a score between 20 and 40 represents a moderate level of perceived social support; a score above 40 is interpreted as high perceived social support. Researchers reported that the multidimensional scale of perceived social support in youth has an acceptable model fit for the three components (family, friends, and significant others) and the Cronbach α of the overall perceived social support and the three subscales (i.e., significant others, family, friends) were estimated at 0.92, 0.86, 0.85 and 0.89, respectively [40]. In the present research, the Cronbach α was found 0.89 for social support and between 0.88 and 0.90 for the subscales, all at an acceptable level. The scale and the subscales had an acceptable validity.

Statistical analysis

The collected data were first entered into SPSS 26 for descriptive and inferential statistical analyses. The former included measures of central tendency such as frequency, minimum and maximum, percentage, mean, and measures of variability, including standard deviation. The latter included the Pearson correlation coefficient. These statistical analyses were conducted to explore the caregivers' and patients' demographic information and test the research hypotheses. The structural equation modeling analysis was done in AMOS to test the mediating role of the caregiving burden between caregivers' social support and mental health.

3. Results

Demographic results

The participating caregivers' demographic information is summarized in Table 1, which indicates that among the 249 caregiving participants, 80.7% were female. The mean age of caregivers participating in the study was 45.05 years, of which, by gender, the average age of women at 45.57 years was slightly higher than male caregivers at 42.85 years. The results also showed that a higher percentage of caregivers were employed and married (60.4% and 66.3%, respectively). Also, according to Table 1, the percentage of caregivers with bachelor's degrees was higher than other groups (38.6%).

Table 2 presents the patients' demographic information. Among 249 patients (care receivers), 57.8% were female. The overall mean age was 74.25 years, and female patients have a higher mean age than men (74.25 years). The results also revealed that 54.6% of patients had Alzheimer, 36.5% had Parkinson, and 8.8% had stroke. As for caregivers, the results showed that 78% of the participating caregivers were patients' children, and no sibling

Table 1. Demographic characteristics of caregivers

Variables		No. (%)	Mean±SD
Gender	Female	201(80.7)	-
	Male	48(19.3)	-
Employment status	Employed	98(39.4)	-
	Unemployed	151(60.6)	-
Marital status	Married	165(66.3)	-
	Single	84(33.7)	-
Education	Under diploma	16(6.4)	-
	High school diploma	60(24.1)	-
	Associate's degree	13(5.2)	-
	Bachelor's degree	96(38.6)	-
	Master's degree	43(17.3)	-
	PhD	21(8.4)	-
Age (y)	Female	-	45.57±12.09
	Male	-	42.85±13.47
Total		249(100)	45.05±12.38

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Table 2. Demographic characteristics of the patients

Variables		No. (%)	Mean±SD
Gender of patients	Female	144(57.8)	
	Male	105(42.2)	
Type of disease	Alzheimer	136(54.6)	
	Parkinson	91(36.5)	
	Brain stroke	22(8.8)	
Which family member was the caregiver?	Children	196(78.7)	
	Spouse	36(14.5)	
	Sister/brother	0(0)	
	Others	17(6.8)	
Caregiving duration	Between 1 to 3 months	11(4.4)	
	Between 3 to 6 months	8(3.2)	
	Between 6 to 12 months	22(8.8)	
	More than 12 months	208(83.5)	
Mean of hours	-	-	48.18±47.38
Patients' mean ages	Female	-	75.15±8.62
	Male	-	73.01±8.60
	Total	249(100)	45.05±12.38

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Table 3. Results of bivariate analysis

Variables	1	2	3	4	5	6	7	Mean±SD
Social support	1							42.49±8.61
Caregiving burden	-0.35**	1						70.07±18.81
Total mental health	0.27**	-0.61**	1					52.50±12.67
Physical symptoms	0.24**	-0.57**	0.82**	1				12.76±4.38
Anxiety symptoms	0.26	-0.62**	0.85	0.71	1			12.55±4.36
Social symptoms	0.20**	-0.21**	0.61**	0.28**	0.26**	1		10.31±3.87
Depression symptoms	0.12	-0.47**	0.80**	0.48**	0.61**	0.4**	1	16.88±3.78

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Table 4. Path coefficients of social support on the mental health

Variables	Direct Effect	Indirect Effect	Total Effect	Variance
On mental health from	-	-	-	0.61
Social support	-	0.33	0.33	-
Caregiving burden	-0.78	-	-	-
On caregiving burden from:	-	-	-	0.17
Social support	-0.42	-	-0.42	-

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caregiver was found in the sample. About the duration of caregiving, 83.5% of the caregivers had taken care of patients for more than a year. Finally, the findings revealed that the participating caregivers spent 48 hours a week on average providing care for patients at home.

Bivariate analysis

As the results in Table 3 show, the mean scores of participants' perceived social support, caregiving burden, and mental health are 42.49, 70.07, and 52.50, respectively. This finding shows that the caregivers enjoyed high social support on average, a moderate caregiving burden, and a borderline level of mental health. Moreover, according to Table 3, a significant negative correlation between caregivers' perceived social support and caregiving burden (r=-0.35, P<0.01) means that an increase in the caregivers' perceived social support is accompanied by a decrease in their caregiving burden. The findings also showed a statistically significant positive correlation between social support and the physical symptoms dimension of mental health (r=0.24, P<0.01). Overall, a statistically significant positive correlation was found between caregivers' perceived social support and their mental health (r=0.27, P<0.01). This significant positive correlation shows that if family, friends, or significant others highly support the caregivers, they can enjoy a high level of mental health too and vice versa.

Path analysis

To answer the question of whether the caregiving burden has a mediating effect on the relationship between social support and mental health, the structural equation modeling analysis was used to map a model, the final version of which is provided below (having omitted the paths of low estimated coefficients).

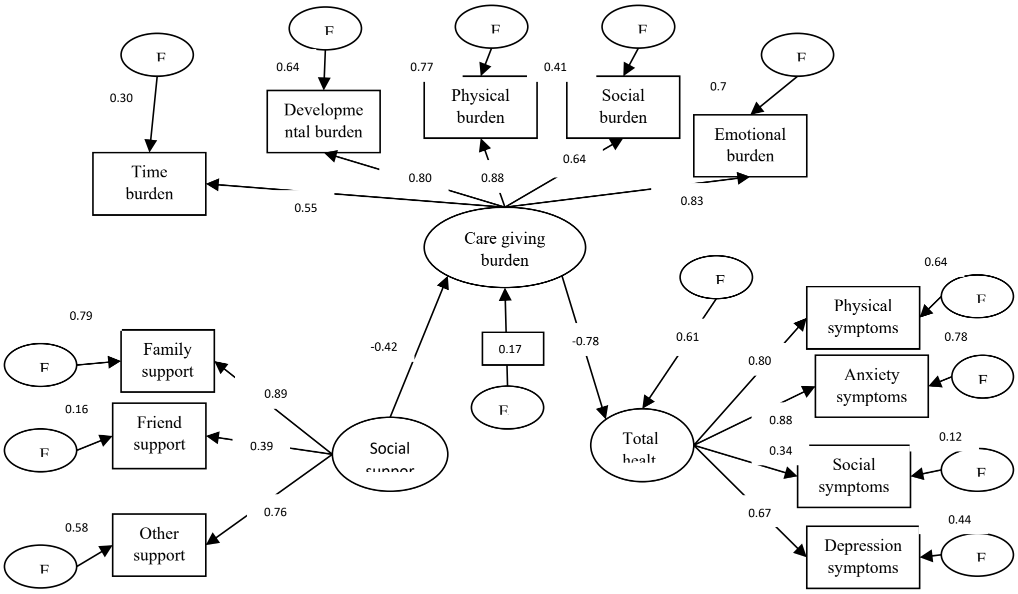

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Figure 2. Final model of structural equation of social support, caregiving burden, and caregiver mental health

The Chi-squared value was estimated for the model at 2.58; the goodness of fitness index was 0.92; the adjusted goodness of fitness index was 0.87; the comparative fitness index was 0.90; the increase fitness index was 0.90; the normalized fitness index was 0.92; the Tucker-Lewis fitness index was 0.91, and the root mean square error of approximation was 0.07. These all attest to the fitness of the final model. Thus, the model fitness was confirmed.

The results summarized in Table 4 and Figure 2 show that social support indirectly affects mental health (through the moderating effect of the caregiving burden). The results mentioned above also show that 61% of the mental health variance in this model is explained by exogenous and moderating variables (i.e., social support and caregiving burden), while 17% of the variance in caregiving burden is explained by social support. Generally, we can conclude that the caregiving burden moderates the relationship between the caregiver's social support and mental health.

4. Discussion

The findings show that 86% of the caregivers experienced the caregiving burden during the COVID-19 pandemic. Also, 76% reported spending longer time providing care for patients in the pandemic. Therefore, while the caregivers attempt to protect themselves against the infection, they experience more pressure to prevent the transmission of the virus to those whom they are serving. Thus they support the patients more than before. This burden and support create many challenges for personal healthcare. For instance, most caregivers not only take care of older adults but also take care of their children. What adds to their burden is their job, school close-up, and the temporary absence of certain services such as respite and leisure [41]. The results also showed that caregivers with 3-6 months experience more burden than others. Moreover, caregivers who take care of the patient more than 20 hours a week experience a heavier burden, and their mental health is at the borderline of disease.

Since early 2020, when coronavirus was declared a global pandemic by World Health Organization (WHO), the virus has caused over three million deaths all over the world and influenced all aspects of people's life [42]. In this respect, Park et al. maintained in their research during the pandemic that caregivers engaged in long-term caregiving are more at risk of mental health issues, and they stand more chances of affliction with mental disorders than the non-caregivers [13]. Similarly, some researchers maintained that the coronavirus adversely affected family-member caregivers because isolation and loneliness that have become prevalent during the pandemic significantly affect depression [43]. The findings also revealed a positive association between perceived social support and mental health. The increasing caregivers' social support promotes their health and vice versa.

Reducing social support is associated with less mental health. Moreover, the caregiving burden moderates the relationship between caregivers' social support and mental health. In other words, social support affects caregivers' burden and, thus, affects their mental health. Because caregivers are faced with many tasks and duties, such as taking care of the elderly patient and their children and social and occupational duties, their social life and leisure activities can be declined. Their wellbeing and quality of care can be affected, too, as well as the patient's health and their return to society [23]. It can cause tensions in caregivers' social roles [18]. The coronavirus epidemic has also created certain challenges for caregivers. For example, the epidemic and the consequent preventive measures have tremendously affected people's mental health. This social isolation resulting from the pandemic and unreliability of the virus can induce depressive thoughts, frustration, anxiety, and loneliness and aggravate these symptoms in those with mental diseases [25].

Regarding the present findings and the related literature, it can be concluded that socially supported caregivers enjoy better physical and mental health [44]. However, low social support can affect caregivers' mental health and afflict them with depression, anxiety, physical and social symptoms. This finding can be explained by the fact that those receiving better and more social support from family and others feel a better sense of belonging and attachment and enjoy better mental health. This condition can, in turn, improve their physical, social, and mental performance [27]. In another research, scientists maintained that social support could reduce the adverse effects of stressful situations and severe symptoms of fatigue [45]. It can also significantly reduce distress in the act of caregiving. Therefore, the social support received from others can protect caregivers against the chronic fatigue resulting from care services. Similarly, Shukri et al. believed that caregiving can adversely affect the caregivers' role and reduce psychological traits such as self-conception and can, thus, increase vulnerability and threaten mental health [28]. These researchers also mentioned that social support positively affects caregivers' physical and mental performance and that caregivers perform better socially and mentally after being socially supported. Another research also stated that social support can not only affect caregivers' self-conception through physical processes but can also affect mental health and anxiety, which is a key factor involved [30].

Adequate social support can relieve the physiological system and can, thus, reduce stress reactions. It can, therefore, reduce the biological tendency to anxiety. Thus, interventions that help improve mental conception of social support and educate caregivers to fight against heavy burdens can positively affect their mental health, especially those receiving less social support. Regarding the present findings, we can also say that caregivers who are highly supported socially, emotionally, instrumentally or informationally by family, friends and significant others probably experience less caregiving burden. This support affects their experience of caregiving burden and, consequently, their mental health. However, social communication and cooperation such as socializing with family, friends and neighbors have been largely influenced by the COVID-19 pandemic. This reduced state of cooperation can adversely affect caregiving burden, mental health, and quality of life (QoL). Because caregivers engaged in long-term act of care provision are often faced with financial, physical, and emotional problems, they may require more social support. If the caregiving burden is reduced, their mental health can be improved.

Although caregivers with less caregiving burden require fewer social sources to reduce the burden, they need more social support to improve their mental health. Caregiving burden, as a moderator of the relationship between social support and mental health, affects social support in multiple ways. Instances are giving loans to resist the financial stress or educational interventions to remove depression. As a result, understanding the role of caregiving burden is significant in the design of educational programs and interventions. These programs should be designed with a focus either on caregiving burden or on depression and mental health [30].

Finally, it can be concluded that though quarantine effectively reduces the speed of an infectious disease epidemic, staying at home can adversely affect mental health and lifestyle because of low social cooperation and satisfaction with life. We can say that social cooperation through family, friends, or neighbor contacts has been influenced by the need to stay home. These adverse effects can affect communication, too [46]. During the COVID-19 pandemic, caregivers experience more hardship. They and or their patients are faced with more problems than usual and they mostly lack any psychological support. They should take care of themselves too and should, thus, find other alternatives for respite and anxiety management [47]. Besides taking care of their physical health against the virus, the caregivers should take care of their mental health. As an instance, they should avoid watching, reading, or listening to news. They can take advantage of deep breathing, body stretch, and meditation. They should try to have a healthy and balanced diet, exercise more, sleep adequately and avoid alcohol and drug abuse. They also need to have access to an ideal support network to share their thoughts, concerns, information, problems and feelings with family or friends [6].

Study limitations

Quarantine due to the coronavirus pandemic and difficult access to the target group is a limitation of this study. Also, the high number of questionnaire items led to the reluctance of some people to participate in the research.

Suggestions for further research

Due to the adverse effect of social isolation resulting from the COVID-19 pandemic on caregivers and the reduced rate of social support and cooperation, it is suggested that future investigations explore the effect of other social support components, especially the instrumental and informational components. This kind of research can help better reveal the effect of this variable on mental health and caregiving burden.

Conducting interventional studies and planning educational programs for older adult caregiving can be effective in improving mental health and preventing the caregiving burden.

5. Conclusion

With regard to the present findings, we can conclude that increased social support and decreased caregiving burden experienced by caregivers can be good predictors of mental health. Thus, mental health specialists had better think of interventions to increase social support to prevent the caregiving burden and improve mental health. Such interventions can help improve caregivers' physical and mental health and QoL. They can effectively increase the quality of care services for older adults, who are precious assets and a rich source of knowledge and experience. Thus, older adults can also enjoy a higher QoL.

Ethical Considerations

Compliance with ethical guidelines

All ethical principles are considered in this article. The participants were informed of the purpose of the research and its implementation stages. They were also assured about the confidentiality of their information and were free to leave the study whenever they wished, and if desired, the research results would be available to them. A written consent has been obtained from the subjects. Principles of the Helsinki Convention was also observed.

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Authors' contributions

All authors equally contributed to preparing this article.

Conflict of interest

The authors declared no conflict of interest.

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