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Effectiveness of Resilience Education in the Mental Health of Family Caregivers of Elderly Patients with Alzheimer's Disease

Fatemeh Ghaffari [1], Mehdi Rostami [2], Zahra Fotokian [1, *] and Mahmoud Hajiahmadi [3]

[1] Nursing Care Research Center, Health Research Institute, Babol University of Medical Sciences, Babol, I.R. Iran
[2] Student Research Committee, Health Research Institute, Babol University of Medical Sciences, Babol, I.R. Iran
[3] Department of Statistic and Epidemiology, Non-Communicable Pediatric Diseases Research Center, Babol University of Medical Sciences, Babol, I.R. Iran

[*] *Corresponding author*: Assistant Professor, Nursing Care Research Center, Health Research Institute, Babol University of Medical Sciences, Babol, I.R. Iran. Tel: +98-9127177552, Fax: +98-1155226413, Email: zfotoukian@yahoo.com

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Abstract

Background: Continuing care of an elderly patient with Alzheimer's disease may result in psychosocial and physical disorders in family caregivers, as well as limitations to providing complete care.
Objectives: The aim of the present study was to determine the effectiveness of resilience education in the mental health of family caregivers of elderly patients with Alzheimer's disease.
Methods: This study followed a randomized, clinical trial design. The study population consisted of family caregivers of elderly patients with Alzheimer's disease who referred to hospitals and neurologists' offices located in the western cities of Mazandaran province, Iran. Data were collected between 2016 and 2017. Fifty-four family caregivers were recruited through convenience sampling and randomized into control and intervention groups (27 in each group). Demographic characteristics, Connor-Davidson Resilience Scale, and General Health Questionnaire were used for data collection. Resilience education was provided in eight sessions (45 min each) using PowerPoint presentations and educational pamphlets. The mental health scores were calculated using the indices including normality tests and analyzed using the independent and paired *t*-tests, analysis of variance (ANOVA), and Bonferroni test.
Results: An independent *t*-test showed improvements in the mental health status of those who received the educational intervention (mean difference: 23.8 $\pm$ 6.4; $P < 0.001$). The independent *t*-test also indicated statistically significant differences between the groups' anxiety/insomnia (8.8 $\pm$ 2.3 versus -0.12 $\pm$ 2.5), somatic symptoms (7.2 $\pm$ 2.2 versus -0.9 $\pm$ 1.03), social dysfunction (4.5 $\pm$ 2.9 versus 0.2 $\pm$ 1.3), and depression (3.2 $\pm$ 2.2 versus -0.08 $\pm$ 0.6; $P < 0.001$).
Conclusions: Resilience education successfully improved the mental health of family caregivers. Therefore, it is suggested that healthcare providers, Alzheimer's associations, and NGOs provide educational interventions to help promote the caregivers' mental health.

Keywords: Alzheimer's Disease, Resilience, Psychological, Family Caregivers

1. Background

Alzheimer's disease is a common chronic disease among elderly patients (1, 2), which results in progressive memory loss, personality change, and difficulty in daily activities. It is estimated that approximately 100 million elderly patients will live with Alzheimer's disease by 2050 (3). There are no official statistics regarding the disease in Iran; however, according to the vice-president of the Iranian Alzheimer's Community, there are currently 212000 patients with Alzheimer's disease in Iran who require at least one family caregiver (4). Research shows that family caregivers meet more than 80% of Alzheimer's patient needs. Often, the elderly person can be cared at home by favorable levels of caring services. Therefore, isolation, physical fatigue, and mental pressure threaten family caregivers (2-4). Studies have revealed that more than 80% of family caregivers experience high levels of social, physical, and psychological problems, such as stress, depression, and anxiety, alongside coping with the caring pressure (3, 4). Therefore, the majority of family caregivers require knowledge and skills to promote self-care and health.

Numerous solutions are recommended for promoting family caregivers' health. Building resilience is suggested and describes a situation in which a caregiver improves social performance and overcome difficulties, despite experiencing high mental pressure (3). Santos et al. showed that resilience education could decrease stress and promoted

caregivers' physical and psychological health (1). Other research has found that the employment of resilience training offers many advantages (5-7). Many resilience studies explore personal characteristics that may affect coping or resilience and focus on individuals experiencing specific adverse circumstances (e.g., illness, bereavement, abuse, etc.). Researchers have demonstrated the effectiveness of interventions that assist family caregivers to provide support for patients with dementia (8-10).

2. Objectives

While there are many studies examining stress management as part of diminishing the pressure of caregiving (2, 6, 8-10), we were not aware of any studies that used resilience training to promote mental health in family caregivers of elderly Alzheimer's patients in Iran. Therefore, this study aimed to determine its efficacy in this population.

3. Materials and Methods

This study followed a randomized, clinical trial design. The study population consisted of family caregivers of elderly Alzheimer's patients who referred to hospitals and neurologists' offices located in the western cities of Mazandaran province, Iran (Ghaemshahr Razi Hospital; Ramsar, Tonekabon, and Ghaemshahr neurologists' offices). Data were collected between 2016 and 2017. Having considered a 95% confidence level, a power of 0.8 for a two-tailed test, and expecting a 10 percent difference in the mental health mean score based on similar studies (2, 6), the required sample size was calculated as 64 participants (32 people for each group). Participants were recruited through convenience sampling. In total, 64 family caregivers of older adults with Alzheimer's disease completed an initial eligibility assessment. However, 10 family caregivers were excluded from the study based on the exclusion criteria (n = 4) or due to declining to participate (n = 6). The remaining 54 eligible participants were grouped into intervention and control groups by a block-randomized allocation method. The participants in odd-numbered blocks were placed into the intervention group (n = 27) and even-numbered blocks were placed in the control group (i.e., no intervention group; n = 27). The caregivers in the groups were adjusted for age, sex, marital status, occupation, education level, income level, caring duration, smoking situation, and family relationship with the patient. Two participants in the intervention group missed two or more program sessions and two participants in the control group missed assessments due to the death of their patients during the program. Therefore, of 54 family caregivers, 50 (92.6%) completed all follow-up assessments (25 in the intervention group and 25 in the control group).

Family caregivers of elderly patients with Alzheimer's disease were invited if they were not caring for any other patients, were giving full-time and complete care in three domains of financial care (paying for treatment and caring), physical care (helping in patient's daily activities), and emotional care (controlling patient's fear, anxiety, and delirium) (11), were able to respond to questions, and were literate. The intervention could be discontinued if the caregivers missed at least two intervention sessions, the patient died, or the participant revoked their cooperation. The data collection tools included:

1. The demographic characteristics questionnaire (including age, sex, marital status, occupation, education level, income level, caring duration, smoking habits, and family relationship with the patient).

2. Connor-Davidson Resilience Scale: This instrument is based on a five-point Likert scale (from 0 = absolutely correct to 4 = always correct). The reliability and validity of this questionnaire were approved in Besharat's research (11) with a Cronbach's alpha of 0.84. The questionnaire was sent to 10 faculty members for validity assessment and administered to 30 caregivers for reliability assessment. Internal consistency was approved by Cronbach's alpha of 0.87 and stability with test-retest method (r = 0.92). The demographic characteristics and resilience questionnaires were completed before the intervention in both groups.

3. General Health Questionnaire (GHQ): The GHQ consists of 28 items and four subscales (somatic symptoms, anxiety/insomnia, social dysfunction, and severe depression). Participants receiving a cutoff score of 23 or higher were considered to have probable psychiatric distress (11, 12). The GHQ was completed before and 35 - 40 days after the intervention in both groups.

The intervention was administered as a training program that aimed to promote resilience development through PowerPoint presentations and educational pamphlets. These were supplied through a lecture for the intervention group. The program was based on Henderson-Milstein and Kravets' resilience education projects, as presented in Table 1 (11, 12). The group-based intervention process required eight sessions (45-minute sessions once per week) and was held as an educational class by one of the researchers in a hospital located in Mazandaran province, Iran. There was no intervention designed for the control group and the participants in this group received routine care, such as education on medicinal and non-medicinal care for their patients. At the end of the intervention, an educational program was implemented that aimed to promote resilience development in the control group.

Participants' written consent was obtained and all data were kept anonymous and confidential. Participants

Table 1. Outline of Training Program

Session	Educational Content
1	Introducing the members; Explaining Alzheimer's disease, resilience and individuals specifications
2	In-person supportive factors (self-esteem, optimism, etc.)
3	External supportive factors and personal sense of responsibility
4	Resilience promotion solutions (commitment)
5	Resilience promotion solutions (control)
6	Resilience promotion solutions (challenging)
7	Resilience promotion solutions (coping)
8	Concluding the discussed topics (problem solving)

were assured that their participation was voluntary and that they could withdraw from the study at any time without any negative repercussions. The researchers ensured that ethical standards were adhered to during and after data collection. The study protocol was approved by the Research Ethics Committee of Babol University of Medical Sciences (reference number: MUBABOL.REC.1395.48). Data were analyzed using SPSS version 16. The normality of data was evaluated using the Kolmogorov-Smirnov test. The mental health score means were analyzed using parametric tests, such as independent and paired *t*-tests, analysis of variance (ANOVA), and Bonferroni test.

4. Results

The average age was 43.4 $\pm$ 6.3 years in the control group and 42.6 $\pm$ 6.2 years in the intervention group. The study sample demographics are shown in Table 2. The Shapiro-Wilk test was used to check normality before and after intervention in both groups and the data were considered to be normal at a significance level of 0.05. The mental health variable in both groups showed a normal distribution before (P = 0.94) and after the intervention (P = 0.53). The variance homogeneity was checked using Levene's test (P > 0.05). The variances were homogeneous at pretest while they were heterogeneous at posttest. However, the equality of variances hypothesis was accepted since the overall standard deviation was smaller than the mean.

The results showed that there was a significant difference (P < 0.001) between the mental health scores before (39.9 $\pm$ 8.4) and after (16.08 $\pm$ 3.7) the intervention in the intervention group. A paired *t*-test was used to compare the scores of mental health subscales. There was a significant difference in somatic symptoms, anxiety/insomnia, social dysfunction, and severe depression scores before and after the intervention (P < 0.001; Table 3).

An ANOVA test was used to demonstrate the hypothesis that "the mental health condition of family caregivers varies with their demographic characteristics". The effects

Table 2. Demographic Variables of Intervention and Control Groups Before Intervention

Variables	Control	Intervention	P Value[a]
Marital status			0.57
Single	4 (16)	5 (20)	
Married	14 (56)	18 (72)	
Widow/widower	5 (20)	1 (4)	
Divorced	2 (8)	1 (4)	
Gender			0.22
Female	18 (70)	22 (88)	
Male	7 (30)	3 (12)	
Education level			0.23
Primary education	9 (36)	3 (12)	
High school diploma	11 (44)	8 (32)	
University education	5 (20)	14 (56)	
Employment status			0.16
Retired	3 (12)	6 (24)	
Self-employed	8 (32)	5 (20)	
Employee	3 (12)	7 (28)	
Worker	2 (8)	0 (0)	
Housewife	9 (36)	7 (28)	
Income level			0.49
Low	4 (16)	0 (0)	
Moderate	16 (64)	14 (56)	
High	5 (20)	11 (44)	
Smoker			0.31
Yes	4 (16)	7 (28)	
No	21 (84)	18 (72)	
Caring duration			0.48
6 months	0 (0)	2 (8)	
6 - 24 months	12 (48)	15 (60)	
> 24 months	13 (52)	8 (32)	
Family relationship			0.45
Child	20 (80)	22 (88)	
Spouse	5 (20)	3 (12)	

[a]The significance level was 0.05.

of age (F = 5.85, P = 0.003), income level (F = 3.3, P = 0.04), and caring duration (F = 3.5, P = 0.03) were significant on caregivers' mental health while the variables of marital status, education level, smoking habits, and family relationship with the patient had no significant effect (P > 0.05). Pairwise comparisons using the Bonferroni test showed that an increase in age, income, and caring duration decreased mental health scores, indicating that aging resulted in improved mental health. The mental health of caregivers with lower incomes was significantly different from the mental health of those with higher incomes, as a higher income resulted in a lower mental health score. The

Table 3. Comparison of the Mean Scores of Mental Health and Related Subscales in the Two Groups[a]

Mental Health Subscales, Groups	Pre-Intervention	Post-Intervention	P Value[b]	Mean Difference	P Value[b]
Severe depression					< 0.001
Intervention	4.5 ± 3.04	0.4 ± 0.7	< 0.001	3.2 ± 2.2	
Control	4.8 ± 3.6	5.08 ± 3.7	0.23	-0.08 ± 0.6	
Anxiety/insomnia					< 0.001
Intervention	11.6 ± 2.8	3.4 ± 1.5	< 0.001	8.8 ± 2.3	
Control	10.04 ± 4.02	10.5 ± 3.7	0.16	-0.12 ± 2.5	
Somatic symptoms					< 0.001
Intervention	10.8 ± 3.2	3.5 ± 1.5	< 0.001	7.2 ± 2.2	
Control	8.9 ± 2.7	9.8 ± 2.7	0.088	-0.9 ± 1.03	
Social dysfunction					< 0.001
Intervention	12.9 ± 4.3	8.6 ± 2.2	< 0.001	4.5 ± 2.9	
Control	8.2 ± 3.4	7.4 ± 3.01	0.12	0.2 ± 1.3	
Mental health					< 0.001
Intervention	39.9 ± 8.4	16.08 ± 3.7	< 0.001	23.8 ± 6.4	
Control	32.04 ± 7.02	32.9 ± 7.2	0.11	-0.9 ± 2.8	

[a]Values are expressed as mean ± SD.
[b]The mean difference is significant at the 0.05 level.

results also showed that the mental health of those caring for their family members for six months was significantly better than the mental health of those who cared for their family members for 24 months or more. In this regard, the logistic regression analysis showed that the odds ratio of caring duration was 6.76 (P = 0.04). This indicated that caregivers with longer caring duration could experience mental health difficulties 6.76 times those with shorter caring durations.

5. Discussion

The results indicated that resilience education promoted the mental health of family caregivers of elderly patients with Alzheimer's disease, which is similar to other studies (2, 13, 14). This could be explained by stating that resilience education for caregivers was successful in inducing the feeling of strength for dealing with high levels of stress. Martin-Carrasco et al., also believed that educational interventions resulted in more effective interactions in caring among caregivers and that teaching them on how to find better solutions in facing adversity decreased their physical and mental problems (13).

The resilience education was also successful in decreasing anxiety/insomnia and severe depression, which are also consistent with other studies (2, 14, 15). The results by Hosseini Ghomi's confirmed the effectiveness of resilience training in stress reduction of mothers whose children suffered from cancer in Imam Khomeini Hospital of Tehran (16).

In fact, resilience educational programs have been found to be effective in improving coping mechanisms (2).

While our findings are consistent with those in the literature showing that higher levels of resilience were associated with lower depression rates and greater physical health (2, 14, 15), they are in contrast to Moljord's results that showed a negative correlation between resilience, physical activity, and depressive symptoms in adolescents (17).

The results showed that resilience education was successful in decreasing somatic symptoms and social dysfunction among family caregivers. Dias' study also showed that less resilient caregivers suffered from physical problems and referred to doctors more often than did those with higher resilience. Resilience increased self-care among caregivers, positively changed their habits and lifestyle, made them stronger in facing stressors of caregiving, and decreased the probability of experiencing physical symptoms (2). Additionally, more resilient caregivers were reported to have better social interactions and more success in social activities (2, 13, 18).

Fernandez-Calvo et al.'s study showed interventions that encouraged active coping techniques had the best effects on caregivers in terms of reducing the impact of adversities generated during care, creating self-confidence to move forward, on augmentation their experience of positive emotions, and promoted self-efficacy and competence in providing care (19). Losada et al.'s study showed that commitment therapy for dementia family caregivers minimized negative or dysfunctional thoughts resulting from the care (20).

Our results also showed a significant relationship between the caregiver's age and mental health. Aging was found to increase resistance to stress load and helped determine more effective solutions in facing adversity. Adults are typically excluded from policymakers and healthcare providers' health promotion programs. Therefore, family caregivers who are often the patients' children and are at the middle age or older may be neglected, while different, multi-aspect health-threatening factors can influence them. Fitzpatric and Vacha-Haase's study showed an inverse relationship between age and mental health and older caregivers had higher life satisfaction and were experiencing less psychological problems (15).

Our results showed a significant relationship between caring duration and caregiver mental health. Caregivers could be threatened with social activity dysfunction, fatigue, or exhaustion as the caring duration increased. Therefore, providing social-based services (e.g., respite services, daily care, transportation, and emergency responding services) are suggested as a solution for mental health promotion. Other research has also shown that previous experience or long-lasting elderly care, the family's social and financial status, knowledge and information about the disease, religion, and governmental support are effective in improving caregivers' mental health (3).

Based on the present study, we concluded that a significant relationship existed between income level and mental health, which is consistent with observations in previous studies. For instance, Dias et al. and Martin-Carasco et al. suggested that higher income was an indicator of better-coping mechanisms when facing problems and decreased psychological disorders among caregivers (2, 13).

Based on our results, mental health promotion after the intervention is not affected by the caregivers' sex. This could be explained by changes in Iranian culture; sons now have more roles in elderly caring than before. The equal sex distribution among our study groups might be another explanation. This is in contrast to the results of Clay that suggested sex and family relationship as variables affecting the caring pressure among caregivers of elderly patients with Alzheimer's disease. He also claimed that female caregivers experienced less depression, stress, and anxiety than males (21).

There was no significant correlation between family relationship and mental health in our study. The reason might be that the majority of the caregivers participating in this study were the children of their patients. This finding is in contrast to the results of Kang, who showed that spousal caregivers were more resilient than children or other relatives (18). de Oliveira Gaioli's study also discussed the role of family relationship and caring duration in caregivers' mental health (21). These differences can be explained by discrepancies in the research population and setting. Since the spouses of elderly patients with Alzheimer's disease often suffer from a chronic disease, this limits them in providing care and results in the transfer of caring pressure to their children.

The smoking behavior was another ineffective factor in caregivers' mental health, as the majority of our participants were nonsmokers. Andren and Elmstahl's results showed that unsafe behaviors, such as smoking, could induce physical and mental disorders; therefore, smoking caregivers were less resilient than were nonsmoking caregivers (22).

The education level was not significantly related to the mental health of caregivers of Alzheimer's disease patients, as our results showed. This can be due to that mental health promotion is dependent on health literacy rather than education level. However, this finding is in contrast to the results of Leach et al. (6). Marital status was another irrelevant factor found in this study, while Andren and Elmstahl considered married caregivers to have more social support networks, resulting in less stress and better mental health (20).

5.1. Limitations

Our small sample size may have resulted in a study sample that is not representative of the general population. Moreover, convenience sampling was used in the present study. Since the caregivers were easily available, this sample was not representative of the general population of elderly Alzheimer's disease patients' family caregivers. Future research should employ random sampling to increase generalizability.

5.2. Conclusions

In the present study, resilience education successfully promoted the mental health of family caregivers. Therefore, educational interventions provided by healthcare providers, the Alzheimer's associations, and NGOs can promote caregiver mental health. Financial support and shortening the caring duration by including other family members are among the solutions recommended for caregivers' mental health promotion. Healthcare providers, especially nurses, are more suitable to provide society-based services and practical solutions for the mental health promotion in this population.

This study is among the limited studies attempting to determine the role of coping strategies in promoting mental health in caregivers of elderly Alzheimer's disease patients. Therefore, we suggest that interventional studies be conducted using coping strategies against psychological disorders and mental pressure/stress in this group of clients. There was no significant relationship between mental health and family relationship with the patient, education level, smoking habit, and occupation; thus, future

studies investigating these factors are needed for more clarification.

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Footnotes

Authors' Contribution: Fatemeh Ghaffari, Zahra Fotokian, and Mehdi Rostami studied the concept and designed it. Fatemeh Ghaffari and Zahra Fotokian analysed and interpretated the data. Zahra Fotokian and Fatemeh Ghaffari drafted the manuscript and revised the manuscript critically for important intellectual content. Mehdi Rostami and Mahmoud Hajiahmadi analyzed the data statistically.

Clinical Trial Registration Code: The current study was registered in the Iran Registry of Clinical Trials (IRCT2016080829251N1).

Conflict of Interests: The authors declare no conflict of interest.

Ethical Approval: The study protocol was approved by the University of Babol Medical Sciences research ethics committee (Reference number: MUBABOL.REC.1395.48).

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