

The Effect of Virtual Training on the Care Burden of Caregivers to Patients with Breast Cancer

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Abstract

Background: Breast cancer is still a major health concern, causing stress not only for the patients but also for their caregivers.

Objectives: The aim of the present study was to determine the effect of virtual training on the care burden of caregivers to patients with breast cancer.

Methods: This clinical trial was conducted on 80 caregivers of patients with breast cancer referred to the Mehraneh Clinic of Zanjan, Iran, in 2022. The participants were chosen by convenience sampling and randomly divided into the experimental and control groups using the block randomization method. A demographic information questionnaire along with the Zarit care burden questionnaire were used to collect data. The care burden of caregivers was determined before, immediately after, and one month after the intervention. The data were analyzed in SPSS 26 software using descriptive and inferential statistics (the independent t-test, Chi-square test, Mann-Whitney test, Fisher's exact test, and a marginal model for longitudinal data).

Results: According to the results, the mean (SD) age of the caregivers was 42.20 (11.54) years, of whom 60% were male. Based on the longitudinal marginal model, no significant difference in care burden was observed between the two groups immediately after the intervention ($P=0.077$); however, this difference was statistically significant one month after the intervention ($P<0.001$).

Conclusion: According to the findings, the virtual training intervention reduced the care burden of caregivers of patients with breast cancer in the long term. Therefore, providing training related to care burden reduction through cyberspace and social media can be suggested as a suitable and available method.

Keywords: virtual training, care burden, patient caregiver, breast neoplasms

Introduction

Today, cancer is one of the most important healthcare issues [1] and is either the first or the second cause of death in 112 countries of the world [2,3]. According to the report of the world health organization (WHO), in 2020, about 19.3 million new cancer cases and 10 million deaths due to cancer occurred just in 2019 [3].

The trend of cancer incidence is also ascending in Iran [4], with breast cancer being the most common cancer among women. In 2016, about 108798 new cases of cancer were reported in Iran, 32.4% of which had been breast cancer [5]. The age of breast cancer incidence in Iranian women precedes at least one decade compared to women living in developed countries. Breast cancer is the

second most common cause of death among Iranian women. Meanwhile, about 200 to 250 Iranian men are also diagnosed with breast cancer every year [6,7].

In addition to causing many problems for patients, the diagnosis of breast cancer predisposes their caregivers to various conditions such as depression, social isolation, trouble focusing, anxiety, and stress [8]. The caregivers who experience more severe stress also encounter problems in performing their care duties [9]. Caregivers are people who help the patient perform his/her daily living activities such as eating and moving, provide them with psychological, emotional, and social support, and carry out communication with the medical team in terms of various circumstances, pharmaceutical therapies, and financial issues [10]. Caregivers dedicate most of their time to providing care to the patient and generally forget about their own needs, leading to changes in their lifestyle [11]. These events can jeopardize the health of caregivers and eventually decrease the quality of patient care [10].

Based on the evidence, the average daily time of caring for a cancer patient is estimated to be 8.8 hours [12]. In such a situation, if the caregiver is unable to balance the time dedicated to patient care or to oneself, he/she will be imposed with care burden [13].

Care burden is the experience of physical, social, emotional, and financial problems and stresses by caregivers due to the hardships of this process [14]. Excessive care burden reduces the quality of life of caregivers [15], as well as the quality of patient care [10]. Previous studies indicate that the caregivers of cancer patients experience moderate to high care burdens [16-19], and studies in Iran have reported this type of care burden to be severe [11, 20-22]. Therefore, determining the extent of the care burden and intervening to reduce it can play an important role in improving the general health of caregivers and upgrading the quality of the care provided to cancer patients [20]. One of the important interventions in this field can be training programs, whose effectiveness in reducing care burden has been confirmed in previous studies [23-26].

On the other hand, recent studies have highlighted the importance of behavioral change interventions and Internet-based educational programs for the

prevention and treatment of chronic diseases [27]. Some studies have noted that virtual training programs have been effective in resolving the problems associated with chronic diseases, as well as caregivers' resilience, quality of life, self-efficacy, and care burden [28-31]. However, there have been inconsistencies with the results of other studies, reporting that virtual training was inefficient [32-36].

Accordingly, numerous systematic studies in the field have emphasized the inadequacy of the available evidence and recommended the need to conduct more studies to ascertain the effectiveness of virtual training programs in different cultures [29, 37-40].

Based on the above-mentioned, this study was designed and conducted to investigate the effect of virtual training on the care burden of caregivers of patients with breast cancer.

Methods

The present study was a clinical trial, and its study population comprised caregivers of patients with breast cancer referred to the Mehraneh Clinic of Zanzan city, Iran. This study was approved with the ethics code IR.ZUMS.REC.1400.284 and IRCT code IRCT20210930052640N1.

The sample size was calculated to be 94 caregivers who were chosen by the convenience sampling method and then randomized into the two groups of control and experimental via the block randomization method. The inclusion criteria were: tendency to participate in study, being literate, not having anxiety or depression, ability to use virtual social networks, at least 3 months have passed since the diagnosis of the disease, not receiving similar training in the last few months. The exclusion criteria were: Lack of consent to continue participating in the study, the absence of more than two sessions, participating in other educational programs at the same time. After explaining the objectives of the research to, written consent was obtained. After a face-to-face session to introduce the training program, the participants of the experimental group received organized training via WhatsApp social media. The training program consisted of a review of the literature related to caregivers' problems, as well as their educational needs, presented as audio and video files and clips. The training was provided in eight sessions during one month (two sessions per

week). The caregivers of the control group received no intervention. Care burden was determined in both groups before, immediately after, and one month after the intervention.

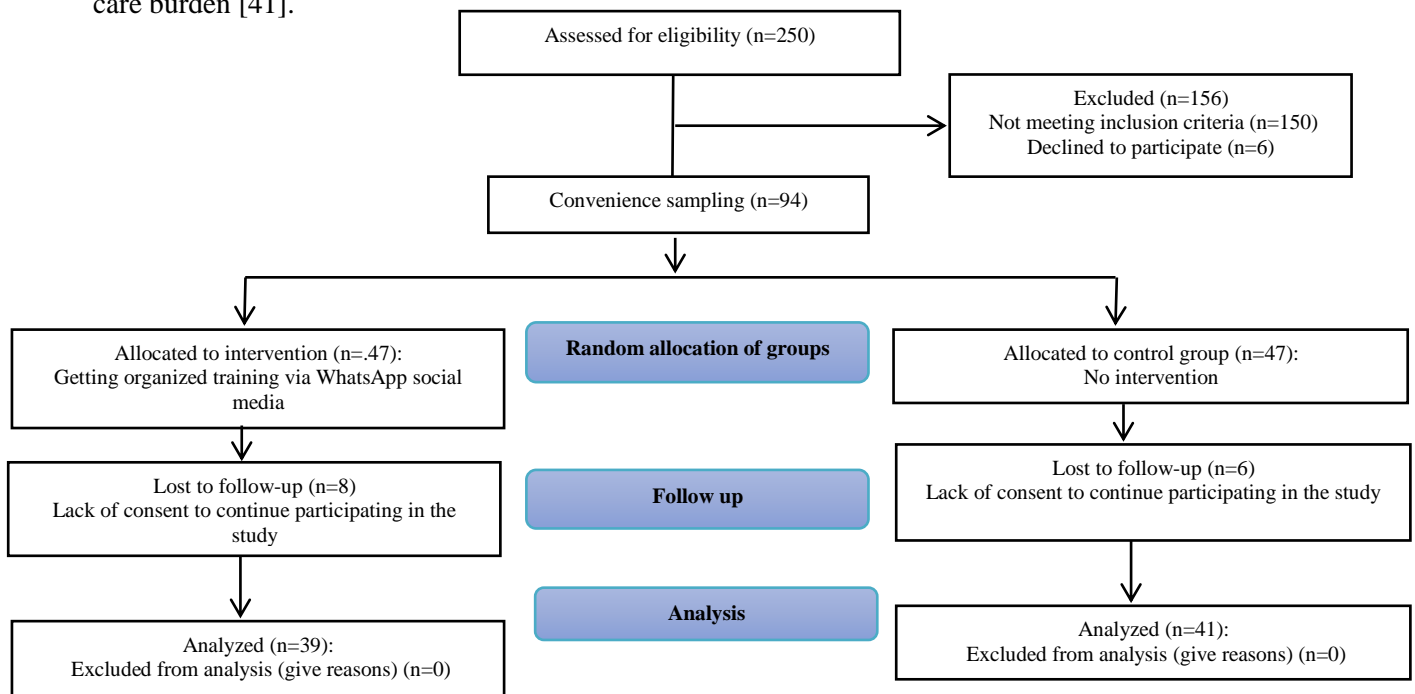
In this study, data collection tools included a demographic information form and the Zarit care burden questionnaire. The demographic information form included queries about age, gender, marital status, educational levels of the patient and the caregiver, the length of time that has passed since the diagnosis and also questions about the caregiver, including his/her relationship with the patient, the presence of a helper, caring for another patient, suffering from a specific or chronic disease, the place of residence, vacancy status, employment status, average monthly income, the number of family members.

The Zarit questionnaire evaluates caregivers' personal, social, emotional, and financial pressures using 22 items, each being designed and scored on a 5-point Likert scale (from 0 to 4, never to almost always). A higher score in this questionnaire means higher care burden and vice versa, with a total score ranging from 0 to 88. The score between 0 and 20 indicates low or no care burden; scores from 21 to 40 reflect moderate care burden, and scores from 41 to 88 indicate severe care burden [41].

Various studies, including the study of Al-Rawashdeh et al., have confirmed the validity and reliability of this questionnaire [41]. Likewise, various studies in Iran, including the study of Mollaei et al., have confirmed the content validity of the Persian translation of this questionnaire, and regarding reliability, Cronbach's alpha coefficient was reported as 0.83 [22]. In the present study, the content validity of the questionnaire was confirmed, and its reliability was verified based on Cronbach's alpha coefficient of 0.72.

Statistical Analysis

The quantitative and qualitative variables were described as mean (SD) and number (percentage), respectively. Normality of data was assessed by Shapiro-Wilks test. To compare two groups in terms of demographic characteristics of caregivers and patients, and disease-related information, the Chi-square\Fisher's exact test used for qualitative variables and Mann-Whitney test or Independent T-test was for quantitative variables. The marginal longitudinal model with gamma link function was used to compare care burden in the before, after and follow-up in the two groups. Data analyzed by IBM SPSS 26 with $P \leq 0.05$ significance level.



CONSORT diagram

Results

The results of the t test showed that the mean (SD) age of the experimental and control groups caregivers were 41.62 (11.21) and 42.20 (11.54) years, respectively (P=0.82). Also, the mean (SD) age of the experimental and control groups

patients were 50.7±12.06 and 48.81 (10.98) years, respectively (P=0.40).

In this study, the comparison of the two groups indicated that they were comparable in terms of background and possible confounding variables (Tables 1, 2, and 3).

Table 1: Comparison of Demographic Characteristics of Caregivers Based on Intervention and Control Groups

| Variable | Category | Group | | Test statistics | P-Value |
|--|-----------------------|----------------|---------------------|-----------------|----------|
| | | Control (n=41) | Experimental (n=39) | | |
| Gender: n (%) | Male | 23 (56.1) | 25 (64.1) | 0.53 | 0.465** |
| | Female | 18 (43.9) | 14 (35.9) | | |
| Marital status: n (%) | Single | 9 (22.0) | 8 (20.5) | 0.02 | 0.875** |
| | Married | 32 (78.0) | 31 (79.5) | | |
| Education: n (%) | Under Diploma diploma | 10 (24.4) | 7 (17.9) | 0.99 | 0.639** |
| | Diploma | 14 (34.1) | 17 (43/6) | | |
| | Collegiate | 17 (41.5) | 15 (38.5) | | |
| Employment status: n (%) | Employed | 22 (53.7) | 25 (64.1) | 0.90 | 0.343** |
| | Other | 19 (46.3) | 14 (35.9) | | |
| Relation: n (%) | Spouse | 16 (39.0) | 19 (47.8) | 5.89 | 0.117** |
| | Parents | 2 (4.9) | 3 (7.7) | | |
| | Child | 15 (36.6) | 16 (41) | | |
| | Other | 8 (19.5) | 1 (2.6) | | |
| Specific Disease: n (%) | Yes | 2 (4.9) | 5 (12.8) | 1.58 | 0.209** |
| | No | 39 (95.1) | 34 (87.2) | | |
| Assistant caregiver: n (%) | Yes | 28 (68.3) | 24 (61.5) | 0.40 | 0.527** |
| | No | 13 (31.7) | 15 (38.5) | | |
| Taking care of another patient: n (%) | Yes | 5 (12.2) | 1 (2.6) | 2.67 | 0.102*** |
| | No | 36 (87.8) | 38 (97.4) | | |

Table 2: Comparison of Demographic Characteristics of Patients Based on Intervention and Control Groups

| Variable | Category | Group(n) | | Test statistics | P-Value |
|-----------------------------|-------------|----------------|---------------------|-----------------|----------|
| | | Control (n=41) | Experimental (n=39) | | |
| Gender: n(%) | Male | 0 (0.0) | 2 (5.1) | 2.16 | 0.142** |
| | Female | 41 (100) | 37 (94.9) | | |
| Marital status: n(%) | Single | 5 (12.2) | 0 (0.0) | 5.11 | 0.101*** |
| | Married | 31 (75.6) | 33 (84.6) | | |
| | Other | 5 (12.2) | 6 (15.4) | | |
| Education: n(%) | Illiterate | 6 (14.6) | 5 (12.8) | 1.06 | 0.785* |
| | High school | 16 (39.1) | 15 (38.5) | | |

| | | | | | |
|--------------------------------|---------------------|-----------|-----------|------|---------|
| | Diploma | 6 (14.6) | 19 (23.1) | | |
| | Collegiate | 13 (31.7) | 10 (25.6) | | |
| Occupation: n(%) | Employed | 8 (19.5) | 8 (20.5) | 0.01 | 0.911* |
| | Other | 33 (80.5) | 31 (79.5) | | |
| Habitat: n(%) | City | 36 (87.8) | 35 (89.7) | - | 0.784** |
| | Village | 5 (12.2) | 4 (10.3) | | |
| Native: n(%) | Yes | 33 (80.5) | 34 (87.2) | 0.66 | 0.417* |
| | No | 8 (19.5) | 5 (12.8) | | |
| Family income: n (%) | Insufficient | 15 (36.5) | 10 (25.6) | 2.31 | 0.315* |
| | Relatively | 22 (53.7) | 21 (53.8) | | |
| | sufficient | 4 (9.8) | 8 (20.6) | | |
| Housing situation: n(%) | Owner | 31 (75.6) | 31 (79.5) | 0.17 | 0.678* |
| | Other | 10 (24.4) | 8 (20.5) | | |
| To live alone: n(%) | Yes | 2 (4.9) | 2 (5.1) | - | 0.999** |
| | No | 39 (95.1) | 37 (94.9) | | |

*Chi-square test; **Fisher's exact test; *** Chi-square test based on Monte Carlo;

Table 3: Disease-Related Information of Patients Based on Experimental and Control Groups

| Variable | Category | Group | | Test statistics | P-Value |
|---|-----------------|----------------|--------------------|-----------------|----------|
| | | Control (n=41) | Experimental(n=39) | | |
| Duration of diagnosis (month): Mean (SD) | - | 13.78±9 | 24±21 | 1.83 | 0.068*** |
| Another disease: n(%) | Yes | 9 (22.0) | 11 (28.2) | 0.42 | 0.518* |
| | No | 32 (78.0) | 28 (71.8) | | |
| Need care: n(%) | Little | 23 (56.1) | 19 (48.7) | 1.28 | 0.527* |
| | Relatively high | 11 (26.8) | 15 (38.5) | | |
| | High | 7 (17.1) | 5 (12.8) | | |
| Support Organization: n(%) | Yes | 7 (17.1) | 7 (17.9) | 0.011 | 0.918* |
| | No | 34 (82.9) | 32 (82.1) | | |
| Insurance: n(%) | Yes | 40 (97.6) | 36 (92.3) | 1.161 | 0.281** |
| | No | 1 (2.4) | 3 (7.7) | | |

*Chi-square test; **Fisher's exact test; ***Mann-Whitney test

The mean (SD) score of care burden before the intervention was 26.75 (8.36) in the control group and 25.30 (7.74) in the experimental group, showing no significant difference based on the Mann-Whitney test ($P=0.120$).

The mean (SD) of care burden immediately and one month after the training program showed declining trends in both groups (Figure 1). Because the distribution of the care burden score was not normal, longitudinal marginal models

were used to compare the care burden score between the two groups on three measurement occasions (Table 4). Accordingly, the interaction between the study group and the measurement occasion was statistically significant ($P=0.045$). There was no significant difference in the care burden score comparing the two study groups before the intervention ($P=0.415$) and immediately after the intervention. However, one month after the intervention (the follow-up stage),

there was a significant difference between the control and experimental groups, as the care burden was 20% lower in the latter than in the former.

In the control group, the care burden showed a 9% decline immediately after the intervention compared to the baseline, which was not statistically significant ($P=0.077$). In the follow-up time (i.e., one month after the intervention),

there was a 29% decline in care burden compared to before the intervention, which was statistically significant ($P<0.001$). In the experimental group, the decline in care burden compared to the baseline reached 21% immediately after the intervention (statistically insignificant) and 40% in the follow-up time, showing a statistically significant difference (Table 4).

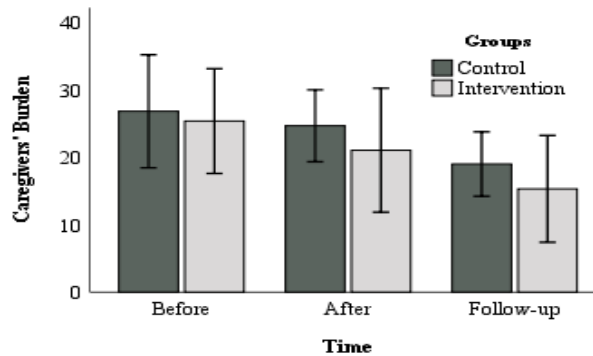


Figure 1: The Mean (SD) Caregivers' Burden Score in the Study Groups Before, After and Follow-Up Period of the Intervention

Table 4: The Results of Fitting the Gamma Marginal Model in Order to Compare the Care Burden in the Before, After and Follow-Up in the Study Groups

| Variable | Time category | Group category | Regression coefficient | Standard error | P-value |
|--------------------------|---------------|----------------|------------------------|----------------|---------|
| Time¹ | After | - | -0.084 | 0.047 | 0.077 |
| | Follow-up | - | -0.345 | 0.059 | <0.001 |
| Group² | - | Intervention | -0.056 | 0.068 | 0.415 |
| Time× Group | After | Intervention | -0.103 | 0.061 | 0.094 |
| | Follow-up | Intervention | 0.160 | 0.080 | 0.045 |

Reference category: ¹Before the intervention; ²Control group

Discussion

This study aimed to determine the effect of virtual training on the care burden of caregivers of patients with breast cancer referred to the Mehraneh Clinic of Zanjan city in 2022. Based on findings, before the implementation of the training program, there was no statistically significant difference in terms of the mean care burden score between the two groups. According to our findings, the caregivers tolerated a

moderate level of care burden, which was in agreement with the findings of some other studies reporting a moderate level of care burden among caregivers [19,22,42-44]. However, some other studies have reported high care burden among caregivers [11,26,45]. Excessive care burden causes many problems for patients and their caregivers, increases their propensity for a variety of physical and psychological diseases, and imposes on them financial and occupational

problems at the social level. The above-mentioned problems consequently decrease the quality of the care provided to patients by caregivers [39,9]. Nevertheless, some studies, such as Heckel's study, have reported that caregivers endure a low level of care burden [36].

In the present study, there was no significant difference in the mean care burden scores of the caregivers of patients with breast cancer before and immediately after the intervention. This can be attributed to the short time from the baseline step to the second step of the study (i.e., immediately after the training), preventing caregivers from applying the training, which was mainly focused on the methods to deal with psychological problems, i.e., the outcomes of using these techniques not yet emerged. These results were in agreement with the findings of some other studies [33-36,46,47].

On the other hand, the results of some other studies opposed those of the present study [21, 23, 25, 26, 45], which may be related to differences in educational content and topics, training methods, and the stage of the disease among these studies.

Also, the findings of the present study showed that the mean care burden score in the intervention group was significantly higher one month after the intervention compared to before the intervention, as well as compared to the control group. This finding highlighted the effectiveness of the virtual training program in improving the psychological and emotional status of caregivers. This is also consistent with the fact that the application of the materials provided to the caregivers required more time to result in desired mental and psychological outcomes. Also, it seems that with the time elapsing from the diagnosis of the disease and the initial shock fading, more focus can be directed toward training and assimilating it, resulting in better and more favorable outcomes. In parallel with the findings of the present study, Gabriel *et al.* reported a decline in the care burden score in caregivers 12 weeks after the intervention [25]. Similar results were also reported in the study conducted by Seyed Fatemi and Pahlavanzadeh [26,31].

One of the limitations of the present study was small number of samples of men with cancer and the lack of equal distribution of this variable in the two study groups. Also the possibility that because no action was taken in the control group,

the feeling of receiving attention from the support source (researcher) has led to a decrease in the sense of burden of care in intervention group.

Conclusion

According to the findings of the study, virtual training through social media reduced the care burden among caregivers of breast cancer patients. Therefore, considering that cyberspace is widely used by and accessible to caregivers without space and time limitations, providing virtual training programs to the caregivers of breast cancer patients through social media can be a viable and easy way to manage and alleviate their care burden.

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Conflict of interest

The authors have declared no conflict of interest.

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References

1. Miller KD, Fidler-Benaoudia M, Keegan TH, Hipp HS, Jemal A, Siegel RL. Cancer statistics for adolescents and young adults. *Cancer J. Clin.* 2020;70(6):443-59.
2. Lin L, Li Z, Yan L, Liu Y, Yang H, Li H. Global, regional, and national cancer incidence and death for 29 cancer groups in 2019 and trends analysis of the global cancer burden, 1990–2019. *J Hematol Oncol.* 2021;14(1):1-24.
3. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global cancer statistics 2020: GLOBOCAN estimates of

- incidence and mortality worldwide for 36 cancers in 185 countries. *Cancer J. Clin.* 2021;71(3):209-49.
4. Jazayeri SB, Saadat S, Ramezani R, Kaviani A. Incidence of primary breast cancer in Iran: Ten-year national cancer registry data report. *Cancer Epidemiol.* 2015;39(4):519-27.
 5. Tilaki KH, Auladi S. Awareness, attitude, and practice of breast cancer screening women, and the associated socio-demographic characteristics, in northern Iran. *Iran J Cancer Prev.* 2015;8(4).
 6. Amirkhah R, Naderi-Meshkin H, Mirahmadi M, Allahyari A, Sharifi HR. Cancer statistics in Iran: Towards finding priority for prevention and treatment. *The Cancer Press.* 2017;3(2):27-38.
 7. Roshandel G, Ghanbari-Motlagh A, Partovipour E, Salavati F, Hasanpour-Heidari S, Mohammadi G, et al. Cancer incidence in Iran in 2014: results of the Iranian National Population-based Cancer Registry. *Cancer Epidemiol.* 2019;61:50-8.
 8. Kilic ST, Oz F. Family caregivers' involvement in caring with cancer and their quality of life. *Asian Pac J Cancer Prev.* 2019;20(6):1735.
 9. Gosain R, Gage-Bouchard E, Ambrosone C, Repasky E, Gandhi S. Stress reduction strategies in breast cancer: Review of pharmacologic and non-pharmacologic based strategies. *Semin Immunopathol.* 2020 Dec;42(6):719-734.
 10. Litzelman K. Caregiver Well-being and the Quality of Cancer Care. *Semin Oncol Nurs.* 2019 Aug;35(4):348-353.
 11. Salmani N, Ashketorab T, Hasanvand S. The burden of caregiver and related factors of oncology patients of Shah Vali Hospital. *Advances in Nursing and Midwifery.* 2014;24(84):11-7. [In Persian]
 12. Girgis A, Lambert S, Johnson C, Waller A, Currow D. Physical, psychosocial, relationship, and economic burden of caring for people with cancer: a review. *J Oncol Pract.* 2013;9(4):197-202.
 13. Rajabi M, Bastami M, Shahvaroughi Farahani N, Tavanaie AH, Ghanbari B, Alasti H. Religious Coping as a Predictor of the Burden of Care in the Caregivers of End-stage Cancer Patients. *Iran Journal of Nursing.* 2018;31(114):6-16. [In Persian]
 14. Ge L, Mordiffi SZ. Factors associated with higher caregiver burden among family caregivers of elderly cancer patients: a systematic review. *Cancer Nurs.* 2017;40(6):471-8.
 15. Mishra S, Gulia A, Satapathy S, Gogia A, Sharma A, Bhatnagar S. Caregiver burden and quality of life among family caregivers of cancer patients on chemotherapy: A prospective observational study. *Indian J Palliat Care.* 2021;27(1):109.
 16. Akpan-Idiok PA, Anarado AN. Perceptions of burden of caregiving by informal caregivers of cancer patients attending University of Calabar Teaching Hospital, Calabar, Nigeria. *Pan Afr Med J.* 2014 Jun 18;18:159.
 17. Borges EL, Franceschini J, Costa LH, Fernandes AL, Jamnik S, Santoro IL. Family caregiver burden: the burden of caring for lung cancer patients according to the cancer stage and patient quality of life. *J Bras Pneumol.* 2017 Jan-Feb;43(1):18-23.
 18. Seo YJ, Park H. Factors influencing caregiver burden in families of hospitalised patients with lung cancer. *J Clin Nurs.* 2019;28(9-10):1979-89.
 19. Yildiz E, Karakaş SA, Güngörmüş Z, Cengiz M. Levels of care burden and self-efficacy for informal caregiver of patients with cancer. *Holist Nurs Pract.* 2017;31(1):7-15.
 20. Safaeian Z, Hejazi SS, Delavar E, Hoseini Azizi T, Haresabadi M. The relationship between caregiver burden, and depression, anxiety and stress in family caregivers of cancer patients referred to Imam Reza Hospital in Bojnurd City. *IJPN.* 2017;5(3):7-14. [In Persian]
 21. Aliakbarian M, Karimi Moonaghi H, Emadzade A, Behnam Vashani H. The effect of group training on burden of caregivers of children with cancer. *MJMS.* 2019;62(5):1692-9. [In Persian]
 22. Mollae F, Borhani F, Abbaszadeh A. Correlation of burden of care and spiritual health in family caregivers of cancer patients. *Nursing and Midwifery Journal.* 2019;17(4):292-9. [In Persian]
 23. Ashghali Farahani M, Ghane G, Sydfatemi N, Hagani H. Effect of educational program on the burden of family caregivers of hemodialysis patients. *EBCJ.* 2016;6(1):7-18.
 24. Esfahani AK, Gheisarian Z, Bigdelian H. The Effect of a Caregiving Program on the Caregiving Burden of Mothers of Children Undergoing

- Corrective Surgery for Congenital Heart Disease. *JPN*. 2018;4(3):41-5. [In Persian]
25. Gabriel IO, Mayers PM. Effects of a psychosocial intervention on the quality of life of primary caregivers of women with breast cancer. *Eur J Oncol Nurs*. 2019;38:85-91.
26. Pahlavanzade S, Khosravi N, Moeini M. The effect of a family need-based program on burden of caregivers of leukemia patients in Isfahan in 2013-2014. *Iran J Nurs Midwifery Res*. 2014;19(6):629.
27. Attai DJ, Cowher MS, Al-Hamadani M, Schoger JM, Staley AC, Landercasper J. Twitter social media is an effective tool for breast cancer patient education and support: patient-reported outcomes by survey. *J Med Internet Res*. 2015 Jul 30;17(7):e188.
28. Bostanchi F, Parhizkar A, Salehi K, Nasiri Kalmarzi R, Roshani D. The Effect of Virtual Education on the Quality of Life of Asthmatic Patients, Tohid Hospital in, Sanandaj City, 2018. *3 JNE* 2020; 9 (2) :10-18. [In Persian]
29. Raunsbæk Knudsen L, Lomborg K, Ndosi M, Hauge EM, de Thurah A. The effectiveness of e-learning in patient education delivered to patients with rheumatoid arthritis: The WebRA study-protocol for a pragmatic randomised controlled trial. *BMC Rheumatol*. 2021 Dec 20;5(1):57.
30. Salehi Nejad S, Azami M, Motamedi F, Bahaadinbeigy K, Sedighi B, Shahesmaili A. The Effect of Web-based Information Intervention in Caregiving Burden in Caregivers of Patients with Dementia. *jhbmi* 2017; 4 (3) :181-191. [In Persian]
31. Seyedfatemi2 N, Ahmadzad Asl M, Bahrami R, Haghani H. The Effect of Virtual Social Network Based Psycho-education on Resilience of Family Caregivers of Clients with Severe Mental Disorders. *IJPN* 2019; 6 (6) :1-8. [In Persian]
32. Dionne-Odom JN, Ejem DB, Wells R, Azuero A, Stockdill ML, Keebler K, et al. Effects of a Telehealth Early Palliative Care Intervention for Family Caregivers of Persons With Advanced Heart Failure: The ENABLE CHF-PC Randomized Clinical Trial. *JAMA Netw Open*. 2020 Apr 1;3(4):e202583.
33. Elahiyan Borojeni E, Afrasiabifar A, Najafi Doulatabad S, Mousavizadeh A. The effect of the Movie- Based Education on Sleep Quality in Patients with Bronchial Asthma. *armaghanj* 2017; 22 (2) :176-188. [In Persian]
34. Estaji Z, Hejazi S, Tabarraie Y, Saedi M. The Effects of training through text messaging via cell phones on the compliance of patients undergoing hemodialysis. *Journal of North Khorasan*. 2016; 8 (2) :203-213. [In Persian]
35. Karimi Moonaghi H, Hasanzadeh F, Shamsoddini S, Emamimoghadam Z, Ebrahimzadeh S. A comparison of face to face and video-based education on attitude related to diet and fluids: Adherence in hemodialysis patients. *Iran J Nurs Midwifery Res*. 2012 Jul;17(5):360-4.
36. Heckel L, Fennell KM, Reynolds J, Boltong A, Botti M, Osborne RH, et al. Efficacy of a telephone outcall program to reduce caregiver burden among caregivers of cancer patients [PROTECT]: a randomised controlled trial. *BMC Cancer*. 2018 Jan 8;18(1):59.
37. Hu C, Kung S, Rummans TA, Clark MM, Lapid MI. Reducing caregiver stress with internet-based interventions: a systematic review of open-label and randomized controlled trials. *J Am Med Inform Assoc*. 2015;22(e1):e194-e209.
38. Klimova B, Valis M, Kuca K, Masopust J. E-learning as valuable caregivers' support for people with dementia - A systematic review. *BMC Health Serv Res*. 2019 Nov 1;19(1):781.
39. Ploeg J, Ali MU, Markle-Reid M, Valaitis R, Bartholomew A, Fitzpatrick-Lewis D, et al. Caregiver-Focused, Web-Based Interventions: Systematic Review and Meta-Analysis (Part 2). *J Med Internet Res*. 2018 Oct 26;20(10):e11247.
40. Sala-González M, Pérez-Jover V, Guilabert M, Mira JJ. Mobile Apps for Helping Informal Caregivers: A Systematic Review. *Int J Environ Res Public Health*. 2021 Feb 10;18(4):1702.
41. Al-Rawashdeh SY, Lennie TA, Chung ML. Psychometrics of the Zarit Burden Interview in Caregivers of Patients With Heart Failure. *J Cardiovasc Nurs*. 2016 Nov/Dec;31(6): 21-28.
42. Miguel I, Moreira A, Freire J. Burden, quality of life and distress of the main caregiver in head and neck, cervix and rectum cancer patients. *J Cancer Res Ther*. 2017;5(3):14-8.
43. Rha SY, Park Y, Song SK, Lee CE, Lee J. Caregiving burden and the quality of life of family caregivers of cancer patients: the relationship and correlates. *Eur J Oncol Nurs*. 2015 Aug;19(4):376-82.

44. Vahidi M, Mahdavi N, Asghari E, Ebrahimi H, Eivazi Ziaei J, Hosseinzadeh M, et al. Other Side of Breast Cancer: Factors Associated with Caregiver Burden. *Asian Nurs Res.* 2016 Sep;10(3):201-206.
45. Raesi R, Mirzaei A, Saghari S, Raei M, Bokaie S, Hushmandi K. Investigating the Effect of Tele-Nursing on the Care Burden of Family Caregivers of COVID- 19 Patients. *jcnursing* 2021; 14 (3) :21-29. [In Persian]
46. Abedini S, Jomehpour S, Fallahi S, Ghanbarnejad A, Nikparvar M. The effect of virtual education of cardiovascular risk factors on the knowledge of general physicians. *JMIS* 2020; 6 (1) :31-36. [In Persian]
47. Faraji S, Valizadeh S, Sharifi A, Shabazi S, Ghojzadeh M. The effectiveness of telegram-based virtual education versus in-person education on the quality of life in adolescents with moderate-to-severe asthma: A pilot randomized controlled trial. *Nurs Open.* 2020 Jun 28;7(6):1691-1697.