

# Comparison of the Effect of Electronic Learning and Blended Learning on the Empowerment of the Caregivers of Cancer Patients Under Chemotherapy

Nahid Karimi

Shiraz University of Medical Sciences

Nahid ZarifSanaiey

Shiraz University of Medical Sciences

Fatemeh Vizeshfar ( [vizeshfar@yahoo.com](mailto:vizeshfar@yahoo.com))

Shiraz University of Medical Sciences <https://orcid.org/0000-0003-1261-7318>

---

## Research Article

**Keywords:** Cancer, Chemotherapy, Blended learning, Electronic learning

**Posted Date:** June 3rd, 2021

**DOI:** <https://doi.org/10.21203/rs.3.rs-488554/v1>

**License:**  This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

---

**Version of Record:** A version of this preprint was published at Supportive Care in Cancer on November 17th, 2021. See the published version at <https://doi.org/10.1007/s00520-021-06682-z>.

## Abstract

**Objective:** Cancer is a chronic disease that affects the person and family. E-learning is a common method of educating for patients and caregivers. The present study aimed to compare the impact of electronic learning and blended learning on the empowerment of the caregivers of cancer patients under chemotherapy.

**Methods:** This clinical trial was performed in the main chemotherapy center of Shiraz University of Medical Sciences during October 2018-December 2020. A total of 123 caregivers of cancer patients who were under chemotherapy were selected through simple random sampling based on drawing in two intervention groups and one control group. The empowerment of caregivers was evaluated using the caregivers' empowerment questionnaire in all three groups at the beginning of the study, immediately after the intervention, and one month after intervention. The data were analyzed by descriptive and statistical tests utilizing the SPSS software version 22.

**Results:** The comparison of knowledge scores between the two intervention groups shows not significant difference between the two groups ( $P=0.3$ ). Comparison of attitude scores demonstrated the group intervention one had a better attitude than the two others groups after intervention ( $P=0.003$ ). The mean performance score increased in both intervention groups with a significant difference ( $P=0.00$ ). No significant differences were observed between demographic data and knowledge, attitude and performance of three groups ( $P>0.05$ ).

**Conclusion:** Our results indicated that electronic and blended learning types affected the attitude and performance of patients' caregivers. Therefore, blended learning could be applied as a source of enhancing the empowerment of caregivers.

## Introduction

Cancer accounts for about 12% of mortality throughout the world. In developed and developing countries, cancer is the second and third cause of mortality, respectively (1). According to the statistics of the World Health Organization (WHO) in 2018, approximately 1.7 million new cases and 600 thousand deaths due to cancer occur annually in the United States (2). In Iran, cancer-related mortality reached 1000 cases per 56000 individuals per year (3).

Insufficient healthcare infrastructures, limited therapeutic options, and rapid disease progression lead to a high mortality rate due to cancer (4). Cancer patient has to accept long treatments with chemotherapy agents because of the chronic nature of cancer. The side effects of these treatments include nausea, hair loss, fatigue, muscle pain, skin burns, weight changes, and psychological issues (5). Repeated hospitalizations for treatment make a normal life for patients and their families impossible. The family is directly responsible for taking care of the patient. When a severe injury occurs for one of the family members, care needs augment and cause problems.

Studies on the quality of life of cancer patients showed that cancer exerts remarkable effects on the physical, psychological, social, and economic aspects of a patient's family (6). Requests for sooner discharge from hospital and care at home are increasing due to elevated demands for non-hospital care and a higher number of people with cancer history. The latter issue might be challenging for a long time (7). An unofficial caregiver is a friend, parents, or relatives who support the patient in all aspects of performance and life (8). Family caregivers have a positive impact on the compatibility of patients and play a key role in the management of different dimensions of taking care of the patient (9). These caregivers may face diverse problems, such as social seclusion, losing identity, economic issues, and deficient information (10).

Nowadays, determining the needs of patients and their caregivers is essential because of the growing trend of chronic diseases and limited hospital resources (6). The caregivers of these patients might encounter major challenges. Not receiving the required personal information and expert knowledge about the disease and their health are among the most important challenges. Caregivers are improved personally, physically, and psychologically and provide better care in case of receiving the needed information (11). Not having enough information about taking care of and supporting patients results in inadequate care and finally leaving the patient (12). These days, information technology with its influences on all domains is considered as one of the most necessary tools in the education field (13).

There are diverse methods for educating the caregivers, one of which is electronic learning. Electronic learning is a technique completed by modern communication mechanisms, such as computers, computer networks, images, maps, and electronic ports. In electronic learning, educational content is prepared and provided for the person by computer and networks. The benefits of this learning method are learning at any time and place, as well as preventing time waste (14). Electronic learning tools enable the learners to learn both individually or in a group (15). Blended learning is a combination of face-to-face and electronic methods that eliminates the disadvantages of both techniques (16). Simultaneous with the development of technologies in the field of education, new styles of educational activities have emerged, which are known as blended learning.

The benefits of this type of learning and blended learning environments attract different people to this learning method (17). It is important to train the caregivers of patients and blended training is possible to affect the empowerment of the caregivers of cancer patients under chemotherapy. Therefore, the present study aimed to evaluate the impact of using blended learning on the empowerment of the caregivers of cancer patients under chemotherapy who referred to the specialized clinic of Shiraz University of Medical Sciences.

## **Materials And Methods**

### **Study Protocol and Target Sample**

This clinical trial was performed as an experimental study with a pretest-posttest design on two intervention groups and one control group. We aimed to compare the impact of electronic learning and blended learning on the empowerment of the caregivers of cancer patients under chemotherapy who referred to the specialized clinic of Shiraz University of Medical Sciences. The study setting was Shahid Motahari chemotherapy center, Shiraz University of Medical Sciences, Shiraz, Iran. This center provides service everyday on both morning and afternoon shifts. The inclusion criteria entailed age of over 18 years, Iranian nationality, the ability for reading and writing in Persian, not having attended similar classes, and not being affected by psychological disorders. The exclusion criteria were incomplete questionnaires, unwillingness for continuing cooperation, and being absent in more than one session.

In order to determine the final sample size, a pilot study was carried out first. The pilot study was performed on 60 caregivers of cancer patients and the final sample size was calculated as 123 individuals. The participants were randomly allocated to the intervention and control groups by drawing for each group. All the caregivers who met the inclusion criteria were enrolled in the study following the signing of informed consent. The data were collected by a questionnaire, the validity of which was determined by content validity and face validity. The questionnaire was delivered to ten specialized members of the university scientific committee.

They presented their ideas regarding the agreement of questions with aims, as well as the impact coefficient, relevancy, clarity, fluency, and necessity of questions. The comments were evaluated and all items had impact coefficients over 1.5 and suitable face validity. Content validity ratio and content validity index after the omission of unnecessary questions were obtained as 1 and 0.8, respectively. The reliability of the questionnaire was confirmed by the Cronbach's alpha of 8.7 and the significance level of 0.05.

The questionnaire consisted of two parts, the first of which addressed demographic characteristics, including the age of caregiver and patient, gender of caregiver and patient, caregiver income, education level of caregiver and patient, the number of the children of caregiver and patient, occupation of caregiver and patient, and disease length. The second part was the survey of caregivers' empowerment and entailed 30 items. This part of the questionnaire had three sections and evaluated the knowledge, attitude, and performance of caregivers. Questions 1–19, 20–25, and 26–30 were related to the knowledge, attitude, and performance of caregivers, respectively. The knowledge section consisted of two-option questions, which had only one correct answer. In case the caregiver had chosen the correct answer they were given a score of 1, otherwise 0.

The attitude and performance questions were scored based on a five-point Likert scale. The total score of the questionnaire was 74 with a knowledge score in the range of 0–19. Scores 0–6, 7–13, and 14–19 were considered weak, moderate, and good, respectively. Attitude score had a range of 0–30 with scores 0–10, 11–20, and 21–30 representing weak, moderate, and good status, respectively. Moreover, the performance score was 0–25 with 0–8, 9–16, and 17–25 showing weak, moderate, and good conditions, respectively.

Intervention group 1 (IG1) received blended training as face-to-face and educational CD. Intervention group 2 (IG2) received the content only as a CD. Three 90-min educational sessions were held by the researcher during three weeks for IG1. The sessions were repeated in small groups for the caregivers who could not attend the training sessions for any reason. In the first session, a pretest was performed and subjects related to cancer, and its statistics, reasons, prevention measures, screening tests, as well as the importance of the role of family caregivers were presented. In the second session, the subjects of the first session were reviewed and chemotherapy definition, some common side effects of chemotherapy, including nausea, vomit, hair loss, anorexia, xerostomia, and facing approaches for these problems were discussed.

In the third session, the first and second sessions were reviewed. Afterwards, common side effects of chemotherapy, including fatigue, hemorrhage, overweight, different infections, nutritional points related to cancer patients under chemotherapy, and the relationship between chemotherapy and diabetes were discussed. Posttest was performed immediately after this session and one month later. It should be noted that caregivers in the control group received the routine care of the ward and a CD of the educational content was given to them after the termination of the study and data collection.

## Data analysis

The data were analyzed by descriptive statistics, such as frequency and percentage, as well as analytical tests, including the Chi-square test, independent t-test, paired t-test, and repeated measures analysis of variance. The analyses were conducted using the SPSS software version 22.

## Results

The three groups were not significantly different in terms of demographic characteristics and all three groups were homogenous. Comparison of the mean knowledge score between the two intervention groups showed that knowledge score in caregivers elevated ( $P=0.002$ ), but the difference was not significant between the two groups ( $P=0.3$ ). Table 1 presents the mean knowledge scores in the two intervention groups and the control group on three times pre-intervention, immediately post-intervention, and one month post-intervention.

In IG1, the mean knowledge score was  $5.68\pm2.92$ ,  $8.53\pm3.23$ , and  $8.41\pm3.42$  on pretest, immediately posttest, and one month posttest, respectively. In IG2, the mean knowledge score was  $3.26\pm6.02$  on pretest,  $9\pm3.92$  immediately posttest, and  $8.7\pm3.42$  one month posttest. The mean knowledge score posttest was categorized as good. In the control group, elevation was not observed in the mean knowledge score immediately post-intervention because this group did not receive any training. In terms of the mean knowledge score one month post-intervention in the two intervention groups, forgetting the subjects and not using the educational CD and manuals led to reduced mean knowledge score.

The data in this table were analyzed utilizing the two-way analysis of variance by ranks. Table 1 demonstrates that training was effective in improving the knowledge of the caregivers of cancer patients

under chemotherapy. Therefore, it can be a step toward better care with higher quality at home. Comparing the attitude scores revealed that the mean score augmented in each group and IG1 had a better attitude following the intervention, compared to the two other groups ( $P=0.003$ ). Table 2 demonstrates the mean score of attitude in the two intervention groups and the control group on pretest, immediately posttest, and one month post-intervention.

The mean attitude score in the IG1 pre-intervention was  $22.7 \pm 3.002$  followed by  $24.75 \pm 2.82$  immediately posttest and  $24.8 \pm 2.77$  one month post-intervention. The mean attitude score in the IG2 was  $22.6 \pm 2.55$ ,  $24.29 \pm 2.2$ , and  $24.41 \pm 1.98$  pretest, immediately post-intervention, and one month posttest. This elevation in the mean score shows that educational intervention enhanced the attitude of caregivers. In both groups, the mean attitude score raised one month posttest. It could be justified by the fact that caregivers in the two intervention groups had educational CD and supplements. The mean attitude score posttest was categorized as good.

The mean performance score in both intervention groups augmented significantly posttest ( $P=0$ ,  $P=0$ ). The IG1 indicated a better performance ( $P=0.007$ ). Table 3 demonstrates the mean performance scores in the two intervention groups and control group pretest, immediately posttest, and one month posttest. In the IG1, the mean performance score of cancer patients was  $18.87 \pm 2.66$  pretest, which reached  $21.07 \pm 2.1$  immediately posttest and  $21.38 \pm 2.03$  one month post-intervention. In the IG2, the mean performance score was  $18.85 \pm 2.23$  pretest,  $20.7 \pm 2.05$  immediately posttest, and  $20.78 \pm 1.95$  one month posttest.

The analysis of data indicated that educational intervention exerted a positive impact on both intervention groups and the mean performance score increased in both groups. However, the mean performance score had a more prominent elevation in the IG1 who received blended training through discussion, presentation, and educational CD, compared to the IG2 who were trained only by CD. The latter finding shows that discussion and presentation were more influential regarding the performance of caregivers. The mean performance score was categorized as good after the intervention. The demographic characteristics of patients and caregivers were not significantly correlated with knowledge, attitude, and performance variables.

## Discussion

Cancer is one of the frequent diseases in today world. The number of people affected by cancer is increasing (18). Despite the remarkable advances in medicine, cancer is still among the most important diseases and the second cause of death (19). Increased survival rate in patients with chronic disorders should be accompanied by improved quality of life. In addition to healthcare personnel, patients and their caregivers should also participate actively in this subject. Patients and their caregivers clearly need to acquire sufficient knowledge and information in the field of disease and care (20).

Therefore, the current study aimed to compare the impact of applying electronic learning and blended learning on the empowerment of the caregivers of cancer patients under chemotherapy. Our findings

demonstrated that the intervention groups and control group had a significantly different empowerment after the intervention. Furthermore, the pretest and posttest mean scores of knowledge, attitude, and performance were significantly different in all groups.

## **Impact of Blended Learning on Knowledge**

Findings of the present study indicated that blended learning has a positive effect on the knowledge of the caregivers of cancer patients under chemotherapy. A similar investigation by Khoshnoodifar et al. (2019) evaluated the impact of traditional and electronic training on the knowledge, skill, and satisfaction of nurses concerning cardiopulmonary resuscitation. Their results were in line with the current study and showed that the scores of participants augmented considerably after the intervention. However, awareness level was remarkably higher in the nurses of electronic training group than those in the traditional training group (21).

Lyink et al. (2019) assessed the effect of distance training and showed that it had a better influence on learners (22). Rigen et al. (2019) investigated the impact of electronic healthcare on people with dementia and their caregivers. They observed that electronic training raised the knowledge of caregivers leading to improved care (23).

Kiza et al. (2018) performed a study titled “family caregivers for adult cancer patients: knowledge and ability for pain control in a limited environment”. These authors concluded that interventions for knowledge enhancement are one of the approaches for controlling cancer-related pain at home (24) (Table 1).

## **Impact of Blended Learning on Attitude**

Our results indicated that blended learning imposed a positive effect on the attitude of the caregivers of cancer patients under chemotherapy. Klimova et al. (2019) evaluated the impact of electronic learning on the caregivers of patients with dementia. The results revealed that electronic training courses helped the caregivers to have a better self-confident, sympathy, understanding, and ability ( $P < 0.03$ ) (25).

In this regard, Masoudi et al. (2010) completed a study titled “the influence of family-centered empowerment pattern on the attitude of the caregivers of multiple sclerosis (MS) patients” on 70 caregivers of MS patients. Their findings revealed that empowerment the caregivers of MS patients resulted in the enhanced understanding and attitude of caregivers helping them for efficient care (26) (Table 2).

## **Impact of Blended Learning on Performance**

The findings of current study demonstrated that blended learning positively affected the performance of the caregivers of cancer patients under chemotherapy. Prusler et al. (2019) conducted a quasi-experimental study to assess the effect of the access of patients to caregivers and information on 45 caregivers in the United States through web. They reported that an important issue for patient is the

presence of a caregiver for providing support in therapeutic and care measures ( $P < 0.001$ ) (6). Consequently, the knowledge, attitude, and performance of caregivers are crucial due to their important role (Table 3).

## **Effect of Demographic Characteristics on Learning**

According to tables 6 and 7, demographic characteristics, including age and education level were influential factors in the present study. In this regard, Khashabi et al. (2016) performed an investigation titled “the rate of the satisfaction of patients with periodontal diseases with training methods in Urmia dentistry clinic and the effect of age and gender on learning”.

This quasi-experimental study was carried out on 360 people who referred to the dentistry clinic and an evaluation checklist was the data collection tool. The findings showed that age was effective in learning (27). Moghimi et al. (2006) performed a study on 80 teachers in Mashhad, Iran titled “influence of the characteristics of the employees of Razavi Khorasan Education Organization on their participation in the recommendation system”.

Study instrument was participation questionnaire and the results showed that education level was an important effective factor in the learning and participation of individuals, which is consistent with our findings ( $P < 0.05$ ) (28). Results of the present study and previous investigations indicated that blended and electronic learning methods affect people learning and empowerment and improves their knowledge, attitude, and performance. On the other hand, strengthening is considered as a suitable approach for supporting patients and their caregivers (29).

Nurses, as the treatment personnel who are in daily direct contact with patients and their caregivers, can enhance the knowledge, attitude, and performance of caregivers through training (30). In summary, findings revealed the influence of blended learning on the empowerment of caregivers. As a result, blended learning could be applied as a source of improving the empowerment, attitude, and performance of caregivers. In this regard, Seif zargar et al. completed a study titled “impact of cognitive, visual, and aural treatment on cognitive performance considering gender and learning style” on 80 students. Their results demonstrated that gender did not influence performance and learning (31).

## **Abbreviations**

Not applicable

## **Declarations**

### **Funding**

Funding for this study was provided by Vice-chancellor of research of Shiraz University of Medical Sciences (No: 97-01-08-17533). VCR had no role in the study design, collection, analysis or interpretation of the data, writing the manuscript, or the decision to submit the paper for publication.

## **Conflict of Interests**

All authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## **Availability of data and material**

The data that support the findings of this study are available on request from the first author.

## **Code availability**

Not applicable

## **Ethics approval**

This study was approved by the Ethics Committee of Shiraz University of Medical Sciences, Shiraz, Iran (No. IR.SUMS.REC.1397.703). All the participants were in-formed about the study objectives and signed written informed consents for taking part in the study.

## **Consent to participate**

All participant complete consent form.

## **Consent for publication**

Not applicable

## **Acknowledgements**

The authors would like to thank Vice-chancellor of research Shiraz University of Medical Sciences which supported financially this study (Grant No: 17533), and also very appreciate all research participant.

## **Authors' contributions**

Fatemeh Vizeshfar&Nahid Karimi: Conceptualization, Method-ology, Software , Data curation, Writing-Original draft preparation, Visualization, Investiga-tion, Supervision, Validation, Writing- Reviewing and Editing. Nahid Zarifsanaiey: Conceptualization, Methodology, Investigation, Supervision.

## **References**

1. Puri S, Ashat M, Pandey A. Socio-demographic characteristics of cancer patients: Hospital based cancer registry in a tertiary care hospital of India. Indian Journal of Cancer. 2014;51:1-4.
2. You M, Henneberg M. Cancer incidence increasing globally: The role of relaxed natural selection. Evol Appl 2018;11(2):52-140.
3. Zendehdel K. Cancer statistics in I.R. Bas Clin Cancer Res. 2019;11(1):1-4.

4. Muliira J, Kizza I. Role of family caregivers and perceived burden when caring for hospitalized adult cancer patients. Wolters Kluwer Health. 2019;60(5).
5. Abbasi A, Shamsizadeh M, Asayesh H. The relationship between caregiver burden with coping strategies in Family caregivers of cancer patients. Iranian Nurs Sci Assoc. 2017;1(3):62-71.
6. Preussler J, Mau L, Majhail N, Messner C. Caregiver availability and patient access to hematopoietic cell transplantation: social worker perspectives inform practice. Supportive Care in Cancer. 2019;13.
7. Jivraj N, Gallagher L, Papadakos J. Empowering patients and caregivers with knowledge: The development of a nurse-led gynecologic oncology chemotherapy education class. Can Oncol Nurs J. 2018;28(1):4-7.
8. Kebos L, Dale w. Quality of life of caregivers of old patients with advance cancer. KEHOE ET AL. 2019;67(5).
9. Lim H, Tan J, Chua J. Quality of life of family caregivers of cancer patients in Singapore and globally. Singapore Med J. 2017;58(5):258-61.
10. Ugalde A, Gaskin C. Appraising the potential for implementation of evidence into practice. WILEY. 2019;8:687.
11. Mirzabeygi M, Fatemiyani A. Comparing the effect of E-Learning and traditional Learning on cognitive learning. Scientific journal. 2015;1:37-60.
12. Kim Y, Carver C, Spiegel D. Role of family caregivers' self-perceived preparedness for the death of the cancer patient in long-term adjustment to bereavement. Psychooncology. 2017;26(4):484-92.
13. Taghipoor K, Mahmoodi M. Combined learning and its role in learning. Quarterly Journal of Studies and Research In Behavioral Sciences. 2020;1(1).
14. Karim E. Electronic Learning and its benefits in education. EURASIA Journal Of Mathematics. 2019;15(3).
15. Derouin R. E-learning in organization. J Manag. 2005;1(31):902-42.
16. Hrastinski S. What do we mean by blended learning. AECT. 2019;63(1):564-9.
17. mahmoodi M. The role of combined learning in the development of education and the teaching process of combined learning with presenting its necessities, challenges and solutions. Kharazmi Higher Institute of Science and Technology. 2018;1(1).
18. Boyle P, Levin B. World Cancer Report2008. Geneva: WHO Press. IARC Press. 2008;6.
19. Shaha M, Cox C, Talman K, Kelly D. Uncertainty in breast, prostate, and colorectal cancer: implications for supportive care. J Nurs Scholarsh 2008;40:60-7.
20. Kishimoto T. Instability and Serum Acetate Levels During Hemodialysis. Artificial Organs. 1980;5:108-11.
21. Khoshnoodifar M, Rafiei S, Zeraati Nasrabadi M. The effects of CPR training using two traditional and electronic training methods on the knowledge, skill, and satisfaction of nurses from In service education of cardiopulmonary resuscitation Majallah-i Dānishgāh-i Ӯlūm-i Pizishkī-i Qum 2019;13(9):34-43.

22. Lieneck C. Service learning via distance learning:a unique learning combination. *The Journal of Health Administration Education* 2019;12(5).
23. Rijn A. Linking two new E-health caregiver interventions to meeting centres for people with dementia and their carers; a process evaluation. *Aging and Mental Health*. 2019;24(8).
24. B K, J M. Family caregivers for adult cancer patient: knowledge and self-efficacy for pain management in a resource-limited setting. *Supportive Care in Cancer*. 2018.
25. Klimova B, ValisM. E-learning as valuable caregivers' support for people with dementia *BMC Health Services Research*. 2019;19(781).
26. Masoodi R, Alhani F, Moghadassi J, Ghorbani M. The effect of family-centered empowerment model on skill, attitude , and knowledge of multiple sclerosis caregivers. *Journal of Birjand University of Medical Sciences*. 2010;17(2):87-97.
27. Khashabi E, Esmaeili M. Evaluation of patients' satisfaction with periodontics with training methods in the clinic Urmia dentistry and determining the effect of age and gender on their learning. *The Journal of Urmia University of Medical Sciences*. 2017;28(2).
28. Moghimi M. Investigating the effect of personality traits and characteristics of employees of Khorasan Razavi Education Organization on their participation in the proposed system. *Educational and Psychological Studies of Ferdowsi University*. 2006;1(1).
29. Crawford T, Roger P. The interactional consequences of 'empowering discourse' in intercultural patient education. *Patient Educ Couns* 2017;100:495-500.
30. Backman C, Chartrand J, Dingwall O. Effectiveness of person- and family-centered care transition interventions: a systematic review protocol. *Syst Rev*. 2019;1(6):158.
31. Seyf A, Sharifi H. Evaluation of the effectiveness of cognitive reading, visual, auditory therapy on cognitive function according to gender and learning style. *Clinical Psychology and Personality*. 2021;1.

## Tables

**Table 1.** Mean knowledge score of the caregivers of cancer patients under chemotherapy in two intervention groups and the control group pretest, immediately posttest, and one month posttest

| Knowledge            | Intervention group 1<br>(Mean±SD) | Intervention group 2<br>(Mean±SD) | Control group<br>(Mean±SD) | P-value |
|----------------------|-----------------------------------|-----------------------------------|----------------------------|---------|
| Pretest              | 5.68±2.92                         | 6.02±3.26                         | 6.63±2.82                  | 0.001   |
| Immediately posttest | 8.53±3.23                         | 9±3.92                            | 4.4±3.81                   | 0.004   |
| One month posttest   | 8.41±3.41                         | 8.7±3.42                          | 7.73±2.4                   | 0.02    |

**Table 2.** Mean attitude score of the caregivers of cancer patients under chemotherapy in two intervention groups and the control group pretest, immediately posttest, and one month posttest

| Attitude             | Intervention group 1<br>(Mean±SD) | Intervention group 2<br>(Mean±SD) | Control group<br>(Mean±SD) | P-value |
|----------------------|-----------------------------------|-----------------------------------|----------------------------|---------|
| Pretest              | 22.7±3.002                        | 22.6±2.55                         | 22± 3.1                    | 0.000   |
| Immediately posttest | 24.75±2.82                        | 4.29 ±2.222                       | 22.7±3.21                  | 0.000   |
| One month posttest   | 24.8 ±2.77                        | 24.41±1.98                        | 22.82 ± 3.22               | 0.000   |

**Table 3.** Mean performance score of the caregivers of cancer patients under chemotherapy in two intervention groups and the control group pretest, immediately posttest, and one month posttest

| Attitude             | Intervention group 1<br>(Mean±SD) | Intervention group 2<br>(Mean±SD) | Control group<br>(Mean±SD) | P-value |
|----------------------|-----------------------------------|-----------------------------------|----------------------------|---------|
| Pretest              | 18.87±2.66                        | 18.85±2.23                        | 18.78±3.45                 | 0.000   |
| Immediately posttest | 21.07±2.10                        | 20.7±2.05                         | 19.34±3.37                 | 0.000   |
| One month posttest   | 21.36±2.03                        | 20.78±1.95                        | 19.6±3.61                  | 0.000   |