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Effect of Laughter Yoga on Mental Well-Being of Cancer Patients Undergoing Chemotherapy

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Abstract

Background: It is generally accepted that cancer affects the concept of mental well-being by changing the physical, psychological, spiritual, and social dimensions of the patient's life. Laughter yoga as one of the complementary therapies may promote mental well-being in patients undergoing chemotherapy.

Aim: This study aimed to determine the effect of laughter yoga on the mental well-being of cancer patients undergoing chemotherapy.

Method: This randomized controlled trial was conducted on 69 cancer patients undergoing chemotherapy at Reza Medical Center, Mashhad, Iran, in 2018. The intervention group was subjected to four 20-30 min sessions of laughter yoga prior to chemotherapy. On the other hand, the control group received routine self-care training. The mental well-being scores were measured using the Warwick-Edinburgh Mental Well-being Scale (WEMWBS) before and after the laughter yoga sessions. Data were analyzed in SPSS software (version 20) using an independent t-test, Mann-Whitney test, Wilcoxon test, and repeated measures ANOVA.

Results: According to the results, the mean age values of the patients were 49.0 ± 9.6 and 45.2 ± 12.6 years in the intervention and control groups, respectively. Regarding the independent t-test results, the mean post-test WEMWBS score in the intervention group (50.0 ± 8.9) was significantly higher than that in the control group (47.9 ± 10.4 , $P=0.004$). Moreover, the repeated measures ANOVA showed a significant increase in the mean post-test WEMWBS score in the intervention group ($P<0.001$).

Implications for Practice: Laughter yoga can promote the mental well-being of patients undergoing chemotherapy; therefore, its clinical applications are recommended in this study.

Keywords: Cancer, Chemotherapy, Laughter yoga, Mental well-being

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Introduction

Cancer accounts for 9% of all mortality worldwide. It is the second leading cause of death in developing countries after cardiovascular disease and the third leading cause of death in Iran (1). Cancer can have a psychological, emotional, and physical impact on patients' lives and their family members and cause changes in many aspects of life including physical, mental, spiritual, and social dimensions (2). Symptoms of anxiety, depression, hopelessness, feelings of social isolation, fear of the reaction of a spouse or relatives, worries about marriage, fear of death, and fear of sterility are common in cancer patients, all of which are associated with the concept of mental well-being in this population.

The mental well-being is defined as the self-assessment of life in the present and past times, including the emotional response of individuals to the events and judgments they make about their own life satisfaction (3). The concept of mental well-being has two emotional components (i.e., the maximum positive and minimum negative emotions) and the cognitive dimension (i.e., individuals' satisfaction with life). High personal values and high mental well-being can lead to better acceptance and less anxiety in cancer patients when they are diagnosed with the disease (4). The concept of mental well-being is also one of the important concepts in the quality of life of cancer patients (3). Accordingly, the current treatments should focus on reforming and modifying the quality of life, expanding empowerment, developing life satisfaction, and ultimately promoting mental well-being. The promotion of the mental well-being in patients improves mental-physical health and increases life expectancy, happiness, economic success, and social participation (5). Therefore, complementary and alternative medicine (CAM) alone or in combination with standard treatments may be used in cancer patients.

Laughter yoga is one of the CAMs along with laughing sports. This treatment combines unconditional laughter with yoga breathing and yoga stretching exercises so that people laugh without jokes or satire show (6). Some believe that both real and fake laughter has a similar effect on the body (7). Studies so far have shown the positive benefits of laughter on various body systems, such as muscle relaxation and changes in the immune system, hormones, and mental parameters (7, 8). The laughter yoga was first introduced by an Indian physician included all kinds of laughter exercises. This treatment combines unconditional laughter with yoga breathing and yoga stretching exercises so that people will laugh without joking or humor (6).

The laughter yoga includes four main steps of clapping, deep breathing, childlike playfulness, and laughter exercises. Laughing releases endorphins and reduces stress hormones, which gives the person a sense of "well-being" (7). Laughter yoga in patients reduces stress, depression, psychosomatic disorders, and pain; in addition, it strengthens the immune systems, relationships with others, self-confidence, and social presence (7). Furthermore, it is an easy, affordable, and available method that can help maintain and promote mental well-being in patients. Additionally, there is the possibility of teaching and practicing laughter yoga by patients themselves, which helps them increase self-care which is regarded as one of the major objectives of nursing.

Hawton et al. (2010) showed that cognitive behavior therapy was one of the techniques to promote mental well-being (9). Ko and Youn (2011) reported that forced laughter increased sleep quality in community-dwelling elderly and improved positive mood in the subjects with a low depression score (10). In a study performed by Farifteh et al. (2014), the laughter yoga in cancer patients reduced stress before chemotherapy and ultimately improved the quality of life (11). There is no study to date on the mental well-being of patients undergoing chemotherapy. Moreover, no study was found on the effect of laughter yoga on mental well-being, despite the beneficial effects of this therapy. Therefore, the present study aimed to evaluate the effect of laughter yoga on the mental well-being of cancer patients undergoing chemotherapy.

Methods

This randomized, double-blind, clinical trial was conducted on patients who referred to Reza Radiotherapy Oncology Center, Mashhad, Iran, for chemotherapy in 2018. The sample size was estimated based on the results of a pilot study on 10 participants in each group using the formula of mean comparison. The final sample size was calculated to be 34 individuals for each group with a confidence interval of 95% and a test power of 80%. Finally, 39 patients were included in each group considering the sample attrition. Out of this population, 5 and 4 participants were excluded from the

intervention and control groups, respectively, due to unwillingness to continue laughter yoga training and worsening or delaying chemotherapy. Finally, 69 remained patients were assigned into two groups of intervention (n=34) and control (n=35).

The researcher first introduced himself to patients and then selected eligible individuals based on the inclusion criteria checklist. The inclusion criteria were 1) age range between 18 and 60 years, 2) consciousness, 3) non-metastatic cancer, 4) no hearing or visual impairment, 5) access to telephone for follow-up, 6) willing to participate in four-session chemotherapy program per month, 7) no symptoms of osteomyelitis, 8) no upper gastrointestinal cancer, 9) the absence of concurrent radiotherapy, 10) as well as no mental and physical capability to perform laughter yoga movements.

On the other hand, the patients with major stress at the time of research, exacerbation of the disease, the need for intensive care, delay in chemotherapy due to thrombocytopenia or any other factor, the inability to attend laughter yoga sessions, and change in chemotherapy regimen were excluded from the study. The patients were selected using a convenience sampling method. After meeting the inclusion criteria, the eligible individuals were assigned into intervention and control groups based on randomized sequences produced by SPSS software and kept in a sealed envelope. All participants were informed of the research procedure and objectives; in addition, written informed consent was obtained from the selected individuals in both intervention and control groups.

Warwick-Edinburgh Mental Well-being Scale (WEMWBS) was used to measure the mental well-being level of the patients. This instrument includes 14 questions which are scored using a 5-point Likert scale from never (1) to always (5). The minimum and maximum scores on this scale range from 14 to 70, respectively, and the high scores indicate a higher level of mental well-being. The WEMWBS had three dimensions, including feelings of optimism, positive relationships, and having energy. The first dimension is related to usefulness, feeling relaxed, vitality, confidence, and optimism. The second dimension is intellect, feeling close to others, and thinking well. The third dimension is related to high energy, the ability to overcome problems, receive appropriate attention, and be loved by others (12). The content validity of this scale was determined regarding the participant selection, demographic characteristics, and informed written consent to participate in the study. Subsequently, the tool was developed by reviewing literature extensively based on new references. Moreover, four research professors and experts on oncology were requested to evaluate the content validity of the questionnaire.

The final tool was utilized after applying recommendations and required corrections. The validity of the Persian version of the WEMWBS tool has been confirmed in a study conducted by Rajabi (13). Regarding the reliability, 10 participants were asked to complete the questionnaire, and its reliability in terms of participant selection, demographic characteristics, and informed written consent was confirmed based on Cronbach's alpha coefficient of 0.81 obtained by internal consistency method.

The questionnaires were completed before and after laughter yoga sessions by the patient or using interviews in a quiet room in the chemotherapy ward. The intervention group was subjected to four 20-30 min laughter yoga sessions (11). The training program was developed by a researcher, who was able to hold the laughter yoga sessions after receiving necessary training from a laughter yoga instructor over a course of 16 hours. He held the training sessions under the supervision of a laughter yoga instructor prior to each chemotherapy session in the center auditorium adjacent to the Chemistry Department. The hall can accommodate 50 people for the ceremony of the center. Each laughter yoga session lasted 20 to 30 minutes, and the laughter lasted 30 to 45 seconds. The exercises consisted of fifteen basic standing steps including:

Step 1: Clapping in a rhythm of 1-2-3, 1-2-3, with chanting of ho-ho-ho, ha-ha-ha.

Step 2: Deep breathing with inhalation through the nose and exhalation through the mouth (five times).

Step 3: Warming up and stretching the neck and shoulders (five times each).

Step 4: Hearty laugh technique in which both arms are opened over the head tilted slightly backward laughing simultaneously.

Step 5: Greeting laughter technique in which palms facing each other and laughing at other people in the group.

Step 6: Appreciation laughter technique in which the pointing finger is joined with the thumb to make a circle while making gestures as if one is appreciating the group members and laughing simultaneously.

Step 7: One-meter laughter technique in which one hand is moved over the stretched arm of the other and shoulder is extended in three moves by chanting Ae..., Ae....., Aeee....., and then the participants burst into laughter by stretching both arms and throwing their heads a little backward laughing from the belly (four times).

Step 8: Silent laughter technique in which the mouth is opened as far as possible without sound and then looking into other's eyes making some funny gestures.

Step 9: Humming laughter technique with a closed mouth in which the mouth is closed with laughing and a humming sound while humming keep on moving in the group and shaking hands with other members of the group.

Step 10: Swinging laughter technique in which a large circle is formed while running and laughing towards the center of the circle by chanting Aee....Ooo....Eee...Uuu.

Step 11: Lion laughter technique in which the tongue is extended fully with eyes wide open and hands stretched out like the claws of a lion laughing from the tummy.

Step 12: Cell phone laughter technique in which an imaginary mobile phone is held next to ear while making different gestures moving around in the group to meet different people.

Step 13: Argument laughter technique in which a finger is pointed at different members of the group with laughing.

Step 14: Gradient laughter technique which starts with the appearance of a smile on the face, and the smile gradually getting bigger and bigger. Subsequently, the members gradually burst into hearty laughter and bring the laughter down slowly and gradually and stop.

Step 15: Heart to heart laughter technique in which the members come together and hold hands or hug each other and laugh.

At the end of the session, the participants repeated loudly in positive affirmations, such as "I am the happiest person in this world" and "I am the healthiest person in this world" (6, 7). Laughter yoga exercises were held in groups. The grouping was performed according to the chemotherapy program that indicated the day of attendance at the chemotherapy center. The participants were divided into 3 groups of 8, 14, and 12 persons. After each laughter yoga session, chemotherapy was performed at the center according to the protocol.

The control group received only the usual self-care training, such as face-to-face training, and they were provided with the educational pamphlets by the researcher in the auditorium of the center next to the chemotherapy ward. It should be noted that these pamphlets were also distributed to the intervention group. The educational content was prepared and approved after reviewing the literature as well as careful and up-to-date studies based on reference books, articles, the National Cancer Prevention and Control Program published by the Ministry of Health and the World Health Organization, and under the supervision of a research team advisor and consultant. It is worth mentioning that the team advisor and consultant were experts in the education, care, and health psychology of cancer patients undergoing chemotherapy.

The study protocol was approved by the Ethics Committee of Mashhad University of Medical Sciences, Mashhad, Iran (IR.MUMS.NURSE.REC.1397.021) and submitted to the authorities of Reza Radiotherapy Oncology Center, Mashhad, Iran. Moreover, the required permissions were obtained from the managers of the center and the matron of the ward. The reason for choosing this center as a research setting is the full cooperation of its authorities and its type of activities which are exclusively focusing on providing cancer patients with chemotherapy. Eligible individuals were assigned into two groups after face-to-face explanation of the research procedures and objectives and obtaining written informed consent. The patients who were unwilling to continue the research procedure were excluded from the study. The data were analyzed using SPSS 20 software (version 20) through descriptive statistics (i.e., frequency distribution, mean, standard deviation) to describe and categorize the data, and inferential statistics (i.e., the Chi-square test, independent t-test, Mann-Whitney U test, and repeated measures ANOVA) to test the study hypothesis. Moreover, Wilcoxon test was used for intragroup comparison, and the normality of quantitative variables was checked by Kolmogorov-Smirnov test. A p-value less than 0.05 was considered statistically significant.

Results

According to the results, the majority of the patients were female in the intervention (n=22, 67.7%) and control groups (n=24, 68.6%). Moreover, 16 (47.1%) and 11 (31.4%) patients in the intervention

and control groups were suffering from gastrointestinal cancers, respectively. Additionally, the majority of the patients in the intervention (n=31, 91.2%) and control groups (n=34, 97.1%) had a history of chemotherapy. In total, 33 (97.1%) and 35 (100%) patients in the intervention and control groups had no experience in laughter yoga, respectively. Furthermore, 13 (25.4%) and 12 (21.8%) patients in the intervention and control groups had been previously prescribed by fluorouracil drug, respectively. The results of the statistical tests showed that the two groups were homogenous in terms of age, gender, type of cancer, previous chemotherapy experience, and experience in laughter yoga (Table 1).

The results revealed no difference between the intervention and control groups regarding the mean pre-test WEMWBS score (P=0.36); however, a difference was observed between the intervention (50.0±8.9) and control groups (47.9±10.4) in terms of the mean post-test WEMWBS score.

In the same line, the independent t-test results showed that the intervention group obtained higher mean post-test WEMWBS score (P=0.004), compared to the control group. Regarding the intragroup comparison, the Wilcoxon test result indicated that the mean post-test WEMWBS score was significantly increased in the intervention group (P<0.001), whereas it decreased in the control group (P=0.02). According to Table 2, the result of the mean WEMWBS score comparison between two groups with repeated measures ANOVA shows that the total effect (P<0.001), group effect (P=0.04), and interaction effect (P<0.001) are significant; however, the time effect (P<0.001) has no significance (P=0.09). The Cohen's effect size calculated for laughter yoga intervention was estimated at 0.72. In addition, the test power was obtained at 91%. Additionally, repeated measures ANOVA was used to avoid increasing α values.

Table 1. Demographic characteristics of the patients undergoing chemotherapy

Variables	Groups		P-value
	Intervention	Control	
Age (mean±SD)	49.0 (9.6)	45.2 (12.6)	P=0.38
Frequency of chemotherapy (mean±SD)	6.3 (6.8)	5.5 (4.6)	P=0.87
Gender	Male	12 (35.3)	P=0.73
	Female	22 (67.7)	
Type of cancer	Digestive	16 (47.1)	P=0.50
	Breast	11 (32.4)	
	Respiratory	3 (8.8)	
	Reproduction	2 (5.9)	
	Lymph	0 (0.0)	
	Bone	2 (5.9)	
Previous chemotherapy experience	Yes	31 (91.2)	P=0.28
	No	3 (8.8)	
Experience of participating in a laughter yoga program	Yes	1 (2.9)	P=0.49
	No	33 (97.1)	

*: Chi-square, **: Exact Chi-square, ***: Mann-Whitney, and ****: Fisher's exact test

Table 2. Mean mental well-being score in cancer patients undergoing chemotherapy in the intervention and control groups

Mental well-being score	Groups		Independent t-test result intergroup
	Intervention (n=34)	Control (n=35)	
	mean±SD	mean±SD	
Pre-test	47.9±10.4	47.9±8.9	P=0.36
Post-test	46.3±9.8	46.3±9.0	P=0.004
Difference in pre-test and post-test	-1.6±3.6	-1.6±3.3	P<0.001
Repeated measures ANOVA test results	Total effect (intergroup and intragroup)		P<0.001
	Group effect (intergroup)		P=0.04
	Time effect (intragroup)		P=0.09
	Interaction (intergroup and intragroup)		P<0.001

Table 3. Mean score of mental well-being dimensions in patients with cancer undergoing chemotherapy in the intervention and control groups

Mental well-being dimensions	Groups		Intergroup test result	
	Intervention (n=34) mean±SD	Control (n=35) mean±SD		
Optimism	Pre-test	24.8±0.5	24.3±5.4	*P=0.72
	Post-test	26.5±4.8	23.2±5.0	*P=0.007
	Difference in pre-test and post-test	1.7±2.3	-1.0±2.0	*P≤0.001
	Intragroup comparison	***P≤0.001	***P=0.004	
Positive relationships	Pre-test	11.9±1.9	10.4±2.3	*P=0.18
	Post-test	11.7±2.1	10.0±2.4	**P=0.002
	Difference in pre-test and post-test	0.5±0.9	-0.4±1.1	**P=0.001
	Intragroup comparison	***P=0.002	***P=0.06	
Having energy	Pre-test	14.0±2.7	13.0±3.2	*P=0.51
	Post-test	14.7±2.7	12.9±2.7	**P=0.003
	Difference in pre-test and post-test	0.7±1.2	-0.11±1.5	**P=0.03
	Intragroup comparison	***P=0.002	***P=0.72	

** : Independent t-test, ** : Mann-Whitney U test, *** : Wilcoxon test

In addition to the WEMWBS score, its triple dimension score was also evaluated in this study. The obtained results are as follows:

There was no statistically significant difference between the intervention and control groups regarding the mean pre-test optimism score (P=0.72); however, the mean post-test optimism scores were 26.5±4.8 and 23.2±0.5 in the intervention and control groups, respectively. Independent t-test showed that the intervention group obtained higher mean post-test WEMWBS scores (P=0.007), compared to the control group. Considering the intragroup comparison, the Wilcoxon test result showed that the mean post-test optimism score was significantly increased (P=0.001) in the intervention group, whereas it decreased in the control group (P=0.004, Table 3). There was no significant difference between the intervention and control groups regarding the mean score of pre-test positive relationships (P=0.18); however, the mean scores of post-test positive relationships were 11.7±2.1 and 10.0±2.4 in the intervention and control groups.

The results obtained from the independent t-test revealed that the mean score of post-test positive relationships was significantly higher in the intervention group (P=0.002), compared to the control group. With respect to the intragroup comparison, the Wilcoxon test result demonstrated that the mean score of post-test positive relationships was significantly increased in the intervention group (P=0.002); however, no significant difference was observed in the control group in this regard (P=0.06, Table 3). Furthermore, there was no statistically significant difference between the intervention and control groups regarding the mean scores of pre-test energy (P=0.51); however, the mean scores of post-test energy were 14.7±2.7 and 12.9±2.7 in the intervention and control groups, respectively. The results of independent t-test showed that the mean score of post-test energy was significantly higher in the intervention group (P=0.002) than that in the control group. Regarding the intragroup comparison, the Wilcoxon test result showed that the mean score of post-test energy was significantly increased in the intervention group (P=0.002); however, no significant difference was observed in the control group in this regard (P=0.72, Table 3).

Discussion

The present study was conducted to investigate the effect of laughter yoga on the mental well-being of cancer patients undergoing chemotherapy. The findings showed that the implementation of the laughter yoga program for patients undergoing chemotherapy could significantly increase their WEMWBS score by about 6%. No similar study was found in a review of studies on the effect of laughter yoga on mental well-being in patients undergoing chemotherapy. Therefore, the researcher tried to employ the results of other studies in this section.

In a study conducted by Kheirandish et al. (2015), the laughter yoga was able to reduce the levels of stress and depression to 1.2% and 18.2%, respectively, among the patients with multiple sclerosis.

It should be noted that the difference was significant (14). Since the laughter is an effective emotional response to human life and social function (11), it can be concluded that the reduced levels of anxiety and stress can increase the life satisfaction of a cancer patient, thereby promoting mental well-being (15, 16).

In the same line, according to a study performed by Ko and Youn (2011), laughter therapy increased the sleep quality of South Korean elderly with low depression scores up to 15.5%. In addition, the mean post-test depression score was significantly decreased in the laughter therapy group, whereas no change was observed in the control group (10). These findings suggest that laughter is effective in improving the positive mood.

Since the positive mood is related to mental well-being (17), it can be concluded that the results obtained from the present study are consistent with the findings of the above study. Shahidi et al. (2011) compared the effect of laughter yoga with a group exercise on depression in older women. The results revealed that the depression scores were significantly reduced to 60% and 37.8% in the laughter yoga and the exercise groups, respectively (6).

Studies have shown that people with high mental well-being were more interested in playing social roles and had mostly positive emotions and were less likely to experience undesirable emotions, such as depression; therefore, it can be concluded that the laughter yoga can be considered as a treatment (17), and the results of this study are in line with those of the above study.

In a study carried out by Rad et al. (2016), humor therapy improved the quality of life of patients with breast cancer undergoing radiotherapy (18). Since the appropriate quality of life can increase life satisfaction as one of the components of mental well-being (19), the results of the present study are consistent with the findings of the above study. Furthermore, Kim et al. (2009) conducted four sessions of laughter therapy in two weeks. They reported that laughter reduced depression and anxiety levels significantly in patients with breast cancer undergoing radiotherapy (20). Additionally, Kammann and Myers (1982) found that depression reduced mental well-being and caused a low level of life satisfaction and happiness (21, 22). The obtained results of the aforementioned study are consistent with the findings of the present study. One of the limitations in this study was a low number of the chemotherapy sessions (i.e., four sessions); accordingly, more accurate results could be obtained by prolonging the duration of laughter yoga.

Implications for Practice

Since the two groups in this study were homogeneous in terms of all underlying and confounding variables but the implementation of laughter yoga, the observed difference between the two groups regarding the mental well-being scores could be attributed to the effect of the intervention. Therefore, the research hypothesis is confirmed according to the increased scores of mental well-being by implementing laughter yoga in patients undergoing chemotherapy. Therefore, it can be stated that the laughter yoga enhances mental well-being in cancer patients undergoing chemotherapy. The laughter yoga is probably associated with effects, such as promoted quality of life, improved positive mood, increased life satisfaction, and enhanced mental well-being through reducing stress and depression. Further studies are required to investigate the exact mechanism of the effect of laughter yoga on mental well-being. Accordingly, it is recommended that further research investigate the effect of laughter yoga program by extending the duration of a laughter yoga intervention for more accurate results.

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Conflicts of Interest

There are no conflicts of interest regarding the publication of the study.

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