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Original Article

The Effects of Laughter Therapy on Nausea and Vomiting in Patients with Cancer Undergoing Chemotherapy

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ABSTRACT

Background:
Patients recognize chemotherapy-induced nausea and vomiting as major side effects. So, it is important to prevent chemotherapy-induced nausea and vomiting in patients suffering from cancer.

Objective**:**
The aim of this study was to determine the effects of laughter therapy on chemotherapy-induced nausea and vomiting in patients suffering from cancer.

Materials and Methods:
This study was a clinical trial performed on 80 patients referred to the chemotherapy department of a hospital in Khorramabad. The participants were randomly divided into two groups: the intervention group (40 persons) and the control group (40 persons). The data gathering tools included the demographic data questionnaire and Morrow nausea and vomiting assessment scale. In order to data analysis, descriptive statistical and inferential statistical methods (Chi-square, Mann Whitney, and Wilcoxon test) were used. SPSS software version 22 was used for analysis.

Results:
The mean age of the participants was 70 ±10.19 years. The result of Chi-square test showed that there was no significant statistical difference between the two intervention and control groups in terms of the severity of nausea after chemotherapy ($p > 0.05$). The result of Chi-square test showed that there was a significant statistical difference between the two intervention and control groups in terms of frequency of nausea after chemotherapy ($p < 0.05$). There was a significant statistical difference between the two intervention and control groups in terms of the severity of nausea and vomiting after chemotherapy ($p < 0.05$).

Conclusion:
Laughter therapy is effective in reducing the incidence of nausea and reducing the severity of nausea and vomiting. It is recommended that health workers, especially nurses, become familiar with how laughter therapy is performed as part of the care of patients undergoing chemotherapy and use it in clinics

Keywords: Laughter therapy, Nausea, Vomiting, Chemotherapy, Neoplasms

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INTRODUCTION

Cancer is a major public health problem worldwide and is the second leading cause of death in the United States(1). There is an increment trend of incidence and mortality rate for most cancers in Iran(2). In Iran, cancer is the second largest cause of chronic non-communicable diseases and the third most common cause of death after heart disease, accidents, and other

natural phenomena(3).

Chemotherapy is the main part of systematic cancer treatment in which antineoplastic factors are used to destroy tumor cells(4). Nausea and vomiting are the most common side effects of chemotherapy. So, it is important to prevent chemotherapy-induced nausea and vomiting (CINV) in patients suffering from cancer as if they are not controlled correctly, about 20% of the patients may refuse treatment(5). Non-pharmacological methods for controlling the side effects of chemotherapy are highly effective and have fewer side effects, and may also be more accessible than drug therapies(6). Researchers recommend a more cost-effective method as a complementary treatment for CINV management because of the limitations of anti-nausea drugs such as costs, side effects, and inability to completely eliminate nausea(7). Numerous studies have shown that some types of complementary medicine can be effective in solving or reducing the problems caused by the disease in patients with cancer. New studies indicate the increasing referral of patients (22-73%), especially patients with cancer, to di-erent branches of complementary medicine(8). About one-third of people use some kinds of these treatments for common diseases such as backache, headaches, anxiety, depression, and vomiting throughout their lifetime(9). The results of the study by Rad and colleagues showed that laughter therapy was effective in reducing the severity of fatigue in patients with breast cancer who received radiation therapy(10). In a review study, Moturi and others studied the effectiveness of complementary therapies in the treatment of chemotherapy-induced nausea and vomiting in patients with breast cancer. They concluded that there were contradictory results of studies on the effectiveness of complementary therapies. For chemotherapy-induced nausea and vomiting, more robust and more diverse clinical trials are needed(11). Kamian and Tabatabaee studied the effect of the Holy Quran on reducing nausea and vomiting caused by chemotherapy. They concluded that the sound of the Quran, even for a short time, can significantly reduce nausea and vomiting due to chemotherapy(12). Tekyaser and co-workers concluded in their study that music therapy and visualized guided images could significantly reduce the severity and term of chemotherapy-induced nausea and vomiting(13).

One of the complementary therapies is laughter therapy. Laughter therapy is a general, effective, low-cost, and uncomplicated treatment. Laughter can have a positive effect on the complications of diseases by improving mood, reducing depression, and improving satisfaction and quality of life(14). Laughter can also change the activity of dopamine and serotonin in the brain, so it relieves painful feelings such as grief and sadness. Various studies have shown that laughter is related to increasing the satisfaction of life(15). Laughter may have some positive effects on patients, but its use is less frequent(16). Kim and colleagues in their study of the effect of laughter therapy on mood and self-confidence of patients suffering from cancer undergoing chemotherapy, concluded that after the laughter therapy, the patients' self-esteem in the intervention group was significantly more than the control group. They also found a significant decrease in the patients' mood disorders of the intervention group(17). Jalali and colleagues showed in their study that laughter and sense of humor had both beneficial short-term effects (before and after the session) and long-term effects (more than 2 months) on lowering blood pressure(18). The results of the study by Burhan and others showed that consuming chamomile extract reduced chemotherapy-induced nausea, but it was not effective in reducing vomiting(19). Since past studies have focused on laughter therapy effects on various variables such as fatigue, mood, and quality of life or the effects of complementary therapies such as music therapy, utilization of medicinal herbs and etc. on chemotherapy-induced nausea and vomiting and no study has been done on the effects of laughter therapy on chemotherapy-induced nausea and vomiting in patients suffering from cancer, in this study we aimed to determine the effects of laughter therapy on chemotherapy-induced nausea and vomiting in patients suffering from cancer.

MATERIALS AND METHODS:

Setting and sample:

This study was a clinical trial performed on patients suffering from cancer undergoing chemotherapy referring to Shahid Rahimi Hospital in Khorramabad, Iran. The target population was those patients who were referred to the hospital for chemotherapy. The Sampling method was available, and the samples were randomly divided into two groups of 40 patients

as the intervention and control groups. The inclusion criteria were as follows: full consent to participate in the research, diagnosis of cancer by an oncology (cancer) specialist, auditory problems (not completely hearing even with the use of auxiliary equipment), and visual problems (inability to read the newspaper at a distance of 30 centimeters with glasses). The exclusion criteria were very ill patients requiring special care and patients with known psychological problems. The researcher provided sufficient explanations about the research objectives to the patients before including them in the research and received written informed consent to participate in the research. The participants were divided into two groups: the intervention group and the control group. Both groups received current treatments and routine self-care training to control nausea and vomiting. The intervention group also received laughter therapy for 30 minutes, 3 times a week for 3 weeks. The number of chemotherapy sessions was finally six sessions. The Morrow nausea and vomiting questionnaire was completed once before the intervention and again after the intervention. The laughter therapy sessions were such that after chemotherapy, at first, funny short films were played for 10 minutes and then, a humorous voice was played for 5 minutes, and finally, funny live shows were performed by a small dramatic group approved by the Ministry of Culture and Islamic Guidance.

Instruments:

The data gathering tools included a demographic information questionnaire and the Morrow assessment scale of nausea and vomiting. The demographic information questionnaire consisted of two parts: the first part consisted of demographic information (age, sex, marital status), and the second part consisted of the type of cancer, the experience of the last chemotherapy, and consumed anti-nausea and vomiting drugs. Demographic information was obtained by interviewing and kept in patients' records. In the present study, information on the incidence and severity of nausea and vomiting were obtained using the Morrow Assessment of Nausea and Emesis (MANE) questionnaire. This tool is a visual measuring scale with 7 degrees Likert scale that (0) shows does not indicate and (6) indicates very strong. The qualitative content validity method was used to determine the validity of the questionnaire; in this way that the instruments were provided to five nursing professors, three medical professors, and two cancer professors, and desired tools were used after considering necessary corrections. Also, in order to determine the reliability of the questionnaire, the correlation coefficient of Cronbachs Alfa was used, which was 0.91.

Data analysis:

For data analysis, descriptive statistical methods (number, percentage, mean, standard deviation) and inferential statistical methods (Chi-square, Mann-Whitney, and paired t) and SPSS software version 22 were used. A significant level of 0.05 was considered.

RESULTS:

70% (28 persons) in the intervention group and 62.5% (25 persons) in the control group were male. The mean age of the patients was 52±10.19 years. 67.5% (27 persons) in the intervention group and 55% (22 persons) of patients under study were married. 40% (16 persons) of the intervention group and 47.5% (19 persons) of the control group had high school diplomas and/or less. Also, in the intervention group, 75% (n=30) and in the control group, 80% (n = 32) of the patients underwent 1-3 sessions of chemotherapy (Table 1). The highest dose of antiemetic drugs in the intervention and control groups were ondansetron 74 (92.5%) and granisetron 70 (87.5%), respectively.

22.5% (9 persons) of the intervention group and 20% (8 persons) of the control group were suffering from stomach cancer, and there was no significant statistical difference between the two groups in terms of the type of cancer (p=0/35). Also, the lowest frequency of cancer was related to prostate and esophageal cancer, which was 2.5% in the intervention and control groups (Figure 1).

In the pre-test stage, 70% (28) of the intervention group and 62.5% (25) of the control group had nausea after chemotherapy. The result of Chi-square test showed that there was no statistical difference between the two intervention and control groups in terms of the frequency of nausea after chemotherapy ($p > 0.05$). In the past-test stage, 47.5% (19) of the intervention group and 60% (24) of the control group had nausea after chemotherapy. The result of Chi-square test showed that there was a statistically significant difference between the two intervention and control groups in

Table 1: Comparison of demographic characteristics of patients in the intervention and control groups suffering from cancer undergoing chemotherapy

Variables	Intervention group		Control group		P value
	Number	Percentage	Number	Percentage	(X^2)
Sex	Females Males	12(30) 28(70)	females males	15(37.5) 25(62.5)	0.17 (0.70)
Marital status	Married Single Divorced	27(65.5) 1(2.5) 1(30)	married singles divorced	22(55) 3(7.5) 15(37.5)	0.00 (0.86)
Educational status	Illiterate Diploma and less Post-diploma and bachelor's degree Master's degree and higher	3(7.5) 16(40) 9(22.5) 12 (30)	Illiterate Diploma and less Post-diploma and bachelor's degree Master's degree and higher	1(2.5) 19(47.5) 6(15) 14(35)	0.89 (-0.34)
Number of chemotherapy sessio	1-3 sessions 4-6 sessions	30 (75) 10(25)	1-3sessions 4-6 sessions	32(80) 8(20)	0.29 (0.53)

terms of frequency of nausea after chemotherapy (p = 0.03). There was a statistically significant difference in terms of frequency of nausea incidence in pre-test and post-test stages in the intervention group (p=0.01). The result of this test showed no significant difference for the control group (p=1.42). In the pre-test stage, 15% (6) of the intervention group and 10% (4 persons) of the control group had vomiting after chemotherapy. The result of Chi-square test showed that there was no statistically significant difference between the two intervention and control groups in terms of the frequency of vomiting after chemotherapy (p> 0.05). In the past-test stage, 10% (4) of the intervention group and 10% (4) of the control group had vomiting after chemotherapy. The result of Chi-square test showed that there was no statistically significant difference between the two intervention and control groups in terms of frequency of vomiting after chemotherapy (p=0.18). There was no statistically significant difference in terms of frequency of vomiting incidence in pre-test and post-test stages in the intervention group (p=0.28). The result of this test showed no significant difference for the control group (p=1.32) (Table 2).

Prior to the intervention, 11 patients (27%) in the experimental group did not have nausea and 12 patients (30%) had mild nausea. Also, in the control group, 27 (67.5%) patients had no nausea, and 6 (15%) had very mild nausea. In the pre-test stage, 70% (28) of the intervention group and 62.5% (25) of the control group had nausea after chemotherapy. The result of Chi-square test showed that there was no statistically significant difference between the two intervention and control groups in terms of the severity of nausea after chemotherapy (p> 0.05). The result of Chi-square test showed that there was a statistically significant difference between the two intervention and control groups in terms of severity of nausea after chemotherapy (p=0.02). There was a statistically significant difference in terms of severity of nausea in the pre-test and post-test stages in the intervention group (p= 0.00). The result of t test showed no significant difference for the control group (p=1.28). In the pre-test stage, 15% (27 persons) of the intervention group and 10% (11) of the control group had vomiting after chemotherapy. The result of Chi-square test showed that there was no statistically significant difference between the two intervention and control groups in terms of the frequency of vomiting after chemotherapy before intervention (p > 0.05). In the past-test stage, 65% (26) of the intervention group and 52.5% (21 persons) of the control group were without vomiting after chemotherapy. The result of Chi-square test showed that there was a statistically significant difference between the two intervention and control groups in terms of severity of vomiting

Table 2: **The frequency distribution of patients suffering from cancer undergoing chemotherapy according to the incidence of nausea and vomiting in the intervention and control groups**

Nausea	Intervention group	Control group	*P* value (x2)
Pre test Yes No	28 (70) 12 (30)	25 (62.5) 15 (37.5)	0.033
Post test Yes No	19 (47.5) 21 (52.5) p*=0.01	24 (60) 15 (40) p*=1.42	
Vomiting			
Pre test Yes No	6(15) 34(85)	4(10) 36(90)	·.185
Post test Yes No	4(10) 36(90)	4(10) 36(90)	
	p*=0.28	p*=1.32	

*Paired t test

after chemotherapy (p=0.02). There was a statistically significant difference in terms of severity of vomiting in pre-test and post-test stages in the intervention group (p= 0.01). The result of this test showed no significant difference for the control group (p =1.34) (Table 3).

DISCUSSION

Studies on the effects of laughter therapy on nausea and vomiting were very limited, and no article about the effects of laughter therapy on chemotherapy-induced nausea and vomiting was found in domestic and foreign studies in an internet search. The results of the present study were considered and compared with various types of complementary medicine on patients. The results of the present study showed that laughter therapy did affect the incidence of nausea in patients undergoing chemotherapy, but it has no effect on the incidence of vomiting. The reason for the effectiveness of laughter therapy in reducing the incidence of nausea and its ineffectiveness in causing vomiting can be due to the different doses of chemotherapy drugs, number of sessions, and type of cancer. Most of the subjects had gastrointestinal cancers such as stomach and colon cancers. These types of cancers can cause

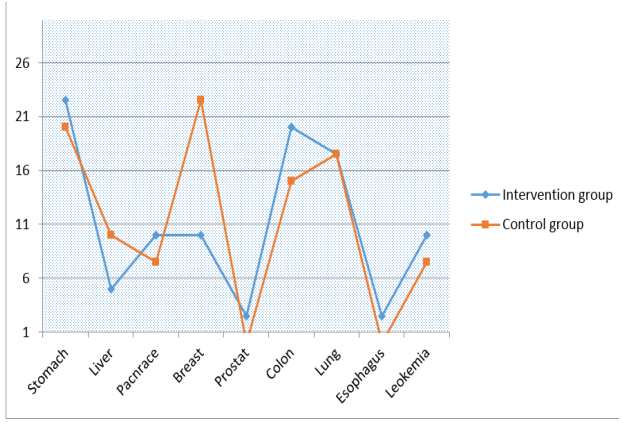

Fig. 1: **Frequency distribution of patients suffering from cancer undergoing chemotherapy based on the type of cancer**

severe vomiting due to gastrointestinal involvement, and the use of antiemetic drugs to control them can be more effective than non-pharmacological methods such as laughter therapy. These findings are comparable to other study results. The result of the study by Taneja and others showed that yoga could reduce muscle contractions in the gastrointestinal tract and the incidence of nausea and vomiting(20). DadKhah and colleagues, in their study concluded that music therapy as a complementary medicine method could improve the acute phase of chemotherapy-induced nausea in patients suffering from cancer(21). Sadat Hosseini studied the effects of music on the reduction of chemotherapy-induced nausea and vomiting and concluded that music reduced nausea in children suffering from malignant cancer undergoing chemotherapy(22). Also, in the study by Campos de Carvalho and co-workers on the effects of relaxation on chemotherapy-induced nausea and vomiting as a single group method before and after the relaxation, it was found that the level of nausea and vomiting at the intervention stage had a significant difference with the previous stages. This matter indicates the effects of non-pharmaceutical treatments on the reduction of chemotherapy-induced nausea and vomiting(23). The results of the present study showed that laughter therapy was effective in reducing the severity of nausea and vomiting after chemotherapy. Wang and colleagues concluded that neural electric stimulation greatly affects the severity of nausea and vomiting in patients suffering from advanced gastric cancer(24).

Table 3: The frequency distribution of patients suffering from cancer undergoing chemotherapy according to the severity of nausea and emesis in the intervention and the control groups

Nausea	Intervention group	Control	P value (x^2)
Pre test			
Without	11 (27.5)	(30) 12	
Very mild	9 (22.5)	(20) 8	
Mild	12 (30)	(25) 10	
Middle	2 (5)	(7.5) 3	
Severe	5 (12.5)	(12.5) 5	
Very severe	1 (2.5)	(5) 2	
Post test			0.0
Without	27 (67.5)	11 (27.5)	
Very mild	6 (15)	7 (17.5)	
Mild	(10) 4	10 (25)	
Middle	(2.5) 1	5 (12.5)	
Severe	(5) 2	5 (12.5)	
Very severe	0	v (5)	
	*p** =0.00	*p** =1.28	
Vomiting			
Pre test			
Without	26 (65)	21 (52.5)	
Very mild	3 (7.5)	4 (10)	
Mild	0	1 (2.5)	
Middle	8 (20)	7 (17.5)	
Severe	3 (7.5)	2 (5)	0.028
Very severe	0	1 (2.5)	
Post test			
Without	37(92.5)	21(52.5)	
Very mild	1(2.5)	5 (12.5)	
Mild	0	0	
Middle	2(5)	5 (12.5)	
Severe	0	3 (7.5)	
Very severe	0	1 (2.5)	
	*p** =0.01	*p**=1.34	

*Paired t test

Raghavendra and others in their study on the effects of a yoga program on chemotherapy-induced nausea and vomiting, concluded that the severity of nausea and vomiting significantly decreased after doing yoga(25). Mundy and colleagues, in their study, concluded that the prevention and control scale of nausea and vomiting and anxiety reduced before and after chemotherapy and after doing yoga(26). Ghanbari and others, in their study on the effect of adding ginger to conventional remedy on the severity of chemotherapy-induced nausea and vomiting, concluded that ginger diet significantly reduced the severity and degree of nausea compared with placebo(27). Khalili and co-workers, in their study, concluded that aromatherapy with cardamom essence reduced the severity of chemotherapy-induced nausea(28). Sadeghi Sharmeh and others found that Nigga point ice massage was effective in reducing the frequency of nausea and cancer of patients suffering from cancer undergoing chemotherapy (29). Some researchers believe that eating peppermint oil and pennyroyal oil, and ginger, along with pharmaceutical methods, was effective in reducing chemotherapy-induced nausea. Taspinar and colleagues, in their study, showed that acupressure as a relaxation intervention significantly reduced the severity of chemotherapy-induced nausea and of patients suffering from malignant cancer but did not affect their vomiting (7). Also, the results of a study by Moradian and colleagues on the effects of Novasic program music on nausea and vomiting in women suffering from breast cancer showed that the above interventions had no effect on nausea and vomiting (30). The results of studies by Ezzone, King, Francis, Kemper, and Yen Pik Sang Ghanbari showed that the use of non-pharmaceutical complementary treatments reduced the complications of chemotherapy and nausea and vomiting (31-35).

One of the limitations of the present study was that laughter therapy was not performed during nausea and vomiting and was performed only before and after chemotherapy. It is suggested that in a larger study, the effect of laughter therapy on different stages of chemotherapy and during nausea and vomiting be studied. Also, in the present study, laughter therapy was not compared with other methods of complementary medicine. It is suggested that in one study, the effect of laughter therapy be compared with methods such as touch therapy, music therapy, Holy Quran sound, and medicinal extracts in reducing nausea and vomiting.

CONCLUSION

The findings of the present study show the effect of laughter therapy as a non-pharmaceutical and complementary method on the incidence of nausea, the severity of nausea and vomiting in patients suffering from cancer undergoing chemotherapy. Due to the fact that the treatment of nausea and vomiting caused by chemotherapy can be unpleasant and costly, patients undergoing chemotherapy can use laughter therapy as a complementary and uncomplicated treatment. It is recommended that health workers, especially

nurses, become familiar with how laughter therapy is performed as part of the care of patients undergoing chemotherapy and use it in clinics.

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