Biomedical & Pharmacology Journal Vol. **10**(2), 773-780 (2017)

Effects of Yoga on Post-Chemotherapy Nausea and Vomiting

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http://dx.doi.org/10.13005/bpj/1167

(Received: February 28, 2017; accepted: March 06, 2017)

ABSTRACT

Nausea and vomiting is the most common and distressing side effect of chemotherapy. Despite advances in antiemetic treatment, this complication is still an annoying problem for a significant number of patients under chemotherapy. This study examined the effect of an integrated yoga program on chemotherapy-related nausea and vomiting. This study was a clinical trial study on 60 outpatients with diagnosed cancer and underwent chemotherapy. The patients were selected based on the inclusion criteria and divided into the two groups of patients groups. In the case group, the yoga program was conducted 30 minute before the start of chemotherapy, the subjects were asked to practice daily at homework. Severity of nausea and vomiting times for 4 days after chemotherapy was evaluated and compared in the two groups. The data were analyzed using the SPSS software. The findings in the first day after intervention showed no statically significant difference between two groups about severity of nausea (P=0.5), but in second and third days (P=0.01) and also fourth day (P=0.001), the severity of nausea was lower in the case group. The mean severity of vomiting in the first, second and third day was not significant difference in two group (P>0.07), but in the fourth day the difference was significant between two groups (P=0.03). The results of study suggest that yoga intervention might be useful as an adjunct with antiemetic drug, for controlling chemotherapy-induced nausea.

Keywords: Chemotherapy, Nausea and Vomiting, Yoga, Complementary Medicine**.**

INTRODUCTION

Nowadays, cancer is considered as one of the most important health complications around the world. According to statistics provided by the World Health Organization in 2014, cancer is a leading cause of dead for 8.2 million deaths (13% of all deaths). Seventy percent the increase in new cases of cancer expected over the next 2 decades[1].

Cancer treatments are divided into four main groups: surgery, radiotherapy, chemotherapy and biological therapy. Chemotherapy helps 10-15 % of patients for restoring health by using cytotoxic drugs for treatment and it is a systemic treatment, while other methods likewise radiotherapy is topical[2] Nausea and vomiting are usually considered the most distressing short-term side effects of chemotherapy due to special content of chemical drugs such as Nitrogen mustard, Nitrous Urea,

Cisplatin, Cyclophosphamide, Streptozocin and Dacarbazine; also nausea and vomiting could be seen in acute, delayed and expected intervals. Despite of medical advances, this condition is already remained problematic in many patients who suffer from cancer. Moreover, antiemetic drugs could be less effective in improving delayed nausea and vomiting than acute nausea and vomiting[3].

In a study was conducted on 320 patients with diagnosed malignancies of head, neck, chest, gastrointestinal and hematopoietic systems, 41% of the patients who were receiving palliative chemotherapy, hospitalized due to vomiting and its adverse effects[2, 4-7]. Metabolites of anti-neoplasm drugs may affect on two important systems, central nervous and digestive system and both might lead to nausea and vomiting[8-10]. To date, despite of advances about antiemetic drug therapy, nausea and vomiting are already one of the most awful symptoms in the patients suffer from cancer[11]. Adversely, chemotherapy-induced nausea and vomiting could worsen the quality of life of the patients[12-15]. In another study, patients rated nausea as their first and vomiting as their third most worried symptoms[16] Some studies shows that nausea could have strong negative impact on patients' quality of life even more than vomiting. So both of these conditions when related to chemotherapy-induced dramatically reduce the quality of life of the patients[17].

Subsequently prevention from predicted nausea and vomiting is importance in oncology. Currently treatment attempts are focusing on non-chemical drug methods such as relaxation, music therapy, touch therapy, acupuncture and yoga that might enable the patients to tolerate the treatment process easier, as these methods have no negative consequences, adverse effects and drug interaction.

From past, yoga and relaxation were suggested for pain reduction and relieve of the anxiety, while it was suspected that whether or not yoga would reduce vomiting and nausea in cancer patients under chemotherapy. Due to lack of sufficient studies on yoga effects for treatment of adverse effect of malignancy treatment; to reduce the treatment costs and better toleration of chemotherapy by patients, we studied preventive effects of yoga for vomiting and nausea on cancer patients at our radiotherapy and oncology center.

MATERIALS AND METHODS

This was a randomized clinical trial study, the sample patients (n=60)were selected based on including and excluding criteria, All patients were referred to our radiotherapy and oncology Shafa Hospital Center, After calculating the sample size, they were divided to intervention and control groups. They were matched for age, gender and chemotherapy drugs.

Inclusion criteria were tendency to participate in the study; possession of efficient health for participation; older than eighteen years old; literacy level above guidance school; passing at least one course of chemotherapy with vomiting experience; using the same regimen of antiemetic as other patients; treated by cisplatin or cyclophosphamide; Lack of known psychological disease before cancer diagnosis.

Exclusion criteria were incidence of diagnosed disease or any malignancy with metastasis to gastrointestinal tract, recorded in patient's case file; incidence of brain tumors diagnosed by a physician; performing radiotherapy concurrently with chemotherapy; using other complementary medicines or herbal treatments to control nausea and vomiting during the study; and who followed yoga program less than three times per week.

Data Collection were performed by Demographic questionnaire, Khavar and VAS scales for vomiting times and nausea severity. At the beginning of first course, before yoga exercise, the demographic data, nausea severity and times of vomiting were recorded. The interval between courses of chemotherapy was every three weeks and each course took four days and administered outpatient. The antiemetic drug regimens were Dexamethasone 16 mg and Granisetron 3 mg that administered intravenously 30-60 minutes before start of chemotherapy. Then Patients were selected for three courses of chemotherapy with vomiting.

At second course, Yoga exercises were offered included "Asana" (the art of arrangement),

Pranayama (breathing exercises) and Relaxation. Yoga exercise was begun half an hour before chemotherapy. First, complete breathing was performed at Sukhasana status for 10-5 minutes. After relaxation by yoga, administration was continued at Shavasana condition by focus on breathing for 30 minutes and then the chemotherapy drugs were administered. The patients were monitored at home by phone calls three times weekly and if possible were visited face to face.

Statistical analysis

Data were encoded and then entered into computer to analyze by SPSS software version 16. Descriptive statistics and Mann-Whitney tests were applied to compare the average severity of nausea and vomiting between groups. T-test and Wilcoxon test were used for comparing groups before and after the intervention.

Ethical Considerations

We obtained informed consent from all the patients to participate in the current research, also we ensured the patients sufficiently for confidentiality of personal information. This clinical trial was conducted under approval of ethical committee of our university that is regional branch of World health organization.

RESULTS

All sixty patients' information was recorded such as demographic data, cancer pathology, medication regimens and intervals of receiving chemotherapy. Frequency of males and females in control group were 10 (33.3%) and 20 (66.6%), respectively. similarly 10 (33.3%) males and 20 (66.6%) females enrolled in study group; therefore there was no statistically significant differences between two groups regarding gender (table1).

Breast cancer was the most prevalence malignancy (60%) and patients received TAC regimen of chemotherapy 5 to 7 times. Based on Mann-Whitney test significant differences did not observed between two groups regarding the severity of nausea on the first, second, third and fourth days after chemotherapy (Pe" 1.0), so both groups were similar based on severity of nausea before yoga. In evaluation of relation of nausea severity and yoga effect, there was a significant difference between two groups after 3-4 days after the chemotherapy (P= 0.0001). Totally, comparing of average severity of nausea showed significant statistical difference after first trial of yoga (P=0.001) (table 2).

Also we showed that there was a significant difference about severity of nausea between two studied groups after performing the second trial of yoga (P=0.001). (table 3). So as shown in diagram one, the Severity of nausea as considerably reduced after second period of exercising yoga (diagram 1)

Based on Mann-Whitney test there was no statistically significant difference between two groups with respect to severity of vomiting in the first, second, third and fourth days after chemotherapy (Pe"42); while two groups were similar in association with severity of vomiting. There was no significant difference between two groups with respect to severity of vomiting in the first period of yoga exercise (P>0.05). But there was statistically significant difference between two studied groups in evaluation of severity of vomiting and yoga exercise at the fourth day of second period (P=0.03) (table 4)**.** But at the fourth day post-chemotherapy, times of vomiting dramatically decreased (diagram 2)

Comparing the average severity of acute and delayed phases of nausea and vomiting induced by chemotherapy and effect of yoga showed that there was significant improvement in delayed phase of nausea after this intervention (P<0.001) (table 5).

DISCUSSION

The aim of this study was evaluating the effect of yoga on severity of nausea and vomiting times induced by chemotherapy. As there are several substances within chemotherapy drugs that cause nausea and vomiting in the patients, we attempted to trial a method that with altering the mental state of the patients, would cover all the causes of nausea induced by chemical substances.

We found out that nausea and vomiting were more prevalent within in the younger patients than older individuals in the selected sample; it was similar to Molassiotis *et al*'s study (2000). Correspondingly, Molassiotis showed that females

had more symptoms of anxiety, nausea and vomiting after chemotherapy and surgery in comparison with males [18]. Similarly in their trial the patients with breast and lung cancers had the most frequency between all studied patients in both groups.

Sajjadian (2005) studied the effect of complementary medicine on the patients with cancer. He showed that there was significant relation between patients' educational level and effectiveness of the complementary medicine interventions such as yoga and meditation[19].

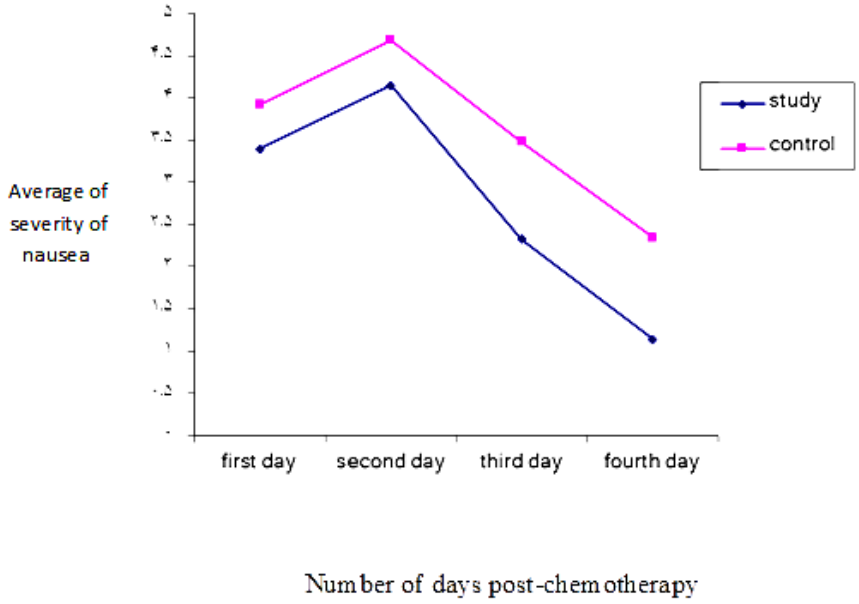

Diagram 1: Comparing the average severity of nausea caused by chemotherapy in the second period after yoga exercise within control and study groups

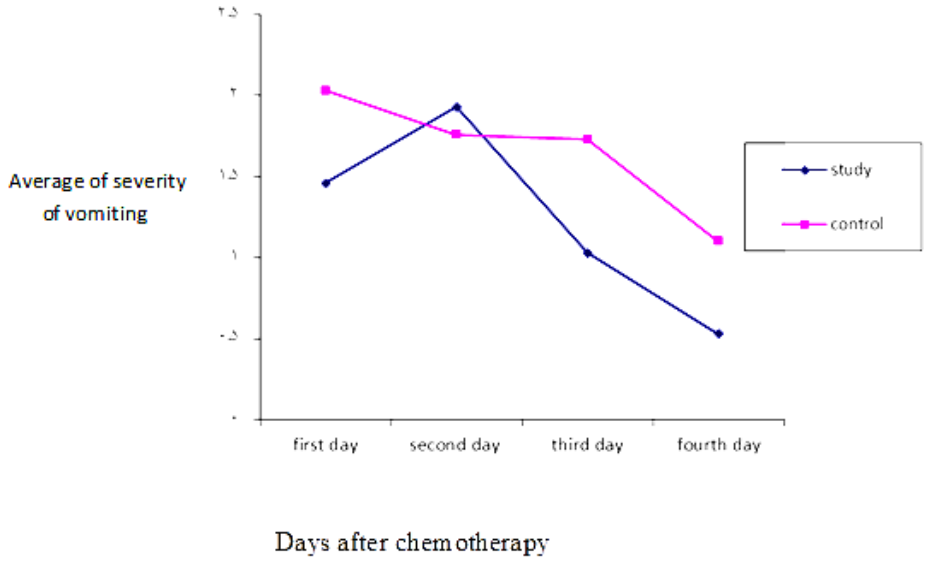

Diagram 2: Comparing the average severity of vomiting induced by chemotherapy after the second period of yoga in two study and control groups

But Raghavendra (2007) suggested that there was no associated relation between patients' educational level and using of complementary medicine, as well as we showed. Also intervals of chemotherapy administration in Raghavendra's study were almost similar to our study[20].

Table 1: Frequency distribution of subjects according to demographic data

Demographic data		Control N (%)	Study N (%)
Age range	18-27	13 (43.3%)	13 (43.3%)
	28-37	10 (33.3%)	10 (33.3%)
	38-47	5 (16.7%)	5 (16.7%)
	48-57	1 (3.3%)	1 (3.3%)
	more than 58	1 (3.3%)	1 (3.3%)
Gender	female	20 (66.6%)	20 (66.6%)
	male	10 (33.3%)	10 (33.3%)

Raghavendra *et al* (2007) studied the effect of an integrated yoga program on chemotherapy induced nausea and emesis in breast cancer patients. Similar to our study, they showed that there were significant differences between average and standard deviation of severity of nausea in both study and control groups[20].

In our study, statistical analysis didn't show significant difference for nausea severity at first and second days after chemotherapy in the trial, but difference was significant at third and fourth days. Totally, comparison of the effect of yoga on average of nausea severity showed statistically significant difference in both groups. It could be considered that injection of antiemetic drugs before chemotherapy might hide the yoga effectiveness on nausea at the first and second days of post-chemotherapy.

Correspondingly in Raghavendra's study (2007), there was no significant difference between the times of vomiting within two study and control groups. They didn't mentioned to the effect of yoga on

Table 2: Comparing the average severity of nausea caused by chemotherapy during the first period of Yoga

P value	Average	Study Standard deviation	Average	Control Standard deviation	Time
0.3	3.3	1.8	3.9	2.4	First day
0.3	4.7	1.8	5.08	1.8	Second day
0.0001	2.5	2.06	4.5	1.6	Third day
0.0001	1.4	1.7	2.9	1.6	Fourth day
0.001	3.01	1.2	1.4	1.9	Total

Table 3: Comparing the average severity of nausea caused by chemotherapy during the second period of Yoga

P value	Average	Study Standard deviation	Average	Control Standard deviation	Time
0.5	3.40(low)	1.77	3.98(medium(	1.9	First day
0.01	4.15(medium)	1.4	4.69)medium(	1.22	Second day
0.01	2.33(low)	1.35	3.48)low(	1.63	Third day
0.001	1.14(low)	1.21	2.35)low(	1.21	Fourth day
0.001	2.7(low)	1.8	3.6)medium(	1.7	Total

Table 4: Comparing the average of severity of vomiting induced by chemotherapy in the second period of yoga exercise

P value	Average	Study Standard deviation	Average	Control Standard deviation	Time
0.1	1.46)low)	1.04	2.03(low)	1.3	First day
0.36	1.93)low)	1.04	1.76(low)	1.38	Second day
0.07	1.03)low)	1.06	1.73(low)	0.90	Third day
0.03	0.53)low)	0.68	1.10(low)	1.09	Fourth day
0.07	1.1)low)	1.06	1.5)low)	1.2	Total

Table 5: Comparing the average severity of acute and delayed phases of nausea and vomiting induced by chemotherapy by after yoga

Vomiting				Nausea				
	Delayed phase Standard deviation	Avg.	Acute phase Standard deviation	Avg.	Delayed phase Standard deviation	Avg.	Acute phase Standard deviation	Avg.
Study	1.2	1.3(low)	1.04	1.5(low)	2.02	2.7(low)	1.78	3.38(low)
Control	1.1	1.5(low)	1.3	1.8(low)	1.8	3.80(medium)	1.9	3.90(medium)
P value	0.06		0.1		0.0001		0.2	

delayed and acute phases of nausea in their study[20]. Our findings showed that yoga had an improved impact on delayed nausea at second, third and fourth days after yoga exercise, clearly. Yoga effectiveness remained hidden meanwhile acute phase of nausea at the first day, probably due to use of antiemetic drugs. But Similar to our study, Molassiotis (2000) showed that there was no significant difference in times of vomiting in both groups [18].

Survey of Salins etal (2016) suggested that oncologists, oncology nurses, and patients felt that integration of early specialist palliative care in a tertiary cancer center in India improves symptom control, end-of-life care, health-related communication, and continuity of care[21].

It seems that yoga has a delayed effect on post-chemotherapy nausea in the patients undergoing suitable courses of this safe exercise. But it seems that larger group studies are required to confirm this finding and also to evaluate the effect of this method on various malignancy types and various groups of patients with various mental health, ethnic, education, socio-economic and other demographic characteristics.

ACKNOWLEDGMENTS

This research is a result of a masters' thesis. Thanks to all the dear patients who participated in this research, as well as the authorities of Shafa hospital Center in Ahvaz City. All the scientific and moral supports of the authorities and managers of Ahvaz Jundishapur University of Medical Sciences are appreciated.

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