

## Effects of Slow-stroke Back Massage on Chemotherapy-induced Nausea and Vomiting in the Pediatrics with Acute Leukemia: a Challenge of Controlling Symptoms

Mojtaba Miladinia<sup>1</sup>, \*Shahram Baraz<sup>1</sup>, Elham Mousavi Nouri<sup>1</sup>, Mehdi Gholamzadeh Baeis<sup>2</sup>

<sup>1</sup> Chronic Diseases Care Research Center, School of Nursing and Midwifery, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, I.R Iran.

<sup>2</sup> Young Researchers and Elites Club, Qom Branch, Islamic Azad University, Qom, I. R. Iran.

### Abstract

#### Introduction

Nausea and vomiting are the most common side effects of chemotherapy in the pediatrics with cancer which affect their quality of life. Use of some methods of complementary medicine in leukemia patients is problematic. Because, leukemia patients are at risk of infection and bleeding, therefore the use of acupressure, acupuncture, and deep massage can be risky in these patients. Slow- stroke back massage is applied on the surface of body, so does not have complications. No study has addressed the effect of massage therapy on chemotherapy-induced nausea and vomiting in pediatrics with acute leukemia in the world.

#### Material and methods

This study was a two-group randomized controlled trial (RCT), double blind and repeated measures design. In this RCT, 45 school age children with acute leukemia were placed in the massage and control groups. Before start of the study, at the day of chemotherapy administration (day 1<sup>th</sup>), only nausea and vomiting were measured. Then during 6 days next (day 2 through 7), the intervention group received 5-minutes Super Smash Bros. Melee (SSBM), immediately before start of each session of chemotherapy. Nausea was measured during chemotherapy, 0.5 h and 3 h after each session of chemotherapy in the two groups. Also vomiting was recorded during 24 h after each session of chemotherapy. Repeated measures ANOVA, Chi-square, and t-test were used for analysis.

#### Results

Most of pediatrics were male (58.13%), and suffered from Acute myeloid leukemia (AML) (81.7%). The repeated measure analysis showed that in the intervention group, the SSBM reduced progressive mean of nausea severity and frequency of vomit over time. While, this side effects have slightly increased over time in the control group.

#### Conclusion

The results of this study are suggesting that SSBM, as a non-pharmacologic, easy and safe method, is effective in controlling Chemotherapy-induced nausea and vomiting (CINV) in the pediatrics with acute leukemia.

**Key Words:** Complementary medicine, Leukemia, Massage, Nausea, Pediatric, Vomiting.

#### \*Corresponding Author:

Shahram Baraz, PhD, Chronic Diseases Care Research Center, School of Nursing and midwifery, Ahvaz Jundishapur University of Medical Sciences, Golestan square, Ahvaz, Iran. Tel. (Fax): +98 6133738333.

Email: shahrambaraz@ajums.ac.ir

Received date: Aug 18, 2015 Accepted date: Sep 22, 2015

## Introduction

Leukemia is among the hematological malignancy, which prevalence and the mortalities is increasing around the world especially in Iran (1). Chemotherapy is the main treatment for patients with acute leukemia and other cancers that can destroy cancerous cells (2). Nausea and vomiting are the most common side effects of chemotherapy and those critical concerns in the pediatrics with cancer (3, 4). Most of cancer patients experience nausea and vomiting after chemotherapy. Prevalence of Chemotherapy-induced nausea and vomiting (CINV) is almost between 54%-96% (5). Nausea as first and vomiting as third are most feared problem, from a list of chemotherapy-related side effects, in the pediatric oncology (6).

CINV induces psychological disorders (anxiety, depression), physiological problems (anorexia, fatigue), electrolytic dysfunctions, nutritional disruption, changes in immune system and stop children normal activity (3, 5, 7). In addition, CINV has a significant impact on costs, children willingness to continue chemotherapy cycle and its increases the worries and stress in the child's and their families (7, 8). Hence, CINV effect on overall quality of life of pediatrics with cancer, which as a basic criterion in the evaluation of cancer treatment response (4, 9).

The real magnitude of emesis control in daily practice remains unknown in the leukemia patients (10). Also, despite the development of anti-emetic therapy/pharmacological therapy, CINV remain still and its commonly seen in clinical practice (2, 11), remain fearful and almost 50% of cancer patients still experiencing nausea and vomiting during treatments (3). Uncontrolled CINV can lead to treatment dose reductions, non-adherence or cessation, and finally decreasing patients' chances of prolonged survival or improvement (3).

Anti-emetics drugs are essential and the appropriate method to decrease nausea and vomiting, but they have not application for all patients and often have undesirable complications (12). So it is necessary to find other methods for a better controlling CINV (7). Hence, use of non-pharmacologic methods, which play an important role are necessary for controlling CINV (11).

Complementary/alternative medicine play an important role in controlling symptoms in oncologic patients (13), but, leukemia patients have a challenge for use of difference types of complementary therapy than other cancer types. Use of some methods of complementary medicine in leukemia patients is problematic. Because, leukemia patients are at risk of bleeding and infection caused by the disease, Therefore, the use of acupressure, acupuncture, and deep massage can be risky in this patients (14, 15). Slow stroke back massage (SSBM) is non-invasive and applied on the surface of the body, so does not have complications such as bleeding or infection.

Since no study has addressed the effect of SSBM on CINV in pediatric with acute leukemia in the world, and with considering the different chemotherapy regimes in this patients than other cancer types, this study aimed to evaluate the effect of massage therapy on CINV in pediatric with acute leukemia in Iran.

## Patients and Methods

This study was a two group Randomized controlled trial (RCT), double blind (participants and researchers) and repeated measures design. Of 108 school-aged children with acute leukemia who had medical records at Chemotherapy ward of Shafa Hospital affiliated to Ahvaz Jundishapur University of Medical Sciences, Iran during 2014-2015, with using convenient sampling, 72 patients

have the inclusion criteria and were invited to this study. Finally, consents were obtained from 45 school- aged children who were enrolled to this study. For certain of random assignment, the first 3 children were assigned to the massage group, and the next, 3 children were assigned to the control group. Finally, considering the samples' drop-out during the study, the data of 43 children were analyzed (23 in the massage group and 21 in the control group) (Figure.1).

Inclusion criteria for this study included: 1) being 7-18 years old; 2) at least 3 months after the diagnosis; 3) lack of known nausea and vomiting indicated in the medical history induced by causes other than chemotherapy; 4) lack of physical injury and skin diseases in the massage area; 5) not receiving radiation therapy.

The exclusion criteria during the intervention included: 1) transfer to another hospitals; 2) deterioration in the patient's condition; 3) unwillingness to continue the study.

The data were collected using a demographic characteristics and disease-related data form, the Numeric Rating Scale (NRS= It is a 10 cm ruler tool) for nausea intensity, and daily recording form for frequency of vomit.

Children were receiving chemotherapy for 7 days consecutive. Before start of the study, at the day of chemotherapy administration (day 1<sup>th</sup> = baseline), only nausea and vomiting were measured. Then, at the during next 6 days (day 2 through 7), the intervention group received

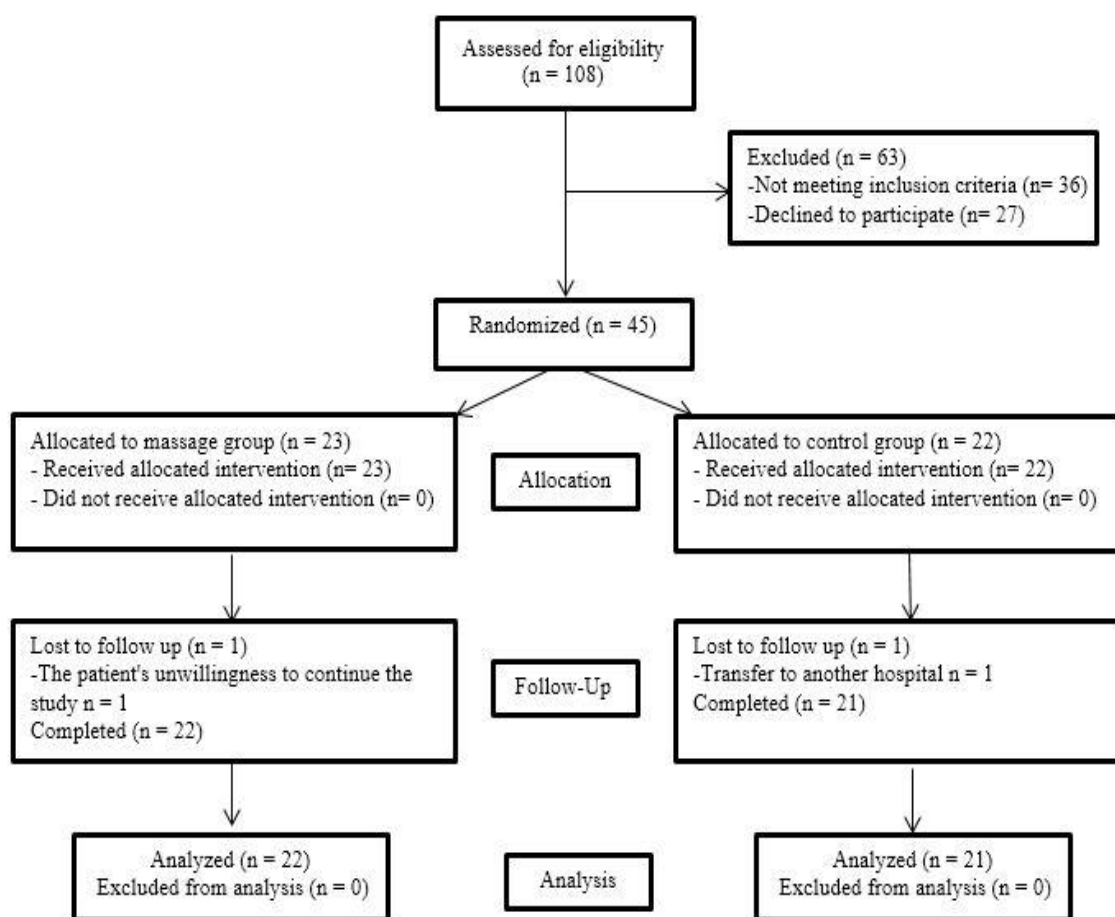
5-minutes SSBM, immediately before start of each session of chemotherapy and in the control group, in order to maintain the controlled conditions of the study, one nurse would speak to the children during the intervention.

Nausea was measured at the during chemotherapy, 0.5 h and 3 h after each session of chemotherapy in the two groups every day (means of this 3 times was the criterion for every day of study). Also, vomiting was recorded during 24 h after each session of chemotherapy per day in the two groups (means of this frequency of vomit at 24 h was the criterion for every day).

A separate ward with proper light, proper temperature and without environmental stimulants in the pediatric hematology ward was considered for massage therapy. This study was approved in the Ethics Committee of Research Center of the Ahvaz Jundishapur University of Medical Sciences, Iran. Ethical considerations were observed in accordance with the Helsinki Declaration. For the convenience of patients, massages on male and female patients were performed by a male and female massager, respectively.

#### Data analysis

Data analysis was carried out by SPSS version 15 (Inc., Chicago, IL, USA). P value <0.05 was considered significant. Descriptive statistics, Chi-square test, Independent t-test, and Repeated measures ANOVA test were used for analysis in this study.



**Fig.1:** Consort flow chart of RCT.

**Results**

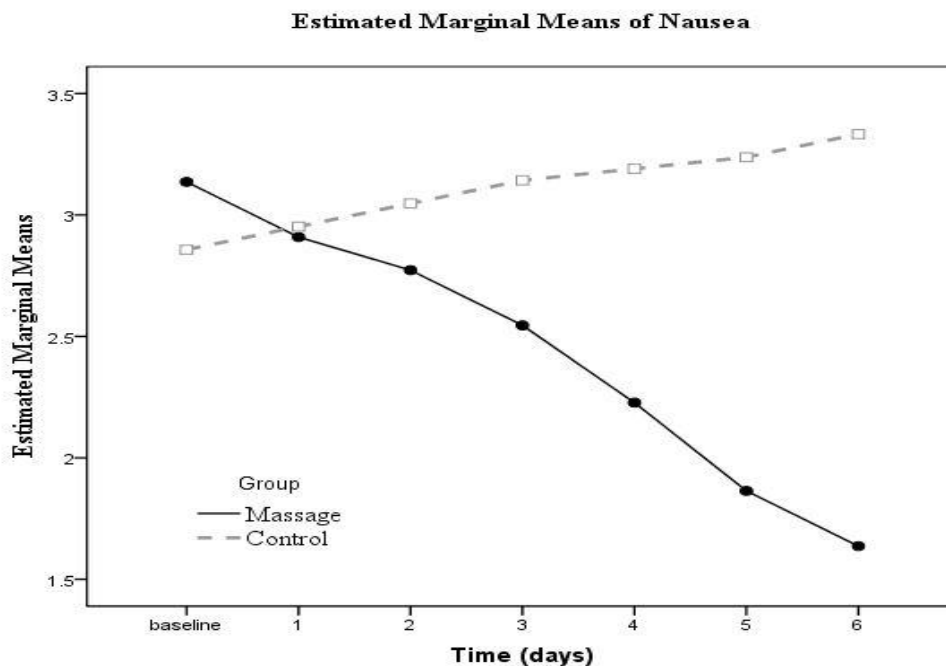
According to the findings of this study, the most of children were male (58.13%), and suffered from acute myeloid leukemia (81.7%). In addition, most of children were in the first year of cancer diagnosis and were in the second chemotherapy cycle. No significant difference was observed of all demographic characteristics and disease-related data between two groups. Therefore, the children of two groups had similar characteristics and were identical (Table. 1). The mean of nausea intensity and frequency of vomiting were not significantly different between the two groups at baseline (P=0.555 and P=0.238 respectively). The repeated measure analysis showed that in the intervention

group, the SSBM intervention significantly reduced progressive mean of nausea severity over time. While in the control group, slightly increase was observed in the mean of nausea intensity over time (Figure.2). Also in the massage group, repeated measure analysis showed that the SSBM intervention significantly reduced progressive mean of frequency of vomiting per every day over time. While in the control group, increase trend was observed in the mean of frequency of vomiting per every day over time (Figure.3).

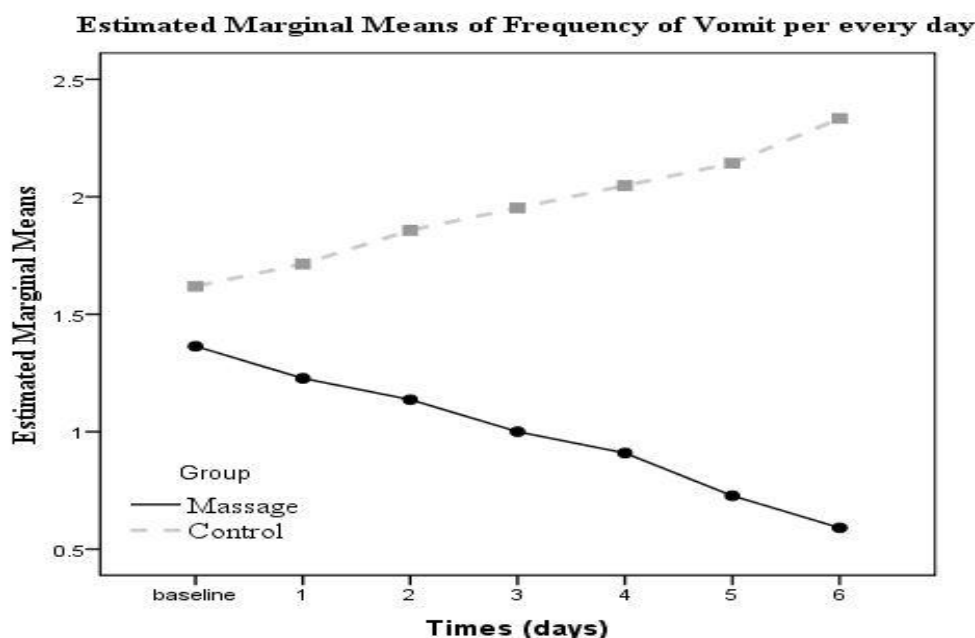
Totally, this study results showed that, statically significant difference between trends of both nausea intensity and frequency of vomiting, between two groups (P=0.001 and P=0.001) (Figure.2 and Figure.3).

**Table 1:** Demographic characteristics and disease-related data between two groups (Mean ± SD)

Variables	Case group (n=22)	Control group (n=21)	P value
Age	11.46±2.14	10.91±1.93	0.705
Gender			
Male	12(54.54%)	13(61.90%)	0.494
Female	10(45.45%)	8(30.09%)	
Type of leukemia			
AML	17(72.27%)	15(71.42%)	0.236
ALL	5(22.72%)	6(28.57%)	
Time passed from diagnosis			
3-6 months	3(13.63%)	4(19.04%)	0.301
6-9 months	6(27.27%)	7(33.33%)	
9-12 months	8(36.36%)	6(28.57%)	
>12 months	5(22.72%)	4(19.04%)	
Chemotherapy cycles receiving			
1	4(18.18%)	6(28.57%)	0.528
2	11(50.00%)	10(47.61%)	
3	7(31.81%)	5(23.80%)	



**Fig. 2:** Trend of nausea intensity in the two groups over time



**Fig. 3:** Trend of means of frequency of vomit (per every day) in the two groups over time

### Discussion

According to the findings of this study, Slow-stroke back massage reduced progressive chemotherapy-induced nausea and vomiting over time in the pediatric with acute leukemia. Hence, this type of massage (SSBM) is as a useful method for these children, besides the routine cancer care. Our findings are consistent with results of the study by Mazlum et al. (2013) which showed that Swedish massage can contribute to chemotherapy-induced nausea and vomiting control in Iranian pediatric with cancer, although this decrease was not statically significant (7), whereas in our study decrease was statically significant. In Mazlum’s study, type of massage and frequency of massage session was difference and dealt with various types of cancer, whereas in our study considered a particular type of cancer. Given that the nature, intensity, and duration of treatment vary in different types of cancer, it is essential that various types of complementary medicine to be exclusively studied in each type of cancer. Billhult et al. (2001) showed that massage therapy is a useful method for symptom

control including nausea in children with cancer (16). The current study showed that our result is in contrast to the results of the study by Post-White et al. (2008) (17). It may be a result of the small sample size (17 children) in Post-White’s study, and the effect of massage therapy might have been significant, if the study had been done in a larger sample size.

Probably, relaxation response caused by massage is effective on nausea directly (18). In addition, massage therapy probably can control CINV indirectly, by decreasing pain. Some studies have shown that pain is one important factor which increase CINV (7). In spite of benefits of this method, few studies have assessed effectiveness of massage therapy on CINV in pediatrics with cancer. Also, massage therapy is accepted by patients and can create a good relationship between children and caring team (19).

**Limitations:** This study had some limitations: 1) children were enrolled only from one hospital; 2) small sample size. It is suggested that other studies with larger mple sizes be conducted.

## Conclusion

Slow-stroke back massage decreased chemotherapy-induced nausea and vomiting in the pediatric with acute leukemia. Hence, the results of this study are suggesting that SSBM, as a non-pharmacologic, easy, cheap and safe method, is effective in controlling CINV in the pediatric with acute leukemia. Therefore, health policy makers should pay attention to this method in clinical practice. Knowledge of staff, regarding the application of this method should be increased and they can use this method approach along with their other methods for controlling CINV in the pediatric with acute leukemia.

## Abbreviation

- CINV: Chemotherapy-Induced Nausea and Vomiting);
- SSBM: Slow-stroke back massage;
- AML: Acute myeloblastic leukemia;
- ALL: Acute lymphoblastic leukemia;
- NRS: Numeric rating scale;
- SD: Standard deviation;
- RCT: Randomized controlled trial.

**Conflict of Interest:** None.

## Acknowledgment

This study was supported by research center of Ahvaz Jundishapur University of Medical Sciences, Iran. Authors also thank the all children, families and staff of the chemotherapy unit of Shafa Hospital in Ahvaz, South of Iran.

## References

1. Miladinia M, Baraz S, Shariati A, malehi As, Ahmadizadeh A. Relationship between chronic pain and quality of life in patients with acute leukemia undergoing chemotherapy. *Jundishapur J Chronic Dis Care.* 2015;4(3):18-24.
2. Prapti NKG, Petpichetchian W, Chongcharoen W. Development of Foot Massage Program on Nausea and Vomiting for Cancer Patients: A Literature Review. *Nurse Media Journal of Nursing.* 2012;2,1:325-55.
3. Pirri C, Katris P, Trotter J, Bayliss E, Bennett R, Drummond P. Risk factors at pretreatment predicting treatment-induced nausea and vomiting in Australian cancer patients: a prospective, longitudinal, observational study. *Support Care Cancer.* 2011;19(10):1549–63.
4. Dewan P, Singhal S, Harit D. Management of Chemotherapy-Induced Nausea and Vomiting. *Indian Pediatr.* 2010;47(2):149-55.
5. Sheikhi MA, Ebadi A, Talaeizadeh A, Rahmani H. Alternative Methods to Treat Nausea and Vomiting from Cancer Chemotherapy. *Chemother Res Pract.* 2015: 818759.
6. Cefalo M, Ruggiero A, Maurizi P, Attinà G, Arlotta A, Riccardi R. Pharmacological management of chemotherapy-induced nausea and vomiting in children with cancer. *J Chemother.* 2009;21(6):605-10.
7. Mazlum S, Chaharsoughi NT, Banihashem A, Vashani HB. The effect of massage therapy on chemotherapy-induced nausea and vomiting in pediatric cancer. *Iran J Nurs Midwifery Res.* 2013;18(4):280–84.
8. Liao C-T, Chu N-M, Liu H-E, Deuson R, Lien J, Chen J-S. Incidence of chemotherapy-induced nausea and vomiting in Taiwan: physicians' and nurses' estimation vs. patients' reported outcomes. *Support Care Cancer.* 2005;13(5):277–86.
9. Krishnasamy M, So WK-W, Yates P, Calvo LEAd, Annab R, Wisniewski T. The Nurse's Role in Managing Chemotherapy-Induced Nausea and Vomiting. *Cancer nurs.* 2014;37(4):27-35.
10. López-Jiménez J, Martín-Ballesteros E, Sureda A, Uralburu C, Lorenzo I, Campo Rd, et al. Chemotherapy-induced nausea and vomiting in acute leukemia and stem cell transplant patients: results of a multicenter, observational study. *Supportive Therapy, haematologica/the hematology journal.* 2006;91(1):84-91.

11. Lou Y, Yates P, McCarthy A, Wang HM. Self-management of Chemotherapy-Related Nausea and Vomiting. *Cancer nurs.* 2014;37(2):126-38.
12. Najafi Ghazlajeh T, Rahimiha F. A study of foot massage effects on the nausea intensity in cancer-affected patients, 2004. *Iran Q.* 2004;17:32-5.
13. Walters SJ. Massage and cancer: Practice guidelines. *ATMS.* 2010;16(3):141-3.
14. Niggemann B, Gruber C. Side-effects of complementary and alternative medicine. *Allergy.* 2003;58(8):707-16.
15. Wesa K, Cassileth BR. Is there a role for complementary therapy in the management of leukemia? *Expert Rev Anticancer Ther.* 2009;9(9):1241-9.
16. Billhult A, Dahlberg K. A meaningful relief from suffering: Experiences of massage in cancer care. *Cancer nurs.* 2001;24(3):180-4.
17. Post-White J, Fitzgerald M, Savik K, Hooke MC, Sencer SF. Massage therapy for children with cancer. *Journal of Pediatric Oncology Nursing.* 2008;26(1):16-28.
18. Grealish L, Lomasney A, Whiteman B. Foot massage: A nursing intervention to modify the distressing symptom of pain and nausea in patients hospitalized with cancer. *Cancer nurs.* 2000;23(3):237-43.
19. Kashani F, Kashani P. The effect of massage therapy on the quality of sleep in breast cancer patients. *Iran J Nurs Midwifery Res.* 2014;19(2):113-8.