

Effect of Foot Reflexology on Chemotherapy Induced Nausea and Vomiting among Cancer Patients

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1.ABSTRACT

Background: Chemotherapy-induced nausea and vomiting (CINV) is a common side-effect in different treatments modalities for cancers. Reflexology is one of the non-pharmacological interventions that could be used to control CINV among cancer patients. **Aim:** Evaluate effect of foot reflexology on chemotherapy-induced nausea and vomiting among cancer patients. **Methods:** Quasi-experimental study with a purposive sample of totally 60 cancer patients from both genders who were admitted to the Oncology Center of Mansoura University Hospital was enrolled in the study. Patients were assigned to the intervention group (foot reflexology) and the control group (routine care). Data were collected using a structured interview questionnaire and the Rhodes index for nausea and vomiting scale. **Results:** There was a significant improvement in nausea and vomiting among the study group than control group according to the Rhodes Index for nausea and vomiting scale as the p-value ≤ 0.05 after implementing foot reflexology sessions. **Conclusion & Recommendation:** Foot reflexology has a good effect on chemotherapy-induced nausea and vomiting among cancer patients and should be used as an adjuvant to daily care for cancer patients undergoing chemotherapy.

Keywords: foot reflexology, chemotherapy-induced nausea, and vomiting, cancer patients.

2.Introduction:

Cancer is considered a disease of the cell characterized by disordered cellular growth which occurs in over 100 different cell or tissue types. These cells or tissues are able of invading surrounding tissues and being transported to other distant regions via the circulation, resulting in metastases (Sousa, Silva, & Paiva, 2019). According to World Health Organization in 2019, cancer is the first or second leading cause of death before the age of 70 (Sung et al., 2021). In 2018, an estimated 18.1 million individuals were diagnosed with cancer worldwide, with 9.6 million individuals dying from it (Cortes et al., 2020).

The main treatment modalities for cancer include surgery, radiation therapy, chemotherapy, hormonal therapy, immune therapy, and target therapy. Each method of treatment can be used alone or in combination based on the type and stage of cancer (Eladham, Eweda, Mohamed, Ismail, and Elsayed, 2021). As chemotherapy is a long-term treatment that includes many cycles and damages both normal and cancer cells (Harorani, Davodabady, Farahani, & Rafiei, 2020). As a result, there are many adverse effects like hair loss, diarrhea, fatigue, nausea, vomiting, as well as pain (Wanchai & Armer, 2020).

Chemotherapy-Induced Nausea and Vomiting (CINV) are the two most dreadful and unpleasant side-effects of chemotherapy for cancer patients (Mosa, Hossain, & Yoo, 2020). Cancer patients who suffer from CINV always experience an increased risk of interruption and refusal of or withdrawal from the chemotherapy regime (Tian et al., 2020). Since antiemetic medicines cannot control CINV alone and can induce a variety of side effects, 59 % of patients seek nonpharmacological therapy (Zorba & Ozdemir, 2018). Complementary and alternative medicines (CAM) are becoming incredibly common among cancer patients (Murat-Ringot, et al.,2020). CAM techniques such as acupuncture, biofeedback therapy, foot reflexology, probiotics, and herbal medicine (Yaqi et al., 2020).

Foot reflexology is a systemic technique in which a practitioner applies pressure to certain pressure areas on the foot to activate the body and deliver health benefits to various parts of the body. For thousands of years, it has been used in various cultures all over the world. (Wang et al., 2020). It is said to be one of the most commonly used (35.2%) complementary therapy modalities by cancer patients (Sevilay & Hilal, 2019). The

underlying mechanisms of the reflexology are thought to help people relax, release endorphins, control pain transmission and perception, and release energy from their bodies (Samarehfkri, Dehghan, Arab, & Ebadzadeh, 2020). As a result, it appears critical to examine the effect of foot reflexology on chemotherapy induced nausea and vomiting among cancer patients.

Aim of the study

The study aimed to evaluate effect of foot reflexology on chemotherapy induced nausea and vomiting among cancer patients.

Research hypothesis

Patients in the study group will experience less chemotherapy-induced nausea and vomiting after implementing foot reflexology sessions than the control group.

3. Materials & Method

Study Design:

A quasi-experimental research design was utilized to conduct this study.

Setting:

The study was conducted out in Oncology Center–Mansoura University in the chemotherapy installation unit.

Sampling:

A purposive sample of a total of 60 cancer patients divided into two groups (30 each) from both genders, patient's age ranged from (20– 60 years old), beginning with the second chemotherapy cycle, agreeing to participate in the study, and able to communicate verbally. Any patients who received radiotherapy, had received foot reflexology therapy before, gout, or suffering from Leg varicose or foot disease were excluded from the study. The control group received routine hospital care only and study group received routine hospital care in addition to foot reflexology sessions.

Data Collection Tools: two tools were used for data collection: -

Tool (1) A structured interview questionnaire

This tool was developed by the researcher to assess the Patient's demographic characteristics and the patient's medical profile data. It consists of 15 questions; 9 questions regarding demographic characteristics and 6 questions covering the patient's medical profile data.

Tool (2) The Rhodes Index for nausea and vomiting scale

This tool was adopted from Rhodes and Mc Denial (1999). It is used to measure the severity,

frequency, and distress of nausea and vomiting occurrence and distress before and after the foot reflexology session. It is an eight-item instrument that uses a five-point Likert scale ranging from 0 to 32 grades. The scale involves three subscales as the symptom experience, symptom development, and symptom distress. The scoring of its items ranged from (0) for the least amount of distress to (4) for the most distress.

Ethical consideration

Before the study, verbal informed consent was obtained from each patient enrolled in the study after clarification of the nature of the study. The researcher emphasized participation is voluntary and confidential. Anonymity, privacy, safety, and confidentiality were secured throughout the study. Every participant had the option to leave the study at any time.

- An approval was got from the research ethical committee of the Faculty of Nursing Mansoura University (Number 28513).
- A permission to carry out the study was got from the responsible authorities of the chosen setting after a description of the study's purpose.
- The study tool I (A structured interview questionnaire) was developed by the researcher.
- The researcher had received theoretical and practical training on how to use foot reflexology from a reflexology professional before starting the study.
- A pilot study was conducted on 10% of patients (6 patients) who were excluded from the study subjects to test the practicality and clarity of the developed tools, and the necessary modifications were made accordingly.

Statistical analysis:

Data entry and analysis were performed using the Statically Package for Social Sciences (SPSS) version 22. The qualitative data were presented as numbers and percentages. In addition, quantitative data were presented as mean standard deviation. The independent T-Test was used to check the differences between the two groups. P-value was significant at a level of ≤ 0.05 .

4. Results:

Table 1. Regarding patients' age, more than half (53.3 %) of the study group and two fifth (40%) of the control group ranged from 40 to less than 50 years old. Moreover, females were the

majority among the study group and the control group (86.7%, 76.7 %) respectively. Concerning level of education, more than half (53.3 %) of the study group and two fifth (40%) of the control group were University level. The highest proportions of patients in the study group and the control group (56.7 %) were not working. In relation to marital status, the majority of the patients in the study group and the control group were married (80.0%, 70.0 %) respectively. Concerning residence, the majority of the patients in the study group and the control group lived in urban regions (80.0%, 70.0 %) respectively. Regarding the living situation, the most percent of the patients in the two groups (100 %, 93%) were living with family. Finally, Table 1 clarifies that no statistically significant differences were detected between the two groups concerning their demographic characteristics ($p > 0.05$).

Table 2. Regarding diagnosis more than half (53.3 %) of the study group and more than two-fifth (43.3 %) of the control group had breast cancer. It was noted that about two-thirds (60.0 %) in both groups did not have any chronic diseases. Concerning types of chemotherapy, it was found that more than two-fifths (46.7%) in the study group and more than one-fourth (26.7 %) in the control group were taking taxotel. By looking at the numbers of chemotherapy cycles, the largest proportion of study and control groups (66.7 %, 60.0 %) respectively were ranged from 2-3 cycles. Regarding Interval between cycles about three-fourths (73.3 %) in the study group and more than

half (53.3 %) in the control group were 3 weeks. Finally, Table 2 shows that there was no significant difference among the two groups according to their medical data. Although, there were significant differences between the two groups regarding types of chemotherapy (p -value = 0.042).

Table 3 shows that before implementing reflexology sessions there was no statistical difference in the mean score of vomiting frequency, retching experience, vomiting distress, nausea duration, nausea severity, vomiting severity, nausea frequency, retching frequency among the study group and the control group. Also, there were no statistically significant differences were detected between the two groups according to vomiting frequency, retching experience, vomiting distress, nausea duration, nausea severity, vomiting severity, nausea frequency, retching frequency as p -value was (1.000, .060, .092, .513, .136, .398, .770, .367).

It is also clear that after implementing 1st, 2nd, and 3rd reflexology sessions there was a significant reduction in the mean score of vomiting frequency, retching experience, vomiting distress, nausea duration, nausea severity, vomiting severity, nausea frequency, retching frequency among the study group comparing to the control group throughout the whole study. In addition, was a statistical difference between the study group and the control group concerning vomiting frequency, retching experience, vomiting distress, nausea duration, nausea severity, vomiting severity, nausea frequency, retching frequency as ($p \leq 0.05$).

Table 1 *Distribution of study participants according to patient's demographic data*

	No	%	No	%	
Age					
20 to less than 30	1	3.3	1	3.3	0.724
30 to less than 40	5	16.7	8	26.7	
40 to less than 50	16	53.3	12	40.0	
50 to 60	8	26.7	9	30.0	
Level of education					
Illiterate	5	16.7	6	20.0	0.260
Primary	0	0	2	6.7	
Preparatory	4	13.3	8	26.7	
Secondary	5	16.7	2	6.7	
University	16	53.3	12	40.0	
Sex					
Male	4	13.3	7	23.3	0.317
Female	26	86.7	23	76.7	
Occupation					
Working	13	43.3	13	43.3	0.603
Not working	17	56.7	17	56.7	

Marital status					
Married	24	80.0	21	70.0	0.480
Single	1	3.3	4	13.3	
Divorced	1	3.3	2	6.7	
Widowed	4	13.3	3	10.0	
Residence					
Rural	6	20.0	9	30.0	0.371
Urban	24	80.0	21	70.0	
Living situation					
Live with family	30	100.0	28	93.3	0.150
Live alone	0	0	2	6.7	

p: p-value for comparing between the studied groups

Table 2: *Distribution of study participants according to their medical profile data*

	No	%	No	%	
Diagnosis					
Stomach	2	6.7	6	20.0	0.081
Colorectal	1	3.3	4	13.3	
Pancreatic	3	10.0	5	16.7	
Lung	3	10.0	2	6.7	
Breast	16	53.3	13	43.3	
Cervical	5	16.7	0	0	
Chronic diseases					
Diabetes Mellitus	6	20.0	5	16.7	0.920
Hypertension	6	20.0	7	23.3	
Absent	18	60.0	18	60.0	
Types of chemotherapy					
Taxotel	14	46.7	8	26.7	0.042*
Folfox	4	13.3	7	23.3	
Taxol	2	6.7	5	16.7	
Xelon	1	3.3	5	16.7	
Plantinol	5	16.7	0	0	
Gemezaz	4	13.3	5	16.7	
Number of cycles of chemo					
2-3	20	66.7	18	60.0	0.300
4- 5	10	33.3	10	33.4	
<5	0	0	2	6.6	
Interval between cycles					
2 weeks	8	26.7	14	46.7	0.108
3 weeks	22	73.3	16	53.3	

*: Statistically significant at $p \leq 0.05$.

Table 3: Comparing chemotherapy-induced nausea and vomiting among study and control groups throughout the study N=30 patients for each group

	S G	C G	P1*	S G	C G	P2*	S G	C G	P3*	S G	C G	P4*
	M ± SD	M ± SD		M ± SD	M ± SD		M ± SD	M ± SD		M ± SD		
Vomiting frequency	3.33±.61	3.33±0.55	1.000	2.33±.66	3.13±.50	.000	1.50±.50	3.10±.60	.000	.76±.50	3.20±.55	.000
Retching experience	3.86±.34	3.46±0.68	.060	3.20±.61	3.66±.47	.002	2.33±.54	3.50±.51	.000	1.43±.50	3.60±.49	.000
Vomiting distress	3.8±.40	3.56±.62	.092	3.06±.63	3.43±.62	.029	2.16±.64	3.40±.62	.000	.90±.80	3.53±.62	.000
Nausea duration	3.33±.54	3.23±.64	.513	2.23±.50	3.20±.66	.000	1.06±.82	3.30±.59	.000	1.00±.00	3.30±.65	.000
Nausea severity	3.90±.69	3.73±.52	.136	3.10±.60	3.73±.45	.000	2.23±.56	3.66±.47	.000	1.30±.46	3.73±.44	.000
Vomiting severity	3.26±.58	3.13±.62	.398	2.23±.56	2.90±.75	.000	1.53±.50	3.16±.74	.000	.63±.49	3.16±.69	.000
Nausea frequency	3.76±.43	3.73±.44	.770	2.96±.41	3.80±.40	.000	2.93±.42	3.81±.41	.000	1.00±.58	3.80±.40	.000
Retching frequency	3.56±.50	3.43±.62	.367	2.63±.66	3.53±.62	.000	2.61±.65	3.54±.61	.000	.76±.56	3.63±.55	.000

5. Discussion

Chemotherapy is an important component of cancer treatment and has contributed to improving cancer survival rates. It has a number of adverse effects, including nausea, vomiting, fatigue, anemia, and hair loss (Olver et al., 2018). CINV is one of the most serious chemotherapy side effects, affecting the patient's quality of life (QoL) and their willingness to continue chemotherapy (Ilyas et al., 2020). Reflexology is a complementary and integrative health practice that therapists are interested in using to help cancer patients manage their symptoms (Wanchai & Armer, 2020). This study is conducted to examine the effect of foot reflexology on chemotherapy-induced nausea and vomiting among cancer patients.

Regarding age, the findings of the current study discovered that the highest percentage of patients in both study and control groups were between the ages of 40 and 50, this finding is constant with Eladham et al. (2021) that the highest percentage of the age of breast cancer was ranged between 40 to 50 years old. Related to the sex, females were the majority in the study group and more than three fourth in the control group. This may be because that more than half of my sample had breast cancer. This result was in disagreement with the result by Sontakke et al. (2020) who revealed that most of the study group and control group were male.

Regarding marital status and occupation, the current study clarified that the majority of patients in both groups were married and not working. This

result was similar to Özdelikara and Tan (2017) who mentioned that the majority of the experimental group and two-thirds in the control group were married, and the majority of patients in both groups were housewives. Regarding the living situation, the most percent of the patients in the study group were living with family. This result is consistent with that conducted by Sontakke et al. (2020) who shown that the majority of the study group was living with family.

In terms of residence, the majority of the patients in the study group and more than two-thirds lived in urban regions. This finding is consistent with Özdelikara and Tan (2017) who explained that more than half of the study and control lived in the city center. Considering the level of education, more than half of patients in the study group were university level. This finding disagreed with the result by Eladham et al. (2021) who clarified that the highest proportion in both study and control group were secondary school. Furthermore, this result is also in disagreement with that reported by Özdelikara and Tan (2017) who found that two-fifths of patients in both groups were primary school graduates.

Interpretation of the findings related to research hypotheses.

According to the present study, implementing foot reflexology sessions had succeeded in reducing chemotherapy-induced nausea and vomiting in patients with cancer. After the implementation of three-foot reflexology sessions, there was a significant difference in the Rhodes Index for nausea, vomiting scale among the study group compared to the control group. The

results of the current study were supported by the study conducted by **Sontakke et al. (2020)** who performed foot reflexology sessions twice a day for three days on patients with cancer. They found that foot reflexology leads to significant improvement in nausea and vomiting among patients undergoing chemotherapy.

Moreover, this result is in the line with the finding of **Sevilay and Hilal (2019)** who found that foot reflexology has good effects on nausea and vomiting among lung cancer patients receiving chemotherapy. They came to the conclusion that foot reflexology can be utilized in the reduction or prevention of nausea and vomiting. Likewise, the result displayed by **Eladham et al. (2021)** confirmed the benefits of foot reflexology sessions on the reduction of chemotherapy induced nausea, vomiting, and fatigue among patients with breast cancer. On the contrary, another study conducted by **Miandoab, Ezzati, Arbabi, Manoochehri, and Zayeri (2012)** reported that the reflexology technique was not found to have a good effect on chemotherapy-induced vomiting of patients. But it caused a reduction in severity and number of vomiting in the first 4 hours after chemotherapy among patients with moderate and severe vomiting. Therefore, they recommended applying reflexology therapy for the experimental group in multiple sessions.

6. Conclusion

After the implementation of three reflexology sessions, there was a statistically significant reducing chemotherapy-induced nausea and vomiting in the study group compared to the control group. Based on the results of this study, we can conclude that foot reflexology has a good effect on chemotherapy-induced nausea and vomiting among cancer patients.

7. Recommendations

Based on the results of the recent study we can recommend that:

- Oncology nurses can integrate foot reflexology massage into their daily care with patients undergoing chemotherapy.
- Oncology nurses need to receive training programs on foot reflexology techniques.

8-Acknowledgments:

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9-References:

- Cortes, J., Perez-García, J. M., Llombart-Cussac, A., Curigliano, G., El Saghri, N. S., Cardoso, F., ... & Arribas, J.

(2020). Enhancing global access to cancer medicines. *CA: a cancer journal for clinicians*, 70(2), 105-124.

- Dadkhah, B., Anisi, E., Mozaffari, N., Amani, F., & Pourghasemian, M. (2019). Effect of music therapy with periorbital massage on chemotherapy-induced nausea and vomiting in gastrointestinal cancer: a randomized controlled trail. *Journal of caring sciences*, 8(3), 165.
- Eladham, M. A., Eweda, S. M., Mohamed, M. A. F., Ismail, M. F., & Elsayed, N. F. The Effect of Foot Reflexology on Chemotherapy Induced Nausea, Vomiting and Fatigue among Breast Cancer Patient.
- Harorani, M., Davodabady, F., Farahani, Z., & Rafiei, F. (2020). The effect of Benson's relaxation response on sleep quality and anorexia in cancer patients undergoing chemotherapy: A randomized controlled trial. *Complementary therapies in medicine*, 50, 102344.
- Ilyas, A. B., Bahaj, R. K., Shaikh, A. A., Khawandanah, B. S., Al-Foheidi, M., & Omer, T. Y. (2020). Breast cancer patients' perceptions of their experience with chemotherapy-induced nausea and vomiting and its impact on quality of life in Jeddah, Saudi Arabia. *Cureus*, 12(12).
- Miandoab, N. Y., Ezzati, Z., Arbabi, F., Manoochehri, H., & Zayeri, F. (2012). The effect of reflexotherapy on chemotherapy-induced vomiting of. *Advances in Nursing and Midwifery*, 21(76), 60-68.
- Mosa, A. S. M., Hossain, A. M., & Yoo, I. (2020). A dynamic prediction engine to prevent chemotherapy-induced nausea and vomiting. *Artificial Intelligence in Medicine*, 109, 101925.
- Murat-Ringot, Audrey, Pierre Jean Souquet, Marion Chauvenet, Charlotte Rentler, Fabien Subtil, Anne Marie Schott, Marie Preau, and Vincent Piriou. 2020. "The Effects of Foot Reflexology on Chemotherapy-Induced Nausea and Vomiting in Patients with Digestive System or Lung Cancer: Protocol for a Randomized Controlled Trial." *JMIR Research Protocols* 9(7). doi: 10.2196/17232.
- Olver, I., Carey, M., Boyes, A., Hall, A., Noble, N., Bryant, J., ... & Sanson-Fisher, R. (2018). The timeliness of patients reporting the side effects of chemotherapy. *Supportive Care in Cancer*, 26(10), 3579-3586.

- Özdelikara, A., & Tan, M. (2017). The effect of reflexology on chemotherapy-induced nausea, vomiting, and fatigue in breast cancer patients. *Asia-Pacific journal of oncology nursing*, 4(3), 241.
- Rhodes, V. A., & McDaniel, R. W. (1999, June). The Index of Nausea, Vomiting, and Retching: a new format of the Index of Nausea and Vomiting. In *Oncology nursing forum* (Vol. 26, No. 5, pp. 889-894).
- Samarehfkri, A., Dehghan, M., Arab, M., & Ebadzadeh, M. R. (2020). Effect of foot reflexology on pain, fatigue, and quality of sleep after kidney transplantation surgery: a parallel randomized controlled trial. *Evidence-Based Complementary and Alternative Medicine*, 2020.
- Sevilay, H., & Hilal, P. (2019). Foot Reflexology Application in Lung Cancer Patients and Sleep. 1(1), 9–11.
- Soliman, G. H., Alagizy, H., & Shehata, O. S. M. (2017). Efficacy of Non pharmacological technique on Chemotherapy Induced Nausea, Vomiting and Retching among Breast Cancer Patients. *IOSR Journal of Nursing and Health Science*, 6(6).
- Sontakke, S. R., Zagade, T. B., Shinde, M. B., & Alate, M. M. (2020). Effectiveness of foot reflexology on nausea and vomiting among patient undergoing chemotherapy. *International Journal of Advanced Science and Technology*, 29(5 Special Issue), 1249–1255.
- Sousa, A. D. R. S., Silva, L. F. D., & Paiva, E. D. (2019). Nursing interventions in palliative care in Pediatric Oncology: an integrative review. *Revista brasileira de enfermagem*, 72, 531-540.
- Laversanne, L., Siegel, J., Ferlay, H., Sung, F., Bray, & Jemal, I., Soerjomataram, M., Global cancer statistics (2020) GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: a cancer journal for clinicians*, 70(3), 293–315.
- W, Xie, L., Xu, Y., Tang, X., Tian, Q., W, Chen & P, Y, Pi, H, Chen (2020). Progressive muscle relaxation is effective in preventing and alleviating of chemotherapy induced nausea and vomiting among cancer patients: a systematic review of six randomized controlled trials. *Supportive Care in Cancer*, 28(1), 1–11.
- A, J, Armer & A, Wanchai (2019). Systematic review association of reflexology in managing symptoms and side effects of breast cancer treatment. *Clinical Practice*, 19(1), 1–11.
- R, Y, Chen, Y, H, Hung, L, W, Wang & M, C, Chu, N, S, Yang, H, K, Chen (2020). Effect of foot reflexology on depression and sleep anxiety: a meta-analysis of randomized controlled trials. *Evidence-Based Complementary and Alternative Medicine*, 2020, 1–11.
- Yaqi, H., Nan, J., Ying, C., Xiaojun, Z., Lijuan, Z., Yulu, W., ... & Yue, Z. (2020). Foot reflexology in the management of functional constipation: A systematic review and meta-analysis. *Complementary Therapies in Clinical Practice*, 40, 101198.
- Zorba, P., & Ozdemir, L. (2018). The preliminary effects of massage and inhalation aromatherapy on chemotherapy-induced acute nausea and vomiting: a quasi-randomized controlled pilot trial. *Cancer nursing*, 41(5), 359-3