

Effect of Acupressure on Chemotherapy Induced Nausea and Vomiting among Patients with Lung Cancer

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Abstract: Lung cancer is one of the most common cancers in the world. Cancer treatments as chemotherapy often cause a host of adverse effects, Chemotherapy-induced nausea and vomiting (CINV) are the most common adverse effects of chemotherapy that may prevent successful treatment completion. **Aim:** The aim of the study was to examine the effect of acupressure on chemotherapy induced nausea and vomiting among patients with lung cancer. **Methods:** A quasi-experimental pre-posttest nonequivalent control group design was utilized. A convenient sample composed of 60 adult male and female patients admitted to the Oncology Department, in one of the governmental hospitals in Egypt, were recruited, and equally randomly allocated to a control and study groups. One questionnaire and four scales were used to collect the data: (1) Demographic data sheet, (2) Rhodes Index of Nausea, Vomiting, and Retching (INVR), (3) Multidimensional Fatigue Symptom Inventory-Short Form (MFSI-SF), (4) Beck Anxiety Inventory, and (5) The Functional Living Index-Emesis (FLIE). Patients were followed up for two chemotherapeutic cycles. **Results:** The study group achieved a significantly higher reduction in the mean nausea and vomiting distress score, decreased mean fatigue and anxiety scores as well as improved functional living activities after receiving acupressure compared to the control group. **Conclusion:** Acupressure could decrease severity of nausea and vomiting, reduce fatigue and anxiety and improve functional living activities in patients with cancer and scheduled on chemotherapy sessions. **Recommendation:** Acupressure could be recommended to be endorsed as a nursing practice for patients on chemotherapy sessions in the early course of the disease, so that the patients experience the maximum benefit.

Keywords: Acupressure, chemotherapy, nausea and vomiting, lung cancer.

I. INTRODUCTION

Lung cancer is a standout amongst the most widely recognized tumors in the world. It is a leading cause of cancer deaths (Pike & Bethesda, 2018). Likewise, with most types of cancer, lung cancer is non-discriminatory in nature and can influence anyone, at any age (Lu's, 2017). Chemotherapy is viewed as the universal management for patients with lung cancer and different other tumors with the reason to treat these diseases by means of controlling the development of the cancer cells (Prapti et al., 2012).

Most patients with lung cancer experience various adverse effects related to the cancer itself or its management adverse effects. These manifestations include pain, nausea and vomiting, fatigue, and anxiety, which are challenging for patients and health care team, because they contribute to impaired quality of life and functional capacity (Akin et al., 2010; Janelins et al., 2013).

Nausea and vomiting are the most widely recognized and unpleasant adverse effects of chemotherapy, and they may counteract effective treatment fulfillment (Chaharsoughi et al., 2013). In a very recent study done by Yousef et al. (2019) stated that nausea and vomiting are the most serious adverse effects of chemotherapy with a prevalence of 54-96%, and it

is more distressing than the cancer itself. The antiemetic drugs are recommended to patients with cancer and are viewed as the essential management to treat nausea and vomiting, however, 30%-40% of such patients announced the presence of nausea and vomiting. Likewise, the utilization of antiemetic drug for a long time has adverse side effects such as fatigue, dried mouth, confusion, drowsiness, tension and extrapyramidal impacts which add to the patients' harms (Sheikhi et al., 2015).

Additionally, fatigue is strongly correlated to occurrence of nausea and vomiting. Fatigue is an extremely often treatable problem in patients with cancer which greatly influences all parts of quality of life. Patients record fatigue as one of the most significant and stressful symptoms associated with cancer and its treatments and it is a strong indicator of diminished overall patient satisfaction as well as quality of life and functional capacity (Campos et al., 2011).

Hence, search for other methods for treating chemotherapy induced nausea and vomiting (CINV) and its consequences signifies a big challenge. So that, alternative therapy concerned the attention of the health care team and expected huge significance in cancer treatment for reasons varying from availability to cost (Janelsins et al., 2013; Lou et al., 2014).

Researchers revealed that acupressure may discover the solution to the most prevalent chemotherapy induced adverse effects as it succeeded in reducing vomiting in about 66% of such cases (Yeh et al., 2012). Acupressure, as an ancient Chinese practice, is being studied for its possible benefit in reducing CINV. Since these symptoms are one of a standout amongst the most dreaded reactions of chemotherapy, learning of possible benefits, even when combined with other available treatment is of great importance (Lau et al. 2016; Dupuis et al., 2018).

According to the traditional Chinese medicine, the body is networked by a system of pathways known as meridians which function is to transport "Qi". "Qi" is the basal energy of the body that streams inside the whole body and is the reason for all activity and development. The traditional channel theory (meridian system) contributes to the theoretical belief that energy channels (meridians) connect the internal organs with the externally positioned skin surface points called acupoints. Acupoint stimulation regulates Qi (El-Saadawy, 2013).

According to the traditional Chinese medicine theory, disease may happen when the energy flow along at least one meridian is obstructed. Acupressure is the practice of applying gentle but firm finger pressure to specific acupoints in the body; it benefits reestablish balance and a health energy flow all over the body. In spite of the fact that researchers don't completely understand the mechanism of acupressure works, it is recommended that acupressure may diminish muscle ache, enhance blood circulation and release endorphins. Some studies demonstrate that it offers various health benefits including the diminishing of CINV (Deng et al., 2013; Ferrari & Broughton, 2016). Acupressure has proven as helpful for patients in decreasing nausea and vomiting, and the effect lasted for 6 - 8 hours (Hussein & Sadek, 2011). As well, Tang et al. (2014), added that acupressure helps lung cancer patients on chemotherapy in lessening cancer-related fatigue and increase activity level. So, the aim of the current study was to examine the effect of acupressure on chemotherapy induced nausea and vomiting among patients with lung cancer.

II. SIGNIFICANCE OF THE STUDY

Chemotherapy protocol described for lung cancer classified as highly emetogenic chemotherapies, emetogenicity is the likelihood that a drug or toxin will stimulate a person to vomit (Daniel et al., 2013). Chemotherapy induced nausea and vomiting can cause severe adverse effects including metabolic problems such as hyponatremia, hypokalemia and metabolic acidosis, inadequate nutritional intake leading to infection and weight loss, dehydration, decreased self-care and its consequences, difficulty with sleeping and anxiety. Likewise, patients with uncontrolled CINV require remain in the hospital for longer time and pay greater expenses. In addition, CINV may have negative consequences such as fatigue, anxiety, functional status and the quality of life and represents a bad experience during cancer management (Taspinar & Sirin, 2010).

Antiemetic not only cannot manage CINV totally but also have several adverse effects. So, it is crucial to find other approaches for a better control (Chaharsoughi et al., 2013). In response to the severity and persistence of their adverse effects, patients often try alternative therapies such as mindful meditation, deep relaxation techniques, massage, and acupressure in conjunction with standard treatments (Kasymjanova et al., 2013). In this respect, Genç et al. (2013); Garcia, et al. (2013); Ayers & Olowe (2015) reported that, acupressure is an applicable adjuvant treatment for CINV, however, additional studies are required.

Acupressure has been found to have promising effect in reducing nausea and vomiting during chemotherapy. It is generally reported as safe, low cost, tolerant, with no serious complications has been published. In addition, this therapy has grown in popularity because it is noninvasive and easy to self-administer.

III. RESEARCH METHODOLOGY

THE AIM

The aim of the current study was to examine the effect of acupressure on chemotherapy induced nausea and vomiting among patients with lung cancer

RESEARCH HYPOTHESES

To achieve the aim of the study, the following hypotheses are articulated:

H₁. The mean scores of nausea and vomiting distress will be significantly lower among the study group who receive the acupressure when compared to the control group who receive the routine hospital care.

H₂. The mean scores of fatigue will be significantly lower among the study group who receive the acupressure when compared to the control group who receive the routine hospital care.

H₃. The mean scores of anxiety will be significantly lower among the study group who receive the acupressure when compared to the control group who receive the routine hospital care

H₄. The mean scores of functional living will be significantly lower among the study group who receive the acupressure when compared to the control group who receive the routine hospital care.

STUDY DESIGN

A quasi-experimental pre-posttest nonequivalent control group design was utilized to accomplish the study aim.

SETTING

The study was carried out at the Oncology Department in one of the governmental hospitals in Egypt.

SAMPLE

A convenient sample composed of 60 patients was recruited whereas, the G*Power 3.10 was utilized to determine the required sample size, as the significance level (α) at .05, the test power $1-\beta$ at 0.95, and the effect size at 0.85, an additional 10% of patients were recruited to compensate dropout. The calculated sample size is 60 patients, randomly equally assigned to control or study groups (30 patients each). The sample was selected according to the following inclusion criteria: Adult male and female patients diagnosed with lung cancer, suffered at least from one episode of emesis either before or during administration of chemotherapy, and still had to attend at least one additional chemotherapeutic session, finally, had willing to participate. While the exclusion criteria included: Patients who had gastro-intestinal cancer or problem, and/or patients who were currently on radiotherapy protocol.

TOOLS FOR DATA COLLECTION

One questionnaire and four scales were used to collect the data.

1. Demographic data sheet: This sheet was designed by the researchers to collect the baseline data related to demographic variables such as; age, gender, marital status, education, and work status.

2. Rhodes Index of Nausea, Vomiting, and Retching (INVR) (Rhodes & McDaniel, 1999): It is used to evaluate the distress of nausea, vomiting and retching. It consisted of 8 items, each item has a numeric value from "0" which indicates no distress to "4" the highest distress. The instrument consisted of three subscales: nausea (3 questions), vomiting (3 questions), and retching (2 questions), providing a total range of 0–32. The validity and reliability testing had previously been performed, as Cronbach's Alpha was 0.98.

3. Multidimensional Fatigue Symptom Inventory-Short Form (MFSI-SF) (Stein, Jacobsen, Blanchard, & Thors, 2004): It is designed to measure fatigue, it is a Likert-type scale containing of 30 questions. The tool consists of subscale: general

fatigue, physical fatigue, emotional fatigue, mental fatigue and vigor-possible responses ranged from “0” not at all, to “4” extremely high, with total score ranged between 0 to 120. Higher scores indicate a higher level of fatigue. Reliability was evaluated, the alpha coefficients was 0.85.

4. Beck Anxiety Inventory: Designed by Steer and Beck (1997), it is used to measure the severity of an individual’s anxiety. It consists of 21 questions each question has the same set of four possible answers ranged from “0” means not at all to “3” severely great, with total score ranged between 0-63, the higher score indicates greater anxiety status. The Cronbach’s Alpha for the instrument was 0.92.

5. The Functional Living Index-Emesis (FLIE): Adopted from (Schipper, Clinch, McMurray, & Levitt, 1984). It measures the impact of nausea and vomiting on physical activities, social and emotional functions among cancer patients. It includes 18 items, each item has score ranged from “1” none to “7” a great deal. The total score ranged from 18 to 126 with the higher scores indicating a more positive impact from nausea and vomiting on the patients’ daily functioning. Reliability of the FLIE was assessed using Cronbach’s Alpha, it was 0.90.

PILOT STUDY

A pilot study was conducted on 6 patients fitting to inclusion criteria to assess the feasibility of the study and test tools for required time of filling out and to assess its clarity and applicability. Required modification was performed according to results of the pilot study and the piloted sample was excluded from the main research sample.

ETHICAL CONSIDERATIONS

An official permission was obtained from hospital administrators to conduct the study. During the phase of data collection, each potential patient was informed with the purpose, nature and interventional part of the study. In addition, the researchers emphasized to each interviewee that participation in the study is entirely voluntary; anonymity and confidentiality were assured through coding of data. Informed consent was taken from each patient who agreed to participate in the study, after explaining the nature and benefits of this research. On the other hand, they were assured that the intervention used in this study (acupressure) is safe, noninvasive, can be self-administered and has no harmful effect. For ethical reason, the control group received an acupressure session after data completion. Re-demonstration was performed for each patient in the control group in order to ensure learning and understanding. In addition, brochure was provided for such patient.

PROCEDURE OF THE STUDY

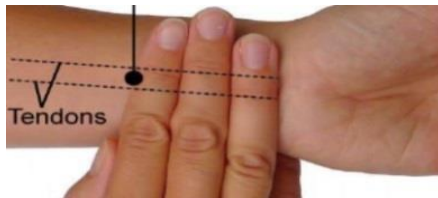
Once the permission was granted from the head manager of the Oncology Department to proceed with the study, the researchers initiated data collection. Data were collected from April to October 2018. The study was conducted through the following phases; assessment phase, intervention phase, and evaluation phase.

Assessment phase: In this phase, all patients who fulfill the inclusion criteria were interviewed individually to explain the nature and purpose of the current study, and then the consent forms were obtain from the patients who agreed to join in the study. After that, patients were randomly divided into two equal groups: The control group who received routine hospital care (100 cc saline plus one ampoule of ondansetron (zofran 8mg) plus ampoule corticosteroid (decadron 8mg) for 10-15 minutes before administration of chemotherapeutic drugs). The study group who received acupressure plus routine hospital care. Demographic data sheet, Rhodes Index of Nausea, Vomiting and Retching (INVR), Multidimensional Fatigue Symptom Inventory, Beck Anxiety Inventory, and Functional Living Index-Emesis were filled in during the 1st interview to have base line information.

Intervention phase: During this phase, the researchers started to apply acupressure for the study group. The researchers performed acupressure in the two acupressure points which were neiguan (pericardium 6 "P6"), and Zusanli (stomach 36) until the patients stop vomiting and report comfort. All patients were observed along two of chemotherapy cycles. In addition, acupressure was repeatedly performed whenever the patients reported nausea or had vomiting. Moreover, re-demonstration by the patients was performed under supervision of the researchers in order to be sure that they could perform acupressure by their own. Furthermore, each patient was provided by a brochure that includes the site of acupoint and step by step instructions on how to perform the acupressure technique.

Acupressure Technique:

1- First, estimate the location of the acupressure points. The first point is neiguan, "pericardium 6 (P6)" acupressure point. It is located on the palm side of the wrist a couple of inches toward the body in between the two tendons (palmaris longus & flexor carpi radialis). An easy way to find the point is to place three fingers across the wrist starting at the wrist crease. The second point is Zusanli (stomach 36) 3 fingers below the knee approximately one finger across the head of the tibia.



Neiguan, pericardium 6 (P6)



Zusanli (stomach 36)

2- Press on the acupressure points in a circular movement 30 circles clock wise followed by 30 circles anti-clock wise.



- 3- The finger must remain at the same point on skin and be moved in small circles.
- 4- The pressure was firm but not harming, it must be gentle and firm.
- 5- The thumb is usually used on pressure. The thumb faces the body i.e. the pressure is directed towards the body.
- 6- The patients are asked to perform breathing exercise during acupressure session.
- 7- Acupressure was performed in the pressure points until the patients stop vomiting and report comfort, but not for less than 10 minutes.
- 8- Acupressure was not performed in the arm that had cannula.

Evaluation phase: Patients were followed up for two chemotherapeutic cycles whereas each cycle takes three days with 21 days interval between cycles, Rhodes Index of Nausea, Vomiting and Retching (INVR), Multidimensional Fatigue Symptom Inventory, Beck Anxiety Inventory, and Functional Living Index-Emesis were filled in by the end of the 1st interviewed chemotherapeutic cycle and this is considered as the 1st post intervention reading, while the 2nd post intervention reading was by the end of the next chemotherapeutic cycle for all patients either study or control groups.

DATA ANALYSIS

The collected data were scored, tabulated and analyzed using Statistical Package for the Social Science (SPSS) program, version 20. Descriptive statistics as frequency distribution, mean, standard deviation, as well as, inferential statistics as Chi square, and t-test were utilized to analyze data pertinent to the study. Level of significance was set at $p \leq 0.05$.

IV. RESULTS

The findings of the current study are presented in two sections. Section (1) describes the study participants' demographic characteristics. Section (2) shows the comparison of mean scores between the control and study groups regarding nausea and vomiting, fatigue, anxiety as well as functional living status during the study period.

Section (1): The Study Participants' Demographic Characteristics.

Table (1): Frequency and Percentage Distribution of the Demographic Characteristics of the Studied Sample (n=60).

Variables	Control group (n:30)		Study group (n:30)		X2 test	P- value
	No	%	No	%		
Age in years:						
35 -<40	5	16.7	6	20	0.76	0.53
40-<45	6	20	7	23.3		
45-<50	7	23.3	6	20		
50-<55	7	23.3	5	16.7		
55 and more	5	16.7	6	20		
Gender:						
Male	18	60	20	66.7	0.28	0.965
Female	12	40	10	33.3		
Marital status:						
Married	22	73.3	25	83.3	0.1	0.75
Unmarried	8	26.7	5	16.7		
Work status:						
Working	15	50	16	53.3	0.08	0.989
Not-working	15	50	14	46.7		

*p-value significant: ≤ 0.05

Table (1) shows that, 20% of the control group and 23.3% of the study group had age ranged between 40 to less than 45 years, followed by 23.3% of the control group and 20% of the study group had age ranged between 45 to less than 50 years. Male is the predominant gender among the study sample as 60% and 66.7% of the control and study groups respectively were male. Regarding marital status, 73.3% of the control group and 83.3% of the study group were married. Additionally, 50% and 53.3% of the control and study groups respectively are working. There were no statistically significant differences between both groups in relation to demographic data.

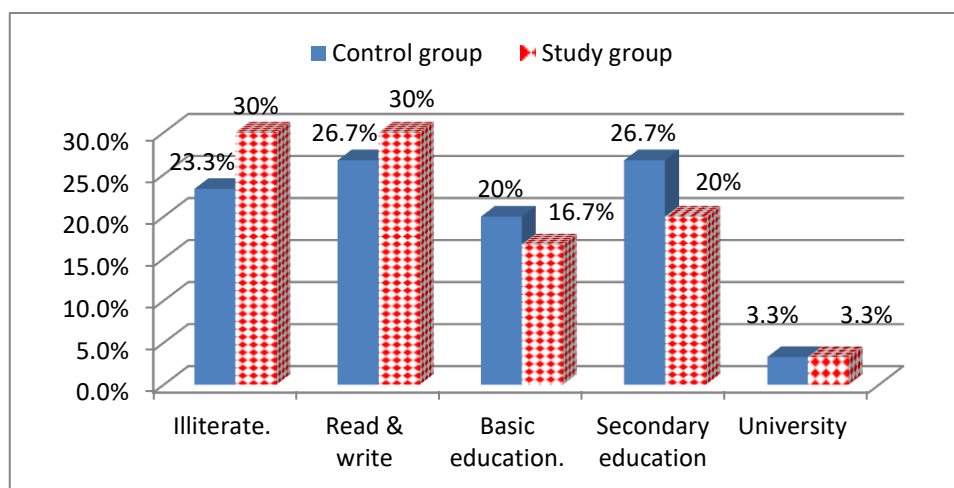


Figure (1): Percentage Distribution of Educational Level among Control and Study Groups (n=60).

Figure (1) shows that an equal percentage of 26.7% of the control group are either read and write or had secondary education. However, 30% of the study group either can read and write or illiterate, with no statistically significant differences between both groups ($X^2=0.71$, $p\text{-value}=0.53$).

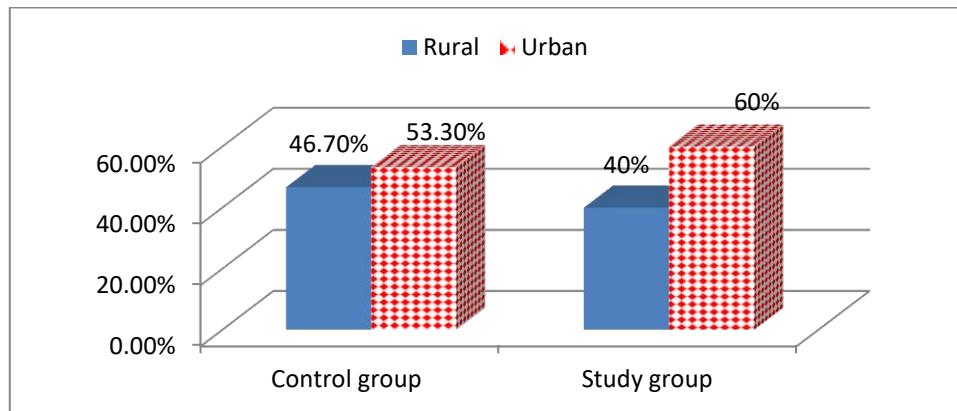


Figure (2): Percentage Distribution of the Control and Study Groups Regarding Place of Residence (n=60).

Figure (2) reveals that 53.3% of the control group and 60% of the study group were residing in urban areas, with no statistically significant difference between both groups ($X^2=0.21$, p-value=0.89).

Section (2): Comparison of Mean Scores between the Control and Study Groups Regarding Nausea and Vomiting, Fatigue, Anxiety and Functional Living Status during the Study Period.

Table (2): Comparison of Mean Nausea, Vomiting and Retching Distress Scores Between Control and Study Groups along the Study Period (n=60).

Variables	Pre intervention		1st post intervention		2nd post intervention	
	control	study	control	study	control	study
Nausea score	4.5±1.3	4.2±1.8	4.3±1.3	3.4±1.1	4.5±1.4	2.7±1.2
t-test	0.695		2.37		4.22	
p-value	0.493		0.025*		0.000*	
Vomiting score	4.6±1.3	5±1.1	4.6±1.4	3.7±1	4.9±1.3	3±0.8
t-test	1.44		2.214		6.13	
p-value	0.161		0.036*		0.000*	
Retching score	3.1±0.9	3±1	3.1±0.9	2.4±0.7	3.3±0.9	1.9±0.8
t-test	0.414		2.86		5.44	
p-value	0.683		0.008*		0.000*	
Total scores	12.1±3.3	12.3±3.2	12.1±3.3	9.5±2.3	12.7±3.2	7.6±2.2
t-test	0.276		3.261		6.833	
p-value	0.784		0.003*		0.000*	

*p-value significant: ≤ 0.05

Table (2) shows that there was no statistically significant difference between the control and study groups in the pre intervention period in relation to total mean score of nausea, vomiting and retching distress (t-test=0.276, p-value=0.784). However, there were statistically significant differences between both groups during 1st post intervention (t-test=3.261, p-value= 0.003) and 2nd post intervention readings (t-test=6.833, p-value= 0.000).

Table (3): Comparison of Mean Fatigue Scores Between Control & Study Groups along the Study Period (n=60).

Variables	Pre intervention		1st post intervention		2nd post intervention	
	control	study	control	study	Control	study
General scores	14.4±2.2	14.7±2.3	16.3±1.8	11.7±2	16.7±1.9	8.9±2.8
t-test	0.547		7.64		10.46	
p-value	0.589		0.000*		0.000*	
Physical scores	15 ± 2.4	15.6±2.5	16.6±2	11.7±2.6	16.6±1.8	10.2±2.2
t-test	0.951		7.399		10.31	
p-value	0.350		0.000*		0.000*	

Emotional scores	15.8±2.1	15.1±3.2	16.4±2.2	12.3±2.6	16.6±2.1	9.5±2.8
t-test	0.850		5.5		8.861	
p-value	0.403		0.000		0.000	
Mental scores	8.5 ±2.7	9.5±2.5	8.6±2.8	9.3±3.1	8.4±2.7	7.8± 2.8
t-test	1.468		1.137		0.874	
p-value	0.153		0.265		0.390	
Vigor scores	8.8±1.3	8.8±2.9	10.1±1.7	6.2±0.7	10.8±1.7	6.2±0.8
t-test	0.111		10.24		13.70	
p-value	0.912		0.000*		0.000*	
Total scores	47.8±7.6	48±10.5	51.8±7.4	35.2±9.9	52.3±7.2	32.1±6.3
t-test	0.073		6.65		9.361	
p-value	0.942		0.000*		0.000*	

*p-value significant: ≤ 0.05

Table (3) reveals that there were no statistically significant differences in the pre intervention reading between the control and study groups in relation to all subscales and total fatigue scores (t-test= 0.073, p-value=0.942), while, in 1st and 2nd post intervention readings, there were statistically significant differences in the total mean of fatigue scores (t-test= 6.65, p-value=0.000, & t-test= 9.361, p-value= 0.000 respectively).

Table (4): Comparison of Mean Anxiety Scores Between Control & Study Groups along the Study Period (n=60).

Study periods	Mean ± SD		t-test	p-value
	Control group	Study group		
Pre intervention	39.7±5.7	37.4±4.7	1.458	0.157
1st post intervention	42.2±5	32.3±2	8.4	0.000*
2nd post intervention	43.3±4.7	30.5±4.7	9.50	0.000*

*p-value significant: ≤ 0.05

Table (4) indicates that there was no statistically significant difference between the control and study groups in relation to anxiety in the pre intervention time (t-test=1.458, p-value=0.157), while, there were statistically significant differences between both groups in 1st post intervention time (t-test=8.4, p-value= 0.000) and 2nd post intervention time (t-test=9.50, p-value= 0.000) readings.

Table (5): Comparison of Mean Functional Living Activities Scores Between Control & Study Groups along the Study Period (n=60).

Study periods	Mean ± SD		t-test	p-value
	Control group	Study group		
Pre intervention	69.1±8.1	65.3±7.2	1.858	0.074
1st post intervention	70.1±7.2	62.1±7.1	4.55	0.000*
2nd post intervention	71.2±7.3	58.7±6.9	6.97	0.000*

*p-value significant: ≤ 0.05

Regarding functional living activities, there was no statistically significant difference between the study and control groups during the pre-intervention period (t-test= 1.858, p-value= 0.074), while there were statistically significant differences in the 1st post intervention period (t-test= 4.55, p-value= 0.000), as well as, 2nd post intervention period (t-test= 6.97, p-value= 0.000).

V. DISCUSSION

Cancer is the leading cause of death in economically developed countries and the second leading cause of death in the developing countries. Globally, cancer represents 5.1% of the total disease burden and 12.5% of all deaths (Byju et al., 2018). Chemotherapy, a primary treatment for cancer, uses cytotoxic medications that interrupt the cell cycle and inhibit cancer cells from replicating or surviving, it had its benefits as well as its side effects (LeMone et al., 2011).

Nausea and vomiting are serious side effects after the administration of chemotherapy drugs. Despite the use of antiemetic, CINV are not controlled effectively in the cancer setting (Chintamani, 2011). Acupressure has been found to have hopeful effect in decreasing nausea and vomiting during chemotherapy. Various study results point to this effect (Molassiotis et al., 2012; Genç et al., 2013). Otherwise, today acupressure is widely used to treat anxiety (Beikmoradi et al., 2015).

This study aimed to examine the effect of acupressure on chemotherapy induced nausea and vomiting among patients with lung cancer. It comprised 60 adult male and female patients who were randomly equally assigned to control and study groups (30 patients each) and diagnosed with lung cancer, suffered at least from one episode of emesis either before or during administration of chemotherapy, and still had to attend at least one additional chemotherapeutic session, are willing to participate at the oncology department in one of the governmental hospitals in Egypt. The findings of the current study are discussed in two sections. Section-1 displays the study participants' demographic characteristics. Section-2 deals with the comparison of mean scores between the control and study groups regarding nausea and vomiting, fatigue, anxiety as well as functional living status during the study period.

Section I: The study participants' demographic characteristics

According to the present study inputs, about two thirds of the control group and study groups had age ranged between forty to less than fifty five years. The highest percentages of patients in the whole sample were male, married; around half of the study sample were either illiterate or can just read and write, employed, and living in urban areas. The research findings revealed that there were no statistically significant differences related to the demographic data, so homogeneity of the control and study groups was achieved.

The current study results were to some extent in congruence with those of another study done by Byju et al., (2018), on 40 cancer patients selected by purposive sampling to explore the impact of acupressure on nausea and vomiting for patients receiving chemotherapy, who concluded that the dominant gender among the study sample was male, more than half of the sample had age ranged between fifty one to sixty years. Additionally, more than three fourths of the study sample was married, and most of the study sample was employed. However, regarding educational status, around two thirds of the study sample had either secondary education or higher education.

Section II: Comparison of mean scores between the control and study groups regarding nausea and vomiting, fatigue, anxiety as well as functional living status during the study period.

The present study finding demonstrated that there was no statistically significant difference between the control and study groups in the pre intervention reading in relation to total mean scores of nausea, vomiting and retching distress. While there were statistically significant differences between both groups during 1st and 2nd post intervention readings, whereas, the study group had lower total mean scores of nausea, vomiting and retching. This might indicate that nausea and vomiting were significantly improved in the study group who received routine hospital care plus acupressure when compared with control group who received only routine hospital care. In fact, the underlying mechanism by which acupressure can improve nausea and vomiting is not clearly understood, but the researchers may suggest that acupressure produces muscle relaxation and promotes feeling of comfort as well, this muscle relaxation also occurs for gastrointestinal muscles. Moreover, gastrointestinal muscle relaxation promotes comfort as well as anxiety relief which might add a valuable effect on nausea and vomiting. In addition, breathing exercise that was performed during the acupressure can help to reverse the gastric motility to be down rather than to be up which can also had helpful effect.

In this regard, the study conducted by Grunberg et al. (2010) and Byju et al. (2018), who reported that 70%–80% of the sample who received chemotherapy suffer from CINV, although they were taking antiemetic. Additionally Bender et al. (2002) stated that as many as 60% of patients who receive cancer chemotherapy experience some degree of nausea and vomiting. In the light of the findings from this study, as well as other related studies, it can be concluded that nausea and vomiting continues to be a major side effect of chemotherapy irrespective of the use of antiemetic.

Moreover, these results agree with those of very recent studies carried out by Shen and Yang (2017) and Eldridge (2018), who found that acupressure significantly increased the mean meridian energy and efficiently reduced the intensity of nausea and vomiting in patients with cancer lung receiving chemotherapy and recommend that, clinical nurses should provide acupressure as an intervention to control nausea and vomiting for patients undergoing chemotherapy. As well,

Abusaad and Ali (2016) examined the impact of acupressure among 60 adolescents with leukemia who received chemotherapy, in Egypt, and found significant decreasing of the duration, frequency and severity of nausea, vomiting and retching in comparison with control group.

However, these results were inconsistent with those which were preceded by Wulffa et al. (2009), who concluded that, no significant effect was reported by patients who received acupressure in the control of CINV. As well, the results of the present study disagreed with those of Genc and Tan (2015), who conducted his study on the effectiveness of acupressure in the control of CINV among 120 patients with breast cancers. They reported that, the acupressure wristband was not an effective method in controlling CINV. This difference could be due to the variation in size of sample, cancer diagnosis and socio-cultural variations.

The present study shows that there was no statistically significant difference in the pre intervention point between the control and study groups in relation to all subscales and total fatigue scores, while, during the 1st and 2nd post intervention readings, there were statistically significant differences in the total mean of fatigue scores, whereas, study group had lower total mean scores of fatigue when compared with control group. The researchers have interpreted these results in the light of the fact that acupressure produces relaxation, restores balance and a health energy flow within the body, as well as improves blood circulation that could relieve or decrease level of fatigue. Additionally, study group also had reduction in intensity of nausea and vomiting which may also contribute in improving fatigue.

These results come in the same line with the findings of Ayers and Olowe (2015), as they found that around seventy to eighty percent of patients receiving chemotherapy are at risk of CINV, which can lead to fatigue, and the ability to perform normal activities for daily living. As stated by Kasymjanova et al. (2013), his study of acupressure in lung cancer patients demonstrated the cumulative benefits of multiple treatments. Approximately two thirds of patients who received at least 4 acupressure treatments experienced a reduction in fatigue, and thirty percent noted reduction in their anxiety. When those patients received 6 or more treatments, the improvement in well-being increased to seventy percent. Moreover, Beikmoradi et al. (2015), reported that there was a statistically significant difference in the fatigue scores between the acupressure and control groups, whereas, acupressure group had lower mean fatigue scores.

Additionally, findings of the present study revealed that, there was no statistically significant difference between the control and study groups in relation to anxiety scores in the pre intervention reading, while in 1st and 2nd post intervention readings there were statistically significant differences between both groups, as, the study group had lower total mean scores of anxiety when compared with the control group, which may indicate that acupressure decreases anxiety status. The researchers' explanation for this finding is that, if there was decrease in the intensity of nausea and vomiting as well as fatigue, it may consequently lead to reduce anxiety status among the study group. These findings are similar with those of the study done by Beikmoradi et al. (2015), which revealed that performing acupressure significantly decreased mean score of anxiety in the acupressure group.

Finally, regarding functional living activities, there was no statistically significant difference between the control and study groups in the pre intervention reading, while there were statistically significant differences in the 1st post intervention reading, as well as, 2nd post intervention reading. As, the study group had lower total mean scores of functional living activities, this might indicate that functional living activities were significantly improved in the study group who received acupressure when compared to the control group who received only routine hospital care. The current study finding was in agreement with that of a study done by Tang et al. (2014), which reported that the study group who received acupressure, had significantly improvement in performing daily living activities than the control group. Beneficial effects on fatigue related to daily living activities and functional living in lung cancer patients can be found by doing acupressure once every morning, with each acupoint pressed for 1 min, and concluded that significant improvements were found with regards to fatigue level, functional activity and motivation in the acupressure group.

Based on the beneficial effects of acupressure on the distress of nausea and vomiting, fatigue levels, anxiety severity, and functional living activities of patients in the study group revealed from the current study; it was crucial to focus on that the effects of acupressure on CINV among patients with lung cancer will be verified through a systematic review of the results of the studied sample, forming a basis for the suggestion that acupressure is an economic intervention which can be understood and performed by both patients and nurses alike, in order to decrease the risk of the future complications which might affect those patients. So, hopefully this study plays a corner stone in the nursing future chain of acupressure as an alternative therapy program support.

VI. CONCLUSION

In conclusion, the study results supported the four research hypotheses, in that acupressure was effective in reducing nausea and vomiting score, decreasing fatigue and anxiety, as well as improve functional living activities when the study group was compared with the control group.

VII. RECOMMENDATIONS

Based on the study results, the following recommendations were suggested:

1. Acupressure recommended to be endorsed as a nursing practice for lung cancer patients who are on chemotherapy sessions in the early course of the disease, so that patients can experience the maximum benefit .
2. Replicate this study on a larger scale in different cancer diagnoses as breast cancer to be able to generalize the results.
3. Further studies may be needed to determine the stability of the effects of the acupressure on nausea and vomiting among patients with cancer.

VIII. NURSING IMPLICATIONS

Patients with lung cancer and scheduled for chemotherapy sessions suffer from tremendous complications as nausea and vomiting. Thus, the nurse must act as an active member to care for cancer patients by enabling them to use self-management strategies to relieve or decrease their complaints, consequently enhance their quality of life. Therefore, the endorsement of acupressure in routine hospital care is crucial in providing a practical nursing role for such patients, as well as, this intervention may contribute to improve quality of nursing care. Acupressure is safe, with no-cost; effective, easy to learn, as well as, it can be performed independently anywhere and anytime, which increases their applicability. Therefore, the current study delivered innovative research by examining the effect of acupressure on chemotherapy induced nausea and vomiting among patients with lung cancer, as it uses such intervention technique with these previously mentioned benefits.

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