Mansoura Nursing Journal (MNJ) Vol. 9. No. 2 – 2022
Print ISSN: 2735 – 4121 Online ISSN : 2735 – 413X

Original Article

Effect of Benson's Relaxation Response on Anorexia in Cancer Patients Undergoing Chemotherapy

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1.ABSTRACT

Background:Anorexia is one of the most common side effects reported in cancer patients undergoing chemotherapy, which reduce treatment success rates, and increase mortality. Therefore, aim of this study: is to evaluate the effect of Benson's relaxation response on anorexia in cancer patients undergoing chemotherapy. Method and sample: A quasi-experimental research design was conducted in the medical department and the outpatient chemotherapy unit in Oncology Center, at Mansoura University Hospital throughout four months. A purposive sample of 86 cancer patients undergoing chemotherapy and having anorexia, was divided into two matched groups; Benson's relaxation response group (A) and the control group (B). Benson's relaxation response was directed to the Benson's relaxation response group twice a day for 21 consecutive days. Data were collected using tool 1 A structured Interview Questionnaire and tool 2 Functional Assessment of Anorexia/Cachexia Therapy-Anorexia/Cachexia Subscale.**Results**: Cancer patients undergoing chemotherapy who receive Benson's relaxation response experience less anorexia than whom receive routine care as $p \leq 0.05$. **Conclusion**: Benson's relaxation response had a positive effect on anorexia in cancer patients undergoing chemotherapy. **Recommendation:** Cancer patients undergoing chemotherapy should be encouraged to perform the Benson's relaxation response by providing them an illustrated booklet.

Keywords: Anorexia, Benson's relaxation response, Cancer, Chemotherapy.

2.Introduction:

Cancer is a generic term for a large group of diseases that can start in virtually any organ or tissue by abnormally growing cells that invade other parts of the body, ultimately leading to death **(Leitão, 2020)**. The predicted global cancer burden is expected to exceed 27 million new cancer cases per year by 2040. Such an increase will be most significant in underdeveloped countries **(Zarmouh et al., 2021)**. In Egypt, age-standardized incidence rates per 100,000 constituted 166.6, incidence rates were calculated at a regional and a national level, the results were those of Lower Egypt, Middle Egypt, and Upper Egypt **(Ibrahim, Khaled, Mikhail, Baraka, & Kamel, 2014)**.

Cancer treatment modalities reported are surgery, radiation therapy, and systemic treatment, including chemotherapy, targeted therapy, hormonal therapy, and immunotherapy **(Miller et al., 2019)**. Chemotherapy causes severe side effects which affect an individual's physical health, quality of life and emotional state **(Yang, Chen, & Shi, 2020)**. Anorexia is one of the most common side effects reported in cancer patients undergoing chemotherapy **(Jafarimanesh, Akbari, Hoseinian, Zarei, & Harorani, 2020)**. The most commonly cited medications for anorexia are corticosteroids, progestins Megestrol Acetate (MA), anamorelin, and dronabinol. However, the use of these drugs has many adverse effects with prolonged use **(Barbosa de Moura et al., 2020)**. Most current pharmaceutical interventions tend to relieve symptoms only temporarily without addressing the underlying causes **(Palesh et al., 2018)**. Meanwhile, one effective and low risk nursing intervention is complementary and alternative medicine (CAM) **(Farahani et al.,2019)**. Complementary and Alternative Medicine (CAM) is more efficient, less invasive, and more accessible than other treatments. Moreover, it lowers treatment costs **(Hughes, Liddle, Sinclair, & McCullough, 2018; Fateme et al., 2019)**. Relaxation is a complementary and non-pharmacological method.

The Benson relaxation response (BRR) is one of the relaxation methods that dampens stress responses by relaxing and releasing the muscles. The relaxation response is a term coined by Dr. Herbert Benson in the 1970s that describes the body's ability to cope with the fight-or-flight response to decrease physiological and psychological symptoms of distress **(Sadeghimoghaddam, Alavi, Mehrabi, & Bankpoor-Fard, 2019)**. Patients' comfort during chemotherapy is one of the aims that nurses work for and CAM is the facilitator to achieve this aim **(Lewis, Dirksen, Heitkemper, Bucher, & Camera, 2015)**. Nurses therefore play a critical role in the early assessment, education, prevention, and reassessment of the effectiveness of the intervention to support the nutritional needs of patients and their families **(Del Ferraro, Grant, Koczywas, & Dorr-Uyemura, 2012)**.

Aim of the study

The aim of this study was to evaluate the effect of Benson's relaxation response on anorexia in cancer patients undergoing chemotherapy.

Research hypothesis:

Cancer patients undergoing chemotherapy who receive Benson's relaxation response will experience less anorexia than whom receive routine care.

3. Methods

Study Design:

A quasi-experimental research design was used throughout this study.

Setting:

This study was conducted in the medical department and outpatient chemotherapy unit in Oncology Center at Mansoura University Hospital. The medical department is located on the 9th floor at the hospital and divided into 2 parts; one for male patients which is located in the left side and the other for female patients which is located on the right side. The outpatient chemotherapy unit is located in the second floor

Subjects:

Sample technique:

A purposive sample of 86 cancer patients undergoing chemotherapy and who having anorexia, were enrolled in the present clinical trial, and divided into two matched groups: Benson's relaxation response group (A) and control group (B). Study included patients aged between 20-60 years, of both sexes, patients received at least one chemotherapy cycle, having the ability to communicate, willing to participate in the study, and excluded patients who had limits on movements to relax, stomatitis, Patients take an appetite stimulant as megestrol acetate, corticosteroids, thalidomide, Patients take hypnotics, opioid analgesics and, anxiolytics, Patients who take hormonal therapy like tamoxifen, and Patients who have a chewing problem.

Tools of data collection:

Two tools were used to collect data pertinent to the study:

Tool I: A structured Interview Questionnaire: This tool was developed by the researcher after reviewing relevant literature **(Harorani et al., 2020)**. It included the following 3 parts:

Part 1: Patient's Demographic Data: This part consisted of 6 items (age, gender, marital status, level of education, occupation, and activity level).

Part 2: Health Relevant Data: This part consisted of 6 items (the medical diagnosis, patient's history, date of diagnosis, number of chemotherapy sessions within the treatment protocol, number of chemotherapy sessions received by the patient, duration of anorexia as a side effect of chemotherapy.

Part 3: Anthropometric Measurements: This part consisted of patient weight at the first chemotherapy session, patient height in meter, patient weight in kilogram on a fixed scale were taken to calculate body mass index(BMI)= weight in kilograms

height in meters squared

Tool II: The Functional Assessment of Anorexia/Cachexia Therapy-Anorexia/Cachexia Subscale (FAACT–A/CS): This tool was originally developed by **Cella et al.,(1993)**, validated by **Blauwhoff-Buskermolen et al., (2016)**, (4th version, Dutch) for diagnosis of anorexia.

Scoring system:

This FAACT–A/CS score consists of 12 questions related to appetite and food intake. Each question is on a 5-point Likert scale (0=not at all, 1=a little bit, 2=somewhat, 3=quite a bit, 4=very much). The sum score ranges from 0 to 48, whereby a lower score indicates less appetite. A total score of ≤37was considered to indicate the presence of anorexia.

Data collection process:

Phase I: Preparatory phase included the following:

- ***Administrative stage***:

-Ethical approval was obtained from the Research Scientific Ethical Committee of the Faculty of Nursing, Mansoura University. Official letter was submitted from the faculty of Nursing of Mansoura University to the director of the oncology center in Mansoura University Hospital, to obtain his approval to conduct the study.

-content validity: A jury of six experts (five in the field of Medical-Surgical Nursing Department and one in the oncology field) was tested the content validity of the developed tools and the required modifications were carried out.

- Face validity*:* It was carried out by conducting **a pilot stud**y on 10% of the study sample (9 patients) which excluded from the study sample, to ensure the feasibility, clarity, relevance, comprehensiveness, free of mistakes & applicability of the developed tool.

- **Feasibility**; through an analysis that considers all of a study's relevant factors including economic, technical, legal, and scheduling considerations to ascertain the likelihood of completing the study successfully.

- **Tool reliability** was tested by means of the Cronbach Alpha test to calculate the inner consistency of the tool. It was founded as, (α= 0.832).

- **Ethical consideration and human rights:**

All relevant possible aspects were considered. Prior to the study, oral / written consent was obtained from each patient after providing comprehensive information about the nature of the study, aim, benefits, risks, compensation, and alternative treatment. The researcher emphasized that participation is absolutely voluntary. Participants were informed that they have the right to refuse to participate in the study and withdrawn at any time and the refusal to participate in the study wouldn't affect their care. Anonymity, privacy, safety, and confidentiality were assured throughout the whole study.

- Coloured booklet was developed by the researcher after reviewing recent literature review.

Phase II: Operational phase:

- When the necessary approval is obtained the researcher started to collect data. Data collection extended over a period of four months, from the beginning of April to the end of July 2021, the investigator used to go to the medical department and outpatient chemotherapy unit in Oncology Center 5 hours/ day (from 9;00 AM to 2:00 PM), 3 days/week (Saturdays, Mondays and Wednesdays).
- The framework of the study was carried out according to 3 phases as the following: Assessment phase, implementation phase, and evaluation phase.

A. <u>Assessment phase:</u>

- All patients were interviewed individually to collect the necessary data using tool I.
- The researcher assessed the patient's level of anorexia using tool II, and filled out the questionnaire by asking patients and filling the questionnaire which took about 20 minutes.

B. <u>Implementation phase :</u>

- Based on the findings of assessment phase, patients who match sampling criteria were divided into two equal groups, Benson's relaxation response group (A) who received BRR instructions, and control group (B) who received only routine nursing care.
- The researcher taught Benson's relaxation response to the group (A) using a booklet.
- In Benson's relaxation response group (A) educational and practical training session were implemented for all patients, educational session took about (5-10 minutes) and then practical training session took about (10 minutes). In the educational session the researcher used simple and understandable sentences. Instructions continued until learning was completed. Here are the steps of the BRR that taught to the BRR group:

1. Gently lie down quietly in a comfortable supine position.
2. Close the eyes slowly.
3. Relax your muscle, starting from the soles of the feet up to the top of the head moving forward, and relax all body parts.
4. Do not dwell upon disturbing thoughts during the relaxation process.
5. Choose a word like "easy" or "calm" and repeat it regularly.

6. Breathe slowly, deeply, and regularly. Repeat focus word silently as you exhale.
7. When other thoughts come to mind, simply say to yourself, "Oh, well" and gently return to the repetition. Continue to relax for 20 minutes during which all muscles should be loosed. You may open your eye to check the time but don't use an alarm.
8. After 20 minutes, open your eyes slowly and do not stand up for 1 or 2 minutes.

- In the practical training session the patients were then asked to perform the relaxation method once in the presence of the researcher to ensure that they had learned and applied it correctly.
- The patients performed it twice a day (once in the morning and once in the afternoon) over 21 consecutive days in a quiet room. The intervention was reminded and followed up by phone calls and through sending messages on WhatsApp group.

C. Evaluation phase:

- This phase aimed to evaluate the effect of Benson's relaxation response on anorexia in cancer patients undergoing chemotherapy. Each patient was interviewed individually after 21 consecutive days from performing Benson's relaxation response twice a day and the outcome was compared with a control group who received only routine nursing care.

Statistical analysis

The collected data were organized, tabulated and statistically analyzed using SPSS software (Statistical Package for the Social Sciences, version 26, SPSS Inc. Chicago, IL, USA). The categorical variables were represented as frequency and percentage. The parametric continuous variables were represented as mean and standard deviation whereas non- parametric and ordinal variables were presented as median and interquartile range (IQR). A Chi square test and fisher exact test were used to test homogeneity between study and control group related to their demographic characteristics and health data. Wilcoxon signed rank test was utilized to test difference of non-parametric continuous and ordinal variables between paired groups. Whereas paired t-test was utilized to test difference of parametric-continuous variables between paired groups. Marginal homogeneity test was utilized to test difference between paired group related categorical variables (more than two categories). Independent t-test was used to compare the means between two unrelated groups on the same parametric continuous variable and ANOVA was used to compare the means between more than two unrelated groups on the same parametric continuous variable Statistically significant was considered at p-value <0.01 &0.05.

Limitation of the study

The patients might have received different types of chemotherapy and medical treatments in the two groups as these treatments may affect the symptoms. Therefore, the results have to be interpreted cautiously. The lack of previous studies in the research area; previous findings are used as the foundation for the researcher to be built upon to achieve the research objectives. So, further studies needed to determine the effect of BRR in reducing anorexia in cancer patients undergoing chemotherapy.

4. Results:

Table (1): Shows distribution of the Benson's relaxation response group (BRR) and control groups according to their demographic characteristics. In relation to age, the age group of 20 to <60 years represents the highest percentage with mean age 39.97±11.25 years of the BRR, and 42.21±8.66 years of the control group. Regarding to gender, it was noticed that females were prevalent than males where 55.8% and 60.5% of the BRR group and the control group respectively were female. Concerning the level of education, 55.8 % and 51.2% of the study and control group respectively were intermediate education. Regarding to marital status, 74.4% & 76.7% of the patient in BRR group and control group respectively were married. No significant difference was found between the two group where $p > 0.05$.

Table (2): Reveals distribution of BRR group and control group regarding health relevant data. As regards diagnosis, 27.9% of the BRR group and the control group had breast cancer, with no statistically significant difference between the two groups $P = 0.12$. Pointing to duration of anorexia 100.0% of BRR group and control group have anorexia since the first dose.

Table (3): Represents significant improvement in patients' weight and body mass index among BRR group in comparison to control group as $p<0.05$.

Table (4): shows a significant improvement in both anorexia subscale and overall anorexia among BRR group in comparison to control group as $p<0.05$

Table (5) shows no statistically significant difference noticed in anorexia among the studied

patients and their clinical data before and after practicing BRR where p values were found to be > 0.050, except diagnosis showed highly statically significant differences in anorexia before and after practicing BRR where p values was0.000**.

Table 1 Demographic characteristics of the studied patients (n=86)

Items	BRR group (n=43)		Control group (n=43)		FE /or $\chi 2$	p
	N	%	N	%		
Age						
From 20 to less than 30 years	9	20.9	4	9.3	3.77	0.29
From 30 to less than 40 years	8	18.6	9	20.9		
From 40 to less than 50 years	16	**37.2**	23	**53.5**		
From 50 to less than 60 years	10	23.3	7	16.3		
Mean ±SD	39.97 ±11.25		42.21 ±8.66		t= 1.03	0.31
Gender						
Male Female	19 24	44.2 **55.8**	17 26	39.5 **60.5**		0.19 0.66
Education						
Illiterate	6	14.0	13	30.2	FE	0.24
Read and write	3	7.0	1	2.3		
Intermediate education	24	**55.8**	22	**51.2**		
Higher education	10	23.3	7	16.3		
Marital status						
Single	5	11.6	5	11.6	FE	0.85
Married	32	**74.4**	33	**76.7**		
Widowed	3	7.0	4	9.3		
Divorced	3	7.0	1	2.3		

FE: Fisher Exact

$\chi 2$: Chi-squared tests

* Significant if ($p \leq 0.05$)

Table 2 Health relevant data of the studied patients (n=86)

Variables	BRR group (n=43)		Control group (n=43)		FE /or $\chi 2$	p
	N	%	N	%		
Diagnosis						
Breast cancer	12	**27.9**	12	**27.9**	FE	0.12
Colon cancer	3	7.0	0	0.0		
Lung cancer	4	9.3	7	16.3		
Liver cancer	3	7.0	1	2.3		
Uterine cancer	1	2.3	7	16.3		
Ovarian cancer	1	2.3	0	0.0		
Leukemia	5	11.6	4	9.3		
Seminoma	6	14.0	2	4.7		
Lymphoma	4	9.3	8	18.6		
Jaw cancer	1	2.3	0	0.0		
Cancer metastasis	3	7.0	2	4.7		
Duration of anorexia						
Since the first dose	43	**100.0**	43	**100.0**		

Table 3 Patients' weight and body mass index differences before and after Benson's relaxation response between the BRR group and control group(n=86)

Items	Before		After	t-value / p
	Mean±SD		Mean±SD	
Patient weight on a fixed scale	BRR group	74.54±16.92	74.95±16.80	2.45/0.02*
	Control group	82.37±18.31	82.08±18.32	3.59/0.001**
Body mass index	BRR group	26.49±6.33	26.64±6.29	2.62/0.01**
	Control group	28.04±6.49	27.94±6.49	3.06/0.004**

* Significant if ($p \leq 0.05$)

** Highly significant if ($p \leq 0.001$)

Table 4 Comparison of Anorexia among the BRR group and control before and after Benson's relaxation response (n=86)

Items		Before	After	
		Median (IQR)	Median (IQR)	Z/ p
Anorexia symptoms	BRR group	5.0 (4.0)	8.0 (8.0)	4.79/0.000**
	Control group	8.0 (4.0)	7.0 (4.0)	3.25/0.001**
Anorexia concerns	BRR group	6.0 (6.0)	8.0 (5.0)	3.55/0.000**
	Control group	9.0 (5.0)	9.0 (6.0)	2.97/0.04*
Others related anorexia	BRR group	5.0 (2.0)	7.0 (4.0)	4.81/0.000**
	Control group	6.0 (1.0)	6.0 (1.0)	2.07/0.6
Overall anorexia	BRR group	16.0 (11.0)	24.0 (17.0)	4.99 /0.000**
	Control group	22.0 (8.0)	21.0 (10.0)	3.31 /0.001**

* Significant if ($p \leq 0.05$)

** Highly significant if ($p \leq 0.001$)

N.B: Median is used for continuous non-parametric ordinal data.

-An increase in the score represents an improvement in anorexia

Table 5 Relationship between anorexia among the studied patients and their clinical data (n=86)

Clinical data of the studied patients	Before BBR	After BBR
	Total anorexia score	Total anorexia score
	Mean ±SD	Mean ±SD
Diagnosis		
Breast cancer	19.25 ±8.53	26.37 ±9.88
Colon cancer	12.33 ±1.52	10.66 ±1.52
Lung cancer	16.36 ±4.71	18.09 ±9.35
Liver cancer	17.25 ±3.20	20.75 ±6.18
Uterine cancer	24.75 ±3.61	25.00 ±5.12
Ovarian cancer	13.00	13.00
Leukemia	22.55 ±10.30	26.66 ±8.24
Seminoma	21.58 ±5.26	24.91±5.94
Lymphoma	17.33 ±7.98	17.58 ±6.66

jaw cancer	4.00	4.00
Cancer metastasis	15.60 ±6.73	14.00±6.96
F value/ p	2.56/0.01*	4.09/0.000**
Previous chemotherapy and cancer		
Yes	19.46 ±9.39	20.76 ±9.86
No	19.26 ±6.00	22.01 ±7.78
t value/ p	0.11/0.91	0.62/0.53
Number of received chemotherapy sessions		
≤ 5	18.48 ±6.44	20.85 ±7.95
6-10	21.50 ±8.44	23.66 ±9.41
t value/ p	1.77/0.07	1.39/0.16

* Significant if ($p \leq 0.05$)

** Highly significant if ($p \leq 0.001$)

5. Discussion

Anorexia is one of the most common side effects reported in cancer patients undergoing chemotherapy. This condition is life-threatening as it increases mortality, and reduces the treatment success rate **(Jafarimanesh, Akbari, Hoseinian, Zarei, & Harorani, 2020)**. Since the pharmacological methods have numerous side effects, patients can benefit from using a variety of non-pharmacological methods, which can help to reduce the side effects of medication. Many of these methods are parts of complementary medicine **(Tola, Chow, & Liang, 2021)**. Benson Relaxation response is one of these complementary therapies **(Reaves & Angosta, 2021)**.

Therefore; This quasi-randomized, controlled study highlights the effect of Benson's relaxation response on anorexia in cancer patients undergoing chemotherapy. The results of the present study revealed that more than one third of the patients in the BRR group were between forty to less than fifty years, and about half of the control group aged were between forty to less than fifty years. This is in the line with the study by **Harorani et al., (2020)** on cancer patients undergoing chemotherapy, in Iran, which reported that the majority of studied groups were between forty and sixty years, these findings may be due to the molecular pathways of aging and cancer being intertwined, cancer incidence is closely related to age, and cancer can be expected to become a formidable challenge as the aging population grows. Regarding gender, the present study showed that females were more prevalent in the study subjects. This result is consistent with the study conducted by **Abo-Touk, (2020)** on cancer patients, which found that females were more than males in his study. But this is inconsistent with the study conducted by **Ibrahim et al., (2014)** on cancer patients, in egypt, who reported that the prevalence of cancer was more in males than females. this discrepancy may be due to the role of sex-specific differences in the incidence of various cancers, with breast, lung, and colorectal cancer predominating in females, while prostate, and colorectal cancers occur more often than others in males.

About educational level, more than half of the study and control group were of intermediate education, and the educational characteristics of these subjects were consistent with **Hack, (2010)** study, who found that more than half of cancer patients were high school graduates. Besides **Harorani et al., (2020)** in a study of the effects of relaxation on self-esteem of the cancer patients, in Arak Ayatollah-Khansari Hospital, Iran, where the experimental group was academic, and in contrast to the control group in which the majority of cancer patients were non-academic. This may be due to cultural or social differences in learning from one community to another. Concerning marital status, the present study revealed that approximately three-quarters of the studied groups were married. Similarly, in Canada, a study by **Hack, (2010)** reported that the majority of patients with cancer were married. Conversely to the study conducted in the USA by **Khanna et al., (2017)** who noticed that most breast cancer patients were single. From the investigator's point of view this difference may be related to the age of the patients selected in the present study was between 20-60 years.

The present study observed that approximately one third of the studied groups had breast cancer, and this result was consistent with **Abo-Touk, (2020)** who reported that the most common diagnosis was breast cancer, it is also in agreement with a North American study by **Islami et al., (2021)** which reported that most of the cancer patients in the Cancer Statistics Study were breast cancer. Unlike a study in Korea, by **Jung,**

Won, Kong, & Lee, (2019) which stated that most of the cancer patients were stomach cancer. The present result may be due to the majority of the studied patients were females, and breast cancer is considered the most common type of cancer among females in Egypt.

The present study revealed that all patients had anorexia since the first dose of chemotherapy. This is in line with a study in Italy by **Galizia, (2018)** who reported that the majority of cancer patients experiencing anorexia since the first dose of chemotherapy. This may be because cancer can impair the function and motility of the gastrointestinal tract (GIT). Likewise, chemotherapy may reduce a patient's desire to eat.

Pointing to the effect of Benson's relaxation response on patients weight, it is clear that there was a statistically significant increase in patient weight and BMI among BRR group in comparison to control group. This result is roughly consistent with a study in America by **Goldfarb, Fuhr, Tsujimoto, & Fischman, (1987)** on patients with anorexia nervosa that showed the efficacy of relaxation in improving appetite and weight gain. This may be due to relaxation which affects the metabolism and physiology of the body can improve circulatory functions and thus improve body weight.

The present study revealed a significant improvement in anorexia among BRR group in comparison to control group. This is in line with the Iranian study by **Harorani et al., (2020)** which reported in a trial to study the effect of BRR on anorexia, that BRR as a complementary method was effective in improving anorexia in cancer patients undergoing chemotherapy. These findings are in agreement with the results obtained in a Turkish study by **Kurt & Kapucu, (2018)** which showed that relaxation exercises have a positive effect in reducing symptoms caused by adjuvant chemotherapy. These exercises increase appetite due to the energy requirements for an increased metabolic rate. Relaxation exercises improve patients' anorexia by improving patients' respiratory function, reducing tissue oxygen consumption, and depressing the sympathetic nervous system.

6. Conclusion

The results of the present study showed that, Benson’s relaxation response had a positive effect on anorexia in cancer patients undergoing chemotherapy.

7. Recommendations:

Based upon findings of the present study, Cancer patients undergoing chemotherapy should be encouraged to perform the Benson's relaxation response by providing them an illustrated booklet.

The same study could be replicated on a large sample size of patients with different age groups, in a different clinical setting, and with a different diagnosis.

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