Research Article

Effectiveness of Progressive Muscle Relaxaion Technique on Pain among Cancer Patients Receiving Radiation Therapy

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Abstract

Background: Pain in cancer may arise from a tumor compressing or infiltrating nearby body parts; from treatments and diagnostic procedures; or from skin, nerve, and other changes caused by a hormone imbalance or immune response. Progressive muscle relaxation technique, a complementary approach to pain relief, is a form of body work that focuses primarily on the feet.

Methodology: A quasi-experimental study was conducted to evaluate the effectiveness of progressive muscle relaxation technique on pain among cancer patients receiving radiation therapy. Totally, 60 samples were selected by non-probability purposive sampling technique, among them, 30 were in the experimental group and 30 samples were in the control group. The investigator implemented progressive muscle relaxation technique for 15 days with the duration of 20–30 min. The level of pain was assessed using numerical pain intensity rating scale. The data gathered were analyzed by descriptive and inferential statistical method.

Results: The finding revealed that, in the experimental group, the post-test mean score was 4.10 ± 1.63 and, in the control group, the mean score was 7.13 ± 2.11 with the mean difference of 3.03. The independent "*t*"-test value ($t = 6.23$) is highly significant. The paired "*t*"-test value ($t = 8.24$) revealed that progressive muscle relaxation technique was effective in reducing the pain. In the experimental group, there is a significant association found between the post-test level of pain and the variables such as age ($\chi^2 = 9.47$), occupational status ($\chi^2 = 12.44$), and stage of cancer ($\chi^2 = 9.83$).

Conclusion: The progressive muscle relaxation technique was effective in reduction of pain among cancer patients receiving radiation therapy.

Keywords: Effectiveness, progressive muscle relaxation technique, pain, cancer patients, radiation therapy

Introduction

Cancer is a leading cause of death worldwide, accounting for nearly 10 million deaths in 2020, or nearly one in six deaths. The most common cancers are breast, lung, colon, and rectum and prostate cancers (the World Health Organization).[1] Worldwide, an estimated 19.3 million new cancer cases (18.1 million excluding non-melanoma skin cancer) and almost 10.0 million cancer deaths (9.9 million excluding non-melanoma skin cancers) occurred in 2020. The global cancer burden is expected to be 28.4 million cases in 2040.[2]

The projected incidence of patients with cancer in India among males was 679,421 (94.1/100,000) and among females 712,758 (103.6/100,000) for the year 2020. One in 68 males (lung cancer), 1 in 29 females (breast cancer), and 1 in 9 Indians will develop cancer during their lifetime 0–74 years of age.[3]

Oncology nurses have special skills in assisting the client and gamily with the psychosocial issues associated with cancer and terminal illness. Radiation therapy pain assessment and

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management remain one of the major clinical challenges confronting health-care professionals. Radiation therapy and chemotherapy tend to be the most painful among 70% of patients who undergo anti-cancerous treatment suffer from severe pain. Nurses play a major role in minimizing pain and discomfort.

The international association for the study of pain widely used definition states: Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage.[4] The present health care system in India under the National Health Policy has laid a lot of emphasis on the merging of complementary and alternative medicine, along with other standard treatment to provide comprehensive health care.[5]

Non-pharmacological approaches can often help divert attention from pain to alternate sensory experiences, which can further change the affective component of the pain experience. Progressive muscle relaxation technique, a complementary approach to pain relief, is a form of body work that focuses primarily on the feet progressive muscle relaxation technique has been around for a long time. It has been shown to induce a state of deep relaxation, reduce stress and tension, improve the blood supply, promote the flow of nerve impulses, reduce inflammation, and assist the body to regain its natural equilibrium or homeostasis.

Irrespective of the state of the body, it is highly unlikely that a progressive muscle relaxation technique will do any harm. Cancer patients' face number of problems, among those pain and fatigue, are common problems. The study was done to evaluate effectiveness of PMR exercises on pain and fatigue among hospitalized cancer patients' receiving radiotherapy. There was significant difference ($P < 0.01$) in pre-NPRS (4.42 ± 2.35) to post-NPRS (3.44 ± 2.05) scores among intervention group (PMR). Pre-assessment mean fatigue scores (CFS) of subjects were 33.80 ± 10.62 in intervention group (PMR) and 33.24 ± 7.02 in controls, whereas post-assessment CFS was 28.52 ± 12.74 and 36.52 ± 7.53 in intervention and control group, respectively. There was significant ($P < 0.01$) reduction in pre- to post-CFS in PMR group, while fatigue increased significantly ($P < 0.01$) in the control group. Conclusion: PMR, along with routine standard treatment, is effective in reducing pain and fatigue among hospitalized cancer patients receiving radiotherapy.[6]

A quasi-experimental study was done to evaluate the effect of progressive muscle relaxation on pain and fatigue among patients with cancer in a selected cancer institute, Kottayam. The findings of the study were that the mean post-test scores of pain and fatigue of the experimental and control group showed a significant reduction in pain and fatigue among experimental group after the intervention. There is positive correlation between pain and fatigue among patients with cancer. The present study suggests that progressive muscle relaxation is effective in controlling pain and fatigue among cancer patients.[7]

Methodology

Objectives

The present study is to assess the level of pain, evaluate the effectiveness of progressive muscle relaxation technique on

Table 1: Frequency and percentage distribution of samples in the experimental and control group according to their demographic variable *n*=60

Demographic profile	Group			
	Experiment		Control	
	F	%	*F*	%
Age				
31–40 years	4	13.3	6	20
41–50 years	8	26.7	10	33.3
51–60 years	18	60.0	14	46.7
Sex				
Male	11	36.7	7	23.3
Female	19	63.3	23	76.7
Marital status				
Married	30	100	30	100
Type of family				
Nuclear	21	70	23	76.7
Joint	9	30	7	23.3
Education				
No formal education	10	33.3	7	23.3
Primary	9	30	7	23.3
Middle	6	20	12	40
High school	3	10	2	6.7
Higher secondary	2	6.7	2	6.7
Occupational status				
Government employee	1	3.3	0	0
Self-employee	2	6.7	1	3.3
Coolie	20	66.7	25	83.3
Unemployment	7	23.3	4	13.3
Habits				
Smoking	1	3.3	0	0
Alcohol	0	0	1	3.3
Chewing tobacco	2	6.7	0	0
No bad habits	18	60	26	86.7
Combined bad habits	9	30	3	10
Dietary pattern				
Vegetarian	4	13.3	3	10
Mixed	26	86.7	27	90

Table 2: Frequency and percentage distribution of samples in the experimental and control group according to their clinical variables *n*=60

Demographic profile	Group			
	Experiment		Control	
	F	%	*F*	%
Stage of cancer				
II stage	9	30	11	36.7
III Stage	21	70	19	63.3
Site of cancer				
Cervical cancer	12	40	12	40
Breast cancer	5	16.7	4	13.3
Esophageal cancer	4	13.3	8	26.7
Neck cancer	8	26.7	6	20
Others	1	3.3	0	0
Duration of radiotherapy				
2–3 weeks regular days of treatment	30	100	30	100
Previous knowledge on progressive muscles techniques				
No	30	100	30	100

Table 3: Paired "*t*"-test value on pain among samples during pre-test and post-test in the experimental and control group *n*=30

Groups	Pre-test		Post-test		Mean difference	Paired "*t*"-test
	Mean	SD	Mean	SD		
Experiment	8.17	1.93	4.10	1.63	4.07	8.24**
Control	8.03	1.29	7.13	2.11	0.90	1.91

Table value=2.58. **Highly significant at $P \leq 0.01$

Table 4: Comparison of post test mean pain score among cancer patients receiving radiation therapy in experimental and control group *n*=60

Group	Post-test		Mean difference	Independent "*t*"-test
	Mean	SD		
Experiment	4.10	1.63	3.03	6.23**
Control	7.13	2.11		

**Highly significant at p≤0.01

pain, and to find the association between post-test levels of pain among cancer patients receiving radiation therapy at selected private hospital. A quantitative evaluative approach with quasi-experimental, pre-test post-test control group design was adopted. Table 3 reveals that the experimental cancer patients had 8.17±1.93 mean pain score in pre-test and in post-test had 4.10±1.63 mean pain score, so the difference is 4.07, this difference is large and it is statistically significant.

Sample size

The sample size for this study was 60 which consist of 30 samples which were in the experimental group and 30 samples were in the control group.

Sampling technique

Non-probability purposive sampling technique was used to select the sample for the present study. The tool used is the variables and numerical pain intensity rating scale.

Table 5: Association between post-test level of pain score and demographic variables

Demographic profile	Post-test level of pain score						Table value	Chi-square test
	Mild pain		Moderate pain		Severe pain			
	n	%	*n*	%	*n*	%		
Age								
31–40 years	1	25	1	25	2	50	9.48	9.47*
41–50 years	4	50	3	37.5	1	12.5		
51–60 years	12	66.7	6	33.3	0	0		
Sex								
Male	4	36.4	6	54.5	1	9.1	5.99	3.66
Female	13	68.4	4	21.1	2	10.5		
Marital status								
Married	17	56.7	10	33.3	3	10	5.99	0.00
Type of family								
Nuclear	13	61.9	5	23.8	3	14.3	5.99	3.52
Joint	4	44.4	5	55.6	0	0		
Education								
No formal Education	8	80	1	10	1	10	15.50	5.85
Primary	3	33.3	5	55.6	1	11.1		
Middle	3	50	2	33.3	1	16.7		
High school	2	66.7	1	33.3	0	0		
Higher secondary	1	50	1	50	0	0		
Occupational status								
Government employee	0	0	0	0	1	100	12.59	12.44*
Self-employee	2	100	0	0	0	0		
Coolie	11	55	8	40	1	5		
Unemployment	5	71.4	1	14.3	1	14.3		
Habits								
Smoking	0	0	1	100	0	0	12.59	6.74
Chewing tobacco	2	100	0	0	0	0		
No bad habits	12	66.7	4	22.2	2	11.1		
Combined bad habits	3	33.3	5	55.6	1	11.1		
Dietary pattern								
Vegetarian	3	75	1	25	0	0	5.99	0.83
Mixed	14	53.8	9	34.6	3	11.5		
Stage of cancer								
II stage	9	100	0	0	0	0	5.99	9.83*
III stage	8	38.1	10	47.6	3	14.2		
Cervical cancer	8	66.7	2	16.6	2	16.6	12.59	5.32
Breast cancer	3	60	1	20	1	20		
Site of cancer								
Esophageal cancer	3	75	1	25	0	0		
Neck cancer	4	50	4	50	0	0		
Others	1	100	0	0	0	0		

*Significant at p≤0.01

The investigator introduced progressive muscle relaxation technique for 15 days with the duration of 20–30 min. The data analysis is done using descriptive and inferential statistics.

Above Table 1 shows that, in the experimental group, the majority 60% samples and, in the control group, 46.7% samples belong to the age group of 51–60 years.

In the control group, 76.7% of the samples were female and in the experimental group 63.3% were female. In the experimental group, majority of the sample 33.3% had no formal education, whereas, in the control group, 40% of the sample had primary education. In the experimental group, 60% of the sample had habit of chewing tobacco and, in the control group, 86.7% of the samples were alcoholic.

Table 2 shows that majority of the samples in the experimental group and control group had III stage of cancer. According to the site of cancer in the experimental and control group, majority of the sample has cervical cancer.

In the experimental cancer, patients had 8.17 ± 1.93 mean pain score in pre-test and in post-test had 4.10 ± 1.63 mean pain score, so the difference is 4.07, this difference is large, and it is statistically significant.

Table 4 indicates in post-test that the cancer patients had 4.10 ± 1.63 mean pain score in the experimental group and the control group had 7.13 ± 2.11 mean pain score, so the difference is 3.03, this difference is more, and it is statically significant.

Table 5 explains that there was a significant association found in the experimental group between the post-test level of pain and demographic and clinical variables such as age, occupational status, and stage of cancer.

Discussion

The study focused on evaluating the effectiveness of progressive muscle relaxation technique on pain among cancer patients receiving radiation therapy. Although in few studies, researchers have assessed effect of progressive muscle relaxation technique on variables such as stress, anxiety, fatigue, depression, and quality of life,[8,9] there is limited literature available on hospitalized cancer patients receiving radiotherapy assessing effect of progressive muscle relaxation technique on pain.

The unpaired "*t*" value 6.23 was significantly greater than the table value. It was evident that the progressive muscle relaxation technique was effective in reducing the level of pain among cancer patients receiving radiation therapy. These present study findings are consistent with the study conducted by Pathak *et al*. (2013).[6]

An analysis of literature review on progressive muscle relaxation technique and imagery interventions for cancer pain reported that interventions reduced sensory experience of pain but had no effect on functional status of patients.[10] One study done on individual difference variables and the effects of progressive muscle relaxation technique and analgesic imagery on cancer pain among 40, hospitalized cancer patients in U.S.A, revealed that only half of the participants achieved a clinically meaningful improvement in pain with each intervention.[8]

The findings of the present study are leading to the conclusion that progressive muscle relaxation technique is effective in reducing pain and fatigue among cancer patients receiving radiotherapy.

Conclusion

The progressive muscle relaxation technique was effective in reduction of pain among cancer patients receiving radiation therapy in the experimental group. There was significant association found between the level of pain in age, occupational status, and stage of cancer in the experimental group.

Conflicts of Interest

Nil.

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