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RESEARCH ARTICLE

Effectiveness of guided imagery in terms of cancer pain and perceived stress among patients with cancer

Sumathy Masanam Kasi*
PhD scholar, Department of Medical Education,
Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Puducherry 605006, India

Abstract: *Background:* The World Health Organisation (WHO) reports that cancer accounts for 13% of global deaths. For cancer survivors, pain and stress significantly debilitate their quality of life, interfering with daily activities and the healing process. While the negative impact of these symptoms is well-documented, there is limited research on the effectiveness of non-pharmacological interventions in the Indian context. *Aim:* This study aimed to evaluate the effectiveness of a guided imagery intervention in reducing cancer-related pain and perceived stress among Stage II cancer patients receiving radiation therapy at a cancer institute in Trichy. *Methods:* A pre-experimental study with a pre-test and post-test design was conducted using a convenience sample of 30 patients. Each patient received a 15-minute guided imagery session with music daily for one week. Pain and perceived stress were measured using the Pain Numerical Scale and the Perceived Stress Scale, respectively, on the 7th day following the intervention. *Results:* Before the intervention, the sample reported mild to moderate pain (63.3% mild, 36.6% moderate) and a high prevalence of severe stress (80%). After one week of intervention, a notable improvement was observed, with 100% of patients reporting mild pain and the percentage of patients with severe stress decreasing to 60%. Paired t-tests showed a statistically significant reduction in both pain ($t=11.21$, $p<0.01$) and perceived stress ($t=7.14$, $p<0.05$) levels, indicating the guided imagery was effective. *Conclusion:* The findings suggest that guided imagery is an effective and viable non-pharmacological intervention for reducing pain and perceived stress in cancer patients. This highlights the potential for integrating guided imagery into standard care protocols to improve patient outcomes and overall quality of life.

Keywords: *Guided imagery, Cancer, Pain, Stress*

Background

According to the latest GLOBCAN 2022 report by Singh et al., India recorded approximately 1.41 million new cancer cases and 0.92 million cancer deaths in 2022, accounting for about 12% of the global total. The report identified key cancers in males as respiratory, prostate, and colorectal, while breast, cervical, and ovarian cancers were most common in females [1]. The Ministry of Health and Family Welfare projects a continued rise in cancer cases, with the Indian Council of Medical Research (ICMR) reporting over 1.5 million cases in 2024, highlighting cancer as a critical public health challenge in the country [2].

Cancer patients experience a wide array of physical and psychological symptoms that significantly impact their quality of life. Among these, pain and stress are highly prevalent and are known to interfere with daily activities and the overall healing process [3]. Guided imagery is a therapeutic technique that uses pleasant mental visualisation to improve a patient's mood and well-being. It is a form of guided meditation or mental health therapy, similar to cognitive behavioural therapy (CBT) with a guided self-help component [4]. The

*Corresponding author: Department of Medical Education, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Puducherry 605006, India Email: sumathyfranciscon@gmail.com
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process involves a researcher or therapist guiding a patient through simple visualisation and relaxation steps, using imagery to help them consciously divert their mind from sensations of pain and stress [5].

This mind-body technique is widely used in cancer care and has been proven effective in various situations [5,6]. Research has shown that positive mental imagery can promote relaxation and reduce stress [6], improve mood [7], alleviate pain (8,9), boost the immune system [10] and minimise nausea and vomiting [11]. Given the existing treatment burden, there is a growing need to explore natural and supportive measures to improve patient well-being.[4] .And there is limited evidence-based practice in the Indian set-up, hence this study aims to investigate a non-pharmacological intervention—guided imagery—to assess its effectiveness in managing pain and stress among cancer patients.

The goal of this study is to assess the effects of guided imagery on patients with cancer. The first objective was to assess cancer pain and perceived stress before and after administering guided imagery. Second, the study seeks to establish the relationship between cancer pain and perceived stress before and after guided imagery. The third objective was to determine the association between selected clinical variables, cancer pain, and perceived stress.

Materials and methods

Study Design and Setting

This study employed a one-group pre-test and post-test design to evaluate the immediate and sustained effect of a guided imagery intervention on cancer pain and perceived stress. The study was conducted at a secondary-level, 100-bedded cancer institute in Trichy, India. Data collection occurred over a period of three months.

Participants and Sampling

A convenience sample of patients diagnosed with Stage 2 cancer was recruited. The inclusion criteria required patients to be: aged 18 years or older, able to understand Tamil or English, currently admitted to the hospital, able to perform self-care activities and ambulate, and experiencing baseline pain of ≥3 on the 0-10 Numerical Pain Rating Scale (NPRS) with concurrent mild perceived stress. The threshold of ≥3 on the NPRS and mild stress was chosen to ensure sufficient variability for detecting changes following the intervention, as recommended by Farrar et al. [12]. Exclusion criteria included patients with Stage 4 cancer, those receiving palliative care, or those currently on intravenous analgesics or morphine medication.

Of the fifty eligible patients identified, thirty consented to participate. Reasons for non-participation included fatigue, unsure regarding the relaxation technique's effectiveness, short hospital admission time, being too stressed and incomplete post intervention questionnaire, resulting in a final sample size of n=30 for the analysis.

Intervention

The intervention consisted of a 15-minute audiotaped guided imagery session developed by the investigator following a literature review and with the assistance of a yoga teacher. The tape featured guided instruction set to music and included a pleasant waterfall scene and sounds [5]. The tape was validated for content by three experts: a cancer specialist, a nursing professor, and a yoga teacher. Usability and feasibility were assessed through pre-testing with two patients. All participants used the same audiotape.

Procedure and Data Collection

Baseline data (pre-test) for pain and perceived stress were collected on Day 1 immediately prior to the administration of the guided imagery tape. Participants listened to the audiotape once a day for next seven days. Thier practice of guided imagery was also noted. Post-test data were collected seven days later, on Day 7.

Instruments

Two instruments were used to collect data: 1) Pain Numerical Rating Scale (NPRS): Pain intensity was measured using a standardised NPRS [13,14]. This 11-point scale (ranging from 0 = No Pain to 10 = Worst Pain Imaginable) was administered verbally.2.Perceived Stress Scale (PSS-10): Perceived stress was measured using the 10-item Perceived Stress Scale (PSS-10), developed by Cohen et al. from Carnegie Mellon University [15,16]. The PSS-10 assesses the degree to which situations in one's life are appraised as stressful, with responses rated on a 5-point Likert scale (0=never to 4=very often). Scores were calculated by reversing the scores of the four positive items (items 4, 5, 7, and 8) and summing all 10 items. Formal permission was obtained for the use of both standardised scales.

Ethical Considerations

The study protocol received approval from the Institutional Ethics Committee, and formal authorization was obtained from the hospital administration. All participants were thoroughly briefed on the study's objectives and provided written informed consent prior to enrollment.

Data Analysis Plan

Data were coded, tabulated, and analysed using SPSS software, Version 19.0 (IBM Corporation). Both descriptive statistics (e.g., frequencies, means, standard deviations) and inferential statistics (e.g., paired t-tests, correlations) were used to address the study objectives.

Results

Sociodemographic and clinical data

The study included 30 participants, with an equal distribution of males and females (50% each). The majority of the sample were middle-aged, with 46.6% of participants being between 40 and 50 years old. All participants were married, and 93.3% resided in urban areas. Over half of the participants (53.3%) lived in a joint family.

Regarding educational background, 73.3% of the participants had a secondary or higher secondary level of education. The most common monthly income was between ₹5,000 and ₹10,000, reported by 43.3% of the sample. Occupations were varied, with the most common being housewives (36.6%), followed by government and private employees (20% each).

Clinical characteristics revealed that 86.6% of participants reported engaging in both tobacco use and smoking. The most common site of cancer was the gastrointestinal (GI) system (56.6%), and the majority of patients (73.3%) had been undergoing treatment for less than six months. The demographic and clinical characteristics are detailed in Table 1.

The study findings are presented according to the established research objectives. The results are based on the analysis of data collected from the final sample of 30 sample (N=28).

Table 1: Demographic characteristics

S.No	Demographic variables	N=30	%
1	*Age*		
	30-40 years	5	16.6
	40-50 years	14	46.6
	50-60 years	11	36.6
2	*Sex*		
	Male	15	50
	Female	15	50
3	*Marital status*		
	Married	30	100
	Unmarried /single		
4	*Education*		
	Secondary	10	33.3

S.No	Demographic variables	N=30	%
	Higher secondary	12	40
	Graduate	8	26.6
5	*Residence*		
	Urban	28	93.3
	Rural	2	6.6
6	*Type of family*		
	Joint family	16	53.3
	Nuclear family	14	46.6
7	*Income*		
	5,000- 10,000	13	43.3
	10,001-20,000	6	20
	< 20,000	11	36.6
8	*Occupation*		
	House wife	11	36.6
	Government employee	6	20
	Private employee	6	20
	Labourer	2	6.6
	Retired	5	16.6
9	*Tobacco use*		
	Yes	26	86.6
	No	4	13.3
10	*Smoking*		
	Yes	26	86.6
	No	4	13.3
11	*Duration of treatment*		
	0-6 months	22	73.3
	6-12 months	5	16.6
	< 12 months	3	10
12	*Site of cancer*		
	Breast cancer	8	26.6
	GI system cancer	17	56.6
	GU system cancer	4	13.3
	Respiratory cancer	1	3.3

Effect of guided imagery on cancer pain and perceived stress

The first objective was to determine the level of cancer pain and perceived stress before and after the guided imagery intervention. The results of the paired t-test indicated that the guided imagery intervention was highly effective in significantly reducing both cancer pain and perceived stress levels among the participants (Table 2).

Cancer Pain Reduction

The mean cancer pain score, measured using the Numerical Pain Rating Scale (NPRS), significantly decreased from a pre-intervention mean of 4.5 to a post-intervention mean of 3.6 ($t=11.217$, $p<.05$). This reduction demonstrates the immediate efficacy of the guided imagery in pain management.

Perceived Stress Reduction

Similarly, the mean perceived stress score showed a highly significant drop. The mean score decreased from 10.66 at pre-test to a post-test mean of 2.4 ($t=7.14$, $p<.05$).

Table 2: Effectiveness of guided imagery on cancer pain and perceived stress

Variables	Range	Pretest	Mean	Post test	Mean	SD	Paired t test
Cancer pain	Mild	19(63.3%)	4.5	30(100%)	3.6	0.521	11.217* p<0.01
	Moderate	11 (36.6%)					
	Severe	-					
	Mild	-	-	-	-	-	7.14*

Variables	Range	Pretest	Mean	Post test	Mean	SD	Paired t test
Perceived stress	Moderate	6(20%)	5.4	12(40%)	10.66	2.4	p<0.05
	Severe	24 (80%		18 (60%)			

Relationship between cancer pain and perceived stress

The second objective was to examine the relationship between cancer pain and perceived stress before and after the intervention. Pearson correlation coefficients revealed a strong positive linear relationship between the two variables at both time points. Before the guided imagery was administered, a strong positive correlation was found (r=0.8). This indicates that higher levels of cancer pain were associated with higher levels of perceived stress. Following the intervention, the correlation remained strong, though slightly diminished, at r=0.7. The persistent positive relationship suggests that despite the overall reduction in both symptoms, their interdependence was maintained. Participant compliance with the full 15-minute guided imagery session was 72%. Non-compliant subjects cited fatigue and lack of concentration as the primary reasons for not completing the full session.

Association with selected clinical variables

The final objective was to determine the association between selected clinical variables (site of cancer, duration of treatment) and the outcome variables (cancer pain and perceived stress).

Pre-Intervention Associations

A Chi-square test of independence was performed using pre-intervention data. The results showed no statistically significant association between the site of cancer and the severity of perceived stress ($\chi2(3)=5.99$, $p>.05$). Likewise, there was no statistically significant association between the duration of treatment and the severity of cancer pain ($\chi2(2)=3.99$, $p>.05$). This suggests that baseline pain and stress levels were independent of these two clinical factors.

Post-Intervention Limitation

It was not possible to reliably establish the association between the selected clinical variables and the post-test results for cancer pain. This was due to a ceiling effect in the data, where all patients (100%) reported a mild pain level after the intervention, which resulted in a lack of variability in the post-test pain scores. This uniform outcome made further meaningful statistical association analysis on the post-test pain data impossible.

Table 3 The association between perceived stress with selected clinical variables.

Sl No	Clicial variables	Mild	Moderate	Severe	X2
1	Site of cancer				
	Breast cancer	-	4	4	$\chi2(3, N=30) = 5.99, p>.05$
	GI system	-	3	14	
	GU system	-	2	2	
	Respiratory cancer	-	1	0	
2	Duration of treatment	-			
	0-6 months	-	9	13	$\chi2(3, N=30) = 5.99, p>.05$
	6-12 months	-	2	3	
	<12 months		2	1	

Discussion

This study aimed to evaluate the effectiveness of an audiotaped guided imagery intervention in reducing cancer pain and perceived stress among patients with Stage II cancer.

The demographic data from this study align with broader epidemiological trends. The sample showed an equal distribution of cancer among males and females, which is consistent with the GLOBOCAN 2022 report showing a similar overall cancer incidence rate between the sexes globally[1]. The prevalence of gastrointestinal cancer in the study sample (56.6%) is also consistent with global data, as colorectal and

gastric cancers are among the most common forms of cancer worldwide [1]. The high rate of tobacco use and smoking (86.6%) found in the participants is a notable finding, as these habits are known to be significant risk factors for various types of cancer.

Our findings support the use of guided imagery as a non-pharmacological intervention for symptom management in oncology. The study demonstrated a statistically significant reduction in both cancer pain [19] and perceived stress levels following the intervention. The mean perceived stress score dropped from 10.66 to 2.4 ($t=7.14, p<.05$). This is consistent with previous research by Chandreablous et al. (2020) and Mahdizadeh et al. (2019), who also found that guided imagery and other mind-body techniques were effective in reducing anxiety and depression in cancer patients [17,18]. Similarly, the significant reduction in pain scores from 4.5 to 3.6 ($t=11.217, p<.05$) aligns with findings from De Paolis et al. (2020), who showed that guided imagery effectively alleviated pain and symptom distress in terminal cancer patients[20].

The analysis of clinical variables revealed no significant association between the site of cancer or the duration of treatment and the initial level of pain or stress. However, it's worth noting that after the intervention, all participants reported a mild pain level (100%). This lack of variability in the post-test data prevented a meaningful association analysis between these clinical variables and the post-intervention outcomes. This suggests the guided imagery intervention was effective across all cancer sites and treatment durations.

The study also highlighted several factors that may influence the effectiveness of guided imagery, such as patient compliance and the intervention's external validity. The compliance rate was 72%, with patients reporting fatigue and difficulty concentrating. This suggests that while guided imagery can be highly effective, its success is dependent on the patient's willingness and ability to practice the technique. The patient's environment, level of self-practice, and personal concentration may also influence the outcome.

The primary limitation of this study was the small sample size and the absence of a control group, which limits the ability to rule out other factors that may have contributed to the observed changes. The challenges in recruiting patients and the reported patient fatigue and medication timing affecting intervention adherence were also notable limitations. The inconsistency in using patient journals for data collection, although providing quantitative data, introduced potential for bias.

Conclusion

This study successfully demonstrated that the guided imagery intervention significantly reduced both cancer pain and perceived stress in patients with Stage 2 cancer. Findings support the use of guided imagery as an effective, non-pharmacological adjunct therapy for symptom management.

The findings of this study provide compelling evidence that the guided imagery intervention is an effective, non-pharmacological strategy for significantly reducing both cancer pain and perceived stress in patients with Stage 2 cancer. While the intervention proved beneficial, its one-group design and the small sample size limit the ability to generalize the results. Future research should address these limitations by incorporating a randomized controlled trial (RCT) design with a larger sample to strengthen the evidence base. Additionally, future studies could benefit from focusing on a single cancer site to better understand site-specific pain responses. Based on these positive outcomes, it is recommended that guided imagery be integrated into routine oncology care, with training provided to nursing staff to facilitate its consistent administration.

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