



Progressive muscle relaxation combined with music on pain and stress

Deepika D, Thenmozhi P*, KalaBarathi S

Department of Medical-Surgical Nursing, Saveetha College of Nursing, SIMATS, Chennai-602105, Tamil Nadu, India

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ABSTRACT

Acute pain is an often unpleasant experience during the postoperative period after abdominal surgery causes diminish in physical functioning, which evokes stress. Hence, the study aimed to determine the effectiveness of Progressive Muscle Relaxation combined with music on the reduction of postoperative pain and stress among patients who have undergone abdominal surgery. The quasi-experimental research design was chosen to conduct the study with 40 samples matched with inclusion criteria. Samples were allocated into the experimental group (n=20) and control group (n=20) by convenience sampling technique. A pre-test was done by using a numerical pain scale and the perceived stress scale for both experimental and control group. The experimental group received progressive muscle relaxation for 10 minutes, followed by theme music for 5 minutes twice a day for three consecutive postoperative days. Control group received the routine care of the hospital. Posttest was done at the end of the third day for both experimental and control group using the same tool. There was a highly statistically significant ($p < 0.001$) reduction in the level of pain and stress after Progressive Muscle Relaxation combined with music at the level of was observed within the experimental group and also found significant ($p < 0.001$) difference between the experimental and control group by unpaired t-test. The study results concluded that progressive muscle relaxation combined with music is useful in the reduction of pain and stress. It is also a simple, cost-effective, and non-pharmacological method that can be used to complement pharmacological management during the postoperative period.



*Corresponding Author

Name: Thenmozhi P

Phone:

Email: thenmozhi.sethu@gmail.com

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INTRODUCTION

Abdominal surgery is a surgical procedure that involves the opening of the abdominal cavity may

be performed under an open or laparoscopic procedure. It commonly includes the treatment of diseases, conditions or wounds including the lower stomach (stomach and guts), liver, gallbladder, pancreas, bile ducts, or encompassing delicate tissues. Ongoing appraisals show that many significant surgeries are performed worldwide every year (Weiser *et al.*, 2008). Abdominal surgery is viewed as one of the most excruciating surgeries (Topcu and Findik, 2012). The detailed commonness of acute postoperative pain shifts broadly (Aguilera *et al.*, 2001; de Menezes Couceiro *et al.*, 2009; Mwaka *et al.*, 2013).

The predominance of postoperative pain was 84.17%, 92.5% and 96.66% at the fifth post-usable hour, second and third postoperative day, sepa-

rately. Less number of patients experienced severe postoperative pain on the third postoperative day while the number of patients encountering gentle agony expanded contrasted with the fifth postoperative hour (Saikia *et al.*, 2016). Lacking treatment of postoperative day is related to different antagonistic outcomes (Mwaka *et al.*, 2013; Harsoor, 2011). The majority group of patients going through medical procedure experience postoperative agony, which isn't just anguishing and troubling, yet may likewise, add to complications and a delayed recovery (Roykulcharoen and Good, 2004).

Insufficient agony control can prompt disabled breath, disturbed rest, loss of hunger, delayed hospitalisation, patient dissatisfaction and expanded treatment costs (Topcu and Findik, 2012; Shang and Gan, 2003; Rejeh *et al.*, 2013). Agony worsens pressure reactions, which lead to expanded tissue breakdown, coagulation and liquid maintenance, and affect the recovery of the patients (Miaskowski, 1993).

It is largely assumed that the presence of postoperative pain antagonistically impacts the patient's understanding of the perioperative period and contrarily impacts perioperative fulfilment (Hanna *et al.*, 2012; Pellino, 1998).

The stress response to surgery causes confusions of metabolic and physiological cycles which induce aggravations in the provocative, intense stage, hormonal, and genomic reactions. Hypermetabolism and hypercatabolism result, prompting muscle squandering, hindered resistant capacity and wound mending, organ disappointment, and passing. The medical procedure prompted pressure reaction is generally like that set off by horrendous wounds, and the length of the pressure reaction, shifts as indicated by the seriousness of surgical procedure (Finnerty *et al.*, 2013). Several studies describe aspects of the hospital environment which evoke stress. Both pain and stress adversely affect the outcome and quality of life of patients (Wilson-Barnett and Carrigy, 1978).

The objective of postoperative consideration is to guarantee that patients have great results which incorporate recovery without entanglements and adequate pain management and stress reduction. There has been great emphasis on non-pharmacological management is currently highly recommended. Clinical practice guidelines have recommended non-pharmacological interventions such as music therapy for the management of pain in critical care patients (Barr *et al.*, 2013) because it decreases pain and stress and does not cause side

effects, and do not need skilled personnel. Amongst progressive muscle relaxation combined music is one of the effective non-pharmacological management. Progressive muscle relaxation is relaxation practice by stretching the muscles and resting them gradually and regularly (Jacobson, 1987).

de Witte *et al.* (2020), who reported that music interventions had a huge general impact on stress reduction in both physiological and mental results and found that more significant impacts were found on the pulse, contrasted with circulatory strain and hormone levels. Many previous studies are suggesting progressive muscle relaxation and music has been decreasing pain and stress and complements the pharmacological management (Çınar and Çam, 2018; Kilic *et al.*, 2015).

Based on theses sound scientific background, the investigators opted to conduct the study Hence the investigators conducted the study aimed to determine the effectiveness progressive muscle relaxation combined with music on reducing pain and stress among patients undergoing abdominal surgery by considering the potential benefits after reviewing the literature.

MATERIALS AND METHODS

The research approach adopted in the study was a quantitative approach by using a quasi-experimental research design. It was conducted among patients who undergo abdominal surgery at Saveetha Medical College Hospital Chennai, after obtaining formal permission from the hospital authority. Samples who matched the inclusion criteria were selected by using a non-probability convenience sampling technique. Patients in the age group of 25 to 60 years of both male and female, were conscious and hemodynamically stable, no sensory impairment, and willing to give consent to participate in the study were included in the study.

The exclusion criteria of the study were patients who developed postoperative complications, under sedation, uncooperative, not interested to hear music, with hearing impairment, paralysis, and fracture. A total number of samples was 40 and allocated into experimental (n=20) and control group (n=20). The participants who consented for willing to participate were informed about the purpose of the study. Demographic variables were collected using multiple-choice questionnaires. Pre-test level of pain and stress was assessed by using a numerical pain scale and perceived stress scale for both experimental and control group. The experimental group was received progressive muscle relaxation for 10 minutes, followed by theme music for 5 min-

utes twice a day for three consecutive postoperative days.

During progressive muscle relaxation, participants were instructed to take a deep, slow breath and then squeeze muscle in the body for 5 seconds and also slowly relax the muscle for 5 seconds while exhaling simultaneously. Followed by theme music was played using MP3 through earphone for five minutes, considering the voice level between 25 to 30 decibels. The control group was received routine care as per hospital policy. Post-test was done at the end of the third day of intervention for both experimental and control group using the same tool. The data were tabulated and analysed by descriptive and inferential statistics using SPSS statistical package. A probability of 0.05 or less was taken as statistically significant.

RESULTS

Regarding demographic variables, The Table 1 shows that in the experimental group most of them, 6(30%) were in the age group of 25 – 35 years and 36 – 45 years, 11(55%) were female, 8(40%) were in the third postoperative day, 13(65%) had undergone emergency abdominal surgery, and 9(45%) had been given general anaesthesia. Whereas in the control group most of them, 6(30%) were in the age group of 46 – 55 years, 11(55%) were female, 8(40%) were in the third postoperative day, 13(65%) had undergone emergency abdominal surgery, and 7(35%) had been given regional and general anaesthesia respectively as mentioned below in Table 1.

Table 2 depicts that in the experimental group, all 20(100%) had moderate pain in the pre-test whereas in the post-test 11(55%) had mild pain and nine (45%) had moderate pain. Whereas in the control group, all 20(100%) had moderate pain in both pre-test and post-test.

In the experimental group, most of them 16(80%) had moderate stress, and 4(20%) had high perceived stress in the pre-test whereas in post-test 15(75%) had mild stress and five (25%) had low stress. In the control group, 15(75%) had high perceived stress and five (25%) had moderate stress in pre-test whereas in post-test 17(85%) had high perceived stress and 3(15%) had moderate stress as shown in Table 3.

Table 4 shows that in the experimental group, the pre-test, the mean score of pain was 6.69 ± 0.49 , and the post-test mean score was 3.97 ± 0.57 . The calculated paired 't' test value of $t=25.277$ was found to be statistically highly significant at $p<0.001$ level.

The table also portrays that the pre-test, mean score of stress was 24.32 ± 2.92 , and the post-test mean score was 14.87 ± 2.17 . The calculated paired 't' test value of $t=22.515$ was found to be statistically highly significant at $p<0.001$ level.

Table 5 shows that post-test level of pain, as well as stresses between the experimental and control group, was compared by student independent 't' test and value of pain $t=14.87$. Stress $t=21.155$ was found to be statistically highly significant at $p<0.001$ level which clearly shows that there was a significant difference in the level of pain and stress between the patients with abdominal surgery in the experimental and control group.

The chi-square test reveals that there is no significant ($p<0.05$) association between the post-test level of pain and stress with the demographic variables in the experimental group among patients undergone abdominal surgery.

DISCUSSION

Postoperative pain is an unpleasant emotional experience after surgery. Pain may affect both physical and psychological functioning, which leads to complications later. Alleviate the pain and stress enhances to improve the speedy recovery. Hence, the present study intensively analyses the effects of progressive muscle relaxation combined with music on postoperative pain and stress among patients undergone abdominal surgery. The present study finding revealed that the percentage of moderate pain is reduced from 100% to 50%. Similarly, regarding the stress, the moderate and high perceived stress is converted to a low and mild level of stress, and none of them had high perceived stress after the intervention.

The study findings observed that there was a significant difference was found in both level of pain and stress before and after the intervention in the experimental group and also between the experimental and control group which infers that intervention was found to be evident in decreasing the level of pain and stress. These findings were supported by the previous study by Varghese (2018); Rejeh *et al.* (2013), who found that the practice of progressive muscle relaxation technique helps to reduce pain among postoperative patients and also concluded that it was effective postoperative pain management. Similarly, the study conducted by Devi and Saharia (2017), who revealed progressive muscle relaxation technique was effective in reducing postoperative pain and the results of this study can be incorporated in surgical units for proper management of postoperative analgesia.

Table 1: Frequency and percentage distribution of demographic variables of patients undergone abdominal surgery in the experimental and control group

Demographic Variables	Experimental Group		Control Group		Chi-Square Value
	No.	%	No.	%	
Age in years					
25 – 35	6	30.0	5	25.0	$\chi^2 = 1.293$
36 – 45	6	30.0	5	25.0	d.f = 3
46 – 65	3	15.0	6	30.0	p = 0.731
66 – 75	5	25.0	4	20.0	N.S
Sex					
Male	9	45.0	9	45.0	$\chi^2 = 0.000$
Female	11	55.0	11	55.0	d.f = 1 p = 1.000 N.S
No. of postoperative day					
First day	2	10.0	2	10.0	$\chi^2 = 1.818$
Second day	6	30.0	3	15.0	d.f = 3
Third day	8	40.0	8	40.0	p = 0.611
Fourth day	4	20.0	7	35.0	N.S
Type of surgery					
Elective abdominal surgery	7	35.0	7	35.0	$\chi^2 = 0.000$
Emergency abdominal surgery	13	65.0	13	65.0	d.f = 1 p = 1.000 N.S
Type of Anaesthesia					
Local anaesthesia	8	40.0	6	30.0	$\chi^2 = 2.136$
Regional anaesthesia	3	15.0	7	35.0	d.f = 2
General anaesthesia	9	45.0	7	35.0	p = 0.344 N.S

N.S – Not Significant

Table 2: Frequency and percentage distribution of pre-test and post-test level of pain in the experimental and control group

Group	Test	No Pain(0–1)		Mild Pain(1–4)		Moderate Pain(5–7)		Severe Pain(8–10)	
		No.	%	No.	%	No.	%	No.	%
Experimental Group	Pre-test	0	0	0	0	20	100.0	0	0
	Post-test	0	0	11	55.0	9	45.0	0	0
Control Group	Pre-test	0	0	0	0	20	100.0	0	0
	Post-test	0	0	0	0	20	100.0	0	0

Paula *et al.* (2002), who inferred that the utilisation of the Progressive Muscle Relaxation Technique empowered the subjects to verify that their agony levels diminished significantly. Essa *et al.* (2017) also consistent with the present study findings that utilisation of the progressive muscle relaxation technique to patients undergoing hysterectomy to minimise their stress, anxiety and depression. This study was limited to only patients undergoing hys-

terectomy, in another study A. Vaajoki *et al.* (2012); Ames *et al.* (2017), who exhibited that the utilisation of music reduces pain intensity and pain distress in bed rest, during profound breathing and in moving situation after abdominal surgery procedure on the second postoperative day. In a meta-analysis by Kühlmann *et al.* (2018) in the year 2018 who analysed that music interventions significantly reduce anxiety and pain in adult surgical patients.

Table 3: Frequency and percentage distribution of pre-test and post-test level of stress in the experimental and control group

Group	Test	Low Stress(0 – 13)		Moderate Stress (14 – 26)		High Perceived Stress (27 – 40)	
		No.	%	No.	%	No.	%
Experimental Group	Pre-test	0	0	16	80.0	4	20.0
	Post Test	5	25.0	15	75.0	0	0
Control Group	Pre-test	0	0	5	25.0	15	75.0
	Post Test	0	0	3	15.0	17	85.0

Table 4: Determine the effectiveness of progressive muscle relaxation combined with music on pain and stress in the experimental group

Variables	Test	Mean	S.D	Paired 't' Test
Pain	Pre-test	6.69	0.49	t = 25.277
	Post Test	3.97	0.57	P = 0.0001 S***
Stress	Pre-test	24.32	2.92	t = 22.515
	Post Test	14.87	2.17	P = 0.0001 S***

***p<0.001, S - Significant

Table 5: Comparison of the post-tests level of pain and stress between the experimental and control group

Pain	Experimental Group		Control Group		Student Independent 't' Test
	Mean	S.D	Mean	S.D	
Post Test	3.97	0.57	6.45	0.47	t = 14.873 P = 0.0001 S***
Stress Post Test	14.87	2.17	29.04	2.06	t = 21.155 P = 0.0001 S***

***p<0.001, S - Significant

Furthermore, in a mixed method of analysis by Amen et al., who reported that music tuning in as a proper mediation that improved patients' post-intercession experience, as indicated by patients' self-report. [Good et al. \(1999\)](#); [Shang and Gan \(2003\)](#) supported the study by proved that the combination of jaw relaxation and music had a significant effect on reducing postoperative pain after major abdominal surgery during ambulation. The current study limits in observing the impacts of progressive relaxation combine music on physiological responses related to pain such pulse rate, heart rate, blood pressure and other psychological factors like anxiety and depression. Hence, future study may

be suggested with a large number of samples and observing vital parameters among patients undergoing abdominal surgery.

CONCLUSION

The findings of the present study concluded that progressive muscle relaxation combined with music is useful in the reduction of pain and stress during the postoperative period among patient undergone abdominal surgery. It is also a simple, safe, non-pharmacological and cost-effective method which can be administered easily as it does not cause any side effects.

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Conflict of Interest

The authors declare no conflict of interest for this study.

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