Progressive muscle relaxation combined with music on pain and stress

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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 the 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.

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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 post-operative 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 these 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 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 |
|----------------------------------|--------------------|---------------|------------------|
| 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         |
| 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         |
| 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 – 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.            | %                  | No.               | %                |
|       |      |              | No.            | %                  | No.               |                |
|       |      |              | No.            | %                  | No.               |                |
|       |      |              | No.            | %                  | No.               |                |
|       |      |              | No.            | %                  | No.               |                |

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 hysterectomy, 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| Pre-test | 0 0                 | 16 80.0                   | 4 20.0                          |
| Group       | Post Test | 5 25.0              | 15 75.0                   | 0 0                             |
| Control     | Pre-test | 0 0                 | 5 25.0                    | 15 75.0                         |
| Group       | 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   | t     | P     | S***          |
| Post Test | 3.97 | 0.57  | 6.45 | 0.47  | t = 14.873 | P = 0.0001 S*** |
| Stress   | 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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REFERENCES

Aguilera, C., Arnau, J. M., Baños, J. E., Laporte, J. R. 2001. Management of postoperative pain in abdominal surgery in Spain. A multicentre drug utilization study. *British Journal of Clinical Pharmacology*, 47(6):667–673.

Ames, N., Shuford, R., Yang, L., Moriyama, B., Frey, M., Wilson, F., Sundaramurthi, T., Gori, D., Mannes, A., Ranucci, A., Koziol, D., Wallen, G. R. 2017. Music Listening Among Postoperative Patients in the Intensive Care Unit: A Randomized Controlled Trial with Mixed-Methods Analysis. *Integrative Medicine Insights*, 12. Article Number: 11786371771654.

Barr, J., Fraser, G. L., Puntillo, K., Ely, E. W., Gélinas, C., Dasta, J. F., Davidson, J. E., Devlin, J. W., Kress, J. P., Joiffe, A. M., Coursin, D. B., Herr, D. L., Tung, A., Robinson, B. R. H., Fontaine, D. K., Ramsay, M. A., Riker, R. R., Sessler, C. N., Pun, B., Skrobik, Y., Jaeschke, R. 2013. Clinical Practice Guidelines for the Management of Pain, Agitation, and Delirium in Adult Patients in the Intensive Care Unit. *Critical Care Medicine*, 41(1):263–306.

Çınar, H., Çam, R. 2018. The effects of progressive relaxation method on the patients applied total knee arthroplasty. *Medical Science and Discovery*, 5(12):380–389.

de Menezes Couceiro, T. C., Valença, M. M., Lima, L. C., de Menezes, T. C., Raposo, M. C. F. 2009. Prevalence and Influence of Gender, Age, and Type of Surgery on Postoperative Pain. *Brazilian Journal of Anesthesiology*, 59(3):314–320.

de Witte, M., Spruit, A., van Hooren, S., Moonen, X., Stams, G.-J. 2020. Effects of music interventions on stress-related outcomes: a systematic review and two meta-analyses. *Health Psychology Review*, 14(2):294–324.

Devi, R., Saharia, H. K. 2017. Effect of progressive muscle relaxation on post-operative analgesia. *International Journal of Medical Research and Review*, 5(2):113–118.

Essa, R. M., Ismail, N. I. A. A., Hassan, N. I. 2017. Effect of progressive muscle relaxation technique on stress, anxiety, and depression after hysterectomy. *Journal of Nursing Education and Practice*, 7(7):77–86.

Finnerty, C. C., Mabvuure, N. T., Ali, A., Kozar, R. A., Herndon, D. N. 2013. The Surgically Induced Stress Response. *Journal of Parenteral and Enteral Nutrition*, 37(5_suppl):21S–29S.

Good, M., Stanton-Hicks, M., Grass, J. A., Anderson, G. C., Choi, C., Schoolmeesters, L. J., Salman, A. 1999. Relief of postoperative pain with jaw relaxation, music and their combination. *Pain*, 81(1):163–172.

Hanna, M. N., González-Fernández, M., Barrett, A. D., Williams, K. A., Pronovost, P. 2012. Does Patient Perception of Pain Control Affect Patient Satisfaction Across Surgical Units in a Tertiary Teaching Hospital? *American Journal of Medical Quality*, 27(5):411–416.

Harsoor, S. S. 2011. Emerging concepts in postoperative pain management. *Indian Journal of Anaesthesia*, 55(2):101–103.

Jacobson, E. 1987. Progressive relaxation. *The American Journal of Psychology*, 100(3/4):522–537.

Kılıç, S. P., Karadag, G., Oyucu, S., Kale, O., Zengin, S., Ozdemir, E., Korhan, E. A. 2015. Effect of music on pain, anxiety, and patient satisfaction in patients who present to the emergency department in Turkey. *Japan Journal of Nursing Science*, 12(1):44–53.

Kühlmann, A. Y. R., de Rooij, A., Kroese, L. F., van Dijk, M., Hunink, M. G. M., Jeekel, J. 2018. Meta-analysis evaluating music interventions for anxiety and pain in surgery. *British Journal of Surgery*, 105(7):773–783.

Miaskowski, C. 1993. Current concepts in the assessment and management of acute pain. *Medsurg Nursing: Official Journal of the Academy of Medical-Surgical Nurses*, 2(1).

Mwaka, G., Thikra, S., Mung‘ayi, V. 2013. The prevalence of postoperative pain in the first 48 hours following day surgery at a tertiary hospital in Nairobi. *African health sciences*, 13(3):768–776.

Paula, A. A. D., De, Carvalho, E. C., De, Santos, C. B. 2002. The use of the “Progressive Muscle Relaxation” technique for pain relief in gynecology and obstetrics. *Revista Latino-Americana de Enfermagem*, 10(5):654–659.
Pellino, T. 1998. Perceived Control Mediates the Relationship Between Pain Severity and Patient Satisfaction. *Journal of Pain and Symptom Management*, 15(2):110–116.

Rejeh, N., Heravi-Karimooi, M., Vaismoradi, M., Jasper, M. 2013. Effect of systematic relaxation techniques on anxiety and pain in older patients undergoing abdominal surgery. *International Journal of Nursing Practice*, 19(5):462–470.

Roykulcharoen, V., Good, M. 2004. Systematic relaxation to relieve postoperative pain. *Journal of Advanced Nursing*, 48(2):140–148.

Saikia, P., Singh, P., Lahakar, M. 2016. Prevalence of acute post-operative pain in patients in adult age-group undergoing inpatient abdominal surgery and correlation of intensity of pain and satisfaction with analgesic management: A cross-sectional single institute-based study. *Indian Journal of Anaesthesia*, 60(10):737–743.

Shang, A. B., Gan, T. J. 2003. Optimising Postoperative Pain Management in the Ambulatory Patient. *Drugs*, 63(9):855–867.

Topcu, S. Y., Findik, U. Y. 2012. Effect of Relaxation Exercises on Controlling Postoperative Pain. *Pain Management Nursing*, 13(1):11–17.

Vaajoki, A., Pietilä, A.-M., Kankkunen, P., Vehviläinen-Julkunen, K. 2012. Effects of listening to music on pain intensity and pain distress after surgery: an intervention. *Journal of Clinical Nursing*, 21(5-6):708–717.

Varghese, J. 2018. The effectiveness of progressive muscle relaxation therapy on postoperative pain. *International Journal of Nursing and Medical Investigation*, 3(2):49–51.

Weiser, T. G., Regenbogen, S. E., Thompson, K. D., Haynes, A. B., Lipsitz, S. R., Berry, W. R., Gawande, A. A. 2008. An estimation of the global volume of surgery: a modelling strategy based on available data. *The Lancet*, 372(9633):139–144.

Wilson-Barnett, J., Carrigy, A. 1978. Factors influencing patients’ emotional reactions to hospitalization. *Journal of Advanced Nursing*, 3(3):221–229.