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The Effects of Use of Multimedia or Yoga in Peri - Operative Period on Anxiety and Pain among Patients Undergoing Orthopaedic Surgery: A Randomized Double - Blind Controlled Trial

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"Mental pain is less dramatic than physical pain, but it is more common and also harder to bear"

- C. S. LEWIS.

Abstract: ***Introduction: Peri - operatively pain an anxiety are the worst feelings in any patient. A search for an ideal method with the use of alternate nostril breathing exercises (pranayama) and multimedia (video clip) has not yet been studied. Aim: To evaluate the effect of alternate nostril breathing exercises (pranayama) and video clip on anxiety and pain among patients undergoing orthopaedic surgery under regional anaesthesia. Materials and Method: A comparative, double - blind study.90 cases of 18 - 65yrs, ASA grade I - II, were grouped into A, B & C (30 each). Each group patients were were shown a video clip/yoga or control. Results: STAI Score, VAS Score: There were no significant differences between the groups during baseline and pre - operative parameters, but anxiety scores were profoundly significantly less in pre - and post - operatively area. Conclusion: We conclude that implementing yoga (breathing exercise) along with the use of multimedia video clip/film has significant impact to alleviate peri - operative anxiety and pain.***

Keywords: yoga, breathing exercise, video film, anxiety, anesthesia, orthopaedic surgery

1. Introduction

Anxiety and Pain are the most commonly encountered unpleasant sensory and emotional condition which is described as feelings of uneasiness and tension. [1]

The prevalence of preoperative anxiety differs based on the surgical context, with rates ranging from 60% to 80%. [2 - 5] Elevated anxiety levels are particularly linked to patients undergoing surgery with uncontrolled systemic illness, extensive elective surgeries, bariatrics patients, elderly or children age group patients. [6]

Anxiety and pain lead to abnormal hemodynamic responses due to the activation of sympathetic, parasympathetic, and endocrine systems. [7] Anxiety causes activation of serotonin and noradrenergic systems, and release hormones like corticotrophin - releasing hormone (CRH) from hypothalamus, adrenocorticotrophic hormone (ACTH) from anterior pituitary gland and Cortisol, a primary adrenal glucocorticoid. [8, 9]

Patients with anxiety face various detrimental effects on health in the form of depression, hypertension, insomnia, irritability. [10, 11] Furthermore, heightened anxiety can increase the dosage of anaesthetic drugs required to achieve unconsciousness, potentially raising the risk of intraoperative awareness. Additionally, anxiety may exacerbate patients pain perception and elevate the need for postoperative pain relief, ultimately diminishing their overall satisfaction with perioperative care. [12]

The administration of anaesthetics and opioids for effective postoperative pain management has been proven to lower plasma cortisol levels, but they have their significant side effects, e. g., nausea, respiratory depression, poor wound healing, gastrointestinal issues, and they may not be cost - effective. [13]

Research indicates that interventions aimed at modifying appraisal, coping strategies, mood, even minor interventions, such as providing patients with information about their surgery and enhancing the hospital environment, have been shown to impact the psychological distress, shorten hospital stays, and reduce medication use, improve surgical recovery. [14]

2. Literature Survey

In recent times, a range of techniques has been implemented to reduce pre - operative anxiety, including the use of written resources, multimedia presentations such as short videos, and yoga practices. The incorporation of video - based education for patients prior to anaesthesia has demonstrated several beneficial outcomes, including enhanced patient satisfaction, improved information retention, and a decrease in anxiety levels. [15 - 17]
Furthermore, multimedia educational strategies for non - surgical patients have been shown to boost satisfaction and promote adherence to medication regimens. [18] This approach to preoperative education aligns with a key goal of Healthy People 2020, which emphasizes the integration of electronic technologies to foster improved health results. [19, 20]

Yoga, a holistic practice that integrates the mind and body, has its roots in ancient India. [21] This discipline includes a variety of techniques such as Pranayama, which involves

controlled breathing exercises, along with physical postures, relaxation strategies, and meditation. [22]

While there is substantial evidence supporting the benefits of yoga in addressing psychological issues such as stress, anxiety, and depression, [23] particularly in those with chronic pain and arthritis, [24] further investigation is needed. Specifically, the effects of these techniques on pain perception during surgical interventions and their influence on the subsequent requirement for pain relief medications have yet to be thoroughly examined. This area of research could provide valuable insights into the comprehensive benefits of yoga practices in clinical settings.

With this background we have carried out such study to evaluate the effect of alternate nostril breathing exercises (pranayama) and video clip on anxiety and pain among patients undergoing orthopaedic surgery under regional anaesthesia.

The primary objective was to assess anxiety by using a self - reported psychological instrument, the Spielberger state trait anxiety inventory (STAI) and VAS score. Secondary outcome was to assess pain by using VAS score and calculate the rescue opioid requirement.

3. Method

Study design: This is a comparative, double - blinded study All patients included were allocated randomisation was possible into three groups.

Study place: Orthopaedic Operation Theatre and Orthopaedic ward of a peripheral tertiary care centre, Nalbari, Assam.

Study period: The period of our study was 1 year, June 2021 - June 2022.

Ethical approval: Enrolment of the patients was initiated only after achieving the approval by the Ethics committee of the institution.

Patient selection: Written informed consent was obtained from patients undergoing elective upper limb or lower limb surgery including arm, forearm, and hand fractures, with American Society of Anaesthesiologist (ASA) I - II; of both sexes; and age range from 18–65 years.

Patients not willing for yoga exercise, ASA III - IV were excluded from the study.

Sample size: Among 110 patients initially enrolled in the study, 20 patients had to be excluded because of the applied exclusion criteria, 90 patients were divided equally into three groups receiving either multimedia (video) guided information, or yoga exercise in orthopaedic elective surgery cases under regional anaesthesia. Anaesthesia was established under brachial plexus peripheral nerve block (PNB) using ultrasound for upper limb surgery or spinal anaesthesia (SA) for lower limb surgery.

Procedure:

Patients were categorised into the following groups: Group A, Group B and Group C, each group had 30 patients each**.**

Group A: Patients were taken to yoga room and were shown a short video clip.

Group B: Patients were taken to yoga room and were given yoga breathing exercise

Group C: Patient was control group, here, patients were taken to yoga room and were not shown video clip nor given yoga.
Researchers and patients were blinded to group allocation until after the completion of baseline anxiety scoring. Staff members working in all study settings were unaware of patients' group allocations. The anaesthetists who carried out the blocks were blinded to the patient group allocation

Technique:
Written informed consent was obtained in the preoperative assessment clinic. On enrolment and before the patients formal preoperative consultation with the surgeon, anxiety was assessed using STAI, and VAS. We did not aim to separate anxiety related to anaesthesia and surgery; therefore, we gave clear instructions to the patients on how to rate their overall level of anxiety using both tests. All patients were taken to dedicated yoga room.

Patients in the video clip group then watched the film using a laptop computer equipped with headphones. Patients in the yoga breathing group were advised to perform yoga and control group were made to sit for 10 mins.
Patients in all 3 groups then underwent routine investigations prior to surgery. On the day of surgery, all the patients were taken to operation theatre and the basic monitoring (heart rate HR, non - invasive blood pressure NIBP, five - lead electrocardiography ECG, and pulse oximetry SPO2 probe) were connected, and baseline vital readings were recorded before performing the regional anaesthesia. For upper limb surgery, supraclavicular block was performed and per lower limb surgery, subarachnoid block was performed, as per standard techniques and drugs.18 G iv cannula was taken in the opposite non - operating limb and intravenous Lactated Ringer's solution infusion 6–8 ml/kg was started. After attaining the effect of regional anaesthesia, patients STAI, VAS (anxiety) and VAS (analgesia) were recorded. Patients if experienced severe anxiety, pain and demanded relief, then they were given rescue analgesics in form of iv fentanyl (opioid) 0.25mcg/kg. After the surgery, all patients were shifted to PACU and all these STAI, VAS (anxiety) and VAS (analgesia) were recorded again. After 1 hour, patients were shifted to orthopaedic ward.

State trait anxiety inventory:
The STAI is a recognised and extensively used tool to measure patient's anxiety. [25] The STAI - trait (STAI - T) form consists of 20 statements and the answers to these are used to determine a patient's underlying (ongoing/personality) anxiety level. Statements in the STAI - T are also rated on a four - point scale (almost never, sometimes, often, and almost always). The overall (total) score for STAI ranges from a minimum of 20 to a maximum of 80; STAI scores are commonly classified as 'no or low

anxiety' (20–37), 'moderate anxiety' (38–44), and 'high anxiety' (45–80). Anxiety scores (Spielberger's STAI) were measured at baseline, the day of surgery in the pre - surgery room and post - surgery after the patient was shifted to post - operative care unit (PACU).

	1	2	3	4
I feel pleasant	☐	☐	☐	☐
I feel nervous and restless	☐	☐	☐	☐
I feel satisfied with myself	☐	☐	☐	☐
I wish I could be as happy as others seem to be	☐	☐	☐	☐
I feel like a failure	☐	☐	☐	☐
I feel rested	☐	☐	☐	☐
I am "calm, cool, and collected"	☐	☐	☐	☐
I feel that difficulties are piling up so that I cannot overcome them	☐	☐	☐	☐
I worry too much over something thar really doesn't matter	☐	☐	☐	☐
I am happy	☐	☐	☐	☐
I have disturbing thoughts	☐	☐	☐	☐
I lack self-confidence	☐	☐	☐	☐
I feel secure	☐	☐	☐	☐
I make decisions easily	☐	☐	☐	☐
I feel inadequate	☐	☐	☐	☐
I am content	☐	☐	☐	☐
Some unimportant thought runs my mind and bothers me	☐	☐	☐	☐
I take disappointments so keenly that I can't put them out of my mind	☐	☐	☐	☐
I am a steady person	☐	☐	☐	☐
I get in a state of tension or turmoil as I think over my recent concerns and interest	☐	☐	☐	☐

Figure A: STAI questionnaires and scoring

VAS Score (Visual analogue scale) (for anxiety): The visual analogue scale (VAS) has also been recognised as a tool for measuring anxiety. In our research, we employed a 0–100 mm scale to assess participants anxiety levels. They were instructed to indicate their anxiety by placing a mark on a Visual Analog Scale (VAS) that they believed accurately reflected their current state of anxiety. The scale was marked at one end as 'no anxiety' and at the opposite end as 'highest anxiety. '

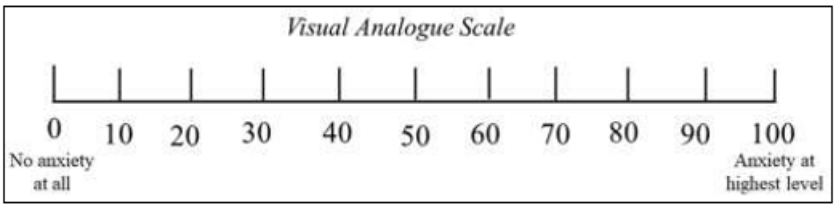

Figure B: VAS Score for anxiety

VAS score (visual analogue scale) (for pain) (0 is no pain at; 10 cm is maximum imaginable pain) was explained to all patients in their preoperative visit.

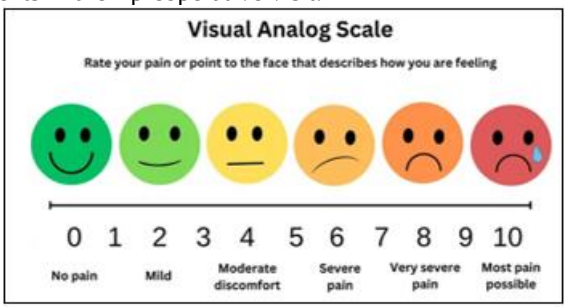

Figure C: VAS score for pain

Alternate nostril breathing: (10 min) The participants were instructed to breathe deeply through nose and during exhalation "AUM" (ॐ) was chanted for as long as their body allowed. Five sessions were conducted over a period of 3 days.

Video - clip:
Film 1 (PNB): A 10 min film descripting the peripheral nerve block (PNB), and the risks involved, specifically the risk of nerve injury (1: 5000–10 000) and block failure (5%) possibly requiring conversion to general anaesthesia. Discussion also included postoperative advice (wearing off of the block and analgesic requirements). The next scene shows the patient entering the anaesthetic room and the entire brachial plexus block procedure. The patient is then moved into the operating theatre and shown talking with the anaesthetist next to him while the surgeons are carrying out the procedure. The last scene shows the patient being transferred to the recovery room.

Film 2 (SA): A 10 min film descripting of the SA and the risks involved, specifically the risk of nerve injury (1: 5000–10 000), block failure (5%) possibly requiring conversion to general anaesthesia, headache (1: 100), itching and nausea (very rare), urinary retention (very rare), and necessity of having a urinary catheter. Discussion also included postoperative advice (wearing off of the block and analgesic requirements). The next scene shows the SA placement. The last scene shows the patient being transferred to the recovery room and having a drink

Statistics:

All data were recorded on data sheet, after collection, data were checked meticulously and then compiled, analysed for statistical significance.

Statistical presentation and analysis of the present study were conducted, using SPSS software version 24.0 (IBM Corporation, Armonk, NY, USA) statistics.

Qualitative variables were presented as numbers and percentages and were analysed by Chi - square test. $P < 0.05$ was considered significant and while at 0.01 and 0.001 are highly significant

Anxiety scores measured at baseline, pre - surgery, and post - surgery were entered as the within - subjects factor; group status was entered as the between - subjects factor in the RMANOVA followed by *post - hoc* analysis with Bonferroni correction, for pairwise comparison between the means of all the outcome measures. A significance level of $P < 0.05$ was assumed.

4. Results

Among 110 patients initially enrolled in the study, 20 patients had to be excluded because of the applied exclusion criteria (fig.1), 90 patients were divided equally into three groups with 30 patients each receiving video clip, yoga exercise and control, Group A, B and C respectively, in the elective orthopaedic surgery cases.

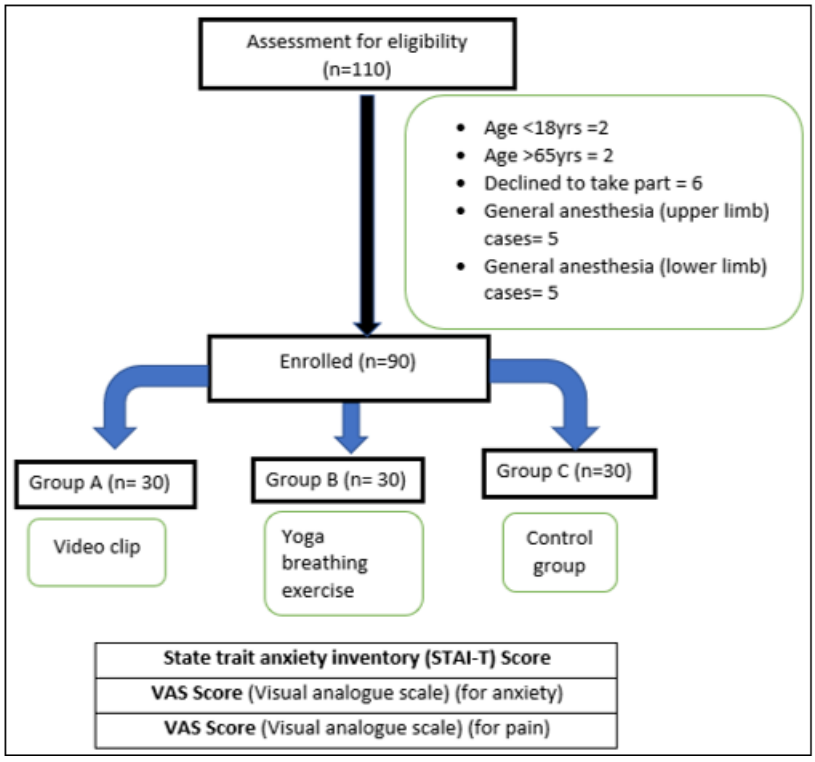

Figure 1: Consort flow diagram showing no. of patients at each phase of the study

In present study, the patients in each groups were demographically comparable regarding age, weight, height, ASA grading, sex, duration of surgery and found statistically insignificant (P<0.05), table 1

Table 1: Demographic profile of patients

Parameters	Group BC	Group BD	Group BF	P value
Age (yr.)	26.3 ±3.7	24.5 ±3.72	25.3 ±3.45	0.164
Weight (kg)	56.63 ±5.4	55.53 ±4.1	56.26 ±3.6	0.597
Height (cm)	163.83±8.7	161.53 ±4.0	160.71 ±4.5	0.129
ASA I	18 (60%)	17 (56.6%)	16 (53.3%)	0.873
ASA II	12 (40%)	13 (43.3%)	14 (46.6%)	
Female no.	16 (53.3%)	14 (46.6%)	13 (43.3%)	0.732
Male no.	14 (46.6%)	16 (53.3%)	17 (56.6%)	

Hemodynamic data of the study population: There were no significant differences between the groups in hemodynamic data, SBP, DBP & HR, table 2.

Table 2: Distribution according to hemodynamic data (intra - operative).

Parameter	Group A	Group B	Group C	P value
HR (beats/min)	77.06 ±3.9	75.5 ±3.8	74.6 ±4.5	0.670
SBP (mm Hg)	120.06±7.4	118.4±9.8	120.86±7.1	0.498
DBP (mm Hg)	72.16±6.8	73.93±9.3	72.16±4.8	0.555

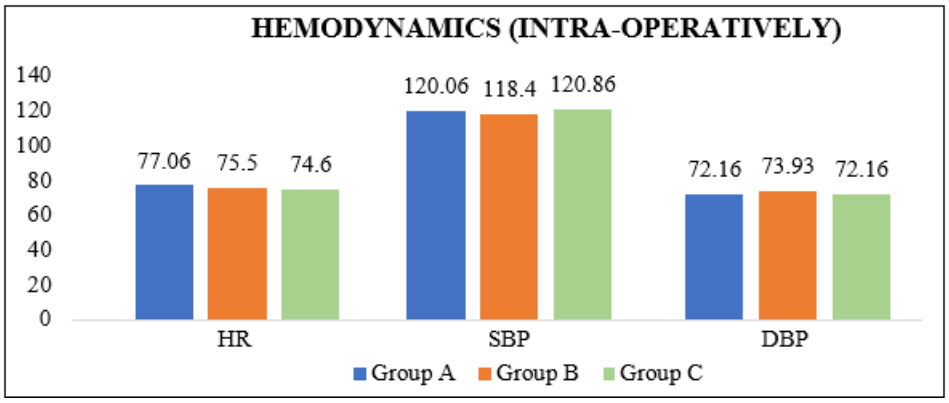

Figure 2: Hemodynamic data

Anxiety scale score:
STAI score:

Table 3: Categorisation of patients in various Anxiety scale score, STAI

	Baseline			Pre - Operative			Post - Operative		
	Group A [N=30]	Group B [N=30]	Group C [N=30]	Group A [N=30]	Group B [N=30]	Group C [N=30]	Group A [N=30]	Group B [N=30]	Group C [N=30]
LOW anxiety state STAI <37	14 (47%)	12 (40%)	15 (50%)	10 (33%)	13 (44%)	9 (30%)	25 (84%)	28 (87%)	22 (74%)
MODERATE Anxiety state STAI 38 – 44	11 (37%)	14 (47%)	11 (37%)	12 (40%)	10 (33%)	12 (40%)	4 (13%)	3 (10%)	6 (20%)
SEVERE Anxiety state STAI >44	5 (16%)	4 (13%)	4 (13%)	8 (27%)	7 (23%)	9 (30%)	1 (3%)	1 (3%)	2 (6%)

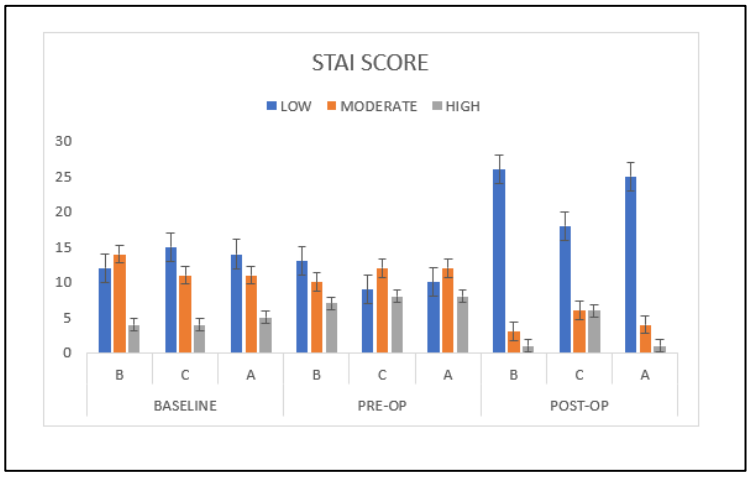

Figure 3: Categorisation of patients in various Anxiety scale score, STAI

STAI Score of the study population: There were no significant differences between the groups during baseline and pre - operative parameters, but anxiety scores were profoundly significantly less in post - operatively area (p= 0.04)

Table 4: STAI Score of the study population

STAI Score (anxiety score)	Group A Mean ± SD	Group B	Group C	f ratio	p value
Baseline, at PAC time	35.41±12.36	40.06±12.01	40.51±12.71	1.6135	0.204
Pre - Operative	39.96±11.65	40.4±14.79	44.0±13.64	0.783	0.460
Post - Operative	33.7±6.79	33.2±6.91	39.2±14.65	3.328	**0.042**

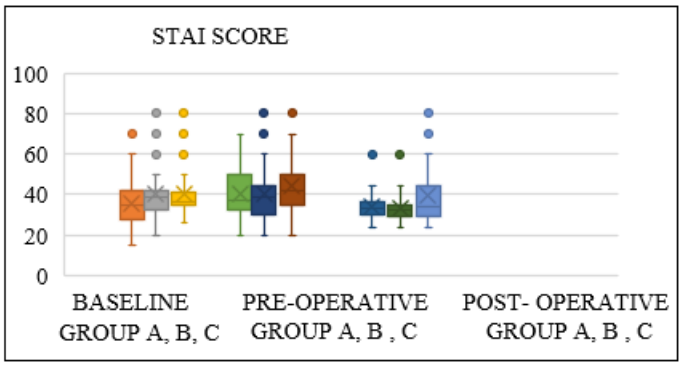

Figure 4: STAI Score of the study population

VAS Score (Anxiety): There were no significant differences between the groups during baseline at PAC time, but anxiety scores were profoundly significantly less in pre - and post - operatively time ($p< 0.0001$). Q value for T1: T2 is 1.24 (non - significant), for T1: T3 is 7.45 (significant), for T2: T3 is 8.69 (significant), showing that anxiety was better managed via yoga and video clip group than control group. Whereas, score between film and yoga group showed similar results.

Table 5: VAS Anxiety Score of the study population

VAS Score (0 - 10 anxiety score)	Group A Mean ± SD	Group B Mean ± SD	Group C Mean ± SD	p Value	f ratio	Q value T1: T2	Q value T1: T3	Q value T2: T3
Baseline, at PAC time	60.0±13.39	61.0±13.73	64.0±11.62	0.463	0.775	(Ins.)	(Ins.)	(Ins.)
Pre - Operative	44.3±13.28	46.3±11.88	58.2±17.23	**0.000329**	8.806	**0.79 (Ins.)**	**0.79 (s.)**	**4.70 (s.)**
Post - Operative	16±10.37	13.6±10.37	30±6.14	**<0.00001**	22.098	**1.24 (Ins.)**	**1.24 (s.)**	**8.69 (s.)**

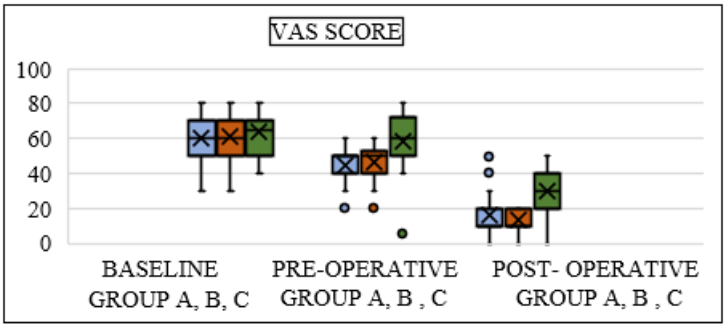

Figure 5: VAS Anxiety Score of the study population

Pain (VAS Score): There were no significant differences between the groups during baseline at PAC time, but VAS pain scores were profoundly significantly less in pre - and post - operatively time ($p< 0.0001$). Q value for T1: T2 is In - significant (ins.), for T1: T3 is significant (s.), for T2: T3 is significant, showing that anxiety was better managed via yoga and video clip group than control group in pre - and post - operative period. Whereas, score between film and yoga group showed similar results.

Table 6: VAS pain Score of the study population

VAS Score (0 - 10 Pain score)	Group A Mean ± SD	Group B Mean ± SD	Group C Mean ± SD	p Value	f ratio	Q value T1: T2	Q value T1: T3	Q value T2: T3
Baseline, at PAC time	4.5± 1.73	4.8 ± 1.73	5.3± 1.74	0.227	1.505	**(Ins.)**	**(Ins.)**	**(Ins.)**
Pre - Operative	2.8 ± 1.36	2.7 ± 1.38	4.8± 1.72	**<0.00001**	18.394	**0.24 (Ins.)**	**7.30 (s.)**	**7.35 (s.)**
Post - Operative	0.9± 0.85	1.1 ± 0.69	3.1± 1.39	**<0.00001**	42.308	**1.07 (Ins.)**	**11.76 (s.)**	**10.69 (s.)**

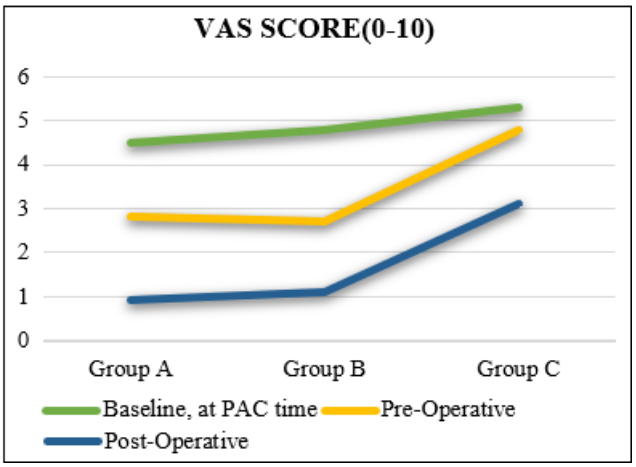

Figure 6: VAS pain Score of the study population

Rescue analgesia: No. of boluses of opioid (fentanyl) required by patient to relieve peri - operative anxiety and pain.

Table 7: Opioid bolus

N=30	Group A	Group B	Group C	p value
Opioid bolus	1	0	4	0.172

5. Discussion

In this prospective, randomized, double blind controlled study, we have demonstrated that viewing a short information film, and doing short term yoga before operation reduce the anxiety of patients undergoing elective orthopaedic surgery under regional anaesthesia. This effect was also sustained in the postoperative period.

Preoperative yoga is a cost - effective and simple intervention that has been effective in decreasing anxiety intra - and post - operatively as shown in our study. Similar results were also

obtained by Rao et al [26] in breast cancer surgery, Azeem et al [27] in cardiac surgery, Mobini et al [28] in patients undergoing coronary angiography, Chandrababu et al [29] for cardiac pathologies, Moody et al [30] for gynaecological procedures and labour patients

This may be explained by the rapid rise in brain GABA levels following a yoga session, which activates the vagal afferents, and it serves as the biochemical foundation for enhanced mood and reduced anxiety. [31]

A short video clip/film providing anaesthesia information and preoperative education intervention has been shown to significantly reduce pre and post - operative anxiety in our study. Similar results were seen by Lin et al [32], Jlala et al [33] in adults undergoing surgery under regional anaesthesia, Ortega et al [34] who showed video for performing ultrasound - guided internal jugular vein - cannulation, Ying et al [35] who showed informational Video About Anaesthesia on Pre - and Post - Elective Caesarean Section for Anxiety and Recovery.

The prevalence of 'high anxiety' among patients having surgery under regional anaesthesia was 16%, 13%, 13% in the assessment clinic 3 days before surgery in patients who were grouped in video clip, yoga breathing exercises and those in control group. Immediately before surgery, this increased to 27%, 23% and 30% respectively. After operation, only 1% reported high anxiety in the video clip and yoga group compared with 2% among controls. These differences demonstrate the effectiveness of our intervention.

This research revealed a notable positive correlation between the two anxiety assessment tools, the STAI and VAS, aligning with earlier findings. [36, 37]

Although STAI did not show a difference in anxiety between the groups in the preoperative period, it proved sensitive enough to identify a significant change post - operatively. This phenomenon may be linked to 'central tendency bias, ' where patients tend to refrain from using extreme scores due to their unfamiliarity with the assessment method when uncertain about their responses. [38]

In our study, we also found significant reduction in VAS pain Score during pre - and post - operative period in video clip and yoga group than control group. This also correlate with the reduced demand of rescue opioid (fentanyl) requirement in both intra - operative and post - operative period. This phenomenon may be attributed to the influence of yoga on elevating dopamine levels in the ventral striatum and increased concentrations of the inhibitory neurotransmitter gamma - aminobutyric acid in the thalamic area. [39]

Hemodynamic parameters were better controlled and showed less deviation from the baseline values in all 3 groups.

6. Summary

1) Preoperative anxiety is a prevalent issue prior to surgical procedures, necessitating effective assessment and management strategies.
2) Incorporating yoga and providing patient education through audio - visual materials during the preoperative phase can serve as a beneficial approach to alleviate anxiety.
3) It is essential to explore various methods for addressing perioperative anxiety to enhance patient comfort and outcomes.

Conclusion: Anxiety and Pain are the most sensitive concerns which needs to be addressed in patients undergoing surgery. By implementing yoga (breathing exercise) along with the use of multimedia video clip/film has significant impact to alleviate peri - operative anxiety and pain, thus, reducing opioid analgesics and hence enhancing patient's satisfaction and recovery.

7. Limitations of Study

1) Patients who are scheduled for surgeries involving the upper and lower limbs often experience different degrees of anxiety. To gain a more comprehensive understanding, we decided to merge these two patient groups, concentrating on those who are administered regional anaesthesia instead of focusing solely on one specific type of surgery.
2) Watching an educational video about anaesthesia has the potential to enhance patients' comprehension and

awareness; however, our study did not assess the extent to which the participants retained this information. This acquisition of knowledge might have played a role in alleviating anxiety levels among the individuals in our study group.

3) The limitations of our research include a small sample size and the inclusion of only patients receiving regional anaesthesia. We intend to conduct a similar investigation involving patients undergoing general anaesthesia, aiming for a significantly larger sample size to strengthen the findings.

References

[1] Klopfenstein CE, Forster A, Van Gessel E. Anesthetic assessment in an outpatient consultation clinic reduces preoperative anxiety. Canadian Journal of Anaesthesia.2000 Jun; 47: 511 - 5.

[2] Matthias AT, Samarasekera DN. Preoperative anxiety in surgical patients - experience of a single unit. Acta Anaesthesiologica Taiwanica.2012 Mar 1; 50 (1): 3 - 6.

[3] Jafar MF, Khan FA. Frequency of preoperative anxiety in Pakistani surgical patients. Journal of the Pakistan Medical Association.2009; 59 (6): 359.

[4] Erkilic E, Kesimci E, Soykut C, Doger C, Gumus T, Kanbak O. Factors associated with preoperative anxiety levels of Turkish surgical patients: from a single center in Ankara. Patient preference and adherence.2017 Feb 28: 291 - 6.

[5] Norris W, Baird WL. Pre - operative anxiety: a study of the incidence and aetiology. British journal of anaesthesia.1967 Jun 1; 39 (6): 503 - 9.

[6] Gomes ET, Bezerra SMMS. Anxiety and depression in the preoperative period of cardiac surgery. Rev Rene. Dec 30, 2017; 18 (3): 420 - 7.

[7] Gonçalves KKN, Silva JI, Gomes ET, Pinheiro LLS, Figueiredo TR, Bezerra SMMS. Anxiety in the preoperative period of heart surgery. Rev Bras Enferm. [Internet].2016 Apr [cited Dec 30, 2017]; 69 (2): 397 - 403.

[8] Bansal A, MittAl A, Seth V. Osho dynamic meditation's effect on serum cortisol level. Journal of clinical and diagnostic research: JCDR.2016 Nov; 10 (11): CC05.

[9] Matousek RH, Dobkin PL, Pruessner J. Cortisol as a marker for improvement in mindfulness - based stress reduction. Complementary therapies in clinical practice.2010 Feb 1; 16 (1): 13 - 9.

[10] Roomruangwong C, Tangwongchai S, Chokchainon AA. Preoperative anxiety among patients who were about to receive uterine dilatation and curettage. Journal of the Medical Association of Thailand.2012 Oct 1; 95 (10): 1344.

[11] Williams JG, Jones JR. Psychophysiological responses to anaesthesia and operation. Jama.1968 Feb 5; 203 (6): 415 - 7.

[12] Thomas T, Robinson C, Champion D, McKell M, Pell M. Prediction and assessment of the severity of post - operative pain and of satisfaction with management. Pain.1998 Jan 1; 75 (2 - 3): 177 - 85.

[13] Benyamin R, Trescot AM, Datta S, Buenaventura RM, Adlaka R, Sehgal N, Glaser SE, Vallejo R. Opioid complications and side effects. Pain physician.2008; 11 (2S): S105.

[14] Lee A, Chui PT, Gin T. Educating patients about anaesthesia: a systematic review of randomized controlled trials of media - based interventions. Anaesthesia & Analgesia.2003 May 1; 96 (5): 1424 - 31.

[15] Snyder - Ramos SA, Seintsch H, Böttiger BW, Motsch J, Martin E, Bauer M. Patient satisfaction and information gain after the preanesthetic visit: a comparison of face - to - face interview, brochure, and video. Anaesthesia & Analgesia.2005 Jun 1; 100 (6): 1753 - 8.

[16] Liguori S, Stacchini M, Ciofi D, Olivini N, Bisogni S, Festini F. Effectiveness of an app for reducing preoperative anxiety in children: a randomized clinical trial. JAMA pediatrics.2016 Aug 1; 170 (8): e160533 - .

[17] Doering S, Katzlberger F, Rumpold G, Roessler S, Hofstoetter B, Schatz DS, Behensky H, Krismer M, Luz G, Innerhofer P, Benzer H. Videotape preparation of patients before hip replacement surgery reduces stress. Psychosomatic Medicine.2000 May 1; 62 (3): 365 - 73.

[18] Steves SL, Scafide KN. Multimedia in preoperative patient education for adults undergoing cancer surgery: a systematic review. European Journal of Oncology Nursing.2021 Jun 1; 52: 101981.

[19] Frentsos JM. Use of videos as supplemental education tools across the cancer trajectory. Clinical Journal of Oncology Nursing.2015 Dec 1; 19 (6): E126.

[20] Steves SL, Scafide KN. Multimedia in preoperative patient education for adults undergoing cancer surgery: a systematic review. European Journal of Oncology Nursing.2021 Jun 1; 52: 101981.

[21] Jeter PE, Slutsky J, Singh N, Khalsa SB. Yoga as a therapeutic intervention: a bibliometric analysis of published research studies from 1967 to 2013. The journal of alternative and complementary medicine.2015 Oct 1; 21 (10): 586 - 92.

[22] Sivaramakrishnan D, Fitzsimons C, Kelly P, Ludwig K, Mutrie N, Saunders DH, Baker G. The effects of yoga compared to active and inactive controls on physical function and health related quality of life in older adults - systematic review and meta - analysis of randomised controlled trials. International Journal of Behavioral Nutrition and Physical Activity.2019 Dec; 16: 1 - 22.

[23] Moonaz SH, Bingham CO, Wissow L, Bartlett SJ. Yoga in sedentary adults with arthritis: effects of a randomized controlled pragmatic trial. The Journal of rheumatology.2015 Jul 1; 42 (7): 1194 - 202.

[24] Sharma M. Yoga as an alternative and complementary approach for arthritis: a systematic review. Journal of evidence - based complementary & alternative medicine.2014 Jan; 19 (1): 51 - 8.

[25] Kruyen PM, Emons WH, Sijtsma K. Shortening the S - STAI: Consequences for research and clinical practice. Journal of Psychosomatic Research.2013 Aug 1; 75 (2): 167 - 72.

[26] Rao RM, Nagendra HR, Raghuram N, Vinay C, Chandrashekara S, Gopinath KS, Srinath BS. Influence of yoga on postoperative outcomes and

wound healing in early operable breast cancer patients undergoing surgery. International journal of yoga.2008 Jan 1; 1 (1): 33 - 41.

[27] Azeez AM, Puri GD, Samra T, Singh M. Effect of short - term yoga - based - breathing on peri - operative anxiety in patients undergoing cardiac surgery. International Journal of Yoga.2021 May 1; 14 (2): 163 - 7. Bidgoli MM, Taghadosi M, Gilasi H, Farokhian A. The effect of sukha pranayama on anxiety in patients undergoing coronary angiography: a single - blind randomized controlled trial. Journal of cardiovascular and thoracic research.2016; 8 (4): 170.

[28] Bidgoli MM, Taghadosi M, Gilasi H, Farokhian A. The effect of sukha pranayama on anxiety in patients undergoing coronary angiography: a single - blind randomized controlled trial. Journal of cardiovascular and thoracic research.2016; 8 (4): 170.

[29] Chandrababu R, Kurup SB, Ravishankar N, Ramesh J. Effect of pranayama on anxiety and pain among patients undergoing cardiac surgery: A non - randomized controlled trial. Clinical Epidemiology and Global Health.2019 Dec 1; 7 (4): 606 - 10.

[30] Moody K, Abrahams B, Baker R, Santizo R, Manwani D, Carullo V, Eugenio D, Carroll A. A randomized trial of yoga for children hospitalized with sickle cell vaso - occlusive crisis. Journal of pain and symptom management.2017 Jun 1; 53 (6): 1026 - 34.

[31] Streeter CC, Whitfield TH, Owen L, Rein T, Karri SK, Yakhkind A, Perlmutter R, Prescot A, Renshaw PF, Ciraulo DA, Jensen JE. Effects of yoga versus walking on mood, anxiety, and brain GABA levels: a randomized controlled MRS study. The journal of alternative and complementary medicine.2010 Nov 1; 16 (11): 1145 - 52.

[32] Lin SY, Huang HA, Lin SC, Huang YT, Wang KY, Shi HY. The effect of an anaesthetic patient information video on perioperative anxiety: a randomised study. European Journal of Anaesthesiology| EJA.2016 Feb 1; 33 (2): 134 - 9.

[33] Jlala HA, French JL, Foxall GL, Hardman JG, Bedforth NM. Effect of preoperative multimedia information on perioperative anxiety in patients undergoing procedures under regional anaesthesia. British journal of anaesthesia.2010 Mar 1; 104 (3): 369 - 74.

[34] Ortega R, Song M, Hansen CJ, Barash P. Ultrasound - guided internal jugular vein cannulation. N Engl J Med.2010 Apr 22; 362 (16): e57.

[35] Che YJ, Gao YL, Jing J, Kuang Y, Zhang M. Effects of an informational video about anaesthesia on pre - and post - elective cesarean section anxiety and recovery: a randomized controlled trial. Medical Science Monitor: International Medical Journal of Experimental and Clinical Research.2020; 26: e920428 - 1.

[36] Kindler CH, Harms C, Amsler F, Ihde - Scholl T, Scheidegger D. The visual analog scale allows effective measurement of preoperative anxiety and detection of patients' anesthetic concerns. Anaesthesia & Analgesia.2000 Mar 1; 90 (3): 706 - 12.

[37] Boker A, Brownell L, Donen N. The Amsterdam preoperative anxiety and information scale provides a simple and reliable measure of preoperative anxiety. Canadian Journal of Anaesthesia.2002 Oct 1; 49 (8): 792 - 8.

[38] Poulton EC. Models for biases in judging sensory magnitude. Psychological bulletin.1979 Jul; 86 (4): 777.

[39] Streeter CC, Jensen JE, Perlmutter RM, Cabral HJ, Tian H, Terhune DB, Ciraulo DA, Renshaw PF. Yoga Asana sessions increase brain GABA levels: a pilot study. The journal of alternative and complementary medicine.2007 May 1; 13 (4): 419 - 26.