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ORIGINAL RESEARCH

Role of preoperative powerpoint information regarding OT environment and technique of anaesthesia on patient cooperation and satisfaction for spinal anaesthesia- A prospective observational study

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ABSTRACT

Introduction: Preoperative education comprises of a number of interventions that occur ahead of surgery to prepare patients for the course of anaesthesia, surgery and postoperative recovery. Preoperative education materials might help improve patient's cooperation and satisfaction to anaesthesia technique, and OT experience as well as decrease their anxiety. Different methods of communication such as verbal explaining, handouts, images, videos, etc might be used to pass the information to the patients make them familiar with the environment and technique. **Aim:** Evaluation of role of preoperative powerpoint information regarding OT environment and technique of anaesthesia on patient cooperation, satisfaction and hemodynamics in elective orthopedic surgeries under spinal anaesthesia. **Material and Methods:** This was a single centred prospective observational study conducted in Department of Anaesthesiology and Critical Care, Post Graduate Institute of Medical Sciences, Rohtak, Haryana, India. A total of 120 patientsin the age group 18-60 years belonging to ASA I-II posted for orthopaedic surgery under spinal anaesthesia were included in the study. Patients were randomized into two groups- Group I (Control Group, n=60) and Group II (Powerpoint Group, n=60). Demographic parameters, baseline HR, BP, RR and VAS^{B} for anxiety were recorded during PAC visit. Preoperatively, HR, BP, RR and VAS^{PRE} for anxiety were recorded. Intraoperatively, HR, BP and RR were recorded. Postoperatively, HR, BP, RR, Patients cooperation to anaesthesia (PCA) an a 1-5 likert scale and Patient's satisfaction score (PSS) on a 1-5 likert scale were noted. **Results:** Total of 120 patients were analyzed with 60 patients in each group. Patients were comparable in terms of age, gender, baseline HR, BP, RR and VAS^{B}. Preoperative Visual Analogue Score (VAS^{PRE}) among the patients in both groups was found to be statistically significant (p value, 0.001) with a mean+- SD of 50.10+- 2.956 in Group I and 36.37+- 1.904 in Group II respectively. Difference in Patient's Cooperation to Anaesthesia (PCA) among both groups was statistically significant (p value, 0.001) with a mean+- SD of 2.42+- 0.497 in Group I and 4.40+- 0.616 in Group II. Hemodynamic parameters were found to be better controlled in the powerpoint group during the intraoperative period. Patient's Satisfaction Score among the patients in both groups was found to be statistically significant (p value, 0.001) with a mean+- SD of 2.47+- 0.724 in Group I and 3.90+- 0.68 in Group II respectively. **Conclusion:** Preoperative information using multimedia tools is interesting, easy to use and interactive for the patient. It is easily retained and helps develop a virtual scenario for the patient in order to decrease their unfamiliarity with the operation theatre environment, anaesthesiapersonnels and procedure. The present study shows that patients who are preoperatively informed using multimedia powerpoint presentation preoperatively have lesser anxiety, good cooperation and better satisfaction towards OT experience, spinal anaesthesia and better hemodynamic control.

Keywords: Preoperative Education, Powerpoint based multimedia information, Patient Cooperation, Patient Satisfaction, Spinal Anaesthesia

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INTRODUCTION

Preoperative education comprises of a number of interventions that occur ahead of surgery to prepare patients for the course of anaesthesia, surgery and postoperative recovery. It induces feelings of control among patients and helps them gain sufficient knowledge to improve the coping ability and engage in appropriate attitudes and behaviours.[1-4] Patients' knowledge deficits on anesthesia and role of anaesthesiologists in their care may contribute to lack of cooperation to anaesthesia technique, anxiety and an unsatisfactory anaesthesia experience. Preoperative education materials might help improve patient's cooperation and satisfaction to anaesthesia technique, and OT experience as well as decrease their anxiety. Different methods of communication such as verbal explaining, handouts, images, videos, etc might be used to pass the information to the patients to make them familiar with the environment and technique.[5] Lack of patient's cooperation to spinal anaesthesia as result of incomplete or deficient knowledge might make administering spinal difficult, increase in number of attempts, inadequate blockade, failed attempt or a restless/anxious patient.

Perioperative anxiety is detrimental for both intraoperative course and postoperative recovery. Entering into an unfamiliar environment of operation theatre, sounds of monitor alarms, narrowness of operation table, low temperature etc all leads to increase in anxiety. Two most common stressors resulting in lack of cooperation or dissatisfaction are lack of knowledge and fear of unknown.[6] Provision of information plays a significant role in improving patients OT experience. Patients who are satisfied have positive interactions with healthcare personnel and feel that their expectations, goals, and preferences have been met to some level. Patient satisfaction with healthcare services is an important outcome that is used as a benchmark for treatment quality.[7-10] It enhances communication, patient- centred attention, and a better relationship between patients and healthcare professionals.Patients engaged during preoperative period boosts their satisfaction, makes them more cooperative and lessens anxiety.[11,12]

Education methods such as powerpoint presentation comprising of audiovisual elements gets easily incorporated into patient's mind and helps alleviates patients fear of unknown.[13] We aimed to assess the effect of powerpoint based information on operation theatre environment and technique of spinal anaesthesia in improving patient's cooperation and satisfaction to spinal anaesthesia in patients undergoing elective surgeries.

MATERIAL AND METHODS

The present prospective, single-blind interventional study was conducted in the Department of Anaesthesiology and Critical Care in a tertiary hospital of teaching institute after obtaining approval from **Institutional Ethical Committee (EC/NEW/INST/2022/HR/0189)** and registering prospectively with clinical trials registry **(CTRI/2024/03/063970)**. Witnessed informed consent was taken from patients.

Patients in the age group 18-60 years belonging to ASA I-II posted for orthopaedic surgery under spinal anaesthesia were included in the study. Patients with prior visit to the operation theatre, education qualification below metric level, impaired eyesight and hearing, history of psychiatric/neurological disorder, head injury, drug abuse, alcohol abuse, or any psychological trauma in past 6 months were excluded from the study.[11] Patients were randomly divided into two groups by using sequentially numbered, opaque, sealed envelopes prepared by the research coordinator, not involved in the study. The estimated sample size is based on PCA (Patient's Cooperation ToAnaesthesia) among groups on the basis of pilot study conducted on twenty patients. For the sample size calculation, we have defined mean difference of 1 with 1.5 Standard Deviation. Sample size is calculated with 95% confidence interval, 80% power and alpha level of 0.05.

- Group I (Control group) (C) : patients undergoing routine preanesthetic checkup
- Group II (Powerpoint group) (PP) : patients exposed to powerpoint based information during pre anaesthetic checkup

During Preanaesthetic Checkup (Day before surgery):

Patients underwent routine bedside preanaesthetic consultation, the day before the surgery. Baseline vitals including blood pressure (BP), heart rate (HR) and Respiratory Rate (RR) were noted during the preanesthetic checkup. All patients were asked to give an estimate of their anxiety on ''Visual Analogue score" on a 10 cm straight line scale **(**VAS^B).As per randomised group allocation, patients of Group II (PP) were shown a 12 slide informational powerpoint presentation on a tablet of screen size 10 inches consisting of still pictures of the premedication room, OT entrance and lobby, OT room comprising of OT table, anaesthesia workstation, monitors and toplights, anaesthetists and staff personals in scrubs, monitors attached, cannulation and iv line setup, Position, cleaning and draping for spinal anaesthesia, Lumbar puncture, Expected position after spinal anaesthesia, oxygen mask application, Transfer out at completion of surgery, Post anaesthesia care unit (PACU), Discharge from PACU.[6] Audio effect was included wherever needed such as beeping of monitors. Every still picture was verbally explained in sequential manner covering every element of the environment and technique of anaesthesia from the point of entry in the premedication room to discharge from the post anaesthesia care unit focusing on making the environment and anaesthesia procedure more familiar for the patient.

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Day of surgery

Pre operatively:

On the day of surgery, all the patients were asked to give an estimate of their anxiety on "Visual Analogue score" on a 10 cm straight line scale (VAS^{Pre}).

Intraoperatively :

HR, BP, RR were noted at the start of anaesthesia and at every 5 minutes for 20 minutes then every 10 minutes till the end of surgery intraoperatively for both the groups.Anaesthetist administering spinal was blinded to the group allocation and was asked to report patient's cooperation to spinal anaesthesia (PCA) on a five point "Likert Scale"after achieving desired level of block and stabilising the patient (1- very poor, 2- poor, 3- neutral, 4- good, 5- excellent).

Postoperatively :

All the patients were asked to report their satisfaction (Patient Satisfaction Score; PSS) to OT and Spinal anaesthesia experience on five point "Likert Scale" before discharge from PACU.(1- not at all satisfied, 2- somewhat satisfied, 3- neutral, 4- satisfied, 5- very satisfied).

STATISTICAL ANALYSIS

The data was coded and entered into Microsoft Excel spreadsheet. Analysis was done using SPSS version 20 (IBM SPSS Statistics Inc., Chicago, Illinois, USA) Windows software program. The variables were assessed for normality using the Kolmogorov Smirnov test. Descriptive statistics included computation of percentages, means and standard deviations. A p value of < 0.05 was considered statistically significant.

RESULTS

Demographic profile

Both the groups were matched for their age, gender, baseline heart rate, mean arterial blood pressure, respiratory rate, and VAS score for anxiety. The difference observed for these baseline characteristics among both the groups was statistically insignificant. (Table/ Fig 1)

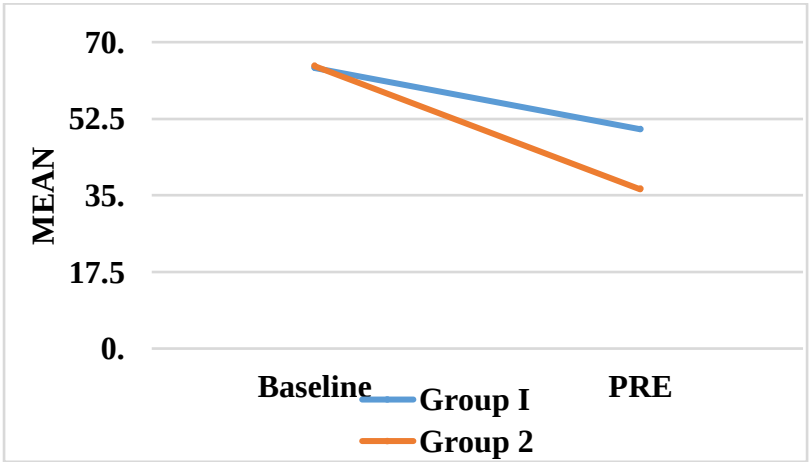
Table 1. Baseline parameters of participants in Group I and II (Age, Gender, Baseline Heart Rate, Baseline Mean Arterial Pressure, Baseline Respiratory Rate and Baseline Visual Analogue Score for anxiety)

PARAMETER	GROUP I (MEAN +-SD)	GROUP II (MEAN +-SD)	P VALUE
Age (years)	36.38 +- 10.875	33.03 +- 9.711	0.08
Gender (M/F)	78.3% / 21.7%	81.7% / 18.3%	0.64
Baseline HR (beats/min)	76.70 +- 9.018	76.97 +- 9.042	0.87
Baseline MAP (mm Hg)	92.27 +- 8.477	92.31 +- 8.312	0.98
Baseline RR (breaths/min)	13.32 +- 8.796	12.25 +- .600	0.35
Baseline VAS	64.10 +- 4.233	64.52 +- 3.539	0.56

VAS score for anxiety (VAS^{B} and VAS^{Pre})

Preoperative Visual Analogue Score (VAS^{PRE}) among the patients in both groups was found to be statistically significant (p value, 0.001) with a mean+- SD of 50.10+- 2.956 in Group I and 36.37+- 1.904 in Group II respectively. (Table/Fig 2)

Fig 2. Mean values of baseline VAS (VAS^{B}) and Preoperative VAS (VAS^{PRE}) of Group I and Group II on a 0-100 mm scale



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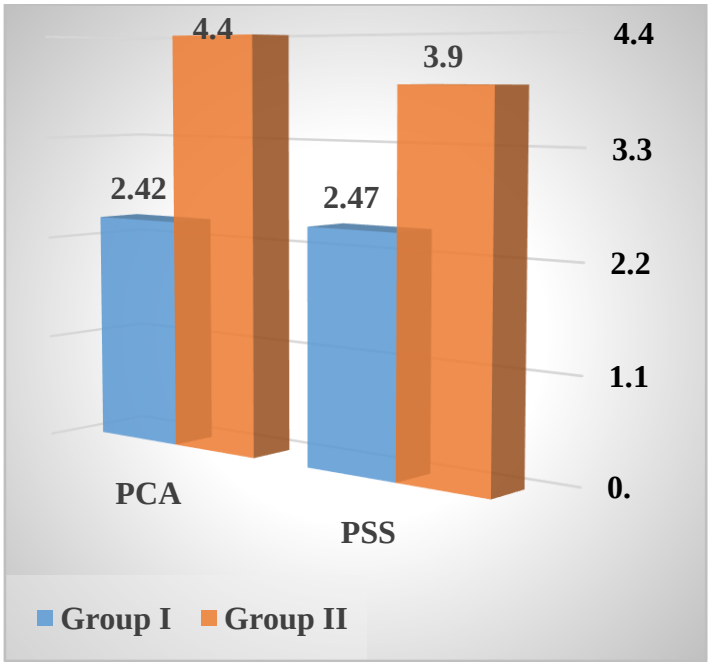
Patients Cooperation to Anaesthesia (PCA)

Difference in Patient's Cooperation to Anaesthesia (PCA) among both groups was statistically significant (p value, 0.001) with a mean+- SD of 2.42+- 0.497 in Group I and 4.40+- 0.616 in Group II. (Table/ Fig 3)

Fig 3. Mean values of Patient's Cooperation to Anaesthesia (PCA) and Patient's Satisfaction Score (PSS) among Group I and Group II



Hemodynamic parameters (HR, MAP, RR)

Heart rate was analyzed statistically using unpaired t test. Baseline heart rate for both the groups was found be comparable with no statistical significant difference having a p value of 0.87 (Group I- 76.70; Group II- 76.97). In Group I, mean heart rate at time points of 0, 5, 10, 15, 20, 30, 40 & 50 minutes in the intraoperative period was found to be 87.48, 86.55, 85.13, 84.10, 82.88, 81.47, 80.17 & 78.82 beats per minute respectively. In Group II, mean heart rate at time points of 0, 5, 10, 15, 20, 30, 40 & 50 minutes in the intraoperative period was found to be 79.62, 79.20, 78.50, 78.08, 77.57, 76.93, 76.45 & 76.32 beats per minute respectively. The difference among both the groups was found to be statistically significant upto 40 minutes in the intraoperative period with a p value < 0.05. Mean heart rate in the postoperative period was statistically insignificant (p value 0.38) among both the groups with a mean of 77.73 and 76.27 in Group I and II respectively. (Table/Fig 4)

Fig 4. Line diagram showing Baseline Heart Rate (HR) in beats per minute, HR at various time points (0 min, 5 min, 10 min, 15 min, 20 min, 30 min, 40 min,50 min) in intraoperative period & HR in the postoperative period in Group I and Group II

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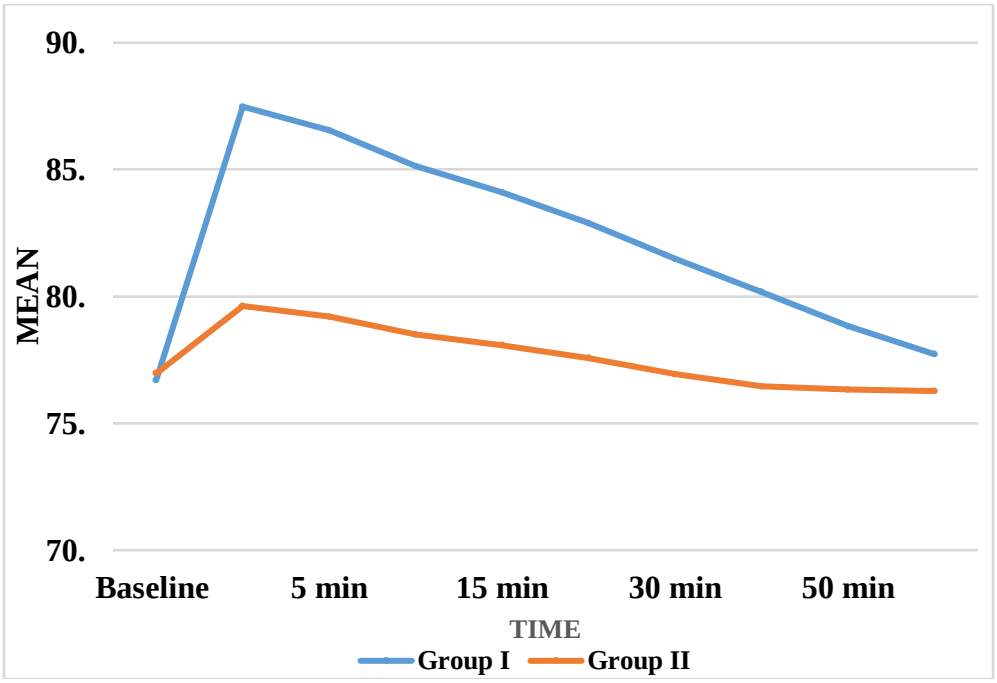
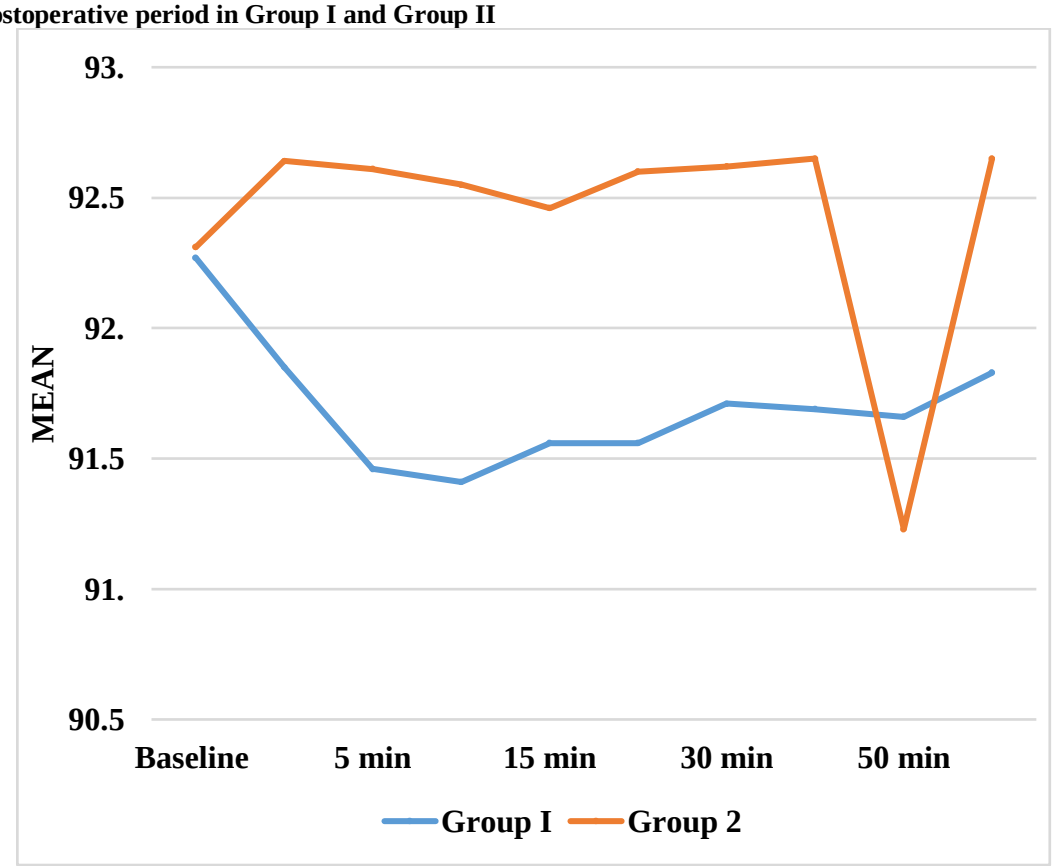


In Group I, MAP at time points of 0, 5, 10, 15, 20, 30, 40 & 50 minutes in the intraoperative period was found to be 91.85, 91.46, 91.41, 91.56, 91.56, 91.71, 91.69 & 91.66 mm Hg respectively. In Group II, MAP at time points of 0, 5, 10, 15, 20, 30, 40 & 50 minutes in the intraoperative period was found to be 92.64, 92.61, 92.55, 92.46, 92.60, 92.62, 92.65 & 91.23 mm Hg respectively. The difference among both the groups was found to be statistically in significant at all time point with a p value > 0.05. Similarly, MAP in the postoperative period was statistically insignificant (p value 0.59) among both the groups with a mean of 91.83 and 92.65 in Group I and II respectively. (Table/Fig 5)

Fig 5. Line diagram showing Baseline Mean Arterial Pressure (MAP) in mm Hg, MAP at various time points (0 min, 5 min, 10 min, 15 min, 20 min, 30 min, 40 min,50 min) in intraoperative period & MAP in the postoperative period in Group I and Group II



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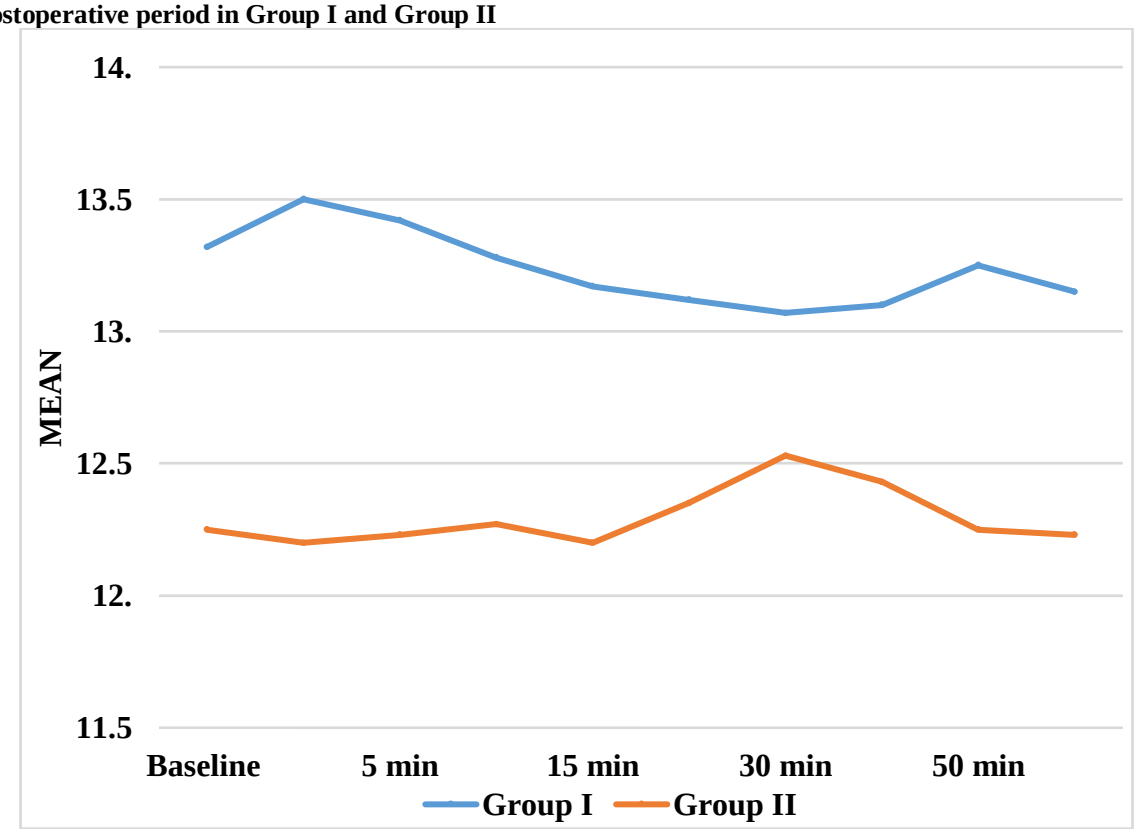
In Group I, RR at time points of 0, 5, 10, 15, 20, 30, 40 & 50 minutes in the intraoperative period was found to be 13.50, 13.42, 13.28, 13.17, 13.12, 13.07, 13.10 & 13.25 breaths per minute respectively. In Group II, MAP at time points of 0, 5, 10, 15, 20, 30, 40 & 50 minutes in the intraoperative period was found to be 12.20, 12.23, 12.27, 12.20, 12.35, 12.53, 12.43 & 12.25 breaths per minute respectively. The difference among both the groups was found to be statistically in significant at all time point with a p value > 0.05. Similarly, RR in the postoperative period was statistically insignificant (p value 0.43) among both the groups with a mean of 13.15 and 12.23 in Group I and II respectively. (Table/Fig 6)

Fig 6. Line diagram showing Baseline Respiratory Rate (RR) in breaths per minute, RR at various time points (0 min, 5 min, 10 min, 15 min, 20 min, 30 min, 40 min,50 min) in intraoperative period & RR in the postoperative period in Group I and Group II



Patients Satisfaction Score to anaesthesia and OT environment (PSS)

Patient's Satisfaction Score among the patients in both groups was found to be statistically significant (p value, 0.001) with a mean+- SD of 2.47+- 0.724 in Group I and 3.90+- 0.68 in Group II respectively. (Table/ Fig 3)

DISCUSSION

Nowadays general population has become more aware and are interested in preoperative education comprising of a number of interventions that occur ahead of surgery in order to prepare themselves for the course of anaesthesia, surgery and postoperative recovery.[14] There is very limited interaction between the anaesthesiologist and patient leading to knowledge deficits on anesthesia and role of anaesthesiologists in their care. This may lead to stranger anxiety, thus contributing to lack of cooperation to anaesthesia technique, anxiety and an unsatisfactory anaesthesia experience.[15] Preoperative education materials might help improve patient's cooperation by building a rapport, satisfaction to anaesthesia technique, OT experience, as well as decrease their anxiety.[16] In the present era, anaesthesiologists must come in front breaking the notion of "behind the curtain force", to provide relevant information to the patients beforehand. Lack of patient's cooperation to spinal anaesthesia as a result of incomplete or deficient knowledge might make administering spinal difficult, increase in number of attempts, inadequate blockade, failed attempt or a restless/anxious patient. Lack of knowledge and fear of unknown are the most common stressors resulting in lack of cooperation or dissatisfaction.Patients who are well informed have positive interactions with healthcare personnel and feel that their expectations, goals, and preferences have been met to some level, thus improving the credibility of the anaesthesia discipline.[17] Patient satisfaction with healthcare services is an important outcome that is often used as a benchmark for treatment quality.[18-20]

The present study was conducted to understand the role of preoperative powerpoint based information regarding OT environment and technique of anaesthesia on patient's cooperation, satisfaction for spinal anaesthesia and maintaining hemodynamics in patients scheduled for orthopaedic surgery under spinal

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anaesthesia. In the present study both the groups were comparable in terms of age, gender, baseline heart rate, mean arterial blood pressure, respiratory rate, and VAS score for anxiety. A significant decrease in VAS score for anxiety preoperatively and better control of heart rate during preoperative and postoperative period was observed in the group of patients who were shown powerpoint based multimedia information during routine pre anaesthetic checkup. Control group also showed a slight decrease in VAS for anxiety after the regular PAC visit. However, it was not found to be statistically significant. Results of the present study are in accordance with similar researches conducted in the past. Study by **Dias et al** revealed that patients who were shown video had a significant decrease in state anxiety score pre-SAB (50.46 +- 10.37; mean +_ SD) ($p < 0.001$).[15] A study in 2010 to determine the effect of preop multimedia information on preoperative anxiety in patients undergoing procedure under regional anaesthesia showed similar results.[21] Another study by **Lin et al** revealed significantly lower anxiety (STAI-S) in the experimental group who received video based information as compared to the control group (received verbal briefing) ; $p < 0.001$.[16] Research work by **Bugers et al** demonstrated that patients who received a preoperative educational intervention the day before surgery reported lower anxiety on STAI, 30 minutes before surgery.**[1]** There is further supporting evidence to this. **Yesilyurt et al** showed that after the video presentation, ASSQ mean scores in the experimental group were lower than before presentation and control group; $p < 0.05$.[11] Results of the present study are in accordance with study by **Helms et al** where they reported a significant decrease of preoperative anxiety in patients who received video education.[6] Study by **Rajput et al** showed that anxiety levels in the test group were lower than the control group post intervention and were statistically significant; $p = 0.02$, thus higlighting the effect of multimedia on anxiety reduction.[22]

In the present study the Group I patients showed a significant increase in HR on the day of surgery and during the intraoperative period. Group II patients showed a better control of heart rate in the preoperative and intraoperative period. Our results are in accordance with previous studies conducted. A study conducted by **Dias et al** showed that mean HR pre SAB in the non video group increased 24% from baseline whereas in the video group it was just 4.87% increase from baseline.[15] In another study the mean HR increased to 13% from baseline in control group at immediate preoperative period as compared to 3.5% in the experimental group and again the difference was statistically significant; $p = 0.003$.[22] In their study mean SBP in preoperative period increased by 18.3% from baseline in the control group as compared to 5% in the group that was shown video preoperatively, The difference was statistically significant; $p < 0.001$ and mean DBP increased to 11.8% from baseline in intraoperative period in the control group as compared to 3% in the video group and the difference was statistically significant; $p < 0.001$.[22]

The hemodynamic variations in the perioperative period might be attributed to the catecholamine surge. Provision of information leads to decreased anxiety, thus a better control on hemodynamics.[15] In the present study the difference among both the groups in terms of trend of mean arterial pressure and respiratory rate was found to be statistically insignificant at all time point with a p value > 0.05.

Patient's satisfaction to anaesthesia is one of the quality outcome of the hospital services and must be taken care of. In the present study the difference in Patient's Satisfaction Score among the patients in both groups was found to be statistically significant with better satisfaction scores in the powerpoint group. In a study by **Ortiz et al** , the group of patients who completed a set of survey on anaesthesia after reviewing the handout material reported significantly higher satisfaction; $p = 0.0028$.[5] Similarly, research by **Lin et al** showed that overall mean (SD) patient satisfaction score was significantly higher in the experimental group who were shown anaesthetic perioperative video as compared to the control group; 90.2(12.3) vs 84.0(17.4) $p = 0.043$.[16] In another study by **Yesilyurt et al** , after the video presentation SNCS mean score of the patients in the experimental group were found to be significantly higher than the patients in the control group; $p < 0.05$.[11] Satisfied patients are more likely to have positive interactions with health care personnel and gives them a feeling that their expectations, goals and preferences have been met.[7]

Provision of adequate information regarding OT environment and anaesthesia procedure improves patient's cooperation to anaesthesia. In the present study patients who were shown powerpoint showed better cooperation on likert scale. There are no available researches, where patients cooperation to anaesthesia is studied using anaesthesia based preoperative education.

The present study shows that patient information about OT environment and anaesthesia procedure in the preoperative period contributes to the patient's knowledge about the exact scenario in a stepwise manner which develops a good feeling in them physically as well as mentally, ceases their anxiety, improves their cooperation to anaesthesia and eventually providing them with a sense of satisfaction to the anaesthesia, thus overall improving the outcome.

LIMITATIONS

Single-centric, small sample size, non assessment of subjective anxiety scores intraoperatively for the concern of negating distraction which can be taken care of in future studies. More elaborate subjective scores for anxiety, cooperation, satisfaction and biochemical markers like cortisol levels, epinephrine, etc., can be used to correlate variations better. Education level of patients might also play a significant role in the understanding of powerpoint.

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CONCLUSION

Lack of knowledge contributes to anxiety which also leads to delay in healing and an increased risk or perioperative complications. Preoperative information using multimedia tools is interesting, easy to use and interactive for the patient. It is easily retained and helps develop a virtual scenario for the patient in order to decrease their unfamiliarity with the operation theatre environment, anaesthesia personnels and procedure. Most of the research available on preoperative education is related to surgical procedures. Anaesthesia related preoperative education is very limited and even very limited data is available on Indian population. It must be imperative for every institution to improve patients education regarding OT and anaesthesia preoperatively to strengthen the positive outcomes and it also makes patients aware of importance of this stream of medicine. The present study shows that patients who are preoperatively informed using multimedia powerpoint presentation preoperatively have better hemodynamic control, lesser anxiety, good cooperation and better satisfaction towards OT experience and spinal anaesthesia.

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Authors Contribution: (concept-C, Preparation of Protocol-PT, Case conduction CC, data analysis DA, review of Literature-RW, manuscript M,)
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ETHICAL APPROVAL/ INFORMED CONSENT/ CLINICAL TRIAL REGISTRY

A. Institutional Ethical Committee (EC/NEW/INST/2022/HR/0189)
B. Informed consent was taken from all participants for the study
C. Clinical trials registry (CTRI/2024/03/063970)

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