e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2023; 15(5); 495-504

Original Research Article

A Hospital Based Prospective Observational Study to Observe Correlation between Preoperative Anxiety and Arterial Pressure Change after Spinal Anaesthesia for Lower Segment Caesarean Section

Amit Yadav[1], Nihar Sharma[2], Subhrat Agarwal[3], Pankag Garg[4], Kavita M[5]

[1]3rd PG Student, Department of Anesthesia, SMS Medical College & Hospital, Jaipur
[2]Associate Professor, Department of Anesthesia, SMS Medical College & Hospital, Jaipur
[3]3rd PG Student, Department of Anesthesia, SMS Medical College & Hospital, Jaipur
[4]Medical Officer, Department of Anesthesia, SMS Medical College & Hospital, Jaipur
[5]2nd PG Student, Department of Anesthesia, SMS Medical College & Hospital, Jaipur

Received: 26-02-2023 / Revised: 24-03-2023 / Accepted: 30-04-2023
Corresponding author: Dr Amit Yadav
Conflict of interest: Nil

Abstract

Background: The most common complication of spinal anaesthesia is hypotension. Preoperative worry is one of the many reasons of hypotension after spinal anaesthetic. We investigated the relationship between preoperative anxiety and changes in arterial pressure after spinal anaesthesia for caesarean delivery.

Material and Methods: A hospital-based prospective observational study with 90 pregnant women separated into three groups (Group A n=30, Group B n=30, and Group C n=30) was carried out. Patients in Group A had mild anxiety, Group B had moderate anxiety, and Group C had severe anxiety. We performed one-way analysis of variance (ONE -WAY ANOVA) to assess preoperative mother anxiety and post spinal hypotension in low, medium, and high preoperative anxiety groups, and the differences between the groups were analysed using an unpaired T-Test.

Conclusion: We concluded that the preoperative anxiety had a significant effect on hypotension after spinal anaesthesia for caesarean delivery.

Keywords: Spinal Anaesthesia, Arterial Pressure, Preoperative Anxiety, Hypotension.

Introduction

Because of the simple technique, rapid onset, dense neural block, and minimal drug exposure, less maternal morbidity and mortality, which is largely due to a reduction in the incidence of pulmonary aspiration and failed intubation, avoids neonatal exposure to depressant anaesthetic drugs, and allows the mother to remain awake during delivery [1], spinal anaesthesia is often the preferred choice for lower segment caesarean section. However, hypotension is the most prevalent consequence associated with spinal anaesthesia, occurring in up to 83% of cases [2-4], but its frequency varies depending on how hypotension is defined [5,6]. Hypotension after spinal anaesthesia is caused by a variety of factors such as maternal positioning, medication amount administered, preloading and co-loading, level of anaesthesia, injection speed, maternal age, neonate weight, use of prophylactic or therapeutic vasopressors, and so on [7].

One of the causes of increased mortality during anaesthesia and surgery is preoperative anxiety [8]. It has a significant impact on patients' hemodynamics, generating an unwarranted increase in preoperative heart rate and blood pressure [9], resulting in sudden myocardial infarction, heart failure, and pulmonary oedema, all of which contribute to a high rate of cardiac death. Preoperative anxiety can significantly increase the likelihood of hypotension during spinal anaesthesia [10], necessitating the administration of additional fluid and vasopressors [11]. The purpose of this study was to see if there was a link between preoperative anxiety and changes in arterial pressure after spinal anaesthetic for caesarean birth.

Material and Method

Following approval from the hospital's ethical committee, 90 pregnant women aged 18 to 35 years old with American Society of Anesthesiologists physical status I to II and weighing 40 to 70 kilogrammes were chosen for elective lower segment caesarean section and written informed consent was obtained. The study excluded patients who were in active labour, had chronic hypertension or pre-eclampsia, had another current medical or psychiatric illness, or had absolute contraindications to spinal anaesthesia. During the pre-anaesthetic appointment, the procedure was described to the patients. The Hamilton Anxiety Rating Scale (HAM-A) was used to assess preoperative anxiety in the preoperative ward on the day of operation.[12] Following a check for normal distribution The HAM-A scale was translated into ordinal groupings, with less than 17 indicating mild anxiety (Group A), 18-25 indicating moderate anxiety (Group B), and more than >25 indicating severe anxiety (Group C). (See Figure 1) All patients were subjected to the standard operating protocol. Monitors were attached, and baseline data such as HR, BP, and SPO2 were recorded. The baseline systolic arterial blood pressure was calculated by averaging three readings taken one minute apart with an automated non-invasive blood pressure instrument. A 5-10ml/kg ringer lactate solution preload was administered. After the fluid infusion, the anaesthesiologist administered spinal anaesthesia in the sitting posture at the L3-L4 intervertebral area with a 25 G quincke needle. Over 30 seconds, 10 mg of hyperbaric bupivacaine was administered. Immediately following spinal anaesthesia, all patients were positioned supine with left uterine displacement. Concurrently with the intra-thecal injection, the patients were given 10 ml/kg of ringer lactate solution, and the rate of i.v. fluid administration was lowered to keep the vein open until the infant was delivered. Blood pressure was checked every minute until delivery, and subsequently every five minutes under anaesthesia. Hypotension was defined as a systolic blood pressure of 90 mmHg or more than a 20% drop from the baseline level, and a diastolic blood pressure of 60 mmHg or more than a 20% drop from the baseline level. Bradycardia was defined as a pulse rate of 60 beats per minute or 20% of baseline heart rate, or a rate that is too slow to be physiologically acceptable for the individual and/or activity. If the maternal systolic blood pressure reached 80%, 6mg ephedrine or 12mg mephentermine was administered. Microsoft Excel 2013 was used to collect and compute data, while SPSS version 28.0 was used to analyse it. The mean + SD (standard deviation) of a continuous variable was used to summarise it. Actual number and percentage (%) were categorical variables. The Hamilton anxiety rating scale, which will be translated into ordinal categories corresponding to low, medium, and high preoperative anxiety groups, will be the study's key variable.

The maximum percentage change in systolic blood pressure after spinal anaesthesia with regard to baseline and the largest absolute change in systolic blood pressure after anaesthesia from baseline were the dependent variables. As continuous data, the dependent variable was examined. The groups with low, medium, and high preoperative anxiety were compared using one-way analysis of variance (ONE -WAY ANOVA), and the differences between the groups were analysed using an unpaired T-Test.

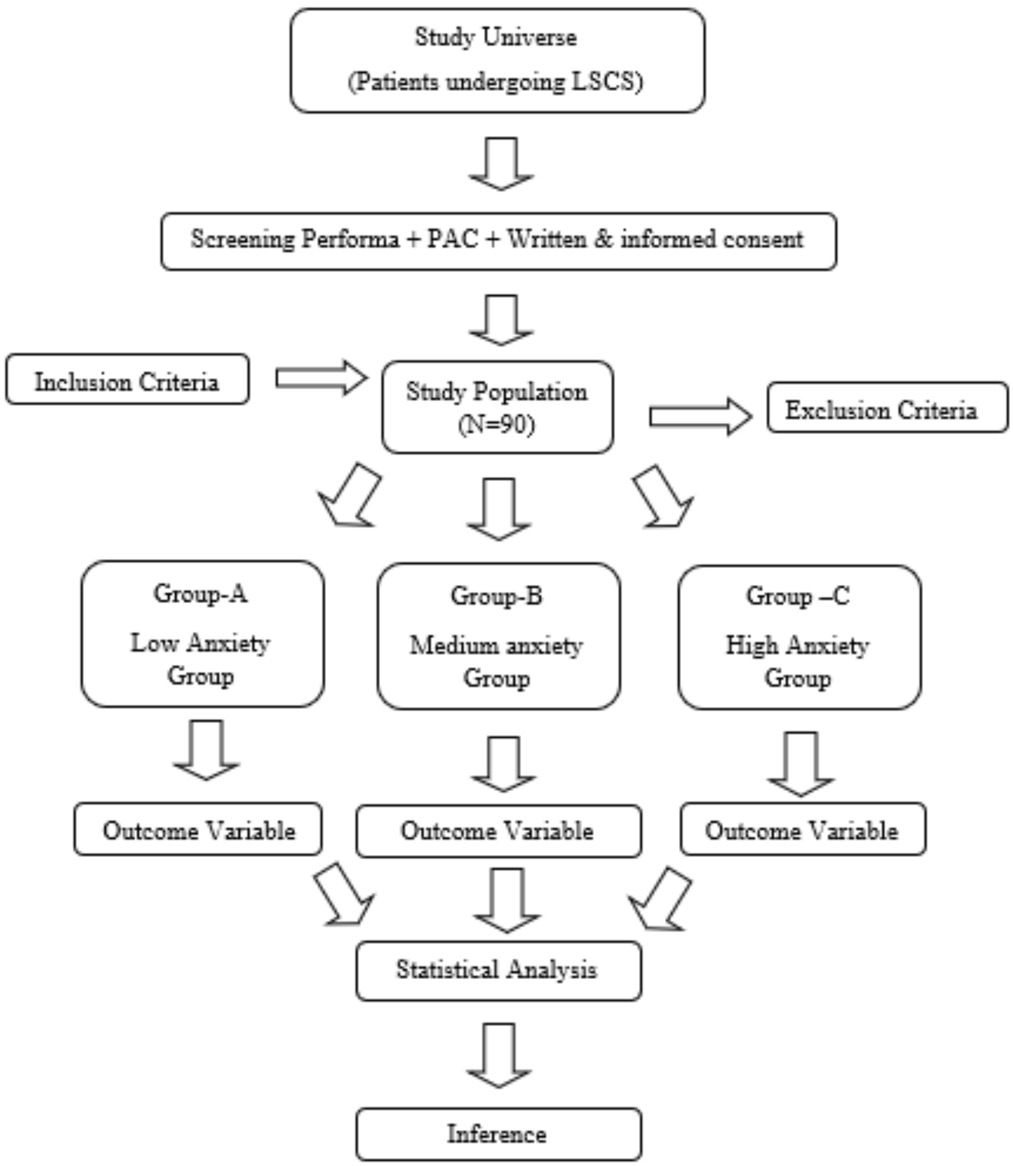

Figure 1: Consolidated standards of reporting trials (CONSORT) diagram

Results

Table 1 summarises the demographic characteristics of the three analysed groups; statistical analysis found nonsignificant variations in age, height, and weight between the three groups. After being accepted into the research, no patients were excluded.

Table 1: Demographic Data

	Group A	Group B	Group C	P value
Age (Years)	28.10±3.98	26.50±4.26	27.57±3.87	0.300
Height (cm)	161.00±3.97	162.37±5.51	162.13±4.04	0.466
Weight (Kg)	64.90±4.85	66.10±7.17	64.70±6.09	0.633
Data are presented as mean±SD or ratio of patients. *P*>0.05 is considered statistically nonsignificant. SD=Standard deviation				

Baseline mean The HAM-A score in Group A was 13.102.81, 20.602.11 in Group B, and 28.232.99 in Group C. The HAM-A score was used to determine groups, and it was statistically significant (p0.001) in all of them. [table 2]

Table 2: Comparison of baseline HAM-A score in different groups

HAM-A Score	Group A		Group B		Group C		P value
	Mean	SD	Mean	SD	Mean	SD	
Baseline	13.10	2.81	20.60	2.11	28.23	2.99	<0.001

The mean baseline SBP in Group A was 121.407.49, 126.475.72 in Group B, and 131.205.16 in Group C. SBP was higher in the anxious group. The difference in baseline SBP was substantial, and the difference remained statistically significant during operation except at 3min, 15min, 20min, 25min, 55min, and 60min. SBP dropped for a few minutes after spinal anaesthesia and then rose to near baseline or higher when a mephentermine dose was given to treat hypotension. SBP dropped more in the anxious group. (See Figure 2)

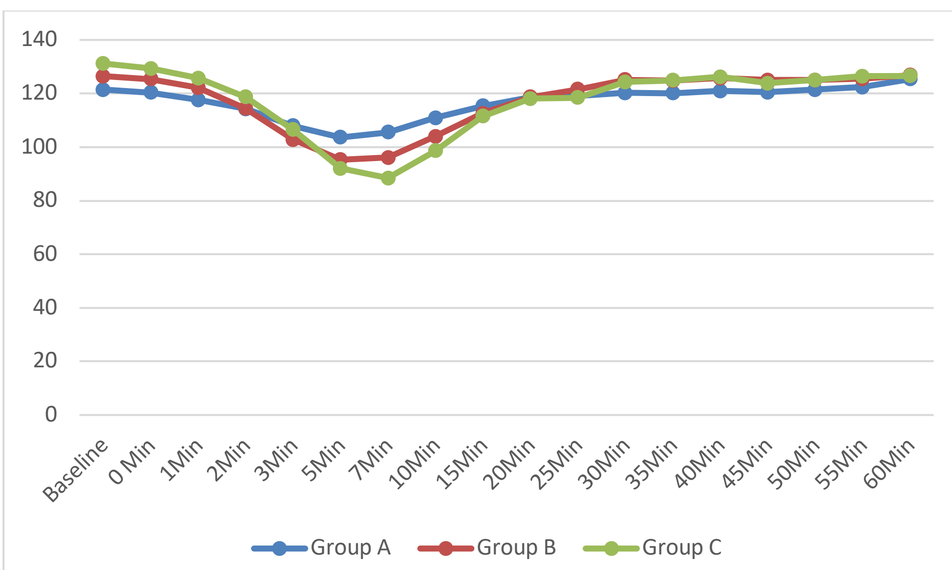

Figure 2: Systolic Blood Pressure

The maximum absolute decline in SBP from baseline at any time period was calculated, and the mean value in group A was 21.207.25, 37.075.30, and 49.075.75. Higher anxiety groups showed a greater reduction in SBP, which was statistically significant (p0.001). [Table 3]

Table 3: Comparison of the Maximum absolute decrease in SBP in different groups

Max Absolute decrease in SBP (Mean±SD)	Group A	Group B	Group C	P value
	21.20±7.25	37.07±5.30	49.07±5.75	<0.001

The maximum percentage reduction in SBP from baseline value at any time period was calculated, and the mean value in group A was 17.375.54, 29.283.74 in group B, and 37.383.93 in group C. Higher anxiety groups showed a greater reduction in SBP, which was statistically significant (p0.001). [Table 4]

Table 4: Comparison of the Maximum percentage decrease in SBP in different groups

Max % decrease in SBP (Mean±SD)	Group A	Group B	Group C	P value
	17.37±5.54	29.28±3.74	37.38±3.93	<0.001

The mean baseline DBP in Group A was 66.606.48, 70.875.98 in Group B, and 84.805.65 in Group C. The anxiety group reported higher baseline DBP. The difference in baseline DBP was substantial, and the difference remained statistically significant at different time intervals during surgery except at 10min, 15min, 20min, 25min, and 45min. DBP dropped for a few minutes after spinal anaesthesia and then rose to near baseline or higher after a mephentermine dose was administered to address hypotension. DBP dropped more in the anxious group, as did SBP. (See Figure 3)

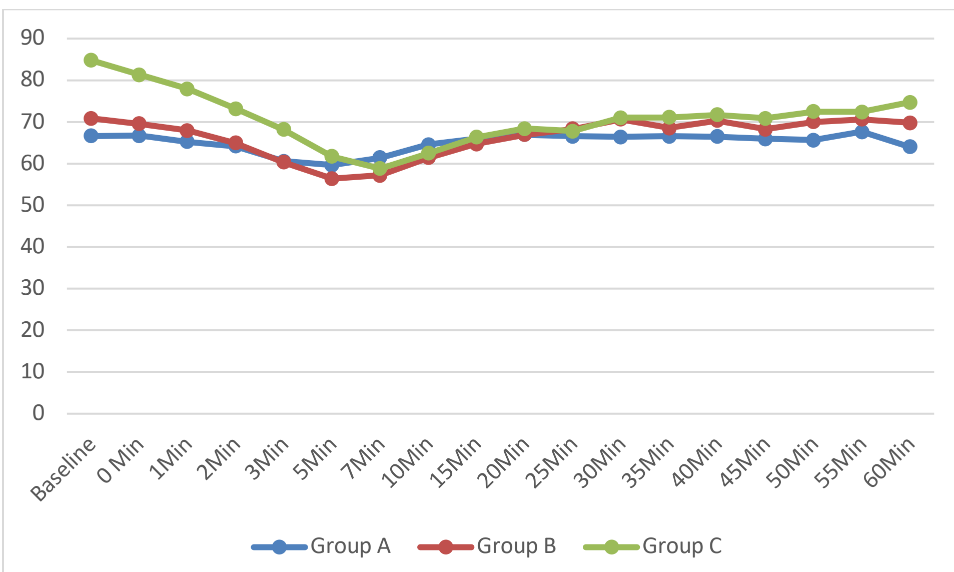

Figure 3: Diastolic Blood Pressure

The mean baseline MAP in Group A was 84.875.26, 89.404.93 in Group B, and 100.274.02 in Group C. The group with higher anxiety had a higher baseline MAP. The difference in baseline MAP was substantial, and the difference remained statistically significant at different time intervals during operation except at 15min, 20min, and 25min. MAP dropped for a few minutes after spinal anaesthesia and then rose to near baseline or higher after a mephentermine dose was given to address hypotension. MAP dropped more in the anxious group, as did SBP and DBP. [Fig-4]

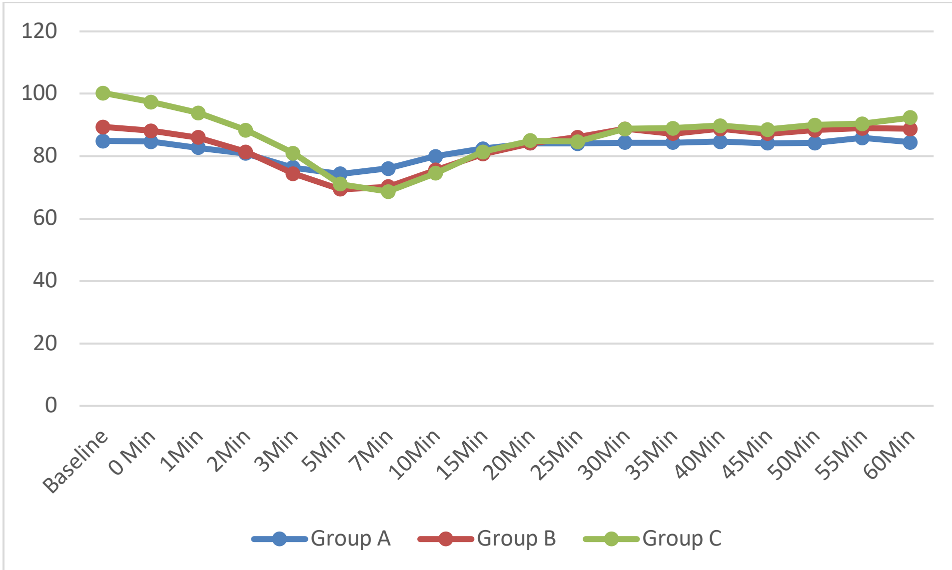

Figure 4: Mean Arterial Pressure

The mean HR in Group A was 82.2013.11, 94.2012.30 in Group B, and 97.1314.05 in Group C. The group with higher anxiety had a higher baseline HR. The difference in baseline HR was substantial, and it remained statistically significant at different time intervals during surgery except at 25min, 30min, 35min, 55min, and 60min. The HR trend was an initial rise following spinal anaesthesia for a few minutes, followed by a reduction to near baseline or more after a mephentermine dose was administered to address hypotension. HR increased greater in the anxious group. [Fig-5]

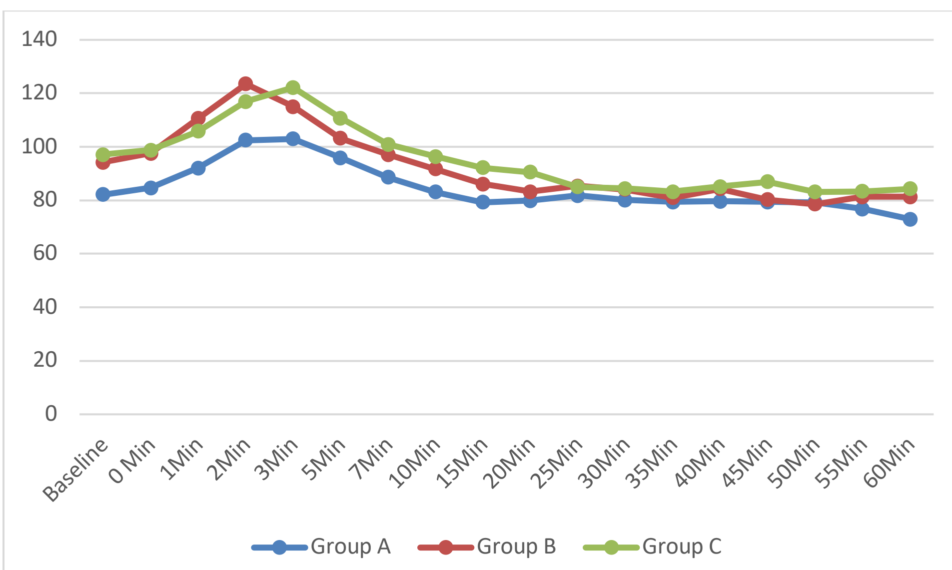

Figure 5: Heart Rate

Discussion

According to this study, more preoperative anxiety in patients undergoing spinal anaesthetic for caesarean section results in a greater fall in systolic blood pressure. Our findings confirm the hypothesis that a simple subjective preoperative anxiety score, such as the Hamilton anxiety scale, can predict hypotension after spinal anaesthesia in elective LSCS [13].

Preoperative anxiety increases baseline sympathetic activation, and because hypotension caused by spinal anaesthesia is mediated by sympathetic block, the higher the baseline sympathetic activation, the more dramatic the haemodynamic effect of spinal anaesthetic [13]. In a prospective study of 164 patients undergoing caesarean births, Soxhuku A *et al*. discovered that almost 70% of patients experienced moderate to severe anxiety, and there was a clear association between the intensity of pre-operative anxiety and intra-operative hypotension [10] In a study similar to ours, Bajwa *et al*. found that increasing pre-operative anxiety was associated with a bigger fall in MAP after spinal anaesthetic for caesarean delivery [14]. In contrast to all of this, a study by Khalid *et al* discovered that the amount of preoperative anxiety is not connected with the incidence of hypotension after spinal anaesthesia for caesarean birth, and that a variety of other factors are responsible for the occurrence of hypotension [15].

Most patients who are anticipating elective surgery are anxious. Several studies have been conducted across various surgical specialties to assess and reduce anxiety in patients before surgery. The degree to which each patient expresses worry about future experiences is determined by a variety of characteristics, including age, gender, level of education, past surgical experience, and the type and size of the intended surgery.

The majority of parturient women who have caesarean births are anxious. However, the level of this anxiety varies greatly based on a variety of conditions. Poverty, low educational standing, and spouses who do not accompany the patient all contribute to the patient's anxiousness. Being satisfied with the facility's ability to provide the best possible care, being confident of completing the surgery successfully, and being knowledgeable of the type of anaesthesia to be delivered reduce preoperative anxiety. This was demonstrated in the Jawaid *et al* [16] study, where 56% of patients stated that having the process explained in detail would reduce their anxiety. while trusting the institution's and personnel's expertise, patients had no information about the route of anaesthetic while agreeing for elective spinal anaesthesia.

The patient's worry would have been reduced if the operation had been thoroughly described to them during the preoperative review. However, hypotension after spinal anaesthesia is affected by a variety of factors, including the dose and kind of local anaesthetic used, patient positioning, patient height, B.M.I., fluid preloading and co-loading, and so on. These confounding factors were attempted to be eliminated in our study design.

In our study, the high anxiety group had a considerably greater fall in both SBP and DBP, and their baseline value was higher. Preoperative hypertension may be linked to preoperative stress and anxiety, since preoperative arterial pressures were greater in patients with high anxiety. For both relative and absolute change from baseline, this difference was clinically important and statistically significant. Differences in preoperative hydration status did not explain the discrepancy; baseline pulse pressure and haematocrit were not substantially different between high and low anxiety groups, and all patients received the same fluid management approach.

The greater hypotension shown in the high anxiety group was observed, despite the patients' inclination to use more vasopressors. In contrast to Danon *et al*., there was no significant independent influence of preoperative anxiety on phenylephrine dosage [17].

They explained why highly anxious women did not require a higher phenylephrine dose, because post-spinal hypotension is influenced by factors other than anxiety, such as breech presentation [18], neonatal weight, maternal age, and peak sensory block height [19]. Increased pregnancy weight gain, as well as BMI, have been proven to influence the occurrence of hypotension [20,21]. Second, parturients' responses to vasopressor dose may differ.

It has been investigated if differences in alpha-adrenergic receptor genotypes result in varying vasopressor dosages necessary during caesarean delivery [22] Higher sympathetic activation in the high anxiety group results in more obvious hypotension and bradycardia after sympathetic block by spinal anaesthetic, as well as greater use of vasopressor agents to normalise blood pressure intraoperatively. According to Badner *et al*., anaesthesiologists are poor for assessing patient anxiety and can actually reduce it by simply [23]. questioning the patients.

The anaesthetist is responsible for meeting patients with the anaesthesiologist and surgeon prior to the operation, providing information, and ensuring that the patient understands it. However, awareness of this information by the patient during pre-anaesthetic assessment could not always be delivered while assessing the patient prior to anaesthesia. However, reducing preoperative patient anxiety may increase postoperative results and anaesthetic satisfaction [24]. Informing patients about the procedures can help to reduce their fear [25]. Giving psychological assistance and confidence to anxious patients is the most successful method. These findings should serve as a reminder to anaesthetists of the importance of reducing anxiety in our patients before to surgery.

Limitations of the study

We only employed the Hamilton anxiety test to assess the patients' preoperative anxiety, which is a subjective exam, but other objective tests are available. In our clinical practise, they are not available. We did not investigate the reasons and prevalence of pre-operative anxiety, as well as the influence of anxiety-relieving interventions on hemodynamic parameters in patients receiving LSCS. We only analysed the elective LSCS population, not the urgent LSCS population. We did not analyse the influence of preoperative anxiety on postoperative pain; consequently, additional research on these people is needed.

Conclusion

In conclusion, we discovered that preoperative anxiety, as measured by a simple subjective Hamilton anxiety score, had a substantial effect on hypotension after caesarean delivery spinal anaesthesia. Anaesthesiologists can help patients reduce their anxiety before surgery by providing psychological support and assurance, as well as providing enough information about the operations and their potential problems.

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