

**RANDOMIZED CONTROLLED STUDY FOR POST DURAL PUNCTURE HEADACHE COMPARING WITH 25 GAUGE QUINCKE AND WHITACRE SPINAL NEEDLES IN OBSTETRIC PATIENTS**Madupathy Veeresham<sup>1</sup>, G. Venkateshwarlu<sup>2</sup>, Jala Prasuna<sup>3</sup>**HOW TO CITE THIS ARTICLE:**

Madupathy Veeresham, G. Venkateshwarlu, Jala Prasuna. "Randomized Controlled Study for Post Dural Puncture Headache Comparing with 25 Gauge Quincke and Whitacre Spinal Needles in Obstetric Patients". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 75, September 17; Page: 12967-12984, DOI: 10.14260/jemds/2015/1871

**ABSTRACT: BACKGROUND:** Spinal anaesthesia is a safe, economical and reliable technique. It provides profound muscle relaxation, decreases the operative blood loss and produces excellent operating conditions. Avoids foetal as well as maternal risks of general anaesthesia. Requires minimum postoperative anaesthesia care and provides adequate post-operative analgesia. But one of the limiting factors in the use of spinal anaesthesia has been the occurrence of post dural puncture headache.<sup>(1)</sup> Its incidence is highest in obstetric patients. **OBJECTIVES:** To compare the incidence of post dural puncture headache and the quality of blockade using 25 gauge Quincke and 25 gauge Whitacre needles in patients undergoing elective LSCS under spinal anaesthesia. **MATERIAL AND METHODS:** A prospective comparative study. 200 patients undergoing elective caesarian section under spinal anaesthesia. Patients aged between 18 to 35 years. Patients with ASA status I and II. Patients undergoing elective LSCS under spinal anaesthesia. Patients were randomly divided into two groups. Group I is named as group B, group II is named as group D. Group B (n=100) – Receives spinal anaesthesia using 25G Quincke needle. Group D (n=100) – receives spinal anaesthesia using 25G Whitacre needle. Using Vol of Local anaesthetic 0.5% heavy Bupivacaine (2ml). **RESULTS AND CONCLUSION:** From the present study, it is concluded that 25G Whitacre pencil point needle is associated with lower incidence of PDPH, less duration of PDPH, delayed onset of PDPH, less side effect and less degree of PDPH than 25G Quincke dura cutting needle in pregnant females undergoing elective lower segment cesarean section. Among the pencil-point needles, the 25 gauge Whitacre needle appears to be the preferred choice in terms of low incidence of PDPH. This study was limited to type of needle tip & bore of needle tip for occurrence of PDPH, but PDPH dependent on other factors also. So further study are required to know exact etiology. And the quality of anaesthesia in both onset of blockade and height of sensory and motor blockade was same when using 25G Quincke and 25G Whitacre needles, so there is no difference in quality of blockade. There are no studies available for the comparison of quality of blockade between 25 gauge Quincke and 25 gauge Whitacre needles.

**KEYWORDS:** Subarachnoid block, regional anaesthesia, Quincke needle, Whitacre needle.

**INTRODUCTION:** "Fear of headache should no longer be a significant deterrent to the use of spinal anaesthesia" -By Ronald Hurley. Post dural puncture headache occurs when transdural leakage of cerebrospinal fluid allows the brain to sag within the cranium, resulting in traction on the cranial contents, and reflex cerebral vasodilation. Postdural puncture headache classically begins 24-48 hours after spinal anaesthesia is given. The incidence of PDPH is higher in females than males and, it is more common in reproductive age group & pregnant females than the elderly.

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As Prevention is better than cure it is better to minimize the incidence of headache, rather than to treat it after it has occurred. Choosing smaller diameter, non-cutting spinal needles will reduce the incidence of post dural puncture headache. During the last two decades more refined and thinner needles of 24G to 28G have been used and the incidence of post dural puncture headache is grossly reduced. Studies reported that the incidence of PDPH can be reduced to almost 0% with the use of specially designed, non-cutting, pencil point and fine gauge needles.

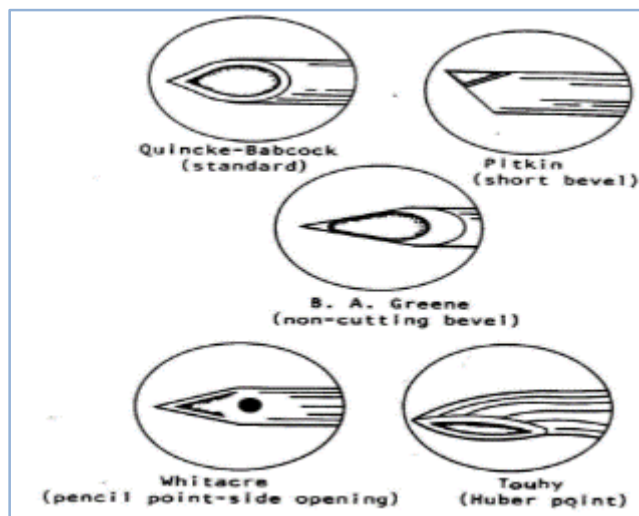
**OBJECTIVES:** Postdural puncture headache classically begins 24-48 hours after spinal analgesia is given. As Prevention is better than cure it is better to minimize the incidence of headache, rather than to treat it after it has occurred. Choosing smaller diameter, non-cutting spinal needles will reduce the incidence of post dural puncture headache during the last two decades more refined and thinner needles of 24G to 28G have been used and the incidence of post dural puncture headache is grossly reduced.

**AIM OF THE STUDY:** To compare the incidence of post dural puncture headache and the quality of blockade using 25 gauge Quincke and 25 gauge Whitacre needles in patients undergoing elective LSCS under spinal anaesthesia.

**OBJECTIVES:** Patients will be followed up for 3 days post operatively thrice a day (Morning, afternoon, evening) and will be questioned as regard to headache with severity, location, character, duration and associated symptoms like nausea, vomiting, auditory, ocular symptoms and neck rigidity.

**The ideal spinal needle should be:**

1. Technically easy to use.
2. Reliable end point.
3. Failure rate less than 4%.
4. Rapid fluid characteristics (Less than 10 sec) for CSF to flow.
5. Low incidence of PDPH in obstetrics and other patients (under 1%).
6. Designed to minimize trauma to all structures in dura, nerves and blood vessels.
7. Inexpensive.



**Figure 1**

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### **Types of Spinal Needles:**

**Quincke Babcock Needle:** The first spinal needle to be introduced in 1891. It is provided with medium length cutting bevel which cuts the dural fibers and possibly causes dural rents to persist.

**Pitkin Needle:** Has a sharp point but short bevel with cutting edges and a rounded heel.

**Greene Needle:** In 1923, H.M. Greene.<sup>(2)</sup> introduced this needle, it has long sharp bevel with a rounded point.

**Whitacre Needle:** (Pencil point needle) Hart and Whitacre introduced in 1952. It is a pencil point needle, has a completely rounded non-cutting bevel with a solid tip. The opening of the needle being on the side 2mm proximal to the tip of the needle. Since the orifice is small, there is delayed appearance of CSF at the hub, a higher risk of tissue occlusion of the lateral orifice and a markedly directional spread (Jet effect) of local anaesthetics from the orifice leading to excessively high or unexpectedly low levels of analgesia. Later some modification were done to diminish any jet like effect and improve CSF flow characteristics by an enlarged side port closer to the needle tip resulting in its cross sectional area being equal to that of the tip of Quincke needle of similar size. Available in 22G to 27G sizes.

**Sprotte Atraumatic Needle** (Conical tipped): Recently introduced in 1989. It was specially designed to eliminate the proposed theoretical disadvantages of the Whitacre needle. The atraumatic attributes of the sprotte needle are derived from its gentle angle conical point with no cutting edge, which minimizes trauma to dural fibers. Available in 22G and 24G sizes.

### **Advantages of Non-cutting spinal needles:**

The theoretical advantages of both Whitacre and Sprotte needle types include:

1. Lower incidence of PDPH than Quincke needle of comparable size.
2. Lower incidence of failed spinal anaesthesia than with fine gauge gauge Quincke needles.
3. Fewer traumas to dural vascular and neural structures than with sharp beveled needles.
4. If PDPH should occur it tends to be milder and more self-limiting than with Quinck needle.

**Disadvantages:** The theoretical disadvantages are:

1. Directional spread of anaesthesia with Whitacre needle is dependent on the orientation of side opening.
2. Possible increased rate of failed spinal anaesthesia with Sprotte needle. (Since the bevel is long, chances of part of the bevel being outside the subarachnoid space and escape of drug subdurally.
3. Possibility of easier deformation of the needle tip with Sprotte needle.
4. Cost effectiveness.
5. More difficult to use than Quincke needle.

**Introducer:** For finer gauge needles introducer is necessary for the easy passage of spinal needle.

- The first person to use an introducer was Corning.
- Later many introducers were introduced.

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- Pitkin guide.
- Sise introducer.
- Lundy modification of sise with locking stylet.

**Technique of Spinal Anaesthesia:** Spinal canal is approached from a posterior aspect via a midline or a paramedian approach. It is also theoretically possible to perform subarachnoid placement of local anaesthetic agents through the paravertebral foramina and even via an anterior intraoperative approach through the intervertebral disc.

**Midline Approach:** The needle is introduced in the midline between adjacent vertebral spines, the needle will be entering almost in an angular fashion. The interspinous space is located by selecting appropriate adjacent spines and palpating the space between them. Having raised skin wheal at this site the needle is inserted between the spines, a slight cephalad inclination is used while inserting the needle. Having pierced the supraspinous ligaments the needle is passed through the interspinous ligament then ligamentum flavum in the midline.

Further advancement results in the needle entering the epidural space then subarachnoid space. Free flow of CSF confirms that the needle is in subarachnoid space.<sup>(3)</sup>

### Advantages:

1. Simple.
2. Atraumatic.
3. Extensive infiltration with local anaesthetics is not required.
4. Central area is relatively avascular.

Hence less risk of intravascular injection and side effects.

### Disadvantages:

1. Needs patient's co-operation.
2. Spine should be mobile (hence suited in young individuals). In those individuals who are aged, infirm or unable to co-operate to assume a flexed position, adjacent vertebral spines can be in apposition making it very difficult to insert a needle between them.

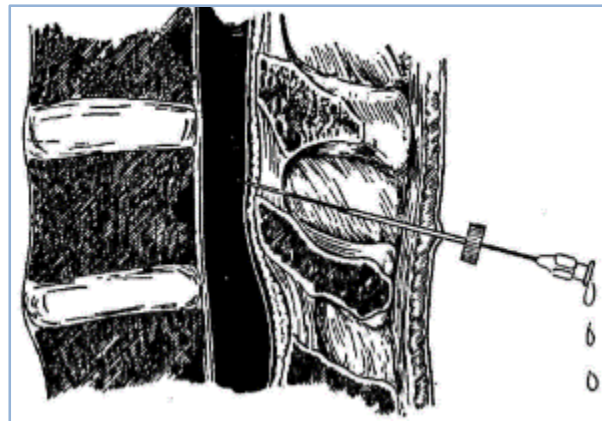


Figure 2

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### **Technique of Spinal Anaesthesia:**

### **Features of PDPH:**

**Onset:** occurs usually within 24-48 hours after the lumbar puncture is performed or may present immediately. It can rarely occur after 5 days.

**Site:** present in the occipital and nuchal region spreading along the scapulae and shoulders and or sometimes in the frontal region behind the eyeballs.

**Nature:** vascular type.

**Aggravated by:** erect posture, coughing and straining or gentle compression over jugular veins.

**Alleviated by:** lying down, abdominal compression.

**Associated features:** sometimes associated with nausea (25%) backache, neck ache and/or neck stiffness, raised temperature.

Less commonly seen are shoulder pain, blurred vision, vomiting or if the low CSF pressure results in fall in intralabyrinthine pressure, patients may experience tinnitus and auditory impairment. Abducent palsy has been reported and may last longer than headache. PDPH is more frequent at high altitudes than at sea level.

Conditions causing loss of body fluids, such as diarrhoea, vomiting, haemorrhage, sweating and lactation tend to make the condition worse so that it is relatively frequent in obstetric patients. It is more common in early ambulation, hence common in patients who underwent haemorrhoidectomy than the patients who had rest for a longer time. It is difficult to assess to what extent spinal headache is due to or accentuated by psychic factors.

### **MATERIAL AND METHODS:**

- Design of study: A prospective comparative study.
- Study place: Gandhi medical college.
- Study population: 200 patients undergoing elective caesarian section under spinal anaesthesia.

### **Inclusion criteria:**

- Patients aged between 18 to 35 years.
- Patients with ASA status I and II.
- Patients undergoing elective LSCS under spinal anaesthesia.

### **Exclusion criteria:**

- Patients with past history of headache.
- Patients with spinal deformities, neurological deficits, psychological ailment, bleeding disorders, grossly obese, extreme height (<140cm, >180cm), hypertensive those with cardiac, renal, other end organ diseases, hypovolaemic and sustaining more than one prick will be excluded from the study.

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### METHODOLOGY:

- Patients were randomly divided into two groups. Group I is named as group B, group II is named as group D.
- Group B (n=100) – receives spinal anaesthesia using 25G Quincke needle.
- Group D (n=100) – receives spinal anaesthesia using 25G Whitacre needle.

### **After a thorough pre-anesthetic evaluation a valid written and informed consent was obtained from all the patients for spinal anaesthesia;**

- All the patients were kept nil by mouth for 8hours before surgery.
- Anaesthesia machine, necessary drugs and equipment required for intubation and resuscitation were checked and kept ready for use in case of need.
- Baseline parameters heart rate (H.R), systolic blood pressure (SBP), diastolic blood pressure (DBP), SPO<sub>2</sub> and respiratory rate (R.R) were recorded in the preoperative room.
- Intravenous line was established with 18G I.V cannula and patients were preloaded with 10ml/kg body weight of ringer lactate over half an hour before the procedure. Inj. Rantidine 50mg and Inj. Metoclopramide 10mg given intravenously before the 30 min shifting to theatre.
- Patients were shifted to operation theatre, baseline H.R, SBP, DBP, R.R were recorded and SPO<sub>2</sub>, ECG was continuously monitored throughout the procedure and noted.
- Lumbar punctures were performed by midline approach in L<sub>3</sub>-L<sub>4</sub> intervertebral space in left lateral decubitus position under full aseptic precautions using the respective lumbar puncture needle. (Quincke needle in group B & Whitacre needle in group D)
- After confirming free flow of cerebrospinal fluid inj. Bupivacaine 0.5% heavy 10mg (2ml) was given after aspiration.
- Immediately after intrathecal injection of the drug, patient was turned to supine position.
- Wedge of 10cm was applied for left uterine displacement (to prevent supine hypotension syndrome).
- Oxygen 4lits/min was administered via Hudson-face mask. The level of sensory blockade was checked by pin prick method using visual analogue scale till it reaches T<sub>4</sub> and motor blockade was checked using modified Bromage scale.
- Intraoperatively patients H.R, S.B.P, D.B.P, R.R were monitored and noted at an interval of 3min for first 15min & there after every 5min whereas SPO<sub>2</sub>, ECG were continuously monitored throughout the procedure.
- Hypotension, i.e., >20mm of Hg fall in baseline systolic blood pressure following spinal anaesthesia was treated with rapid infusion of fluids and injection ephedrine 6mg intravenously.
- Injection atropine 0.6mg intravenously was given when associated with bradycardia (heart rate <60/min).
- Adequate hydration was maintained.
- Blood loss in excess of one litre was replaced.
- At the end of surgery the patients were shifted to the recovery room after ensuring haemodynamic stability.
- During the post-operative period patients were followed up for post dural puncture headache and associated symptoms for 3 days.

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- Everyday patients were asked for history of headache.
- If the patients give history of headache, the following details about the headache were asked;
  1. onset
  2. Location
  3. Quality
  4. Aggravating factor
  5. Relieving factor
  6. Duration
  7. Any associated symptoms like vertigo, nausea, vomiting, blurring of vision and neck rigidity.

### **Criteria for post dural puncture headache were:**

1. Occurred after mobilization.
2. Aggravated by erect or sitting position and coughing, sneezing or straining.
3. Relieved by lying flat.
4. Mostly localized in occipital, frontal or generalized.

### **Severity of headache was assessed on 1 – 4 scale. (Crocker 1976).<sup>(4)</sup>**

1. Mild headache which permitted long periods of sitting/erect position and no other symptoms.
2. Moderate headache, which made it difficult for the patient to stay upright for more than half an hour. Occasionally accompanied by nausea, vomiting, ocular and auditory symptoms.
3. Intense headache immediately upon getting up from bed, alleviated while lying horizontal in bed. Often accompanied by nausea, vomiting, ocular and auditory symptoms.
4. Headache that occurred even while lying horizontal in bed and greatly aggravated immediately upon standing up, eating is impossible because of nausea and vomiting.

We followed the grading of severity of headache by using Crocker 1-4 scale.

**Treatment:** is given to the patients according to the severity of post spinal headache.

### **Mild headache patients:**

- Patients are advised to be in recumbent position.
- Advised to take oral fluids where possible.
- Analgesics – Diclofenac sodium 50mg b.d was given.

### **Moderate headache patients:**

- Patients are advised to be in recumbent position.
- Analgesics – Inj. Diclofenac sodium 50mg b.d was given.
- I.V. fluids 2 pints of Ringer lactate was given.

**Intense and severe headache patients:** In our study no case had intense and severe headache.

The data obtained will be tabulated and appropriate statistical methods were applied and the results were compared with other studies.

### **STATISTICAL ANALYSIS:**

**Randomization:** Sample taken at random from a population when each member of the population has an equal chance of being chosen. The purpose is to produce groups that are as nearly similar as possible prior to the experimental procedure.

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**Mean:** The mean of a collection of a numbers is their arithmetic average, computed by adding them up and dividing by their number.

**Standard Deviation:** It is a statistical measure of spread or variability. The standard deviation is the root mean square deviation (RMS) of the values from their arithmetic mean.

**t-Test:** The t-test or student t-test gives an indication of separateness of two sets of measurements, and is thus used to check whether two sets of measure are essentially different with the null hypothesis that means of two sets of measure are equal.

**There are two types of t-test:**

- Independent measure t-test: when sample are not matched.
- Matched paired t-test: when sample appears in pairs.

**'P'- Value:** It indicates the probability of error and a value less than 0.05 is considered stastically.

**OBSERVATIONS AND RESULTS:** Following were the observations and results of the present study. Demographic data analysis.

Age distribution(in years)	Group B (n=100)	Group D (n=100)
18 - 30	94(94%)	95(95%)
31 - 40	6(6%)	5(5%)

**Table 1: Comparison of age in both groups (N=200)**

Group B consisted of 94(94%) patients in the age group of 18-30 years, 6(6%) patients in the age group of 31-35 years. Group D consisted of 95(95%) patients in the age group of 18-30 years and 5(5%) patients in the age group of 31-35 years. Thus, age wise distribution in the both groups was comparable.

Group B consisted of 94(94%) patients in the age group of 18-30 years, 6(6%) patients in the age group of 31-35 years. Group D consisted of 95 (95%) patients in the age group of 18-30 years and 5(5%) patients in the age group of 31-35 years. Thus age wise distribution was comparable.

GROUPS	MEAN±SD AGE IN YEARS	P- VALUE	RESULT
B (n=100)	24.24±4.3043	0.848	Not significant
D (n=100)	24.35±3.8254		

**Table 2: Comparison of age in both groups (N=200) (Mean ±SD, Years)**

In the group B mean age was 24.24±4.3043 years. In the group D the mean age was 24.35±3.825 years. The mean age values in both the groups were stastically comparable (P>0.05).

Weight Wise Distribution of Cases (kgs)	Group B (n=100)	Group D (n=100)
51-60	59(59%)	53(53%)
61-70	41(41%)	47(47%)

**Table 3: Comparison of weight in both groups (N=200)**



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Group B consisted of 59(59%) patients in the weight group of 51-60kgs and 41(41%) Patients in the weight group of 61-70kgs. Group D consisted of 53(53%) patients in the weight group of 51-60kgs and 47(47%) patients in the weight of 61-70kgs.

Group B consisted of 59 patients in the weight group of 51-60kgs and 41 patients in the weight group of 61-70kgs. Group D consisted of 53 patients in the weight group of 51-60kgs and 47 patients in the weight group of 61-70kgs. Thus weight wise distribution in both the groups was comparable.

Group	Mean Weight kg	P value	Result
B (n=100)	59.49±4.6871	0.267	Not significant
D (n=100)	60.25±4.9795		

**Table 4: Mean weight wise distribution of cases (N=200) Mean ± SD, kgs**

In the group B the mean weight in kgs was 59.49±4.6871. In the group D the mean weight in kgs was 60.25±4.9795. The mean weight values in both the groups were stastically comparable (p>0.05).

Group	140-160cms	160-180cms
B	60(60%)	40(40%)
D	47(47%)	53(53%)

**Table 5: Comparison of height in both groups (N=200)**

In the present study group B consisted of 60(60%) patients in the height group of 140-160cm, 40 (40%) patients in the height group of 160-180cms. Group D consisted of 47 (47%) patients in the height group of 140-160cms and 53(53%) patients in the height group of 160-180cms. Thus height wise distribution in both groups was comparable.

Group	Mean Height (in cms)	P value	Result
B (n=100)	158.67±10.30549	0.1932	Not significant
D (n=100)	160.51±9.58244		

**Table 6: Mean height wise distribution cases (N=200) Mean ± SD, cms**

In group B mean height in cms was 158.67±10.30549, in group D mean height in cms was 160.51±9.58244. The mean height values in both the groups were stastically comparable (p>0.05).

Group	Incidence of PDPH	p- Value
B (n=100)	10(10%)	0.035
D (n=100)	2(2%)	

**Table 7: Comparison of incidence of PDPH in both groups (N=100)**

In group B out of 100 patients 10 patients developed post dural puncture headache and in Group D out of 100 patients 2 patients developed post dural puncture headache. It was observed from the data above that the occurrence of PDPH was higher when using 25G Quincke needle (10%).

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The occurrence of PDPH was less when using 25G Whitacre needle (2%), which is stastically significant ( $p$ -value<0.05)

Location of PDPH	Group B	Group D
Frontal	6(6%)	2(2%)
Occipital	4(4%)	0(0%)
Temporal	0(0%)	0(0%)

**Table 8: Comparison of location of PDPH in both groups (N=200)**

In the present study location of PDPH in group B (n=100) 6(6%) patients developed at frontal region and 4(4%) patients developed at occipital region. In group D (n=100) 2(2%) patient developed at frontal region.

It was observed from the data above that location of PDPH was more at frontal region & occipital region in group B, when compared to group D in which location of PDPH was at frontal region.

Quality of PDPH	Group B	Group D
Dullache	0%	0%
Throbbing	10(10%)	2(2%)

**Table 9: Comparison of quality of PDPH in both groups (N=200)**

In the present study quality of PDPH in group B (n=100) it was throbbing type in 10 (10%) patients and in group D (n=100) it was throbbing type in 2 (2%) patients. It was observed from the data above that in group B more patients got throbbing type of PDPH than in group D.

Onset of PDPH	Group B (n=100)	Group D (n=100)
Day 1	6(6%)	0(0%)
Day 2	4(4%)	2(2%)
Day 3	0(0%)	0(0%)

**Table 10: Comparison of onset of PDPH in both groups**

In the present study onset of PDPH in group B (n=100) on day1, 6(6%), on day2, 4(4%). In group D (n=100) on day2, 2(2%) patients developed PDPH.

It was observed from the data above that onset of PDPH in group B was more on day1 & day2, when compared to group D.

Duration of PDPH in days	Group B	Group D
1	0(0%)	0%
2	4(4%)	2(2%)
3	6(6%)	0(0%)

**Table 11: Comparison of duration of PDPH**

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In the present study the duration of PDPH in group B (n=100) was 3 days in 6(6%) patients and it was 4 days in 4(4%) patients. In group D (n=100) the duration of PDPH was 2 days in 2(2%) patients. It was observed from the data above that duration of PDPH was more in group B when compared to group D.

Severity of PDPH	Group B	Group D
Mild	6(6%)	2 (2%)
Moderate	4(4%)	0%
Intense	0%	0%
Severe	0%	0%

**Table 12: Comparison of severity of PDPH in both groups (N=200)**

In the present study severity of PDPH in group B (n=100) was mild 6(6%) patients and moderate 4(4%) patients. In group D (n=100) severity of PDPH was mild in 2(2%) patients. In present study no case had intense and severe headache. It was observed from the data above that severity of PDPH in group B was more when compared to group D.

Side effects of PDPH	Group B	Group D
Nausea	5(5%)	2(2%)
Vomiting	5(5%)	0
Dizziness	0	0
associated	0	0

**Table 13: Comparison of side effects of PDPH in both groups (N=200)**

In the present study side effects of PDPH in group B (n=100) nausea in 5(5%) patients and vomiting in 5(5%) patients was seen. In group D (n=100) nausea in 2(2%) patients and vomiting in 0(0%) patients was seen. No other associated symptoms were seen in both the groups.

Onset of Blockade	Group B	Group D
	6 min	6 min

**Table 14: Comparison of onset of blockade in both groups**

In the present study in group B (n=100) onset of blockade was 6 min, in group D (n=100) was 6 min. Thus onset of blockade in both groups was comparable.

Vol of Local anaesthetic 0.5% heavy Bupivacaine (2ml)	Group B	Group D
Height of sensory block	T4	T4
Height of motor block	T6	T6

**Table 15: Comparison of Height of sensory and motor blockade in both groups**

In the present study in group B height of sensory block was up to T4 level, height of motor block was up to T6. In group D height of sensory block was up to T4 level, height of motor block up to T6.

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It was observed from the data above height of sensory and motor block was same in both groups.

Quality of Anaesthesia	Group B (n=100)	Group D (n=100)
Adequate	100%	100%
In adequate	0	0
Failure	0	0

**Table 16: Comparison of Quality of blockade in both groups**

In the present study quality of anaesthesia was same in all patients in both groups.

### DISCUSSION:

1. Spinal anaesthesia is a safe, economical and reliable technique. It provides profound muscle relaxation, decreases the operative blood loss and produces excellent operating conditions.<sup>(1)</sup>
2. Avoids foetal as well as maternal risks of general anaesthesia. Requires minimum postoperative anaesthesia care and provides adequate postoperative analgesia.
3. But one of the limiting factors in the use of spinal anaesthesia has been the occurrence of post dural puncture headache(PDPH).<sup>(5)</sup>
4. PDPH occurs when transdural leakage of cerebrospinal fluid allows the brain to sag within the cranium, resulting in traction on the cranial contents, reflex cerebral vasodilatation.<sup>(6)</sup>
5. The loss of cerebrospinal fluid results in traction on the pain sensitive intra cranial vascular structures particularly when the patient assumes upright position.<sup>(7)</sup>
6. The incidents and degree of headache depends upon the size and persistence of the hole in the dura.
7. Choosing small diameter, non-cutting spinal needles will reduce the incidents of PDPH.
8. During the last two decades more refined and thinner needles of 24 G to 28 G have been used and the incidents of PDPH is grossly reduced.<sup>(8),(9),(10)</sup>
9. Quality of sensory and motor block is same with both Quincke and Whitacre needles.

### The factors which influence the occurrence and severity of post dural puncture headache are:

1. Age: Incidence is higher in young patients.
2. Sex: Higher in females when compared to males.
3. Previous history of postdural puncture headache.
4. Multiple perforations.
5. Use of abdominal binder after spinal anaesthesia reduced the incidence of PDPH.
6. Hydration: More incidence in patients who are dehydrated.
7. Activity after dural puncture: Incidence is higher in patients who did not take bed rest following the procedure.
8. Bore of the needle: Incidence of PDPH is reduced by using a finer gauge needle.
9. Tip of the needle: Incidence is more with Quincke (cutting) needle than with pencil point (Whitacre) needle.
10. Approach used: more when paramedian approach was used than in midline approach;

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- In the present study occurrence of PDPH using different types of needle tip were been studied.
- The study was conducted at Gandhi Medical College, Secundrabad with an approval from institutional ethics committee from August 2012 to August 2013.
- Group B: Consisted of 100 patients who received 2 ml of 0.5% bupivacaine in 5% dextrose for spinal anaesthesia using 25G Quincke needle (Dura cutting) by midline approach.
- Group D: Consisted of 100 patients who received 2 ml of 0.5% bupivacaine in 5% dextrose for spinal anaesthesia using 25G Whitacre needle (Dura separating) by midline approach.

### PATIENT DEMOGRAPHICS:

Author's Name	Group B	Group D
Dr.Anjushah et al (2002). <sup>(4)</sup> (N=25)	23.6±2.9	-
Jan Muhammad Shaikh et al. <sup>(11)</sup> (2008) (N=480)	25.8±5.60	-
Ripul Oberoi et al (2009). <sup>(12)</sup> (N=200)	26.97±3.80	27.13±4.22
Zafarullah beigh et al (2011). <sup>(13)</sup> (N=151)	28.9±5.6	-
Present Study (N=200)	24.24	24.35

**Table 17: Age Wise Distribution (Mean±Sd, In Year) - Comparison With Other Studies**

The mean age of patients in both groups of the present study correlates with that of studies by Dr. Anjushah et al (2002).<sup>(4)</sup> The mean age of patients in group B correlates with that of studies by Jan Muhammad Shaikh et al.<sup>(11)</sup> (2008) (N=480), Ripul Oberoi et al (2009).<sup>(12)</sup> (N=200).

Author's name	Group B	Group D
Dr.Anjushah et al (2002). <sup>(4)</sup> (N=25)	56.9±8.9	
Jan Muhammad Shaikh et al. <sup>(11)</sup> (2008) (N=480)	59.9±8.37	
Ripul Oberoi et al (2009). <sup>(12)</sup> (N=200)	63.00±3.65	65.10±3.61
Zafarullah beigh et al (2011). <sup>(13)</sup> (N=151)	61.1±7.1	
PRESENT STUDY (N=200)	59.49±4.68717	60.25±4.9795

**Table 18: Weight Wise Distribution (Mean±Sd, In Kgs) - Comparison With Other Studies**

The mean weight of patients in both groups of the present study correlates with that of studies by Jan Muhammad shaik et al (2008).<sup>(12)</sup> (N=480). The mean weight of patients in group B correlates with that of studies by Zafarullah beigh et al (2011).<sup>(13)</sup> (N=151), Ripul Oberoi et al (2009).<sup>(12)</sup> (N=200).

Author's name	Group B	Group D
Ripul Oberoi et al (2009). <sup>(12)</sup> (N=200)	156.74±4.31	158.61±3.94
Present study (N=200)	158.67±10.305	160.51±9.582

**Table 19: Height Wise Distribution (Mean±Sd, In Cms) - Comparison With Other Studies**

The mean height of patients in both groups of the present study correlates with that of studies by Ripul Oberoi et al. (2009).<sup>(12)</sup>

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### Relation of PDPH with the type and bore of the needle used:

1. The first spinal needle was introduced in 1891. It was provided with a medium length cutting bevel which could cut the dural fibers and possibly caused the dural rents to persist.<sup>(14)</sup>
2. The advantages of Whitacre needle (Dura separating) non-cutting spinal needles were a lower incidence of PDPH, less trauma to the dural vascular and neural structures and if the PDPH occurred it was milder and self-limiting.<sup>(15)</sup>
3. The disadvantages of Whitacre needle (Dura separating) non-cutting spinal needles were an increased failure rate, directional spread of the anaesthetic solution is dependent on the orientation of the side opening, it is costly and more difficult to use than Quincke needle.

Author's name	Group B	Group D
Dr. Benzad sohail et al (2011). <sup>(16)</sup> (N=50)	8%	-
J Buettner; K P Wresch; R Klose et al (1993). <sup>(17)</sup> (N=400)	8.5%	3%
Ripul Oberoi et al (2009). <sup>(12)</sup> (N=200)	9%	1%
Zafarullah beigh et al (2011). <sup>(13)</sup> (N=151)	14%	-
PRESENT STUDY (N=200)	10%	2%

**Table 20: Incidence of PDPH In Comparison With Other Studies (%)**

The incidence of PDPH in both groups of the present study correlates with that of studies by J Buettner; K P Wresch; R Klose et al (1993)<sup>(17)</sup> & Ripul Oberoi et al. (2009).<sup>(12)</sup> Incidence of PDPH in group B is comparable to that of Dr. Benzad sohail et al (2011).<sup>(16)</sup>, & Zafarullah beigh et al (2011).<sup>(13)</sup> (N=151).

Author's name	Group B	Group D
Dr. Benzad sohail et al (2011). <sup>(16)</sup> (N=50)	Frontal-6% Occipital-2% temporal-0%	-
Ripul Oberoi et al (2009). <sup>(12)</sup> (N=200)	Frontal-5% Occipital-1% temporal-3%	Frontal-0% Occipital-1% temporal-0%
Zafarullah beigh et al (2011). <sup>(13)</sup> (N=151)	Frontal-4.67% Occipital-3% temporal-6.33%	-
PRESENT STUDY (N=200)	Frontal-6% Occipital-4% temporal-0%	Frontal-2% Occipital-0% temporal-0%

**Table 21: Location of PDPH In Comparison With Other Studies (%)**

The location of PDPH in both groups of the present study correlates with that of studies by Ripul Oberoi et al (2009)<sup>(12)</sup>. The location of PDPH in group Q is comparable to that of Dr. Benzad sohail et al (2011).<sup>(16)</sup> & Zafarullah beigh et al (2011).<sup>(13)</sup>

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Author's name	Group B	Group D
Ripul Oberoi et al (2009). <sup>(12)</sup> (N=200)	Throbbing type-7% Dull type-2%	Throbbing type-0% Dull type-1%
PRESENT STUDY (N=200)	Throbbing type-10% Dull type-0%	Throbbing type-2% Dull type-0%

**Table 22: Quality of PDPH in Comparison With Other Studies (%)**

The location of PDPH in both groups of the present study correlates with that of studies by Ripul Oberoi et al (2009).<sup>(12)</sup>

Author's name	Group B	Group D
Dr.Benzad sohail et al (2011) <sup>(16)</sup> (N=50)	<24hrs-6% 24-48hrs-2% 48-72hrs-0%	-
Ripul Oberoi et al (2009). <sup>(12)</sup> (N=200)	<24hrs-1% 25-48hrs-2% 49-72hrs-5% 73-96hrs-1%	<24hrs-0% 25-48hrs-1% 49-72hrs-0% 73-96hrs-0%
PRESENT STUDY (N=200)	<24hrs-0% 24-48hrs-4% 48-72hrs-6%	<24hrs-0% 24-48hrs-2% 48-72hrs-0%

**Table 23: Duration of PDPH in Comparison With Other Studies (%)**

The duration of PDPH in both groups of the present study correlates with that of studies by Ripul Oberoi et al (2009).<sup>(12)</sup>

Author's name	Group B	Group D
Dr.Benzad sohail et al (2011). <sup>(16)</sup> (N=50)	MILD-6% MODERATE-2% INTENSE-0% SEVERE-0%	-
PRESENT STUDY (N=200)	MILD-6% MODERATE-4% INTENSE-0% SEVERE-0%	MILD-2% MODERATE-0% INTENSE-0% SEVERE-0%

**Table 24: Grading of PDPH in Comparison With Other Studies (%)**

The grading of PDPH in groups B of the present study correlates with that of studies by Dr.Benzad sohail et al (2011).<sup>(16)</sup> It was of milder grade in group D.

- In the present study side effects of PDPH in group B (n=100) nausea in 5(5%) patients and vomiting in 5(5%) patients was seen. In group D (n=100) nausea in 2(2%) patients and

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vomiting in 0(0%) patient was seen. No other associated symptoms were seen in both the groups.

- It was observed that the incidence of PDPH was higher when using 25G Quincke needle (dura cutting) when compared with 25G Whitacre needle (Dura separating).
- The earlier notion that the use of finer gauge spinal needles prevented PDPH completely was not justified.
- The fact that PDPH occurred with finer gauge needle is an indication that PDPH is governed by many factors of which the bore of the needle and the type of the needle used also play a part.
- The occurrence of PDPH and the degree of headache was less when using a Whitacre needle (Dura separating/ pencil point needle).

### SUMMARY:

- The present study was under taken at Gandhi medical college, secundrabad, Telangana.
- Post dural puncture headache (PDPH) is a very distressing complication of the sub-arachnoid block. It may lead to patient discomfort, prolonged hospitalization and may even require an epidural blood patch for its resolution.
- The mechanism of PDPH is believed to be sagging of the contents of the skull because of decrease in CSF pressure. So PDPH is also known as low pressure headache.
- The main etiology of this condition is the loss of CSF through the dural rent created by the spinal needle leading to decrease in the CSF pressure.
- There are various factors related to PDPH such as age of the patient, gender, needle size, needle tip design, direction of the bevel of the needle and the number of attempts at dural puncture the most important being spinal needle tip design.
- The incidence of PDPH is higher in females than males and it is more common in reproductive in age group and pregnant females than the elderly.
- The reason for this may be extreme changes in intra-abdominal pressure during labour which could influence cerebrospinal fluid pressure, the rapid changes in blood volume following delivery, the dehydration during the labor and the less attention paid to fluid replacement parenterally after delivery.
- In the present study occurrence of PDPH using different types of needle tip were been studied.
- Total of 200 patients undergoing LSCS participated in the study. They were divided randomly in to two groups.
- Group B: Consisted of 100 patients who received 2 ml of 0.5% bupivacaine in 5% dextrose for spinal anaesthesia using 25G Quincke needle (Dura cutting) by midline approach.
- Group D: Consisted of 100 patients who received 2 ml of 0.5% bupivacaine in 5% dextrose for spinal anaesthesia using 25G Whitacre needle (Dura separating) by midline approach.
- The patients in the two groups were similar with respect to age, sex and weight.
- In present study 25 G Quincke and 25 G Whitacre needle were used in midline approach. The following observations were made.

### CONCLUSION:

- From the present study, it is concluded that 25G Whitacre pencil point needle is associated with lower incidence of PDPH, less duration of PDPH, delayed onset of PDPH, less side effect



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and less degree of PDPH than 25G Quincke dura cutting needle in pregnant females undergoing elective lower segment cesarean section.

- Among the pencil-point needles, the 25 gauge Whitacre needle appears to be the preferred choice in terms of low incidence of PDPH.
- This study was limited to type of needle tip & bore of needle tip for occurrence of PDPH, but PDPH dependent on other factors also.
- So further study are required to know exact etiology.
- And the quality of anaesthesia in both onset of blockade and height of sensory and motor blockade was same when using 25G Quincke and 25G Whitacre needles, so there is no difference in quality of blockade. There are no studies available for the comparison of quality of blockade between 25 gauge Quincke and 25 gauge Whitacre needles.

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