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# A COMPARISON OF POST DURAL PUNCTURE HEADACHE IN CESAREAN SECTION VS LOWER LIMB OPERATION UNDER SPINAL ANESTHESIA

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# ABSTRACT

**Background:** Spinal anesthesia stands as a significant milestone in the field of regional anesthetic techniques. Its origins trace back to 1898 in Germany, where the pioneering operation under this anesthesia method was performed by August Bier. This groundbreaking approach paved the way for modern anesthetic practices, and its influence continues to shape contemporary anesthesia techniques. Aim of the study: to recognize the incidence of PPDH in early mobility compare with non-mobile patient due to lower limb operation. **Patient and method**: cross sectional comparative study was conducted in Al-Fayeha Teaching Hospital, between the period from January 2023 to August 2023. The number of patients included in this study 60 divided in two group: Group A: group of c/s. Group B: lower limb operation. All the patient under two categories of ASA class I and II. All of them well received spinal anesthesia for their surgery. **Results**: the results of this study showed significant PPDH in those patient with c/s group A. wheal only two from 30 who they had lower limb surgery. And the p value<0.05 compare with group of c/s they had been suffered from PPDH from total number 30. **Conclusion**: there is significant PDPH in patient who mobilized early after surgery.

**KEYWORDS:** Post-Dural puncture headache, spinal anesthesia.

#### INTRODUCTION

Spinal anesthesia is commonly employed for operations below the umbilicus. Spinal anesthesia has become the prevalent choice for cesarean sections in modern practice. Its popularity can be attributed to several factors including safety, as it poses fewer risks to the mother and baby; cost-effectiveness, being a more affordable option compared to general anesthesia; reliability, as it offers consistent performance; ease of administration, allowing for quicker application by medical practitioners; rapid onset of effects, providing immediate relief and optimal operating conditions; and excellent control over surgical conditions. These collective advantages make spinal anesthesia a preferred method for cesarean sections, promoting both economical and medical benefits. Post-Dural puncture headache (PDPH) stands as one of the most frequent complications stemming from spinal anesthesia, manifesting in approximately 1-10% of patients.<sup>[1]</sup>

Post-Dural puncture headache (PDPH) stands as one of the most frequent complications stemming from spinal anesthesia, manifesting in approximately 1-10% of patients. This condition occurs when there is a puncture in the dura mater, leading to a leakage of cerebrospinal fluid, and subsequently causing headaches. Its commonality highlights the importance of careful technique and awareness of potential symptoms, though it's often considered a manageable complication with appropriate treatment and care.<sup>[2]</sup>

PDPH is usually characterized by a severe headache that is worse when the patient sits or stands upright. The headache may also be accompanied by neck stiffness, nausea, and vomiting.<sup>[3]</sup>

Post Dural puncture headache: is described by the International Headache Society as headache that occurs within 5 days of a lumbar puncture, which is usually associated with neck stiffness and/or subjective auditory symptoms, and that shows spontaneous resolution within

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14 days in two third of patient or responds to an autologous blood patch.<sup>[4]</sup> It is typical onset within 72 hours of Dural puncture either inadvertently during attempted epidural analgesia for labor or deliberately during spinal anesthesia for operation. It is estimated that PDPH follows ~1% of all neuraxial blocks for labor and delivery Pencil-point needle.<sup>[5]</sup>

risk factor of PDPH are: age, weight, female sex<sup>[6]</sup>, needle size and design, and number of puncture attempts. For example, it has been reported that there is an inverse relationship between the incidence of PDPH and both age and weight.<sup>[7]</sup>

Current Recommendations are to use only dura separating needle for spinal anesthesia. Dura-separating needles are designed to separate the dura mater without cutting it. This is thought to reduce the risk of post-Dural puncture headache (PDPH).

Dura cutting spinal needles such as Quincke, the incidence of PDPH varies with the size of the needle, being more with larger sizes such as 24G, Studies have shown that the incidence of PDPH is lower with 25G and 26G Quincke needles.<sup>[8]</sup>

Cutting needle are more likely to cause PDPH. This is because they can cut the dura mater, which can lead to cerebrospinal fluid (CSF) leakage.<sup>[9]</sup>

#### Aim of the study

To recognize the incidence of PPDH in early mobility compare with non-mobile patient due to lower limb operation.

# PATIENTS AND METHODS

Scientific approval for the study was obtained from the Arabic board council, and permission from Al-Fayeha teaching hospital. cross sectional comparative prospective study was conducted at the operation theatres of Al-Fayeha Teaching Hospital, in the period from January 2023 to August 2023.

#### Inclusion criteria

age 18-40, body weight 65-100kg, height 155-185 cm.

# **Exclusion criteria**

- Patient refuse.
- Coagulopathy or patient on anticoagulant.

- Repeated punctures.
- History of migraine.
- Systemic or local skin infections, spine abnormalities.

Two groups of patients had been enrolled in this study regarding the type of operation.

Group A: thirty pregnant patients who received spinal anesthesia were class II ASA.

Group B: thirty male and female patients who received spinal anesthesia for lower limb operation were class I ASA.

Before the start of spinal anesthesia, history and physical examination should have been taken. Pertinent in history is an understanding of previous exposure to anesthetic medication, review of allergies, family history of any anesthetic problems.

A procedural time-out should be performed, confirming the patient's identity, planned procedure, allergy, check for consent, or at least a verbal statement.

The patients were placed in a sitting position, and the back was uncovered. The targeted area was then sterilized with povidone iodine, and the required drug was aspirated into the syringe. Once the area was sterilized, the back was cleared of the povidone iodine, with aseptic technique being maintained. The specific anatomical space was located, and the targeted space was entered with the needle. When the procedure was performed successfully, the proper medical guidelines and precautions have been followed.

All patients appropriately fasted before surgery, at the operating theatre 2 Iv lines G18 were inserted before spinal block and standard non-invasive monitoring was employed by automated blood pressure measurement, oxygen saturation and pulse rate by pulse oximetry.

Spinal block was done by lumbar puncture mid line method for the patient in sitting position at the level (L2-L3, L3-L4 or L4-L5)intervertebral space with spinal needle Quincke G25, the level T10 covered in our procedure.

2.5ml (12.5mg) of 0.5% hyperbaric bupivacaine was injected slowly. Then return the patient to the supine position, starting IV fluid infusion and blood pressure monitoring and Wedge under right hip in pregnant patient.

The data were coded and analyzed using the Statistical Package for the Social Sciences (SPSS) version 26.

The Numeric variables were described as mean and standard deviation, while the categorical data were represented as frequencies and percentages.

Independent samples t-test was used to compare the means of two samples. The chi-square test and Fisher's exact test were used to test the significance of the association between the categorical variables. The P-value of < 0.05 was the criterion of statistical significance.

#### RESULTS

A total of 60 patients who had undergone spinal anesthesia using Quincke G25 spinal needle were

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recruited to the study. The weight and height of each patient were measured, and they were interviewed regarding their current experience of post-dural puncture headache (PDPH).

The mean age of the patients was  $27.5 \pm 4.83$  years, ranging from 19 to 38 years. The mean BMI was  $26.89 \pm 2.6$ . Females represented 75% (N=45) of the study sample. Patients who had undergone orthopedic surgery were 15 males and 15 females. Only 16.7% of the patients had PDPH following their surgery.

Table (1) and table (2) show the sociodemographic and clinical characteristics of the study population.

Table	(1):	The	age,	weight,	height	and	BMI	of	the
study p	oopu	latio	n.						

Variable	Mean ± SD
Age (years)	$27.5\pm4.83$
Weight (Kg)	$73.35\pm9.16$
Height (cm)	$164.95\pm6.08$
BMI	$26.89 \pm 2.6$

Table 2: Sex.	type of surgery	and presence of	f PDPH among stu	dv population.
		and presence of		a population

Variable		Number	Percentage
Sou	Male	15	75.0
Sex	Female	45	25.0
Type of gungany	Gynecological	30	50.0
Type of surgery	Orthopedic	30	50.0
Cummont DDDU	Present	10	16.7
	Absent	50	83.3
Total		60	100.0

The study participants were divided into two groups according to the type of surgery that they had undergone: the gynecological versus orthopedic operation group. The two groups were compared with respect to age, BMI, and current experience of PDPH.

There was no significant difference between the two groups with respect to age (P>0.05). On the other hand,

the mean BMI was significantly lower among patients with gynecological surgery (P<0.05). Similarly, a significant association was found between the type of surgery and current PDPH (P<0.05). Patients who had gynecological surgery were more likely to experience PDPH following their surgery. As seen in Table (3).

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Groups		<b>Gynecological Surgery</b>	<b>Orthopedic Surgery</b>	P-value	
Age (Mean ± SD)		$27.5\pm5.05$	$27.5\pm4.68$	0.650*	
BMI (Mean ± SD)		$25.3 \pm 1.67$	$28.47 \pm 2.39$	0.0001*	
Time to mobilize after surgery (Range in hours)		4-6 hours	24-72 hours		
Current DDDH No (9/)	Present	8 (26.7%)	2 (6.7%)	0.029**	
Current FDFH No.(76)	Absent	22 (73.3%)	28 (93.3%)	0.038**	
Total		30 (100.0)	30 (100.0)		

\* Independent samples t-test was used.

\*\*Chi-square test was used.

To further demonstrate the difference in PDPH among the two study groups, a pie chart was formulated showing that the percentage of PDPH is higher among patients with gynecological surgery under spinal anesthesia. In order to clarify the effect of sex on current PDPH, patients who had undergone orthopedic surgery (n=30) were classified into male and female groups. Although the percentage of female patients with PDPH was higher compared to males, the association was not statistically significant. (P>0.05) as demonstrated in Table (4).

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Table 4: The association between current PDPH and sex among pat	tients with orthopedic surgery.
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	Current PDPH present	Current PDPH absent	<b>P-value</b>
Sex	No. (%)	No. (%)	
Female	2 (100.0%)	13 (46.4%)	0.492*
Male	0 (0.0%)	15 (100.0%)	0.485*
Total	2(100.0)	28 (100.0)	

\* Fisher's exact test was used.

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# DISCUSSION

Spinal anesthesia is becoming increasingly popular due to its simplicity, fast onset, excellent sensory and motor block, early breastfeeding, and good postoperative analgesia. However, it is not complication-free, and the most common complication is post-Dural puncture headache (PDPH), which is associated with Dural puncture and cerebrospinal fluid leak.<sup>[1]</sup>

The incidence of PDPH ranges from 0 to 42.6% after spinal anesthesia according to the needle type and size. The exact cause of PDPH is still unknown, but the main cause is cerebrospinal fluid leakage, which results in gravitational traction on pain-sensitive structures and shifting of intracranial structures. The manifestation of PDPH secondary to cerebrospinal fluid leakage is the result of activation of adenosine receptors that subsequently cause dilation of intracranial arteries and veins for a compensatory increase in blood volume via Monro Kellie doctrine.<sup>[11]</sup>

The incidence of PDPH is affected by several factors, including age, sex, needle size, multiple attempts, needle bevel direction, and previous history of PDPH. The most important factor is the needle size, with larger diameter needles having a higher incidence and more prolonged and severe PDPH.<sup>[12]</sup>

To minimize the risk of PDPH, it is important to use smaller cutting spinal needles or needles without a cutting bevel.<sup>[13]</sup>

Despite the existence of various therapies, there is a continuous controversy about their effectiveness; Epidural blood patch, headache, pain management, preventing PDPH, and pharmacological treatment for PDPH are some of the popular therapies.<sup>[9]</sup>

AGE: - In this study found that there was no significant difference in age between the two groups (P>0.05). Additionally, there was a significant association between the type of surgery and current PDPH (P<0.05), with patients who had gynecological surgery being more likely to experience PPDH as seen in Table (2).

Post-Dural puncture headache (PDPH) is more common in younger patients, with patients aged 20-40 years being the most susceptible. The incidence of PDPH decreases with increasing age, with the lowest incidence occurring after the fifth decade. Some studies have found a higher incidence of PDPH between the ages of 20 and 30 years, while others have found a greater risk of PDPH in the 31-50 years' age range. However, the physiopathology of this age-related risk is not clear. Three factors that could potentially prevent individuals over 50 years old from developing PDPH include the reduced elasticity of the dura mater, weaker reaction of the cerebral vessels to cerebrospinal fluid (CSF) hypotension, and a reduced vertebral extra-Dural space allowing a small amount of CSF accumulation, thereby arresting the leak of CSF

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from the subarachnoid space, our study is in agreement with Bg.

SEX: - In this study to further demonstrate the difference in PDPH incidence between the two study groups, to investigate the association between current experience of post-Dural puncture headache (PDPH) and sex, patients who underwent orthopedic surgery were divided into male and female groups. Although the percentage of female patients with PDPH was higher compared to males, the association was not statistically significant (P>0.05) as demonstrated in Table (4).

However, several studies have reported that women are more likely to develop PDPH than men, even when the risk is adjusted for age. For instance, a study published in the Korean Journal of Anesthesiology found that women presented a risk of PDPH 2.25 times greater than that of men.<sup>[14]</sup>

Another study published in the Journal of Clinical Anesthesia found that the incidence of PDPH was higher among females.<sup>[4]</sup>

Additionally, studies have shown that obstetrics patients are at risk of developing PDPH due to their sex, age, and higher rate of exposure to neuraxial blocks.<sup>[12]</sup>

Women are more likely to be affected by post-Dural puncture headache (PDPH) than men, even when the risk is adjusted for age. Some studies have found that the risk of PDPH in women is twice as great as that in men. This SEX difference may be related to the physiological and psychosocial characteristics of women, as well as their pain perception. Women tend to process nociceptive information differently from men, showing greater sensitivity to painful stimulation, which facilitates the central sensitization process. The incidence of PDPH is higher among females, and there is an inverse relationship between PDPH and increasing age.<sup>[9]</sup>

BMI: - In this study The association between current experience of post-Dural puncture headache (PDPH) and body mass index (BMI) was investigated, and the results showed significant difference between current PDPH and BMI (P<0.05). Bedilu Girma Weji et.al have found no significant association between BMI and PDPH. One study even found that patients with an increased BMI had a lower incidence of PDPH than those with a lower BMI.

Studies have reported conflicting results regarding the association between body mass index (BMI) and post-Dural puncture headache (PDPH).

Some studies have found that lower BMI is associated with a higher risk of PDPH, while others have found no significant association between BMI and PDPH.<sup>[15]</sup> Interestingly, some studies have reported a lower incidence of PDPH.<sup>[16]</sup>

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in morbidly obese patients, possibly due to the large abdominal panniculus acting like an abdominal centigration and raising the intra-abdominal pressure, thus reducing the rate of leak of cerebrospinal fluid (CSF) through the Dural defect.<sup>[17]</sup>

# CONCLUSION

This study approved that the early mobility increases the PPDH as a result of CSF leak according to the recommends of obstetric and gynecological doctor.

while in lower limb surgery the lowest because of limited and restricted by movement induce pain. The older age patient showed decrease the possibility of PPDH than younger age group due to decrease disc space and the bony pads because more adherent and support the dural wall, however the elasticity of dural tissue because less the CSF leakage less as well.

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