

ADDIS ABABA UNIVERSITY
SCHOOL OF HEALTH SCIENCES
DEPARTEMENT OF ANESTHESIA



ASSESSMENTS OF THE MAGNITUDE OF POST DURAL
PUNCTURE HEADACHE (PDPH) AND ASSOCIATED RISK
FACRORS WITH PDPH AMONG PATIENTS UNDERGOING
SPINAL ANESTHESIA FOR ORTHOPEDICS AND UROLOGIC
PROCEDURES IN BLACK LION SPECIALIZED REFERRAL
HOSPITAL, ADDIS ABEBA, ETHIOPIA

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ABSTRACT

BACKGROUND: Although modern anesthesiology has made great progress in the last decades, Neuraxial anesthesia (NA) is still the keynote of regional blockade. It is popular for its effectiveness in producing anesthesia and analgesia with neuromuscular paralysis. As the NA techniques are used popularly in clinic and Hospital, Post Dural Puncture Headache (PDPH), a common iatrogenic complication resulted from post-spinal taps or accidental Dural puncture subsequent to epidural block, is frequently reported and becomes a challenging to health caregivers.

Although the problem has been widely reported verbally by the patients, its magnitude and associated factors are not well being studied in our country. The aims of the study were to assess the magnitude of Post Dural Puncture Headache (PDPH) and associated risk factors with PDPH among patient who underwent spinal anesthesia for orthopedic and urologic procedures in Black Lion Specialized Referral Hospital, Addis Ababa, Ethiopia. From February 15 to March 15, 2016 G.C

METHODS AND MAERIALS: An institutional based Cross Sectional study, was conducted from February 15 to March 15, 2016 G.C in Black Lion Specialized Referral Hospital, Addis Ababa Ethiopia. And a total of 76 consecutive patients undergoing SA aged 17–75 was participated in the study. Those independent variable that were significant on binary logistic regression at $P < 0.2$, were analyzed on multivariate regression, and considered significant association with PDPH at P value < 0.05 .

RESULT: Out of 76 patients undergoing SA for orthopedic and Urologic Procedures; the prevalence of PDPH was 33%. Among patients who develop PDPH; 54% of the patients reported moderate pain while 44% experience mild PDPH. The number of spinal attempt was significantly related (P -value .000, AOR 0.002; 95%CI; 0.000 - 0.03) to PDPH while sex, BMI and Age of the patient was not found significantly related to PDPH with P -values of (0.618, 0.529 and 0.72) respectively. **CONCLUSION AND RECOMMENDATION:** The incidences of Post Dural Puncture Headache was found to be higher (33%) in Black Lion Hospital. The hospital management and the anesthetists in the hospital should minimize the magnitude of PDPH by avoiding use of big and traumatic needle (22G Q-needle) and repeated spinal attempt (> 2 attempt.

Key Words: Post Dural Puncture Headache, Spinal Anesthesia, Quincke Needle

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ACRONYMS

1. **AAU** – Addis Ababa University
2. **ADP**- Accidental Dural Puncture
3. **BMI**: Body Mass Index
4. **CSF**: Cerebro-Spinal Fluid
5. **ETI**: Endo-tracheal Intubation
6. **GA**- General Anesthesia
7. **NA**- Nuraxial Anesthesia
8. **OR**- operation Room
9. **PDPH**: Post Dural Puncture Headache
10. **Q-needle**: Quincke Type Spinal needle
11. **SA**- Spinal Anesthesia

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CHAPTER ONE

1. INTRODUCTION

1.1. BACKGROUND INFORMATION

Spinal anaesthesia developed in the late 1800s. In 1891, Wynter and Quincke aspirated cerebrospinal fluid (CSF) from the subarachnoid space for the treatment of raised intracranial hypertension associated with tuberculous meningitis. (1)

In 1895, John Corning, a New York physician specializing in diseases of the mind and nervous system, proposed that local anaesthesia of the spinal cord with cocaine may have therapeutic properties. (2) Corning injected cocaine 110 mg at the level of the T11/12 interspace. (3)

In August 1898, Karl August Bier, a German surgeon, injected cocaine 10 - 15 mg into the subarachnoid space of seven patients, himself and his assistant. Bier, Hildebrandt and four of the subjects all described the symptoms associated with post-dural puncture headache. Bier surmised that the headache was attributable to loss of CSF. (3)

By the early 1900s, there were numerous reports in the medical literature of the application of spinal anaesthesia using large spinal needles. (4) Headache was reported to be a complication in 50% of subjects. At that time, the headache was said to resolve within 24 h. (4)

The physical phenomenon which causes spinal headache is explained as when the needle pierces dura-mater and cerebrospinal fluid can leak out and pressure drops. The cushioning effect of the fluid disappears and tension is applied directly to the cranial nerves. (5)

Although the incidence of PDPH in research volunteers is ~6% (6), in patients for whom the neuraxial anesthesia (NA) is for clinical purposes; the prevalence of PDPH ranges from 10% to over 80% in different aged patients underwent either epidural or spinal or combined block (7).

Investigations on the risk factors of PDPH revealed that female, age, perpendicular bevel orientation (8), previous history of PDPH (9), repeated dural puncture (10), needle gauge and design (11), and pregnancy (12) are factors substantially related with the occurrence of PDPH.

The leakage of cerebrospinal fluid (CSF) was considered as the major cause of PDPH (13), whereas its real etiology is unknown

1.1. STATEMENT OF THE PROBLEM

Although modern anesthesiology has made great progress in the last decades, neuraxial anesthesia (NA) is still the keynote of regional blockade [14]. NA is popular for its effectiveness in producing anesthesia and with excellent intraoperative neuromuscular paralysis and in generating analgesia for relieving postoperative pain if continuously infused [15, 16].

As the NA techniques are used popularly in clinic, post dural puncture headache (PDPH), a common iatrogenic complication resulted from post-spinal taps or accidental dural puncture (ADP) subsequent to epidural block, is frequently reported and becomes a challenge to health caregivers [16].

A Nordic survey found the incidence of ADP in Obstetric setting is 1% [17], and 73% of the ADP patients developed PDPH [18]. The incidence of PDPH in Obstetric in Middle East is 2-4.6% [19, 20], 22.7% in Western Africa (21), 16.9% in Southeast Asia [22], 16.6% in North Europe [23], and 6% in North America [24, 25].

In non-Obstetric patients, about 18% patients developed PDPH after spinal anesthesia [26], however a lower incidence (4%) was then reported in the next year by the same group [27]. Another group from Denmark reported the occurrence of PDPH was 7.3% in patients underwent different types of surgeries below the diaphragm after spinal anesthesia (28).

Clinical and epidemiological studies support a connection between PDPH and certain demographic factors. The frequency of PDPH was less in older age patients (51-75 years) than younger age comparisons (30-50 years) [29]. Children younger than 13 years rarely get PDPH [30], but that does occur with increasing frequency in adolescents and are similar to those seen in adults [31].

To child younger than 13 years and adult older than 50 years, they have less PDPH incidence than their peers that largely may be related to the reduced CSF pressure [32]. While there are some inconsistencies upon gender as an independent risk factor for the development of PDPH, a recent meta-analysis confirmed the declaration that the odds of developing a PDPH were significantly lower for male than non-pregnant female subjects with an odds ratio (OR), 0.55 and 95% confidence interval (95% CI), 0.44-0.67 [33].

Lower weight is found to be strongly associated with the higher incidence of PDPH [34] and cumulating evidence showed an inverse relationship between BMI and PDPH [35] suggesting that heavier patients in general have higher intra-abdominal pressure, which in turn raises intra-epidural pressure and prevents cerebrospinal fluid from leaking when ADP occurs.

In a more recent study, severe headache after lumbar puncture and sitting position were confirmed as predicting factors of the occurrence of PDPH, and in further sitting sampling position, history of depression, multiple effort of lumbar puncture, and high perceived stress during the procedure were found to be significantly associated with a longer duration of PDPH [36].

In the same study, migraineurs showed no change at the risk of developing PDPH compared to the non-headache subjects, and epidural puncture does not trigger migraine attacks [37]. However, there was report showing that patients had a history of chronic or recurrent headache has more chance in nearly 60% to develop PDPH than those without such a history [38].

Although the leakage of CSF is regarded as the major cause of PDPH, the volume of CSF removed and its role in causing PDPH is unclear. Davignon and Dennehy reported that removal of 15-20 ml of CSF reliably caused headaches [38], but Kuntz et al. did not find such a causal relationship [39]. So it is hard to draw a conclusion from the available data that volume change in CSF causes PDPH. In clinical practice, the volume usually removed during diagnostic lumbar punctures or spinal anesthesia is less than 5ml that means it is not likely to be a significant factor for the PDPH. However, we cannot exclude the possibility that chronic leakage of CSF over more than 15 ml after ADP or spinal anesthesia is causative for the PDPH.

Prophylactic treatment with 8 mg of dexamethasone not only increases the severity and incidence of PDPH, but is also ineffective in decreasing the prevalence of intra-operative nausea and vomiting during cesarean section indicating that dexamethasone treatment is a significant risk factor for the development of PDPH [40].

Nonetheless, hydrocortisone I.V (100 mg in 2 ml 8 hourly for 48 h) was found effective in reducing PDPH following spinal anesthesia [41] suggesting that glucocorticoid with different potency and half-life of action may possess different function in PDPH prevention and therapy.

1.2. SIGNIFICANCE OF THE STUDY

As a well-known iatrogenic complication, PDPH has its special morbidity that affects patient's daily life.

Even though it carries self-terminating characteristic. Patients usually suffer from PDPH and complain about their pain and discomfort after spinal anesthesia.

The magnitudes and associated risk factors of PDPH are not well been studied in Black Lion Hospital as well as in our country Ethiopia.

And this study assessed the magnitudes' of PDPH and associated risk factors among the study participants in Black Lion Specialized and Referral Hospital and

Different recommendation was forwarded based on the results of the study to decrease the prevalence of PDPH in the hospital while decreasing patient pain and suffering from PDPH and improve patient satisfaction in Hospital.

CHAPTER TWO

2. LITERATURE REVIEW

Different researches are conducted in different parts of the world by using various types of variables such as the size and types of the Spinal needle used/Quencke, whitacre, the number of spinal attempts, position of the patient while giving spinal anesthesia, pretreatment with dexamethasone, orientation of the bevel while piercing the dura, and others variables were used as a risk factor for post-dural puncture headache.

Here some of those reviewed literatures that was conducted in different parts of the world are described briefly below.

The incidence of post-dural puncture headache (PDPH) was investigated in Esbjerg Central Hospital, Esbjerg, Denmark prospectively in 1021 consecutive patients undergoing spinal anesthesia's, and its association to age, sex, needle size, number of attempted dural punctures, needle bevel direction, duration of postoperative recumbence, and previous PDPH was analyzed.

During a period of 1 year 1021 spinal anesthesia for different types of surgery below the diaphragm were performed in 873 patients at the Central Hospital of Esbjerg. Multivariate relationships were analyzed using the hierarchical log-linear methods applying the backward elimination principle. A P-value of <0.05 was considered statistically significant

A total of 1021 were given spinal anesthesia's (722 males and 299 females). The ASA physical status was I in 674, II in 256, and III in 91.

The spinal anesthesia was given for orthopedic ($n = 595$) and genitourinary ($n = 426$) surgery by 10 anesthetists. Of the 1021 spinal anesthesia, 122 (11.9%) were complicated by headache postoperatively. Seventy-five patients (7.3% of the overall sample) had typical PDPH according to the criteria.

The multivariate association between the frequency of PDPH, on the one hand, and the number of punctures, size of the needle, sex, position of the patient during introduction of the needle (sitting/laying), direction of the needle bevel, and age, on the other hand, was analyzed.

The frequency of PDPH, statistically significantly but inversely associated with age ($P < 0.0001$), was also significantly related to the direction of the bevel during introduction of the needle ($P = 0.022$)

No statistically significant association was found between PDPH and number of punctures ($P = 0.091$), size of the needle ($P = 0.105$); (22 gauge [$n = 421$], 25 gauge [$n = 451$], or 26 gauge [$n = 149$], sex ($P = 0.118$), or position of the patient at the time of lumbar puncture ($P = 0.192$)

No significant interaction was found between direction of the needle bevel and age ($P = 0.93$), and no second-order interaction was found between the incidence of PDPH, direction of the bevel during the introduction of the needle, and age ($P = 0.37$).

Previous PDPH was found to be a significant predictor of PDPH ($P = 0.0018$).

The incidence of PDPH among patients in whom the bevel was inserted parallel to the longitudinal dural fibers was 0.56 times the incidence among patients in whom the bevel was inserted perpendicularly to the longitudinal dural fibers. (42)

A cross sectional study which was carried out in Dhulikhel Hospital, Kavre, Nepal. Assess the incidence of post dural puncture headache (PDPH) among 120 patients who underwent surgery under spinal anesthesia from June 2008 till August 2008.

Patients age group from 18-45 years old were enrolled in the study.

Patients with ASA grade III or more, previous history of migraine, hypertension, neurological diseases, history of fever, common cold, sinusitis, features of raised intracranial pressure were excluded from the study.

Questionnaire was used to assess the post dural puncture headache 24 hours after surgery. Headache, if present in frontal or occipital areas which increased when sitting or situational movement and relieves by lying in flat position were considered as PDPH.

The mean age of the respondents was 35.03 ± 9.66 years, and BMI 22.39 ± 2.99 kg/m². In the study, the male: female ratio was 1.1:1

The incidence of post dural puncture headache was 25%. It was 30% and 70% in male and female respectively. But sex of the patient was not statistically associated with PDPH ($p= 0.100$).

Among 120 respondents, 45 were from age group 18-30 among which 70% experienced post dural puncture headache; whereas 75 were from age group 31-45 among which 30% of them had post dural puncture headache.

The chi- square test was used to show the association between the post dural puncture headache (PDPH) and age group. The p-value was 0.014 which was lesser than 0.05 and the association of incidence of PDPH with age group was statistically significant at 5% level. It was 2.33 times more in age group 18-30- years than 31-45 years.

In obstetrics and gynecological patients, 50% experienced post dural puncture headache (PDPH); ($p=0.043$), hence, the association was statistically significant.

80% of patient who experienced post dural puncture headache/PDPH had onset of PDPH within 24 hours of surgery and 80% of patient experiencing post dural puncture headache/PDPH had pain on the frontal region (43)

A prospective cohort study was conducted on 675 research volunteers at HIV neurobehavioral research center (HNRC) at the University of California, San Diego from 2003 – 2004 to determine the frequency of post dural puncture headache (PDPH) in neurologically unselected HIV seropositive and seronegative adults volunteering for research, as well as variables associated with PDPH. Variables studied were Age, Gender, BMI, HIV Serostatus, Volume of CSF removed, LP position, HIV viral load and race.

LP was performed under aseptic conditions using a 22G atraumatic Spinal needle. Following LP research volunteer were observed 10 – 30 minutes before being permitted to ambulate.

The participant was contacted within 48 hours of their LP and were asked if they were experienced any headache. Those experiencing headache were managed with initial recommendation for bed rest, enhanced fluid intake including caffeinated beverages and prescribed analgesic as required.

Subjects who experienced a headache that don't not respond to conservative managements (3 volunteer) underwent a blood patch performed by anesthesiologist.

Of 675 LPs performed on research volunteers 575 was done on HIV HIV + subjects and 100 (14.8%) on healthy HIV negative controls.

Of 675 LPs, 38 (5.6%; 95%CI 4.2 -7.1) resulted in PDPH. Of this 38, 32 headaches resolved after rest, hydration and over the counter analgesics. On three patients PDPH was resolved after epidural blood patch.

HIV infected individuals were not more likely to develop PDPH than HIV negative individuals (OR:1.95; 95%CI 0.67, 5.68 P=0.18)

Of 675 LPs performed 502 (74.4%) were done by the nurses, 138 (20.4%) were done by nurse practitioners and 35 (5.2%) were done by the physician. LP procedures which was performed by RN, and NP were no more likely to cause PDPH than procedure performed by MD, (OR: 0.98; 95%CI 0.23, 4.26, P=0.98)

The median amount of CSF removed was 13 ml. (IQR 12 -14). Research volunteers who had greater than or equal to the median volume of CSF withdrawn were not significantly more likely to develop PDPH than research volunteers who had withdrawn less than the median volume (OR: 0.58; 95%CI 0.28, 1.2; P=0.13)

The median number of reported prior LP was 2 (IQR 1-6). Research volunteers who had 0, 1 or 2 prior LP develop PDPH significantly more frequently than research volunteers who report > 2 prior LPs (OR:2.08; 95%CI: 1.06, 4.09; P=0.03)

Subjects less than or equal to the median age 41.9 were no more likely to develop PDPH than the individuals older than the median (OR 1.36; 95%CI: 0.68, 2.72; P=0.39)

Women were not more likely to develop PDPH than men (OR: 1.98; 95%CI; 0.93, 4.21; P=0.09)

Subjects with BMI less than or equal to 25 kg/m² were 3.26 more likely to experience PDPH than those greater than 25 (OR: 3.26; 95%CI; 1.53, 6.96; P=0.001)

The use of premedication for anxiety with Lorazepam 0.25 -0.5 mg, LP position, number of passes, CD4 count, plasma viral load and race was not associated with PDPH on this study. (44)

Other prospective cross sectional study was carried out in the Department of Anesthesiology, Intensive Care and Pain Management, Himalayan Institute of Medical Sciences (HIMS), Dehradun.

A total of 120 patients of ASA I & II obstetric & non-obstetric undergoing elective/emergency surgery under subarachnoid block were included under the study.

It evaluates the frequency of PDPH during spinal anesthesia using 27 gauge Quincke and 27G whitacre needle in obstetric/non obstetric patient.

The study involved 120 patients of either sex; of age group 14-75 years and ASA (American Society of Anesthesiologists) grade I and II, admitted in for elective or emergency lower segment caesarian section and other surgical procedures.

These patients were randomly allocated to 4 groups of 30 patients each. The four Groups were: Group A – Non Obstetric patients with Whitacre 27 G, Group B – Obstetric patients with Whitacre 27G, Group C -Obstetric patients with Quincke 27G, Group D – Non Obstetric patients with Quincke 27 G. And each groups contain 30 patients

All the patients were blinded to the needle utilized. While the anesthetist conducting the procedure was not blinded as the two needles have different appearance making blinding impossible. The following data: patient's age, sex, height, weight, ASA classification, elective or emergency nature of the surgery, number of attempts, position during induction of spinal anesthesia (sitting or lateral) and type of anesthetic agents (lidocaine or bupivacaine) administered to the patient were recorded.

In cases of failed anesthesia or inadequate anesthesia even after 15 minutes' general anesthesia was given. No sedation was given to any patients intraoperatively. Oxygen (5 L/min) by facemask was given until delivery of the baby. Fluid therapy was maintained with lactate ringer solution (10 ml/kg/hr).

Patients were observed on postoperative day 1, 2 and 3 for post dural puncture headache. Post dural puncture headache was defined if it fulfilled the following two criteria: Location in the occipital/frontal areas of the head. And Exacerbation of symptoms while sitting or standing.

In majority of the patients 98 (82%) the block was performed in sitting position.

Most of the patients belonged to ASA grade I (81.5%). There was no significant difference in the ease of needle insertion, dose of local anesthetic and the position in which the block was performed.

In groups A and D the patient was posted for non-obstetric surgery and the age ranged from 15 to 72 years while in group B and C the subjects were young healthy parturient and their age ranged from 18 to 40 and 22 to 40 years old respectively. But statistically there were no significant differences between the groups A and D ($P > 0.05$) and group B and C ($P > 0.05$).

In-group C the sub arachnoid block in 1st attempt was in only 25 (83.34%). In 3 patients second attempt was used and in 1 patient sub-arachnoid block was achieved by third attempt where the patient was then given a successful sub arachnoid block with 23G Quincke spinal needle. This patient post operatively developed PDPH of operatively intensity and was advised bed rest, iv fluids and analgesics. The PDPH resolved after 3 days.

In group B (Obstetric patient with 27G Whitacre) 1 patient (2%) developed PDPH while in group C (Obstetric patient with 27G Q) 2 patients (4%) developed PDPH. The severity of headache ranged from mild to moderate. No epidural blood patch was required in any patient.

In this study, they did not observe PDPH in non-obstetric patients but 10% parturient developed PDPH.

They concluded that, the incidence of PDPH is same in non-obstetric cases whichever needle is used while in obstetric cases the incidence of PDPH is 2% with 27G Whitacre needle and 4% with Quincke spinal needle. (45)

A prospective cohort study was conducted between January 2009 and April 2009 at the Aga Khan University Hospital, Nairobi. Evaluate the incidence of post dural puncture headache following caesarean section under spinal anesthesia.

All pregnant women who underwent Caesarean delivery, both elective and emergency, under spinal anesthesia during this period were included in the study after obtaining an informed consent from each patient.

The association between headache and various factors (Anesthetists level of experience, Preloading done, Needle type, Needle gauge, Number of attempts, position and duration time of the procedure from positioning the patient to delivery of the drug) were assessed using a Fishers exact test.

A total of one hundred and thirteen women (113) undergoing Caesarean section under spinal anesthesia were recruited into the study after obtaining an informed consent. The mean age was 30.5, 95% CI (29.7, 31.4) years. The range was 19 to 40 years.

Spinal anesthesia was performed with a 20-gauge needle in one patient (0.9%), 22gauge needle in thirty-two (28.3%) and 25 gauge in eighty patients (15.9 %).

Out of forty patients who received spinal anesthetics by the registrars, eleven of them developed PDPH (27.5%) and out of fifty-three patients who had the same anesthetic administered by a consultant, eight of them, hence 15.1% developed the PDPH. However, the association between level of experience of anesthetist and occurrence of PDPH was not statistically significant in this study ($p = 0.322$).

In this study, 12.5% of women who received more than 1500 milliliters (mls) of fluid developed PDPH. 19.5% of those who received between 1000 to 1499 mls of fluid developed PDPH and 27.2% of those women who received between half a liter of fluid and 999 mls developed PDPH.

However, this study was not able to demonstrate statistical significance in the reduction in the occurrence of headache between the patients who were pre-loaded and those who were co-loaded, $p = 0.64$.

Twenty-three out of 113 patients reported headache that fulfilled the PDPH criteria. Of the total number of patients with headache, three (13%) classified their headache as mild (<3 on the VAS). Nine (39%) eleven patients (48%) classified their headache as moderate (VAS OF 4-7) and classified their headache as severe (VAS >7).

Headaches responded to simple analgesics and oral fluids in all patients. None of the patients required an epidural blood patch or prolonged enforced bed rest.

In this study only 4.5% of the twenty-two mothers who had the spinal anesthetic administered using the pencil point needle developed the PDPH. Compared to their counterparts who had the spinal anesthetic administered using the quincke, cutting needle, the incidence of PDPH was 24.2%. This association was found to be statistically significant, P= 0.042.

The gauge of the spinal needle used was not found to be statistically significant in this study (between: 20, 22, and 25 G quincke type needle). (46)

An institution based cross sectional study was conducted from February 25-April 10, 2013 in University of Gondar teaching and referral hospital, Gondar, Ethiopia.

Post Dural Puncture Headache (PDPH) and Associated Factors after Spinal Anesthesia among Patients undergoing all surgical and obstetric procedures under spinal anesthesia were assessed in the study during the study period.

A total of 116 patients aged 17-74 years were included in the study. Data was collected by interviewing patients using structured and pre-tested questionnaire and reviewing chart. Both bi-variable and multivariable logistic regressions were used to determine the association between post dural puncture headache and independent variables.

Out of 116 patients who have undergone spinal anesthesia 45 (38.8%) patients developed post-dural puncture headache whereas 11 patients (9.5%) complained headache but they didn't fulfill the criteria to be classified as patients with PDPH.

The proportion of PDPH varies greatly when different needle sizes were used. The proportion of PDPH was very high (63.6%) when 18G spinal needles were used, whereas the proportion was low (8.3%) when small needles were used (> 24 G needle).

By multivariate logistic regression analysis sex, needle size and number of attempts were found to be statistically significant at p-value <0.05 associated with PDPH.

In this study sex was significantly associated with the outcome variable PDPH. Male patients are 80% less likely to develop PDPH than female patients (AOR=0.2, 95% CI: 0.058, 0.67).

Size of the needle used to administer SA is also significantly associated with the development of PDPH. Patients received SA using bigger spinal needles (<24 gauge) were more than 5 times more likely to develop PDPH than patients who received SA using smaller needles P-value 0.005 (AOR=5.3, 95% CI: 1.66, 16.93).

Another significant association was found between number of attempts and PDPH. Patients who received SA on the first attempt were 78% less likely to develop PDPH than their counter part patients who had a repeated attempt (AOR=0.22, 95% CI: 0.09, 0.54). (47)

CHAPTER THREE

3. OBJECTIVES

3.1 General Objective

To Assess the Magnitude of Post Dural Puncture Headache (PDPH) and associated risk factors with PDPH among patient taking spinal anesthesia for elective orthopedic and urologic procedures in Black Lion Specialized Referral Hospital, Addis Ababa, Ethiopia. From February 15 to March 15, 2016 G.C

3.2 Specific Objective

- I. To assess the incidence of Post Dural Puncture Headache (PDPH) in Black Lion Specialized Referral Hospital, Addis Ababa, Ethiopia. From February 15 to March 15, 2016 G.C, and
- II. To evaluate the statistical association between the risk factors and PDPH among patient taking spinal anesthesia for elective orthopedic and urologic procedures in Black Lion Specialized Referral Hospital, Addis Ababa, Ethiopia. From February 15 to March 15, 2016 G.C

CHAPTER FOUR

4. METHOD AND MATERIALS

4.1. STUDY AREA

The study was conducted on Black Lion Specialized Referral Hospital (Tikur Anibesa Specialized Referral Hospital, in Amharic) which is a specialized teaching Hospital located in the heart of Addis Ababa, which is the nation's capital. In 1998 black lion hospital which is the largest referral Hospital in the country was given to Addis Ababa University (AAU) by the minister of health (MOH) for the facility as a main teaching hospital. The hospital provides tertiary level referral treatment.

Black lion Specialized Referral Hospital offer diagnosis and treatments for approximately 370,000 - 400,000 patients per year. It has 800 admission beds with 130 specialist and 50 non-teaching doctors. The emergency department sees around 80,000 patients a year. It is located at Zambia St, Addis Ababa, Ethiopia.

4.2. STUDY DESIGN

Institutional based Cross-Sectional study design was used in the study

4.3. STUDY PERIOD

The study was conduct from February 15 to March 15, 2016 G.C

4.4. POPULATION

4.4.1 SOURCE POPULATION

All patients requiring Spinal Anaesthesia for elective Orthopaedic and urologic procedures from February 15 to March 15, 2016 G.C in Black Lion Specialized Referral Hospital was the source population.

4.4.2 STUDY POPULATION

All consecutive patients which undergone Spinal Anesthesia for elective Orthopaedic and urologic procedures from February 15 to March 15, 2016 G.C in Black Lion Specialized Referral Hospital which is not excluded by the exclusion criteria was included in the study population.

Exclusion Criteria

- Patient which is medically diagnosed with migraine headache

- Patient taking GA with ETI in addition to SA
- Pregnant patient ≥ 2 week of gestation
- Patient with ASA classification class III and above
- Age < 15 years

4.5 SAMPLE SIZE AND SAMPLING TECHNIQUES

$$\text{Sample size}(n) = Z^2 P(1-q)/ d^2$$

Where n – sample size

Z – Z statistics for a level of confidentiality (95% CI)

P – the expected prevalence of proportion and

d – precision

From similar study which was conducted in Gonder referral and teching hospital we take P as 0.39

$$n = (3.8416) (0.39) (0.61)/0.0025$$

$$n = 366$$

Using finite population correction formula, because we expect to underwent 80 spinal anesthesia for Orthopedic and urologic procedures within a month, during situational analysis

$$n = n / 1 + (n-1)/N$$

$$n = 68$$

Non-probability sampling techniques was used during the study. In which all consecutive patients undergoing elective orthopedic and urologic procedures during the study period was included in the study. Those patients that was categorized with in the exclusion criteria was excluded from the study.

4.6. STUDY VARIABLES

4.6.1. INDEPENDENT VARIABLE

- Age
- Sex

- BMI
- Spinal Needle gauge
- Number of lumbar puncture
- Types of the operation
- Types of LA
- Position of the patient during SA
- ASA classification of the patient

4.6.2. DEPENDENT VARIABLE

- PDPH

4.7. DATA COLLECTION TECHNIQUES

During data collection process in Black Lion Hospital, the patient age, sex and its diagnosis was reviewed from the patients' chart. And before entering in to the operation theatre the patient height and weight was be measured, the BMI was calculated and recorded on the questioner paper by the data collectors.

In the operating theater the type and gauge of the spinal needle, and the number of spinal attempts before successful aspiration of CSF and administration of SA was observed and recorded by the data collectors.

All patients were followed for three days' post operatively. The first visit was done on 12 hour of post-operative, and the last visit was conducted on 72 hour of Post operation.

In patients who develop headache within 72 hours of post operation, they were assessed for its positional influence. Those headaches that occurs or worsens within 15 minutes of upright position and improves within 30 minutes of resuming to the recumbent position was considered as Post Dural Puncture Headache/PDPH.

And then the severity of the PDPH was evaluated by using Numerical Rating Scale. Values 1-3 was considered as mild headache, 4-7 as moderate headache, and > 7 was considered as severe headache.

Those patients which doesn't complain headache within 72 hours of post operation were considered as not developing PDPH.

4.8. DATA QUALITY CONTROL METHOD

Before starting the data collection in Black Lion Specialized Referral Hospital, the questionnaire was pretested in 10 consecutive patients who underwent elective Non-obstetric procedures under SA in Zweditu Memorial Hospital. February 1 - 4, 2016.

Those patients were also followed post operatively by the assigned data collector for 3 consecutive days' post operation.

Minor correction was done on the question paper and made ready for data collection process in Black Lion Hospital.

During data collection process in Black Lion Specialized Referral Hospital; each questioner was filled by the data collectors (final year Anesthesia Masters students and assigned data collector) with careful observation and recording of the patient chart and measurements of BMI.

Intra operatively, the number of spinal attempt, the gauge of the spinal needle, position of the patient during SA, types of LA used was carefully observed and recorded on the questioner paper.

The completeness of the questioner paper was checked every day by the PI, during data collection in Black Lion Hospital.

Post operatively the patient was followed by the assigned data collector on the 12 and 72 hour of post operation.

4.9. DATA ANALYSIS AND INTERPRETATION

After finishing data collection process in BLSRH, the questionnaire paper was checked manually for its completeness and then it was coded and entered in to Epi Info version 7 computer software by the Principal investigator.

And then it was transferred in to SPSS version 20 to run descriptive statistics and to test statistical association between the independent and the outcome variable/ PDPH.

Each independent variable was analyzed using binary logistic regression with the outcome variable PDPH and those independent variable which were significant at a p-value of < 0.2 were considered significant and entered in to multivariate logistic regression to control the co-founding.

p-value of < 0.05 were considered significant on Multivariate Logistic Regression.

4.10. ETHICAL CONSIDERATION

Before starting of data collection process ethical clearance paper was obtained from Addis Ababa University, Department of Anesthesia ethical committee. And submitted to the hospital administration.

During data collection process each patient was asked for his/her Oral consent to participate in the study after brief explanation about the objectives of the study by the data collectors’.

Patient identification was coded and the question paper was keep in proper place by the PI.

4.11. LIMITATION OF THE STUDY

Limited number of studies were conducted on the magnitude and associated risk factors of post dural puncture headache nationally and in even in our continent/Africa, therefore adequate literature was not obtained. The comparison of the findings was done with the available studies that was conducted on other countries.

The patients were followed for 3 days after spinal anesthesia, this may miss some patients that may develop PDPH after the 3 days of the operation.

4.12. PLAN FOR DISSEMINATION OF RESULT

The result of the study will be disseminated by hard copy to Addis Ababa University, School of Health Science, and Department of Anesthesia and to the Hospital medical administration office to recommend action to reduce PDPH in the hospital.

The result of the study will also be forwarded to Ethiopian Association of Anesthetists/ EAA, to show the magnitude of PDPH in BLSRH and to forward recommended actions to decrease PDPH in the Hospital.

The study will be also tried to publish on international journals to use as a reference for further studies.

4.13 OPERATIONAL DEFINITION

ASA classification: American Society of Anesthesiologists classification of patient physical status based on presence or absence of systemic diseases and functional limitation to predict morbidity and mortality of the patient.

ASA Class 1. A healthy patient (no physiologic, physical, or psychological abnormalities).
ASA Class 2. A patient with mild systemic disease without limitation of daily activities.
ASA Class 3. A patient with severe systemic disease that limits activity but is not incapacitating.
ASA Class 4. A patient with incapacitating systemic disease that is a constant threat to life.
ASA Class 5. A moribund patient not expected to survive 24 hours with or without the operation.
ASA Class 6. A brain-dead patient whose organs are being removed for donor purposes.

PDPH: described as the headache (HA) after lumbar puncture (LP). The headache occurs or worsens within 15 minutes of assuming the upright position and disappears or improves within 30 minutes of resuming the recumbent position

PDPH Headache Severity:

- I. **Mild headache:** Numerical pain score (1-3) with no limitation of activity, and no treatment required
- II. **Moderate headache:** Numerical pain score (4-6) with Limited activity and Regular analgesics may required
- III. **Severe headache:** Numerical pain score (7-10) with the patient Confined to bed; anorexic

Photo phobia: Sensation of Pain in the eye resulting from exposure to bright light

Spinal Anesthesia: Injection of local anesthetic into the cerebrospinal fluid in the spinal canal to block sensory and motor sensations before they reach the central nervous system. It is used mainly during surgery on the lower abdomen and legs.

Tinnitus: A sensation of hearing ringing, buzzing, hissing, whistling or booming in one or both ears

Vomiting: Expelling of undigested food through the mouth.

CHAPTER FIVE

5. RESULTS

A total of 76 patients were underwent elective Orthopedic and urologic procedures under spinal anesthesia during the study period.

Out this 55 (72.4%) patients were undergone orthopedic procedure in which 41/55 are males (74.5%) while 14/55 (25.5%) were females. The rest 21/76 (27.6%), were underwent urologic procedures under spinal anesthesia in which 18/21 were male (85.7%) while 3/21 were females (14.3%).

Table1. Socio-demographic characteristics of patients undergoing spinal anesthesia for Orthopedic and Urologic procedures in Black Lion Specialized Referral Hospital. From February 15 to March 15, 2016 G.C

VARIABLE		FREQUENCY: N (%)
Age (year)	14.5 - 30.5	27 (35.5%)
	30.5 – 60.5	33 (43.4%)
	≥ 60.5	16 (21.1%)
Sex	Male	59 (77.6%)
	Female	17 (22.4%)
BMI (kg/m2)	< 18.5	20 (26.2%)
	18.5 – 24.5	31 (40.8%)
	> 24.5	25 (33%)
ASA classification	ASA I	48 (63.2%)
	ASA II	28 (36.8%)
Type of operation	Orthopedic procedures	M 41
		F 14
		, 55 (72.4%)

	Urologic procedures	M	18,	, 21 (27.6%)
		F	3,	
Total			76	

Among those patients undergoing both orthopedic and urologic operation under spinal anesthesia 59/76 were males (77.6%) and 17/76 (22.4%) were females.

From a total of 76 patients; 48 (63.2%) patients were ASA class I patients while the rest 28 (36.8%) were ASA class II patients. ASA class III and above were excluded from the study.

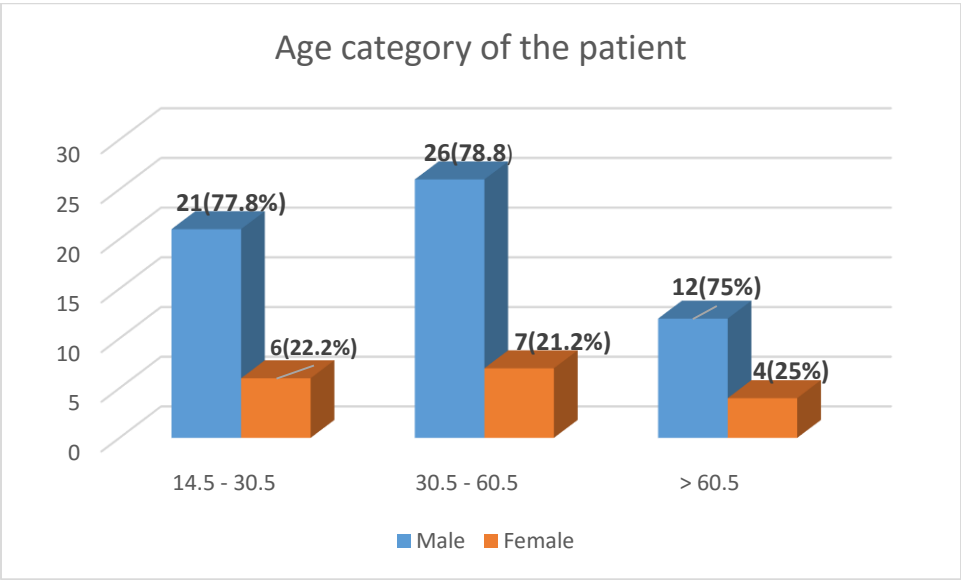


Figure 1.0 Age Category versus Sex of the patients among patients undergoing Orthopedic and Urologic operative procedures in Black Lion Specialized Referral Hospital. From February 15 to March 15, 2016 G.C

Most of the patients 33/76 (43.4%) were age categorized; 30.5 – 60.5 years old, while 27/76 (35.5%) patients were aged; 14.5 - 30.5 years old. The rest 16 (21.1%) patients were age > 60.5 years old.

The mean age of the patients was 38.9 with a SD of 15.34. The minimum and a maximum age of the patients were 17 and 75 years old respectively.

Among patients which were participated in the study, 20 (26.2%) were under weight (BMI; < 18.5 kg/m²), 31(40.8%) were Normal BMI (18.5 – 24.5 kg/m²) and 25 (33%) patients were Obese (> 24.5)

Table 2. Gauge of spinal needle, the number of attempt, types of LA used, and the number of block performed during Orthopedic and Urologic operative procedures in Black Lion Specialized Referral Hospital. From February 15 to March 15, 2016 G.C

VARIABLE		FREQUENCY N (%)
Position of the patient during SA	Sitting	75 (98.7%)
	Lateral	1 (1.3%)
Gauge of SA needle	22 Gauge	76 (100%)
Types of LA used	0.5% bupivacaine plane	63 (82.9%)
	0.5% bupivacaine heavy	13 (17.1%)
Number of spinal attempts	One Attempt	27 (35.5%)
	Two Attempt	23 (30.3%)
	>2 Attempt	26 (34.2%)
Sensory and Motor block of SA	Effective block without IV adjuvant supplementation	65 (85.5%)
	Effective block supplemented with IV adjuvant	11 (14.5%)
	Blocked that are failed and converted to GA with GA	2
Total		76 (100%)

Spinal anesthesia was given using sitting position in 75/76 (98.7%) while only in one patient (1.3%) lateral position was used to give spinal Anesthesia.

22 Gauge; Qincke type spinal needle was used in all patients that were participated in the study.

Widely used local anesthetic was 0.5% plane bupivacaine; 63/76 patients (82.9%) and others were taken spinal Anesthesia using 0.5% heavy bupivacaine 13/76 (17.1%).

Spinal Anesthesia was given after one attempt in 27(35.5%) patient, on the second attempts in 23 (30.3%) patients and after two attempts in 26 (34.2%) patients.

The block of Spinal Anesthesia was effective for the operation in 65 patients (85.5%) without supplementation of other IV adjuvants. While in 11 patients (14.5%) it was supplemented with IV adjuvant. In two patients the SA was failed and converted in to GA with ETI. So it was excluded from the study.

Table 3. The magnitude of PDPH and Associated symptoms among patients underwent Orthopedic and Urologic procedures under SA in Black Lion Specialized Referral Hospital. From February 15 to March 15, 2016 G.C

VARIABLE		FREQUENCY N (%)
PDPH with 72 Hours of post Spinal anesthesia	Yes	25 (33%)
	No	51 (67%)
Among those who develop PDPH	Orthopedic procedures	19 (76%)
	Urologic procedures	6 (24%)
At what time interval did the headache occur	Within 12 hour of post-operative time	14 (56%)
	After 12 hour within 72 hour of post operation	11 (44%)
Did the PDPH has associated symptom?	Nausea and Vomiting	17 (68%)
	Tinnitus	2 (8%)
	Neck stiffness	1 (4%)
	No other symptoms	5 (20%)

Severity of the headache using Numerical pain score	Mild headache	11 (44%)
	Moderate headache	14 (56%)
	Severe headache	-
Total		76 (100%)

Among 76 patients which underwent orthopedic and urologic procedures under SA, 25/76 (33%) develop PDPH. While 51 (67%) does not develop PDPH within 72 hour of post operation.

Two patients were complaining headache but not fulfill the criteria to categorize as PDPH, therefore they were categorized as not developing PDPH.

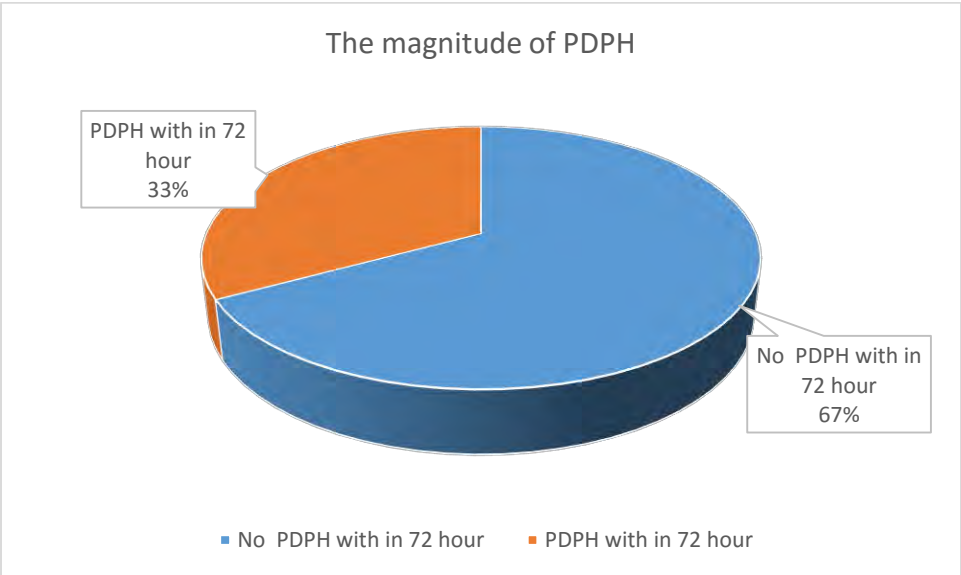


Figure 2.0 the magnitude of PDPH among patients underwent Orthopedic and Urologic procedures under SA in Black Lion Specialized Referral Hospital. From February 15 to March 15, 2016 G.C

Among 25 patients which develop PDPH 19 (76%) were undergone orthopedic procedures in which 13/19 were males (68.4%) while 6/19 (31.6%) were females’.

Among those patients which underwent urologic procedures 6/25 (24%) develop PDPH, in which 4/6 (66.6%) were males while 2/6 (33.4%) were females’.

Most of patients 14/25 (56 %) develop PDPH within with in 12 hour of post-operation, while the rest of the patient 11/25 (44%) reported PDPH within 12 -72 hour of post-operation.

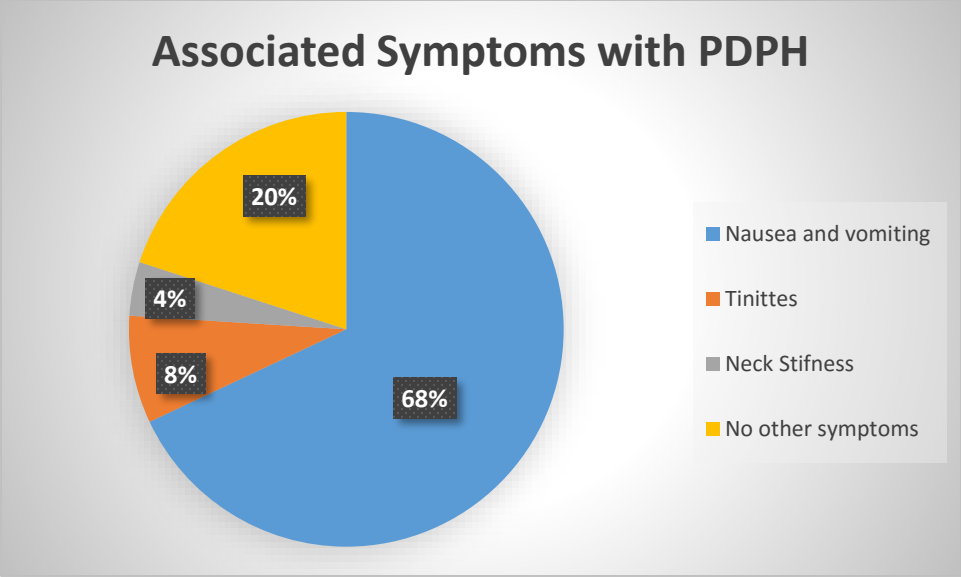


Figure 3.0 Associated symptoms with PDPH among patients undergone Orthopedic and Urologic Procedures under SA and develop PDPH in Black Lion Specialized Referral Hospital. From February 15 to March 15, 2016 G.C

Nausea and vomiting was the most common associated symptom 17/25 (68%) with PDPH patients. while two (8%) patients develop tinnitus and 1 (4%) patient develop neck stiffness. 5 (20%) patients do not have any associated symptom with the PDPH.

Those patients which develop PDPH were encouraged to take bed rest, to drink more fluid and some caffeine like coffee; as patients' choices.

And in addition, those patients which develop tinnitus and neck stiffness were encourage to have evaluation by the internist and other medical staffs for further investigation and managements.

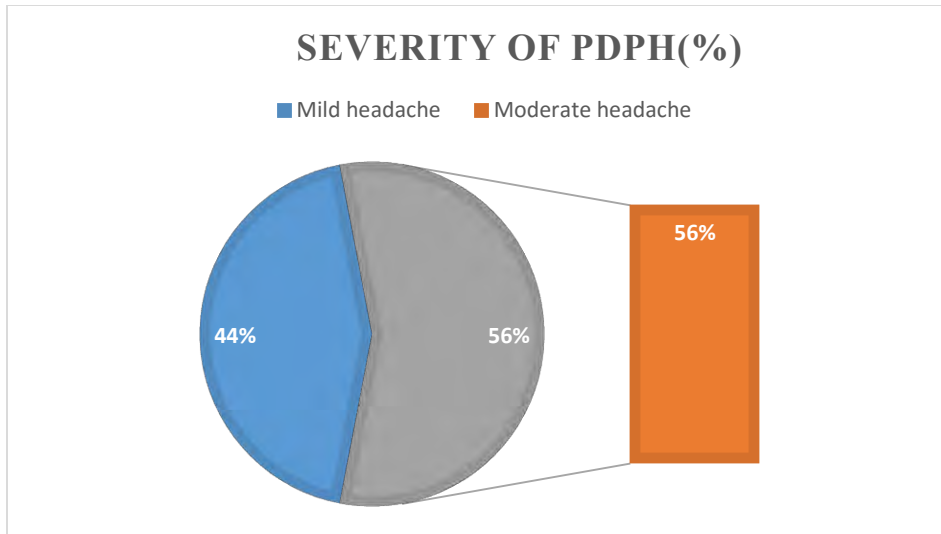


Figure 4.0 Severity of PDPH using numeric pain scale among patient among patients underwent Orthopedic and Urologic procedures under SA in Black Lion Specialized Referral Hospital. From February 15 to March 15, 2016 G.C

The pain score of the PDPH was evaluated using numeric pain scale and the pain was graded as mild headache in 11 (44%) patients, while it was moderate headache in 14 (56%) patients. No patient was complained sever PDPH that have functional limitation.

Table 4. Binary Logistic Regression of each independent variable with the outcome variable PDPH

Independent VARIABLE		Outcome variable (PDPH) FREQUENCY N (%)		OR	P-value	95% CI
		Yes	No			
Sex of the patient	Male	17/59 (28.8%)	42/59 (71.2%)	1		
	Female	8/17 (47.1%)	9/17(52.9%)	2.196	0.164	.726 - 6.641
Age of the patient	14.5 – 30.5	10 (37%)	17 (63%)	1	.72	
	30.5 – 60.5	11 (33.3%)	22 (66.7%)	1.765	.418	.446 6.979
	> 60.5	4 (25%)	12 (75%)	1.500	.554	.391 5.747

Number of spinal attempt	< two attempt	1 (2%)	49 (98%)	.002	.000	0.00 - .020
	> two attempt	24 (92.3%)	2 (7.7%)	1		
BMI of the patient (kg/m ²)	Non-Obese (< 24.5)	23 (45.1%)	28 (54.9%)	21.333	0.004	2.680 - 169.838
	Obese > 24.5	2 (8%)	23 (92%)	1		
Types of LA used	0.5% bupivacaine heavy	13 (17.1%)		.296	.301	.029 - 2.977
Types of operation performed	Orthopedic procedures	55 (72.4%)		4.355	.229	.397 - 47.815
sensory & motor block of SA	Adequate block without IV adjuvant	65 (85.5%)		.211	.241	.027 - 1.676
ASA classification of the patient	ASA I	48 (63.2%)		.252	.424	.009 - 7.394
Position of the patient	Sitting position	75 (98.7%)		807738.1	1	0.000 -

Binary Logistic Regression was done to check the relationship B/n each independent variable and the outcome variable PDPH.

On Binary Logistic Regression, the ages of the patient, types of LA used, position of the patient during SA, types of operation performed and addition of Intra-Venous adjuvants on the spinal anesthesia was not significantly associated with the outcome variable PDPH. With p-values of 0.72, 0.3, 0.228, 2.41 respectively.

The number of spinal attempt, BMI of the patient and Sex of the patient were significant on binary regression at $P < 0.2$, and were introduced in to multivariate analysis to control the co-founding.

Table 5. Multivariate Analysis of Sex, BMI, and number of Spinal attempt of SA

Independent variable	AOR	P-value	95%CI for AOR
Sex of the patient (F)	2.061	.618	.121 - 35.235
BMI of the patient (< 24.5 kg/m ²)	3.053	.529	.094 - 98.719
Number of spinal attempt (\leq two attempt)	.002	.000	.000 - .030

Number of Spinal attempt (\leq two attempt) were significantly related with the outcome variable PDPH.

The risk of the patient developing PDPH after spinal anesthesia using 22G Q-type spinal needle while the spinal attempt is Two or Less is 99.8% less likely as compared to those patients having spinal anesthesia in $>$ two attempt. With the AOR (0.002), 95%CI (.000 - .030) P-value .000.

Sex and BMI of the patient was not significantly related to PDPH on multivariate analysis. With the AOR 2.061, 95%CI; .121 - 35.235; P= .618 and AOR 3.053, 95%CI; 094 - 98.719, p=.529 respectively.

CHAPTER SIX

6. DISCUSSION

Post Dural puncture Headache/PDPH is the third most common reason for litigation in obstetric anesthesia as shown in the data obtained from the American Society of Anesthesiologists (ASA)'s closed claims analysis project (48). The care provider has the responsibility to undertake appropriate measures to predict and prevent the occurrence of debilitating headache.

In this study the overall incidence of PDPH was 33%, while using Q-type 22G spinal needle for Spinal Anesthesia in patient undergoing Orthopedic and Urologic procedures in Black Lion Specialized Referral Hospital.

This result is found to be higher than the figures reported by most studies in other countries. (42, 43, 44, &45). Because of widely used fine (>25) and atraumatic (non- cutting) needle during their study.

The incidence of post-dural puncture headache (PDPH) in Esbjerg Central Hospital, Esbjerg, Denmark in 1021 consecutive patients undergoing spinal anesthesia's for operation under the diaphragm using 22G and 26G Atraumatic needle was 7.3%. (42)

Which is smaller in magnitude when we compared to the present study.

Studies in Dhulikhel Hospital, Kavre, Nepal. Also reported the incidence of PDPH 25% among 120 patients who underwent surgery under spinal anesthesia from June 2008 till August 2008. (43)

Other research that was conducted in 675 research volunteers at HIV neurobehavioral research center (HNRC) in University of California, San Diego also reported 5.6% using 22G Atraumatic needle. (44)

In this study incidence of PDPH is found to be lower when compared to the study that was conducted in Gondar Referral and Teaching Hospital, Gondar, North West Ethiopia. which reported 38.8% of patients develop PDPH among 116 consecutive patients undergone different operation under spinal anesthesia. (47)

This possible due to large gauge of needle (18G & 20G) that were widely used for the SA during the study.

The main reason for this higher incidence of PDPH in this study was the type and gauge of the spinal needle (22G, Q-type) that are used in this study was significantly associated with PDPH as compared to other types of atraumatic or fine Qincke needles (> 25G, Q-needle). (43, 44, 45, 46, 47)

On this study significant association was found between number of spinal attempt and PDPH. In which patient who had spinal anesthesia in two or less attempt, they were 99.8% less likely to develop PDPH as compared to patient who had Spinal Anesthesia in more than two attempt. AOR (0.002), 95%CI (.000 - .030) P= 0.000

And this finding is also similar with studies that were conducted in Gondar Referral and Teaching Hospital in which Patients who received SA on the first attempt were 78% less likely to develop PDPH than their counter part patients who had a repeated attempt (AOR=0.22, 95% CI: 0.09, 0.54; P=0.001). (47)

And this finding were similar with other studies (10, 36, 46, 47) while few study report no significant relationship between number of spinal attempt and PDPH. (42)

Sex of the patient was not significantly related to PDPH (AOR 2.06, 95%CI; 0.12, 35.1; P-value=0.618) coincide with some other studies like in Esbjerg Denmark (42) and in Kavre, Nepal (43)

While Study in Gonder Teaching and Referral Hospital (48) indicate significant relationship between sex of the patient and PDPH. (AOR=0.2, 95% CI: 0.058, 0.67; P=0.009). In this study Male patients were 80% less likely to develop PDPH as compared to female patients.

BMI of the patient was also not significantly related to PDPH in this study (AOR 3.05 95%CI; 0.094, 98.71; P= 0.529). Similarly, studies in Gonder referral hospital (47) also report no significant relationship between BMI of the patient and PDPH.

Study conducted in University of California, San Diego, USA (44), Indicates; BMI less than or equal to 25 kg/m² (Non obese) were 3.26 more likely to experience PDPH than those Obese patients (>25 kg/m²) OR: 3.26; 95%CI; 1.53, 6.96; P=0.001)

In a study which was carried out in Dhulikhel Hospital, Kavre, Nepal. Found a significant relationship between PDPH and age group of the patient. Patients with age group 18-30- years old was 2.33 times more likely to develop PDPH as compared to patients with age group of 31-45 years. (43)

But in my study the age group of the patient was not significantly related to the outcome variable PDPH (P=0.72). Similarly; Studies in Himalayan Institute of Medical Sciences (HIMS), Dehradun (45) And in Gonder University Referral Hospital (48) were also reported no significant relationship between age category of the patient and PDPH.

In this study types of LA and the position of the patient during spinal anesthesia were also not significantly related to the PDPH. Coincide with the study conducted in Himalayan Institute of Medical Sciences (HIMS), Dehradun. (45)

Most of the patients (56%) were complain moderate headache which require bed rest and some analgesics while the rest of the patients express their pain as mild headache (44%). There were no patients complaining severe headache which require prolonged bed rest and epidural blood patch.

This finding was similar to the study which was conducted in Gonder Teaching and Referral Hospital (47) which reported mild and moderate headache in 42.2% and 31.1% of the patient respectively. But this study also reports sever PDPH in 26.7% of the patients; which is possibly due to large gauge of spinal needle (18G & 20G) used in the study.

Study in Himalayan Institute of Medical Sciences (HIMS), Dehradun. Which is also reported mild to moderate pain among patients taking SA for obstetric and non-obstetric operations. (45)

In present study most of the patient develop PDPH within 12 hours Post operation 56% while the rest (44%) develop PDPH between 12 - 72 hours of post spinal anesthesia. This result was similar

with the Study that was conducted in Nepal (43) reports 80% of patients develop PDPH within 24 hours.

6.1 CONCLUSION

This study assessed the prevalence of PDPH in Black Lion Specialized Referral Hospital and its magnitude was higher (33%) as we compared to other studies which were conducted in western countries. Majorities of the patients reports their PDPH as moderate headache (54%) which require prolonged bed rest and some functional limitation after the SA.

This study also revealed the number of spinal attempts have been significantly associated with PDPH; AOR (0.002), 95%CI (.000 - .030) P= 0.000. While Sex, BMI and age of the patients were not significantly associated with PDPH with P-values of 0.618, 0.529, and 0.72 respectively.

6.2 RECOMMENDATION

The hospital management and the anesthetists in Black Lion Specialized Referral Hospital should minimize the incidence of Post Dural puncture headache by avoiding use of large and Q-type needle.

The hospital managements should provide fine needles (>25G) which is associated with less prevalence of PDPH.

And the number of spinal attempts should be limited, in order to decrease the incidences of PDPH in the Hospital. This can be achieved by giving practical training for students in the skill Labs and by providing a refreshment training on techniques' and updates on Spinal Anesthesia for anesthetists which is working in Black Lion Specialized Referral Hospital.

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ANNEX I

QUESTIONER PAPER
ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCE DEPARTMENT OF ANESTHESIA

QUESTIONER PAPER USED TO ASSESS THE PREVALENCE OF PDPH AND ASSOCIATED RISK FACTORS AMONG PATIENT UNDERGOING SPINAL ANESTHESIA FOR ORTHOPEDIC AND UROLOGIC PROCEDURES IN BLACK LION SPECIALIZED REFERRAL HOSPITAL. FROM February 15 TO MARCH 15, 2016 G.C

Date: _____

Time: _____

PART ONE: SOCIO-DEMOGRAPHIC CHARACTERISTICS' OF THE PATIENT

1. Code of the patient _____
2. Sex _____
3. Age _____
4. Card Number _____
5. Ward _____, Bed number _____
6. Weight (kg) _____
7. Height (m) _____, BMI _____ (kg/m²): (< 18.5 kg/m², 18.5 -24.5 kg/m², > 24.5 kg/m²)
8. ASA classification (ASA I/II) _____

PART TWO: TYPES OF SPINAL NEEDLE GAUGE USED, THE NUMBER OF ATTEMPT, THE NUMBER OF SUCCESSFUL BLOCK PERFORMED DURING SPINAL ANESTHESIA IN THE OPERATING THEATRE

9. Position of the patient during spinal anesthesia mark as

X

 - I. Sitting position _____
 - II. Lateral position _____
10. Types of planned operative procedures
 - I. Orthopedic procedures _____
 - II. Urologic procedures _____
11. For female patients only, did you have pregnancy currently
 - I. Yes, (A) < 2 week of gestation _____
(B) ≥ 2 week of Gestation _____
 - II. NO, I haven't _____
12. Type of local anesthetic used _____ (0.5% bupivacaine plane, 5% lidocaine heavy, 0.5% bupivacaine heavy)
13. Gauge of the spinal needle used _____ (18,20,21,22,24,25 26,27 G)

14. Number of spinal attempt
 - I. One attempt _____
 - II. Two attempt _____
 - III. More than two attempt _____
15. Sensory block of anesthesia
 - I. Effective block efficient for the surgery _____
 - II. Effective block supplemented with IV adjuvants/anesthetic agent _____
 - III. Failed block, and converted to GA with ETI _____

PART THREE: THE PREVALENCE AND ASSOCIATED SYMPTOMES OF PDPH AFTER SPINAL ANESTHESIA

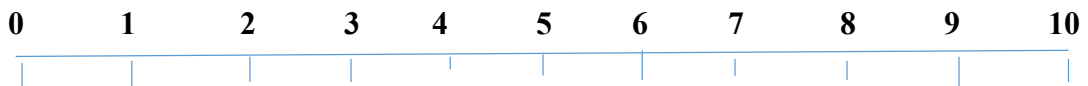
1. Do you have history of medically diagnosed migraine headache previously before spinal anesthesia?
 - I. Yes, I have _____
 - II. No, I have not _____
2. Did you have headache that occurs after spinal anesthesia?
 - I. At 12 hour of post spinal Anesthesia (A) Yes _____ (B) No _____
If the answer for question number 2 sub question I is No, continue to the sub-question II
 - II. At 72 hour of post spinal Anesthesia A) Yes _____ (B) No _____
3. If the answer for question number two (2) is yes, Did the headache occurs or worsens within 15 minutes of upright position and improves within 30 minutes of resuming to the recumbent position with-in 12 hour of post SA
 - I. Yes, it is _____
 - II. NO, it is not _____
4. If the answer is yes for question number three (3), did u have associated symptoms like
 - I. Tinnitus _____
 - II. Neck stiffness _____
 - III. Photophobia _____
 - IV. Nausea and vomiting _____
 - V. NO other symptoms _____
 - VI. Other (specify) _____

PART FOUR: THE SEVERITY OF PDPH AFTER SPINAL ANESTHESIA BY USING NUMERICAL RATING SCLAE OR VERBAL RATING SCALE (for those patients who does not read and write)

5. Assessment of the severity of the PDPH by using numerical rating scale or verbal rating scale, as indicated by the patient
- I. Mild pain (1-3) _____
 - II. Moderate pain (4-7) _____
 - III. Sever pain (>7) _____

Pain assessment tools

1. Numerical rating scale, OR



(Mild pain (1-3), Moderate pain (4-7), Sever pain >7)

2. Verbal rating scale

No Pain, Mild Pain, Moderate Pain, and Sever Pain

Remark: the exclusion criteria from the study will be the following criteria's;

- Patient having previous diagnosis with migraine headache
- Patient taking GA with ETI in addition to SA
- Pregnant patient \geq 2 week of gestation
- Patient with ASA classification class III and above
- Age < 15 years

Name of data collector -----signature ----- date-----

Name of supervisor -----signature ----- date-----

PRINCIPAL INVESTIGATOR

The undersigned agrees to accept responsibility for the scientific ethical and technical
Conduct of the research project and for provision of required progress reports as
Per terms and conditions of the Research Publications Office in effect at the time of
Grant is forwarded as the result of this application.

Name of the student: _____

Date _____

Signature _____

Approval of the primary Advisor

Name of the primary advisor: _____

Date _____

Signature _____