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Nursing interventions: Its Effect on Headache among Patients Post Spinal Anesthesia

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Abstract: Background: The field of anesthesia has seen significant advancements in recent years, with spinal anesthesia being a popular method for surgeries below the umbilicus. However, one complication often associated with spinal anesthesia is post dural puncture headache. Post dural puncture headache is defined as head pain that appears within five days of the dura being punctured. **Purpose**: was to examine the effect of nursing interventions on headache among patients post spinal anesthesia. **Design**: a quasi-experimental research design was utilized for this study. **Setting**: The current study was carried out at general surgery department of Menoufia Emergency Hospital. **Subjects**: A purposive sample of 214 adult patients who fulfilled the inclusion criteria was assigned randomly and equally divided into two groups 107 in each group. **Instruments**: Two instruments were used for data collection structured interview questionnaire and Grading of post dural puncture headache severity. **Results**: The current study revealed that there was a highly Statistically significant differences between control group and study group regarding severity of headache throughout the study period. **Conclusions**: nursing interventions had a positive effect on post dural puncture headache and its severity among study group than control group. **Recommendations**: The current study recommended to generalize these structured nursing measures in the routine post-operative nursing care for patients undergoing spinal anesthesia. More research is needed to investigate the effectiveness of these measures in other types of surgery using spinal anesthesia.

***Key words**: Nursing intervention and Post dural puncture headache.*

Introduction:

Before the introduction of safe and effective anesthetic agents about 175 years ago, surgeries of any kind were rare, dangerous, and only used as a last solution. Patients who underwent surgeries at this time were fully conscious. Now, advances in anesthesia have allowed for lifesaving surgeries that would be impossible otherwise. Surgeries to treat cancer, organ transplants, and open-heart surgery are only few types of the important techniques anesthesia has made possible. Modern anesthetic agents are typically very safe, but there are risks involved, including breathing problems,

allergic reactions, and general confusion after surgery (Nduku et al, 2023).

Anesthesia is the use of medication to prevent the feeling of pain or another sensation during surgery or other procedures that might be painful. Different types of anesthesia affect the nervous system in various ways by blocking nerve impulses and, therefore pain. In today's hospitals and surgery centers, highly trained professionals use a wide variety of safe, modern medications and extremely capable monitoring technology. Based on the type of surgery, anesthesia is divided into three types: general anesthesia, regional (epidural and spinal) anesthesia and local anesthesia (Ramirez & Gan, 2023).

One of the main criteria for choosing the type of anesthesia is the ease of postoperative recovery, including control of postoperative pain, nausea and vomiting, and urinary retention. These side effects may delay hospital discharge or result in unplanned readmission. Spinal anesthesia is a simple and reliable technique with a success rate of over 90%. It is only performed in the lumbar area, specifically the mid to low lumbar levels to avoid damage of the spinal cord and also to prevent intrathecally - injected medications from having any activity in the upper thoracic and cervical regions (Rahimi et al.,2023).

Side effects of spinal anesthesia can result from the physiologic effects on the nervous system and can also be related to placement technique. Most of the common side effects which include mild hypotension, hypothermia, bradycardia, transient neurological symptoms (lower back pain with pain in the legs), urinary retention, nausea, vomiting and post-dural puncture headache (PDPH) or post-spinal headache are minor and are self-resolving or easily treatable while major complications can result in more serious and permanent neurological damage and rarely death. These complications can occur immediately after administration of the anesthetic agent or be delayed (Naik et al.,2023).

Post dural puncture headache (PDPH) is the most popular risk of spinal anesthesia which is associated with cerebrospinal fluid drain and dural puncture. According to the international headache society (2021), post-dural puncture headache (PDPH) refers to a headache which happens within three to five days of dural puncture, it is described by dull bilateral pain finding in the frontal area and eradiate to occiput which worsens through fifteen minutes of sneezing, sitting/standing position, coughing straining and that is recovered through fifteen minutes of lying down (Uppal, et al.,2023).

The precise etiology of headache after dural puncture is unclear, but is may be due to leakage of cerebrospinal fluid (CSF) through the dural hole created by the needle. If CSF leaks at a rate greater than the rate of CSF production, low CSF volume results and thus PDPH can occur (Schyns-van den Berg & Gupta, 2023).

Incidence has been estimated to be quite variable in the literature, but may be approximately 10% to 40% of lumbar puncture (LP) procedures, but can be as low as 2% when small gauge (less than or equal to 24 gauge) non-cutting needles are used. Symptoms of

PDPH typically occur within 48 to 72 hours of LP but can be delayed for months afterward (Plewa & McAllister, 2023).

The factors that increase the risk of developing PDPH following spinal anesthesia are well defined in the literature. Among the patient groups at a high risk of developing PDPH are female patients, particularly those who are pregnant, young age (20-40years), those with prior headache and low body mass index (BMI). The needle size and type are also two important factors that increase the risk (Bakır et al.,2023).

Nurses play a vital role in the management and care for patients with PDPH through five main tasks are; documenting patients' medical history, educating them about their diagnosis, taking part in follow-up appointments, maintaining the proper application of rescue techniques as well as the regular and effective administration of acute medications and can assist in creating support groups for headaches management (Eldoushy, 2023).

First-line treatment of PDPH is conservative. It consists of bed rest, hydration (oral or intravenous) and simple analgesia, defined as peripheral acting drugs that are effective by mouth (such as acetaminophen and non-steroidal anti-inflammatory drugs). Vasoconstrictors, such as caffeine and sumatriptan, have been used in the treatment of PDPH. Conservative management is usually followed for the first 24 to 48 hours as more than 85% of PDPH will resolve. Moderate to severe and not resolving PDPH requires epidural blood patch (EBP) (Bicket et al., 2023).

During the headache, the patient should be advised to lie down in a comfortable position without pillow and although maintaining supine position after the headache's start is not supported by clinical research, but supine position usually recommended as it may alleviate headache through increasing the intra-abdominal pressure, which is conveyed to the epidural space (Eldoushy, 2023).

Fluid therapy or intravenous infusion has been a common practice in medicine, which has received much attention in recent years. Intravenous fluid administration can be used as resuscitation, replacement, and maintenance. However, this prescription may also have side effects, symptoms, etc., which should be used with a proper approach and caution. The complications of spinal anesthesia are very annoying for patients depend of the amount of released CSF fluid. Liquid administration is a hypothesis that has emerged in recent years. Which is used to compensate for lost fluid and converted to CSF and the patient suffers less pain (Muzafar et al., 2021).

Epidural blood patch (EBP) is more invasive than conservative management. EBP is the injection of 15-20 ml autologous blood into the epidural space. It is done to seal the dural tear and stop further CSF leakage. It is considered the gold standard in the treatment of PDPH. It is an invasive procedure with a success rate of around 80%. Before performing an EBP, a written informed consent should be obtained from the patient. Strict asepsis should be followed while collecting the blood. The blood injected spreads in the cephalad direction. Hence, the same

interspace or one space lower is usually selected for performing a blood patch (Lee et al.,2024).

In conclusion, a large percentage of the patients undergoing spinal anesthesia may have post-dural puncture headache. The nursing interventions after the procedure would be successful in decreasing the incidence and duration of this type of headache and its associated symptoms. Therefore, it is recommended to follow these nursing measures in hospitals to be included in the routine post-operative nursing care for patients undergoing spinal anesthesia.

Significance of the study

Reviewing of the admission rate of cases required surgery showed that about 460 cases required lower abdominal surgery under spinal anesthesia during the last year (Menoufia Hospital Statistical Records, 2023). In addition, some of these patients complained of PDPH after spinal anesthesia that hindered their ability of early mobilization, eating, and/or self-caring. Moreover, headache post spinal anesthesia might give patients a bad experience with spinal anesthesia that makes them reluctant to use it again, and the high percentage of headache post spinal anesthesia worldwide (10-40%) (Plewa & McAllister, 2023), this study was performed to help in controlling headache post spinal anesthesia.

It is hoped that surgical patients undergoing spinal anesthesia will be protected from occurrence of PDPH by following the nursing instructions that may lead to reduce risk of complications, hospital stay, nurse's workload and cost burden on the patients and society that are associated with complications management.

Purpose of the study:

The purpose of the current study was to examine the effect of nursing interventions on headache among patients post spinal anesthesia.

Research Hypothesis

The following research hypothesis was formulated to achieve the purpose of the study:

- Patients who receive nursing interventions (study group) will have the ability to control PDPH post spinal anesthesia more than who don't receive these interventions (control group).

Methods:

Research design:

A quasi-experimental research design (study and control) was utilized for this study.

Research Setting:

The study was carried out at general surgery department of Menoufia Emergency Hospital. It is located in the second floor consists of 2 sides, each side has 7 rooms, each room has 4 beds at Shebin El-Kom, Menoufia Governorate, Egypt.

Sampling:

A purposive sample of 214 adult patients who fulfilled the inclusion criteria was assigned randomly and equally divided into two groups.

1) Control group: comprised of 107 patients, they received hospital routine care (receiving medication,

vital signs, listening to patients ' complains and reassurance).

2) Study group: comprised of 107 patients, they received nursing interventions beside hospital routine care. .

The sample size was determined according to the following equation:-

Appropriate sample size was determined using Solvin's Formula (Israel, 2013) which provides a sample size calculator using the following equation:-

n=N÷(1+N(e)^2) Where; **n**=sample size; **N**=total population number(460); **e**=margin of error(0.05).

n=460÷(1+460(0.05) ^{2})

: **n**=214

Inclusion criteria:

- Adult patients aged from 21 to 60 years.
- Their health condition required spinal anesthesia.

Exclusion criteria

1) Patients on regular anti-coagulant therapy because there is risky for subarachnoid hemorrhage.

2) Patients with chronic diseases such as :-

- Renal disease; because these patients are restricted from extra fluids.
- Asthmatic patients; because these patients cannot remain in supine position without pillow for long time (Katz et al., 2018).
- Patients diagnosed with chronic headache to avoid misunderstanding with headache resulting from spinal anesthesia and thus avoid bias.
- Pregnant women because headache post spinal anesthesia is more common in pregnant women than in general surgical patients and thus avoid bias (Kuczkowski, 2006).
- Psychiatric disorder; because they are unable to give written consent about participation in this study.

Instruments of the study:

Two instruments were constructed, tested, and piloted by the researcher based on the current up-date review of the literature ((Campbell et al., 1993 & Eldoushy, 2023) to collect data pertinent of study, these instruments were:

Instrument one:-Structured Interview Questionnaire

This instrument was developed by the researcher after reviewing current related literatures (Eldoushy, 2023) to assess headache post operatively. It included two parts:

- **Part I**:- Socio demographic data: It was used to record data about the following items: Personal data as: age, gender, marital status, address, occupation, level of education, habits (smoking, …etc.)
- **Part II**:- Clinical history of headache : This part was included to assess the following items of headache; occurrence, character, duration, aggravating factors, alleviating factors and finally effect of headache upon activities of daily living e.g. sleep, appetite, concentration and interaction with others, assessment of need for analgesics.

Instrument two: Grading of post-dural puncture headache (PDPH) Severity (Campbell et al., 1993).

It was adapted by the researcher to assess the severity of headache, and its effect on activities of daily living and the required treatment. It is classified into no headache, mild, moderate and severe.

Scoring System:-

No headache scored zero, Mild headache scored 1-3 and has no limitation of activity and does not require treatment, Moderate headache scored 4-6 and lead to limited activity, require regular analgesics and convenient treatment and Severe headache scored 7-10 the patient is confined to bed, anorexic and epidural blood patch is required.

Method

Instruments development:-

The first instrument was developed by the researcher after extensive review of the relevant literature (Eldoushy, 2023) and translated to Arabic. While the second instrument was developed by Campbell (1993) and then adapted by the researcher.

Validity of the instruments:-

All the instruments were tested for face and content validity by a jury of 7 experts in the field of medical surgical nursing to ascertain accuracy and completeness of the instruments then suggestions were incorporated and taken into consideration.

Reliability of the instruments:-

The second instrument was tested using a test-retest method using Alpha Cronbach reliability analysis. The period between each test was two weeks. It was 0,770 for second instrument.

Ethical Considerations:

A written approval from the Ethical and Research Committee of the Faculty of Nursing, Menoufia University was obtained prior to data collection (code number 810). Written consent was obtained from all subjects who met the inclusion criteria and agreed to participate in the study after an explanation of the purpose, procedure, and benefit of the study. Each subject was assured that any obtained information would be confidential and would only be used for the purpose, procedure, and benefit of the study. The researcher emphasized that participation in the study was entirely voluntary, and anonymity of the subjects was assured through coding data. Subjects were also informed that they could withdraw from the study at any time and refusal to participate in the study wouldn't affect their care. Moreover, they were assured that the nature of the study didn’t cause any physical or emotional harm to them.

Pilot study: Prior to data collection, a pilot study was conducted on 10% of the study sample (22 patients) to test the feasibility, clarity, and applicability of the instruments then necessary modifications were made so these patients were excluded from actual study sample.

Data collection process:

Written approval:

An official letter from the Faculty of Nursing was delivered to the responsible authorities (manager and head nurse) of Menoufia Emergency

Hospital to conduct this study then an approval was obtained after explanation of the purpose of the study.

- Data were collected over a period of 12 months from beginning of October 2022 to end of September 2023.

1- Assessment phase

- Subjects of two groups who agreed to participate in the study and fulfilled the inclusion criteria were interviewed individually by the researcher in the department of general surgery at Menoufia Emergency Hospital after doctor round at patient room.
- The researcher assessed each participant of the two groups for socio-demographic data using the first part of instrument I. This assessment took about 10 to 15 minutes / participant.
- Each participant of study and control groups was assessed for their clinical history of headache per-operatively using the second part of the first instrument. This assessment took about 15 minutes.
- Data was collected from 9.00 A.M. to 2.00 P.M. according to the surgical list and the attendance policies of the hospital.
- The researcher started with control group then study group to avoid contamination of the results.

2- Planning phase

- Based on baseline assessment data, the needs of studied participants and using the relevant literature (Eldoushy, 2022), the researcher prepared a handout of illustrative booklet in a simple Arabic language about anatomy and physiology of vertebral column, definition of anesthesia, types of anesthesia, advantages and disadvantages of spinal anesthesia, post dural puncture headache (PDPH) as a common side effect of spinal anesthesia. In addition, it included information about the nursing intervention that decreases the severity of this type of headache such as pharmacological and non-pharmacological nursing interventions in the form of (lying position without pillow for 6 hours and increase fluids as soon as oral intake started). Moreover, the booklet contains information as regard leg exercises, deep breathing, and coughing exercises to prevent post-operative complications.

3- Implementing phase (for the study group)

- The previously prepared booklet was distributed to study group by the researcher at the beginning of the session before the surgery.
- • At the beginning of the session, the researcher taught the patients (study group) deep breathing and coughing exercises, leg exercises, suitable position after spinal anesthesia (lying supine without pillow). The researcher provided each subject of the study group with information related to PDPH such as definition, risk factors and how to manage it. At the end of this session, the researcher allowed each subject to ask questions and provided them with answers.
- Postoperatively, when oral intake started; improve patients hydration

by encouraging them to drink fluids as patient can tolerate such as juice, water, and/or soup.

- Patients remained bed rest in supine position without pillows for 6 hours after the operation and avoid sitting or standing according to surgical procedure.
- This phase took 30-45 minutes.
- The patients of the two groups (study and control) were assessed 8 hours after surgery then in the second day face to face, in the third day and then after one week by telephone if the patient was discharged.

4- Evaluation phase

- Evaluation of the two groups was done using instrument II (Grading of PDPH severity) at 1st day (first 8 hours) , 2nd day, 3rd day and one week postoperatively.
- This phase took about 15-20 minutes for each subject by telephone.
- The comparison was done between two groups to determine the effect of nursing intervention on PDPH among patients undergoing spinal anesthesia.

Statistical Analysis

The collected data organized, tabulated, and statistically analyzed using Statistical Package for Social Science (SPSS) version 25 for windows, running on IBM compatible computer. Descriptive statistics were applied (e.g. frequency, percentages, mean and standard deviation). Qualitative variables were compared using qui square test (x2) as the test of significance, independent (t) test and (ANOVA) test were used to compare mean score between groups. Correlation coefficient test (r) was used to test the correlation between studied variables. Reliability of the study tools was done using Cronbach's Alpha. A significant level value was considered when $p < 0.05$ and a highly significant level value was considered when $p < 0.01$. No statistical significance difference was considered when $p \geq 0.05$.

Results:

Table1 shows that; about two thirds of study group had 31 ≤ 40 years (59.8%) and less than one half of control group had 31≤40 years (43.9%). Concerning marital status, almost three quarters of the study group were married (74.8%) and control group (68.2%). Concerning gender; more than half of study group and control group were female (62.6% & 52.3% respectively). As regard level of education; less than half of the study group and control group (48.6% & 36.4% respectively) had high school education. Regarding occupation; 37.4% of the control group didn't work while study group (44.9%) didn't work. Concerning place of residence; more than one half of the two groups (60.7% & 57% respectively) were from rural area.

There were no statistically significant differences between the two studied groups regarding all socio demographic characteristics.

Table 2 shows that; the most of study group (89.7%) and control group (85%) were non-smokers. More than half of smokers of the two groups were cigarette smoking one package of cigarettes /day (63.6% and 50% respectively). More than half of

smokers of the two groups were smoking for more than one year (63.6% and 75% respectively).

Table 3 revealed that; between two studied groups (control and study); common type of surgery was rectal surgery as a surgical history (45.1% and 72.7% respectively).

Concerning the times of anesthesia taken; the majority of control group received once (92.2%) while study group received once (100%). Regarding type of anesthesia taken; less than one third of two groups undergone spinal anesthesia (31.4% and 20%respectively).Most of the control group had problems post spinal anesthesia (81.3%), while all patients who undergone spinal anesthesia in study group had problems post spinal anesthesia (100%). Headache was the most common problem caused by spinal anesthesia in control group (53.9%) in the previous surgery, pain in the neck and shoulder and neck stiffness were the most common problems in study group (27.3%). Regarding the headache in control group; it occurred 24 hours after previous surgery in most of patients (85.7%) and last more than 3 hours twice daily while in study group; headache did not occur.

Table 4 shows that; the majority of two groups (study & control) (92.5% & 94.4% respectively) didn't know factors that increase headache.

In relation to knowledge about the factors that decrease headache; the majority of two groups (study & control) (92.5% & 94.4% respectively) didn't know these factors.

Table 5 shows that at the first day; about one third of control group had mild and severe headache equally (34.6%) while most of study group had no headache (67.3%).

At second day; less than half of control group had mild headache (44.9%) while the most of study group had no headache (72%).At third day; about half of control group had mild headache (49.5%) while the most of study group had no headache (86%).One week after surgery; about half of control group had mild headache (48.6%) while the majority of study group had no headache (97.2%). For this reason, there was a highly statistical significant differences between two groups.

Figure 1 shows the severity of headache among the study and control groups after one week.

Figure 2 shows that; there is a positive correlation between total severity of headache and its effect on activities of daily living at first day among the study group at (r=0.844 and p=0.000).

Figure 3 shows that there is a positive correlation between total severity of headache and its effect on activities of daily living after one week among the study group at (r=0.683 and p=0.000).

Table (1): Distribution of the studied samples according to their socio demographic data

Socio demographic data	Control group (n=107)		Study group 1 (n=107)		X^2	P-Value
	No.	%	No.	%		
Age (Year)						
21 ≤ 30	33	30.8	26	24.3	**7.335**	**0.052**
31 ≤40	47	43.9	64	59.8		
41≤50	21	19.6	15	14.0		
51≤60	6	5.6	2	1.9		
Mean ± S.D	**26.4 ± 4.02**		**26.6 ± 4.31**		**t= 0.024**	**0.981**
Marital status						
Single	19	17.8	11	10.3	**7.069**	**0.065**
Married	73	68.2	80	74.8		
Widowed	15	14.0	11	10.3		
Divorced	0	0.0	5	4.7		
Gender						
Male	51	47.7	40	37.4	**2.313**	**0.128**
Female	56	52.3	67	62.6		
Place of residence						
Rural	61	57.0	65	60.7	**0.309**	**0.578**
Urban	46	43.0	42	39.3		
Educational level						
Illiterate	19	17.8	11	10.3	**4.961**	**0.175**
Basic education	17	15.9	19	17.8		
High school education	39	36.4	52	48.6		
Higher education or postgraduate studies	32	29.9	25	23.4		
Occupation						
Technical	24	22.4	28	26.2	**3.170**	**0.366**
Administrative work	27	25.2	21	19.6		
Housewife	16	15.0	10	9.3		
No work	40	37.4	48	44.9		

$X^{2:}$ Chi Square Test. **t**= Independent T test. **SD**= Standard deviation. No Statistically significant at p >0.05.

Table (2): Distribution of the studied samples according to their daily habits (smoking).

Items	Control group (n=107)		Study group 1 (n=107)		X^2	P-Value
	No.	%	No.	%		
Smoking						
No	91	85.0	96	89.7	**5.546**	**0.079**
Yes	16	15.0	11	10.3		
If the answer is yes: What is the kind?	**(n=16)**		**(n=11)**		**3.543**	**0.060**
Cigarette	9	56.3	9	81.8		
Shisha	7	43.7	2	18.2		
What is the amount/day?	**(n=16)**		**(n=11)**			
Less than a pack/day	5	31.3	4	36.4	**4.534**	**0.104**
One Pack/day	8	50.0	7	63.6		
More than one Pack/day	3	18.7	0	0.0		
How long have you been smoking?	**(n=16)**		**(n=11)**			
Less than year	2	12.5	2	18.2	**0.835**	**0.659**
One year	2	12.5	2	18.2		
More than one year	12	75.0	7	63.6		

$X^{2:}$ Chi Square Test. No Statistically significant at p >0.05. **Highly significant at p ‹ 0.001.

Table (3): Distribution of the studied samples according to their clinical history of headache pre-operatively

Clinical history of headache	Control group (n=107)		Study group 1 (n=107)		X^2	P-Value
	No.	%	No.	%		
Surgical history					**0.299**	**0.584**
No	56	52.3	52	48.6		
Yes	51	47.7	55	51.4		
If yes: What type of surgery?	**(n=51)**		**(n=55)**		**13.49**	**0.009****
Appendectomy	11	21.6	11	20.0		
Cholecystectomy	13	25.5	2	3.6		
Rectal surgery	23	45.1	40	72.7		
Cardiac surgery	2	3.9	2	3.6		
Cosmetic surgery	2	3.9	0	0.0		
Times of taking anesthesia	**(n=51)**		**(n=55)**		**0.055**	**0.055**
Once	47	92.2	55	100.0		
Twice	4	7.8	0	0.0		
What type of anesthesia was used?	**(n=51)**		**(n=55)**		**2.167**	**0.338**
General anesthesia	32	62.7	35	63.6		
Spinal anesthesia	16	31.4	11	20.0		
Local anesthesia	3	5.9	9	16.4		
Problems caused by spinal anesthesia	**(n=16)**		**(n=11)**		**0.059**	**0.059**
No	3	18.7	0	0.0		
Yes	13	81.3	11	100.0		
If yes, what were these problems?	**(n=13)**		**(n=11)**		**8.969**	**0.110**
Headache	7	53.9	0	0.0		
Lower back pain	0	0.0	1	9.1		
Pain in the neck and shoulders	0	0.0	3	27.3		
Neck stiffness	2	15.4	3	27.3		
Feeling dizzy	3	23.1	2	18.2		
Nausea	1	7.7	2	18.2		
Did you suffer from headache after previous surgery?					**4.010**	**0.045***
No	100	93.5	107	100.0		
Yes	7	6.5	0	0.0		
If yes: When did you feel the headache post-surgery?	**(n=7)**		**(n=0)**		**4.015**	**0.045***
Immediately after recovery	0	0.0	0	0.0		
After 24 hours	6	85.7	0	0.0		
More than 24 hours	1	14.3	0	0.0		
Duration of the headache.	**(n=7)**		**(n=0)**		**4.015**	**0.045***
1-2 hrs	0	0.0	0	0.0		
2-3 hrs	0	0.0	0	0.0		
More than 3 hrs	7	100.0	0	0.0		
How often did you feel the headache/day after previous surgery?	**(n=7)**		**(n=0)**		**4.015**	**0.045***
Once	0	0.0	0	0.0		
Twice	6	85.7	0	0.0		
More than twice	1	14.3	0	0.0		

X^2: Chi Square Test. No Statistically significant at p >0.05. * Significant at p ‹ 0.05.

**Highly significant at p ‹ 0.01.

Table (4): Distribution of the studied samples according to their knowledge about spinal headache pre-operatively

knowledge about spinal headache	Control group (n=107)		Study group (n=107)		X^2	P-Value
	No.	%	No.	%		
Do you know factors that increase headache after previous surgery?					**3.601**	**0.058**
No	101	94.4	99	92.5		
Yes	6	5.6	8	7.5		
If yes, what are these factors?	**(n=6)**		**(n=8)**		**0.608**	**0.304**
Body movement	4	66.7	4	50.0		
Sitting position	2	33.3	4	50.0		
Do you know factors that reduce headache post- surgery?					**3.376**	**0.066**
No	101	94.4	99	92.5		
Yes	6	5.6	8	7.5		
If yes, what are these factors?	**(n=6)**		**(n=8)**		**6.344**	**0.096**
lying at the back or abdomen	5	83.3	3	37.5		
Drinking plenty of fluids	0	0.0	4	50.0		
Comfort	0	0.0	1	12.5		
Take a pain reliever	1	16.7	0	0.0		
Does headache affect concentration?	**(n=7)**		**(n=0)**		**4.015**	**0.045***
No	6	85.7	0	0.0		
Yes	1	14.3	0	0.0		
If the answer is yes, how does it affect?	**(n=1)**		**(n=0)**		**0.136**	**0.877**
Lack of concentration	1	100.0	0	0.0		
Loss of concentration	0	0.0	0	0.0		
Does headache affect appetite?	**(n=7)**		**(n=0)**		**3.930**	**0.049***
No	4	57.1	0	0.0		
Yes	3	42.9	0	0.0		
If yes, how does it affect?	**(n=3)**		**(n=0)**		**0.236**	**0.766**
Loss of appetite	3	100.0	0	0.0		
Eating more	0	0.0	0	0.0		

$X^{2:}$ Chi Square Test. No Statistically significant at p >0.05. * Significant at p ‹ 0.05.

Table (5): Distribution of the study and control groups according to severity of headache throughout study periods post-surgery.

Variable		Control group (n=107)		Study group (n=107)		(p)
		No.	%	No.	%	
severity of headache at first day post-surgery	No headache	7	6.5	72	67.3	**X^2=98.50 p=0.000****
	Mild	37	34.6	20	18.7	
	Moderate	26	24.3	15	14.0	
	Severe	37	34.6	0	0.0	
	Mean ± SD	**4.95±2.72**		**1.24±1.06**		**t=11.41 p=0.000****
severity of headache at second day post-surgery	No headache	11	10.3	77	72.0	**X^2=91.13 p=0.000****
	Mild	48	44.9	18	16.8	
	Moderate	24	22.4	12	11.2	
	Severe	24	22.4	0	0.0	
	Mean ± SD	**3.80±2.56**		**0.99±0.76**		**t=9.363 p=0.000****
severity of headache at third day post-surgery	No headache	13	12.2	92	86.0	**X^2=118.35 p=0.000****
	Mild	53	49.5	10	9.3	
	Moderate	23	21.5	5	4.7	
	Severe	18	16.8	0	0.0	
	Mean ± SD	**3.16±2.37**		**0.32±0.07**		**t=11.27 p=0.000****
severity of headache after one-week post-surgery	No headache	16	14.9	104	97.2	**X^2=147.00 p=0.000****
	Mild	52	48.6	2	1.9	
	Moderate	22	20.6	1	0.9	
	Severe	17	15.9	0	0.0	
	Mean ± SD	**2.62±2.20**		**0.094±0.05**		**t=11.54 p=0.000****

X^2: Chi-square test. **t=** Independent T test. **P**= p-value.
No significant at p >0.05. * Significant at p ‹ 0.05. **Highly significant at p ‹ 0.001.
P: p value for comparing between control group and study group.

Figure (1): Percentage distribution of the study and control groups according to severity of headache after one week

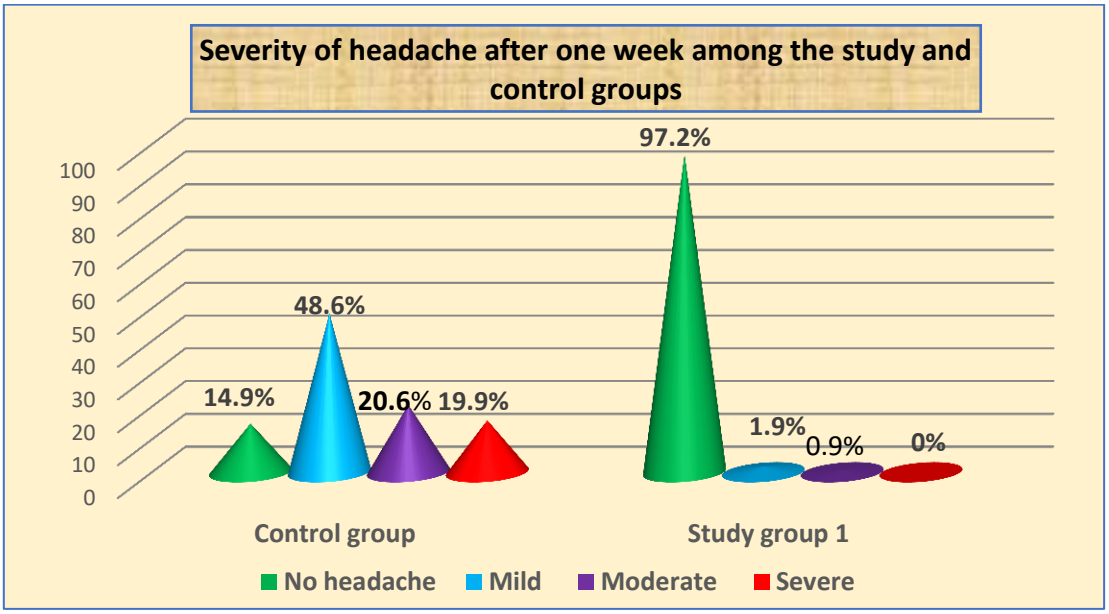


Figure (2): Correlation between total severity of headache and its effect on activities of daily living at first day among the study group (n=107)

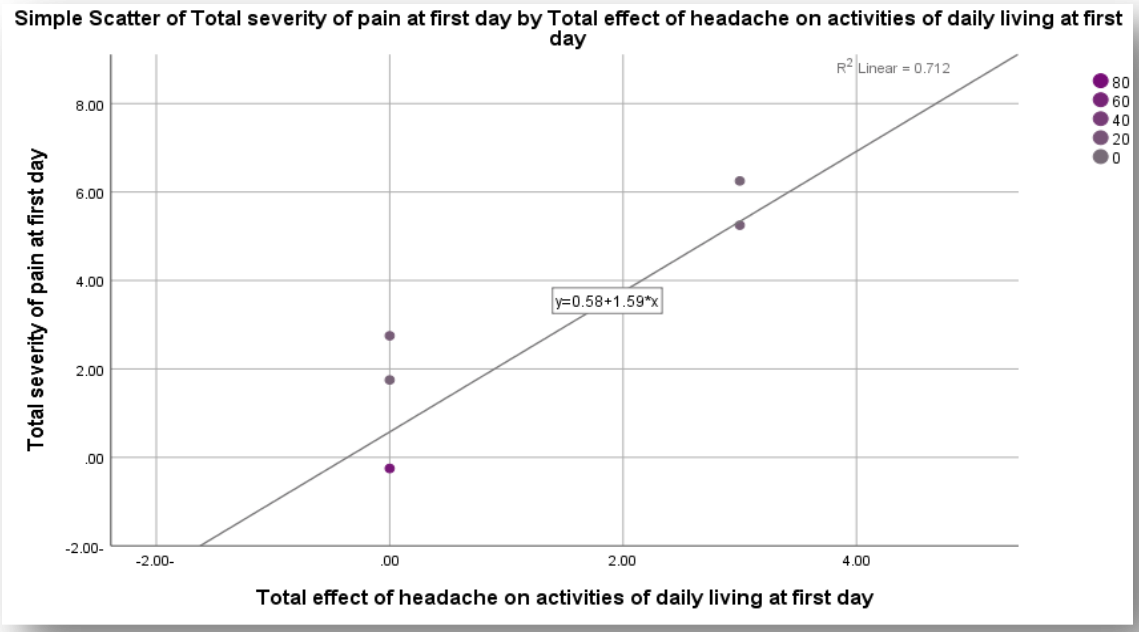
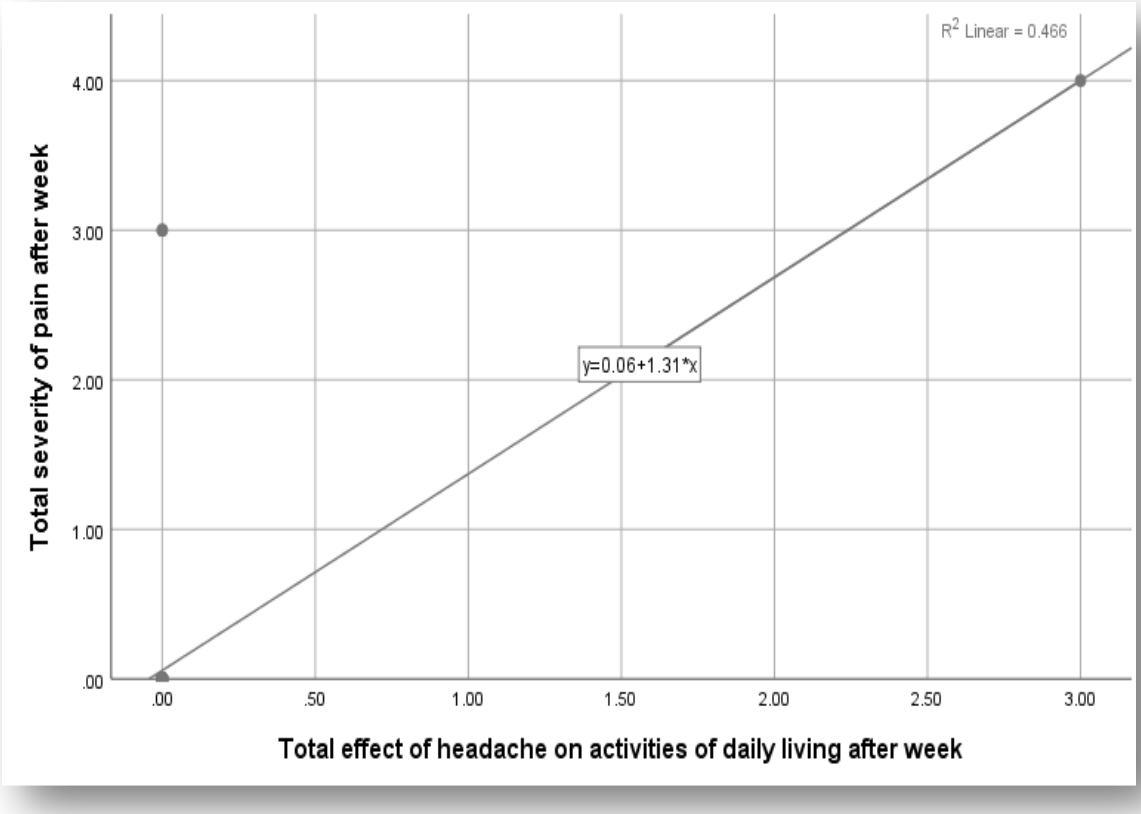


Figure (3): Correlation between total severity of headache and its effect on activities of daily living after one week among the study group (n=107)



Discussion:

Anesthesia is the use of medication to prevent discomfort during surgery or medical procedures. There are three types of anesthesia: general, regional (spinal & epidural), and local. The type of anesthesia used depends on the surgery or procedure being done, the age and medical conditions of the patient.. Sometimes, a patient gets more than one type of anesthesia. (Dobson et al., 2019).

Spinal anesthesia has many advantages over general anesthesia because of easy techniques and rapid onset but it has a lot of complications such as, post dural puncture headache (PDPH) (Ferede et al., 2021).

This study was performed to determine the effect of nursing intervention on PDPH among patients undergoing spinal anesthesia.

Regarding surgical history; the present study stated that, among all studied groups, nearly half of control and nearly two third of study group, common type of surgery was rectal surgery as a surgical history. This result come in disagreement with Ahmed et al., (2021) who revealed that most of studied group had history of abdominal surgeries. Additionally, this finding disagreed with Ahmed (2019) who revealed that; nearly half of studied group had history of abdominal surgeries.

Concerning the times of anesthesia taken; the majority of control group received anesthesia one time, while study group received it once. This result was in the same line with Ahmed et al., (2021) who mentioned that nearly half of studied group received anesthesia one time before, also Ahmed (2019) reported that half of studied group took once anesthesia before. Additionally; Muzafar & Abdulmajeed (2021) added that nearly two third of studied group took once anesthesia before also Idris et al., (2020) stated that more than half of the subjects had received anesthesia for prior cesarean section(CS).

As regarding type of anesthesia taken; less than one third of two groups undergone spinal anesthesia. This result was supported by Ahmed et al.,(2021) who indicated that nearly half of studied groups undergone spinal anesthesia. From the researcher's point of view, this could be attributed to in some of surgical operations patients may have choice to select type of anesthesia and it may come to their thought that spinal anesthesia has less complications.

Concerning problems post spinal anesthesia regarding previous surgery; most of control group had problems post spinal anesthesia while all patients (100%)who undergone spinal anesthesia in study group had problems post spinal anesthesia. This result approved by Ahmed et al., (2021) who mentioned that nearly half of studied groups had problems post spinal anesthesia. Additionally, Muzafar & Abdulmajeed (2021) added, most of studied subjects had problems post spinal anesthesia, also; Idris et al., (2020) who revealed that about forty-six percent of the subjects had problems post spinal anesthetic. From the researcher point of view, this may be related to that

most of patients didn't have knowledge about problems post spinal anesthesia.

Regarding the most common problem caused by spinal anesthesia; pain in the neck, shoulder and neck stiffness were the most common problems in study. This result supported by O'Connor et al., (2022) who stated that most of patients had pain in the neck, shoulder and neck stiffness. Moreover Muzafar & Abdulmajeed (2021) add that nearly three quarter of patients had pain in the neck & shoulder after spinal anesthesia. Additionally, Idris et al., (2020) revealed that only one fifth of subjects had developed complication from the previous experience of surgery and anesthesia, with pain being the leading complication followed by backache. On the other hand, Girma et al., (2022) stated that more than half of studied group had mild back & neck pain and the others had moderate and severe back & neck pain. Also; Uchenna et al., (2022) stated that most of patients didn't have any pain.

Regarding the headache occurrence; the present study showed that; in control group, it occurred 24hrs post-surgery in most of patients who verbated that they have headache and last more than 3 hrs. twice daily while study group, headache did not occur at all post-previous surgery. This result come in agreement with Muzafar & Abdulmajeed (2021) who revealed that most of studied group had headache without intervention but after intervention less than quarter had headache. This result comes in disagreement with O'Connor et al., (2022) most of studied group had headache after caffeine drinks but most of them headache relieved by epidural blood patch.

Concerning knowledge about the factors that increase headache; the current findings stated that the majority of two groups (study & control) didn't know these factors. This result agreed with Adegboye et al., (2022) who studied " Maternal satisfaction towards spinal anesthesia for caesarean section" and revealed that more than two third didn't know factors that increase headache. From the researcher point of view, this may be related to lack of preoperative preparation. This result disagreed with Ferede et al., (2021) who found that most of patient had knowledge about the factors that increase spinal headache post operatively.

Assessment of severity of headache and its effect on activities of daily living and the required treatment among the study and control groups throughout the study periods.

There was a highly statistically significance difference among the two groups regarding severity of headache throughout study periods. In relation to the severity of headache at first day post operatively; about one third of control group had mild and severe headache equally while more than two thirds of study group had no headache. At second day post operatively; more than one third of control group had mild headache while more than three thirds of study group had no headache, while at third day post operatively; about half of control group had mild headache while the majority of study

group had no headache, finally one week after surgery; less than half of control group had mild headache while the majority of study group had no spinal headache post operatively. This result was in the same line with Uchenna et al., (2022) who revealed that most of studied patients didn't have headache and only one third had mild and moderate headache. Moreover; Peker & Polat (2021) who studied " The effects of preoperative reactions of emotional distress on headache and acute low back pain after spinal anesthesia: A prospective" and stated that about one fifth of patients were determined as having headache and (7.8%) were determined as having low back pain. From the researcher point of view; the current findings may be related to that the implementation of nursing interventions was effective and was beneficial to this type patients. This result contradicted with Ferede et al., (2021) who revealed that the majority of patients at day two and almost greater than half of patients were developed moderate headache and followed by mild headache while the study group had no headache, also Girma et al., (2022) stated that more than half of patients were developed at day two mild headache followed by severe headache followed by moderate headache but after intervention there was no headache in the study group. On the other hand, d'Amour, (2022) added that most of studied subjects had moderate pain after intervention.

Correlation between severity of headache and its effect on activities of daily living among the study and control groups throughout the study periods

There is a positive correlation between total severity of headache and its effect on activities of daily living at first day and after one week among the control group.

The results of this study showed that nursing interventions (lying position for 6 hours after surgery and hydration) had a positive effect on PDPH among patients undergoing spinal anesthesia.

In conclusion, a large percentage of the patients undergoing spinal anesthesia had post-dural puncture headache. The nursing interventions after the procedure were successful in decreasing the incidence and duration of this type of headache and its associated symptoms.

Conclusions

Based on the findings of the current study, it can be concluded that:

- Nursing interventions had a significant effect on controlling PDPH among study groups than control group.

Recommendations

Based on the findings of the present study, the following recommendations are derived and suggested:

A-Recommendations for patients:

- Supervised continuous educational programs about prevention of PDPH should be implemented to improve patient's knowledge and awareness about it.
- Colored illustrative booklet should be distributed between patients undergoing spinal anesthesia and

their family members to be oriented about PDPH.

B- Recommendation for further research:

This study can be replicated at different settings and on large probability samples to allow for greater generalization of the findings.

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