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The Effect of Designated Nursing Intervention on Hemodynamic State among Lower Abdominal Surgery Patients Undergoing Spinal Anesthesia

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Abstract

Background: *Postoperative complications remain a serious concern for both the healthcare system and the individual patient, they are linked to poor outcomes and increased healthcare expenses and hemodynamic monitoring is the centerpiece of patient monitoring in acute care settings* ***Aim of the study:*** *This study aims to evaluate the effect of designated nursing intervention on hemodynamic state among lower abdominal surgery patients undergoing spinal anesthesia.* ***Design:*** *A quasi-experimental design is utilized.* ***Sample:*** *A purposive sample of 80 adult patients admitted for lower abdominal surgery using spinal anesthesia* ***Setting:*** *The study was conducted at surgical wards in The Memorial Souad Kafafi University Hospital.* ***Tools****: Four tools were used for data collection, (I) Patient socio-demographic characteristics and health relevant data, (II) Hemodynamic state assessment flow sheet, (III) Visual Analogue Scale, and (IV) Headache Impact Index.* ***Results:*** *there was a highly significant improvement of hemodynamic state and Intracranial pressure for lower abdominal surgery patients undergoing spinal anesthesia after implementing the designated nursing intervention.* ***Conclusion:*** *Hemodynamic stability, decrease the level of post dural puncture headache and severity of Post Dural puncture headache associated complications among the patients who received designated nursing intervention.* ***Recommendations:*** *Applying the designated nursing intervention which included (Deep breathing exercises - Coughing exercises - Foot and Leg exercises in bed- and DISH10 Maneuver for post dural puncture headache which includes (Deep Inspiration, Squeeze & Hold For 10 Seconds) before and after lower abdominal surgery for patients undergoing spinal anesthesia as routine and regular care.*

Key words*:* Hemodynamic, Lower abdominal Surgery, Spinal Anesthesia

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I. Introduction

According to **Boden et al., (2021)** lower abdominal surgery refers to surgical procedures performed in the lower part of the abdomen, typically involving the organs such as the intestines, appendix, or reproductive organs, the bladder, uterus, ovaries, or rectum. It also refers to surgical procedures performed in the lower abdominal region, such as inguinal herniorrhaphy, appendectomy. Types of abdominal surgery include laparoscopic appendectomy, colonic procedures, patch repair of perforated duodenal ulcers, and inguinal groin hernia repair.

According to **Li et al., (2022)** abdominal surgery refers to the operation of abdominal organs to repair accidental injuries, peritonitis, abdominal abscess, and digestive tract diseases. The complications associated with abdominal surgery include decreased appetite, abdominal distension, abdominal pain, anal arrest, nausea, and vomiting. These complications can prolong hospital stay and affect postoperative recovery. Patients undergoing abdominal surgery are at increased risk for pulmonary complications postoperatively, and

postoperative physiotherapy may accelerate the return to normal function and physical activity.

Regarding to **Bogatu et al., (2023)** hemodynamic monitoring technologies are evolving continuously many bedside monitoring options are becoming available in the clinic. In peri-operative and critical care, assessment of hemodynamic function plays an essential role in the treatment of patients at risk of deterioration. The principle of hemodynamic monitoring consists of interpreting a few observations or measurements with reference to a model that encompasses the overall current understanding of cardiovascular physiology.

According to **Telang et al., (2023)** spinal anesthesia is one of the commonest techniques used in anesthetic practice in obstetric patients, children, inpatients, and ambulatory surgery patients. needle design variables, such as the needle size and needle shape, have been modified to enable rapid flow of cerebral spinal fluid (CSF) and injected medications, yet simultaneously limit dural trauma and loss of CSF.

According to **Elkassabany et al., (2023)** spinal anesthesia is a widely used medical procedure, but it does have certain contraindications that should be considered before administering it. There are two types of contraindications: absolute and relative. absolute contraindications include patient refusal and raised intracranial pressure. relative contraindications include administration of anticoagulants, skin or tissue infections at the proposed site of needle insertion, severe hypovolemia. Spinal anesthesia has its benefits, it is important to weigh the risks and benefits before deciding.

Significance of the study:

According to **Gayathiri, & Anandhi, (2021)** abdominal surgery is defined as any surgical operation done on the abdominal cavity, its walls and orifice. Post-operative complications are reported in the range of 2-39% in upper abdominal surgery, due to the surgery closer to diaphragm and 2-5% in lower abdominal surgery. The common complications after abdominal surgery are: atelectasis, pneumonia, bronchitis, pneumothorax, bronchospasm, chronic lung disease. Postoperative pulmonary complication is about 80% in upper abdominal surgery; they cause changes in pulmonary function and respiratory mechanics**.**

Based on **Rao et al., (2021)** in upper abdominal surgery, cardiopulmonary adverse events accounted for 50% of postoperative complications. In emergency abdominal surgery, the incidence of pulmonary complications is 20% to 50%. According to statistics, more than 20% of patients undergoing abdominal surgery have postoperative complications that require invasive treatment, which greatly increases the risk of further morbidity and death.

Theory of the study

This study based on comfort theory, developed by Kolcaba, is a holistic approach to patient care that focuses on maximizing comfort in healthcare settings. The theory emphasizes the importance of addressing components of comfort; (relief, ease, transcendence, and holistic comfort) to enhance patient comfort and improve overall health outcomes **(Lin et al, 2023)**.

Aim of the Study

The study aimed to; evaluate the effect of designated nursing intervention on hemodynamic state among lower abdominal surgery patients undergoing spinal anesthesia.

Research Hypothesis:

lower abdominal surgery patients undergoing spinal anesthesia who will receive the designated nursing intervention will have significant improvement of hemodynamic state and Intracranial pressure as compare to those patients who will not receive the designated nursing intervention.

Study design:

A quasi-experimental research design was used to conduct the study.

I- Technical design:

The technical design includes; the setting, subject & tools that used in the study.

Setting:
The study was carried out at the surgical wards in The Memorial Souad Kafafi University Hospital, the surgical department found in second & third floor in hospital, the second floor consists of two sections, section (B) consists of 7 rooms contain 18 beds Section (D) consists of 3 rooms contain 12 beds. The third floor consists of two sections. Section (A) consists of 6 rooms and contains 18 beds. Section (B) consists of 7 rooms contain 12 beds.

Sampling:
Sample type:
A purposive sample was used.

Sample size
80 adult patients from both genders undergoing lower abdominal surgery with spinal anesthesia. They were recruited from the above-mentioned setting who agreed to participate in the study.
The sample was divided randomly and alternatively into two equal groups (40 patients for each group).
The subjects were selected according to the following criteria:
Inclusion criteria
1. Lower abdominal surgery
2. Adult patients (20 to 60 years old).
3. Both gender
4. The same anesthesiologist performed the procedure for all patients in both groups using the same needle caliber needle size and the same anesthetic drug.

Exclusion criteria
1- Pregnancy in female patients.
2- Patient with chronic disease such as (Hypertension, Diabetes mellitus, Renal failure, chronic obstructive pulmonary disease and heart disease)

Tools of data collection:
Four tools were used for data collection:
Tool 1: Patient Socio-demographic Characteristics and health relevant data
This tool developed by the researcher after reviewing the most recent and relevant literatures and will be filled by the researcher. It will include three parts to cover the following data:

Part I: Patient socio-demographic Characteristics
Part II: Health relevant data
Part III: History of spinal anesthesia
Tool II: Hemodynamic State Assessment Flow sheet
Tool III: Visual Analogue Scale (VAS)
This scale adopted from **Hussain Ali, (2012); Eldoushy, (2023)** This tool will be aimed to evaluate the level of the post-Dural puncture headache (PDPH).

Scoring system:
0 = indicated absence of PDPH
(1-3) indicated mild PDPH
(4-6) indicated moderate PDPH
(7-10) indicated severe PDPH

Tool IV: Headache Impact Index
This tool was adapted from Eldoushy, (2023). and modified by researcher to be appropriate and match with the time of nursing intervention for patients. This tool will be aimed to evaluate grade severity of post-Dural puncture headache's associated complications

Scoring system

0 = no PDPH's associated complications
(1-6) = mild severity of PDPH's associated complications
(7-13) = moderate severity of PDPH's associated complications
(14-20) = severe PDPH's associated complications

Administrative design:

An official permission was obtained by submission of formal letter from the administrators of Faculty of Nursing, Helwan University to the managing director of The Memorial Souad Kafafi University Hospital to get an approval for data collection to conduct the study after explanation of purpose of the study.

II Operational design:

There were three distinct phases to the study that needed to be finished: planning, pilot study, and field work.

A. Preparatory phase:

It includes reviewing of related literature, and knowledge of various aspects of the study using books, articles, internet, periodicals and magazines to develop tools for data collection.

B. Pilot study:

A pilot study was carried out to test the study tools in terms of its clarity, applicability, and efficiency. It was conducted on 8 patients of the study sample, and then they were excluded of the study sample. Data obtained from the pilot study were analyzed and accordingly the necessary modifications were done.

Content and tools validity:

The content validity of the tools was done by a panel of 5 experts and who reviewed the content of the tools for comprehensiveness, accuracy, clarity, relevance and applicability. Minor modifications were done.

The reliability:

It was conducted using the Cronbach's alpha test, the model of internal consistency, was used for the analysis. The researcher used a valid reliable standard tool. Statistical equation of Cronbach's alpha reliability coefficient normally ranges between 0 and 1; higher values (more than 0.7) denote acceptable reliability

C. Fieldwork:

According to the selected theoretical framework:

The actual field work was started at the beginning of February 2024 and was completed and ended on July 2024. Study took about 6 months. the researcher visited the selected setting regularly, three days per week and selected patients regarding inclusion and exclusion criteria.

Field work includes three phases based on conceptual frame work for comfort theory:

I-First phase (Health care needs)

During this phase; the researcher visited the selected setting regularly, three days per week and selected patients regarding inclusion and exclusion criteria, then, assigned them to either a study group or a control group randomly allocation. concerning health care needs, each patient was assessed individually, and data collection was filled by the researcher in the morning before surgery and before designated nursing intervention by using Tool (I) patient socio-demographic characteristics and health relevant data filled for the study and control group by the researcher. In addition, hemodynamic parameters was assessed three times before surgery at first time pre nursing intervention (baseline) and then after surgery post immediate nursing intervention at second time then post follow up nursing intervention after 4 hrs at third time by using Tool (II) hemodynamic state assessment flow sheet and filed by the researcher, then the researcher evaluates the severity of the post dural puncture headache twice after surgery post immediate nursing intervention at first time then post follow up nursing intervention after 4 hrs at second time using Tool (III) and evaluate the grade of severity for post dural puncture headache's associated complications twice after surgery post immediate nursing intervention at first time then

post follow up nursing intervention after 4 hrs at second time using tool (IV). It took around five to fifteen minutes for each patient.

II-Second phase (Comfort interventions)

The researcher anticipates plan interventions and coordinates their activities to fulfill the (Designated Nursing Intervention). Based on the basic assessment, the procedures for each group are as follows: **In the control group**, no intervention was done for the patients and received routine care according to the policies of the hospital. Then the hemodynamic state, severity of the post dural puncture headache and grade of severity for post dural puncture headache's associated complications were assessed. **In the study group**, hemodynamic state, level of the post-dural puncture headache and grade of severity for post-dural puncture headache's associated complications were assessed after applying (Designated Nursing Intervention) for the patients.

In the study group, the researcher aske the patient to make (4) designated nursing intervention which includes (deep breathing exercises, coughing exercises and foot and leg exercises in bed done before and after surgery). and noninvasive techniques DISH10 (Deep Inspiration, Squeeze, and Hold for 10 seconds) maneuver only after surgery then, the researcher gave the patients approximately 15 minute as rest time between each nursing intervention then , the researcher assess and measures hemodynamic parameters and assess peripheral vascular assessment by using Tool II, then assess post dural puncture headache by using Tool III and finally assess the grade of severity for post-dural puncture headache's associated complications using Tool IV and explaining the procedure:

III-Third phase (Enhanced Comfort):

This phase was used to evaluate the effect of designated nursing intervention on hemodynamic state, post dural puncture headache and post dural puncture headache associated complications Objectively, the researcher evaluates the effect of designated nursing intervention on hemodynamic state among study group as measured by tool (II). And assess level of post-dural puncture headache through visual analogue scale (VAS) by using tool III and assess the grade of severity for post-dural puncture headache's associated complications through headache impact index using tool IV. Also, subjectively the patients verbalize level of post-Dural puncture headache and grade of severity for post-Dural puncture headache's associated complications among study group by using tool (III and IV). for hemodynamic state was filled three times Pre-nursing intervention (Base line), post immediate nursing intervention and post follow up nursing intervention after 4 hrs. for assessing level of the (PDPH) visual analogue scale (VAS) was filled two times post immediate nursing intervention and Post follow up nursing intervention after 4 hrs. for the grade of severity for post-dural puncture headache's associated complications headache impact index was filled two times post immediate nursing intervention and post follow up nursing intervention after 4 hrs.

Ethical consideration:

- Ethical approval obtained from the scientific research, ethical committee of faculty of Nursing - Helwan University.
- The study facilitation letter to conduct the study was received from the department of postgraduate studies at faculty of Nursing-Helwan University and sent to the director of The Memorial Souad Kafafi University Hospital.
- An official permission was obtained from the administrative authorities of the selected hospital for the current study.
- The researcher assured confidentiality of data for every selected Patient involved in the study sample by using codes to identify participants instead of names or any other personal identifiers.
- The researcher obtained an oral and written consent from the studied patient after explaining the purpose and objectives of the study.
- The participation is voluntary, that patients they have the right to withdraw from the study at any time without giving any reason.

Statistical Design:

The data obtained was analyzed, and presented in numbers, percentages, in the form of tables and figures as required and suitable statistical tests were used to test the significance of the results obtained.

The following statistical techniques were used:

Percentage, Mean value, Standard deviation, Chi-square (X2), Correlation test (r) and Proportion probability (P-value).

Significance of results

- When P> 0.05 it is statistically insignificant difference.
- When P< 0.05 it is statistically significant difference.
- When P< 0.01or P< 0.001 it is high statistically significant difference.

The main findings of this study were summarizes as follows:

Table (1): shows that, 50.0% of the study and control group respectively were in age group 20-<30 years. Also, 82.4% and 80.0% of the study and control groups respectively were males and 50.0% and 65.0% of them respectively had university education. Additionally, 85.0% and 82.5% of the study and control group respectively were working. and 41.2% and 51.5% of the study and control group respectively had mild occupation effort. Moreover, 65.0% and 70.0% of the study and control group respectively had normal body mass index and 45.0% and 40.0 % of them respectively were smokers. Also, 44.4% and 56.2% of study and control group respectively duration of smoking were ≥10 / years and were 3-<5 duration of smoking / years.

Table (2): shows that, 47.5% and 45.0% of the study and control group respectively had previous history of lower abdominal surgery. Also ,36.8 % and 44.4% of the study and control group respectively type of lower abdominal surgery had appendectomy surgery. Additionally, 50.0% and 45.0% of the study and control group respectively current of the lower abdominal surgery had hemorrhoid surgery.

Table (3): shows that, there was a significant statistical difference between both groups regarding their hemodynamic state (Body temperature- heart rate -blood pressure– respiratory rate- oxygen saturation and urine output) Post Immediate nursing intervention and Post Follow up nursing intervention after 4 hrs. at P-value ≤ 0.05.

Table (4): shows that, there was a significant statistical difference between both groups regarding their hemodynamic state (peripheral vascular assessment) Post Immediate nursing intervention and Post Follow up nursing intervention after 4 hrs at P-value ≤ 0.05.

Table (5): shows that, there was a significant statistical difference between both groups regarding their level of post-Dural puncture headache Post Immediate nursing intervention and Post Follow up nursing intervention after 4 hrs. at P-value ≤ 0.05.

Table (6): shows that, there was a significant statistical difference between both groups regarding grade of severity for post Dural puncture headache's associated complications post immediate nursing intervention at P-value ≤ 0.05.

Table (7): shows that, there was a significant statistical difference between both groups regarding grade of severity for post Dural puncture headache's associated complications Post Follow up nursing intervention after 4 hrs. at P-value ≤ 0.05.

Table (1): Distribution of the study and control groups according to their socio demographic characteristics (n=80).

Variables	Study group (n=40)		Control group (n=40)		X2	P-value
	No	%	No	%		
Age / years						
20-<30	20	**50.0**	20	**50.0**	3.796	0.284
30-<40	9	22.5	11	27.5		
40-<50	4	10.0	7	17.5		
50-60	7	17.5	2	5.0		
Mean ± SD	**34.00 ±11.67**		**32.10±9.22**		0.807	0.422
Gender						
Male	33	**82.4**	32	**80.0**	0.082	0.775

Female	7	17.5	8	20.0		
Level of Education						
Illiterate	5	12.5	1	2.5	4.502	0.212
Read and write	9	22.0	10	25.0		
Secondary education	6	15.0	3	7.5		
University education	20	**50.0**	26	**65.0**		
Occupation						
Working	34	**85.0**	33	**82.5**	1.138	0.566
Not working	6	15.0	7	17.5		
If (working), occupation effort	**(n=34)**		**(n=33)**			
Mild	14	**41.2**	17	**51.5**	2.092	0.351
Moderate	8	23.6	9	27.3		
High	12	35.2	7	21.2		
Body Mass Index BMI						
Optimal weight	26	**65.0**	28	**70.0**	2.781	0.249
Overweight	9	22.5	10	25.0		
Obese	5	12.5	2	5.0		
Smoking						
Yes	18	**45.0**	16	**40.0**	1.040	0.595
No	22	55.0	23	57.5		
Ex-smoker	0	0.0	1	2.5		
If (yes), Duration of smoking/years	**(n=18)**		**(n=16)**			
3-<5	3	16.7	9	**56.2**	4.510	0.105
5-<10	7	38.9	4	25.1		
≥10	8	**44.4**	3	18.7		

X^2=Chi-Square Test * P-value ≤ 0.05 Significant. P-value > 0.05= Non-Significant

Table (2): Distribution of the study and control groups according to their health relevant data (n=80).

Health relevant data	**Study group (n=40)**		**Control group (n=40)**		**X2**	**P-value**
	No	**%**	**No**	**%**		
Previous history of lower abdominal surgery						
Yes	19	**47.5**	18	**45.0**	0. 304	0.936
No	21	52.5	22	55.0		
If (yes) notify type of lower abdominal surgery	**(n=19)**		**(n=18)**			
Appendectomy	6	31.6	8	**44.4**	3.442	0.487
Cholecystectomy	7	**36.8**	4	22.6		
Hemorrhoids	4	21.1	3	16.5		
Hernia	2	10.5	3	16.5		
Current of the lower abdominal surgery						
Appendectomy	4	10.0	5	12.5	5.593	0.348
Cholecystectomy	1	2.5	4	10.0		
Hemorrhoids	20	**50.0**	18	**45.0**		
Hernia	15	37.5	13	32.5		

X^2=Chi-Square Test * P-value ≤ 0.05 Significant. P-value > 0.05= Non-Significant

Table (3): Distribution of the study and control groups according to their hemodynamic state (body temperature- heart rate -blood pressure- respiratory rate- oxygen saturation and urine output) (n=80).

Parameters	**Post Immediate nursing intervention**				**Post Follow up nursing intervention after 4 hrs.**			
	Study group (n=40)		**Control group (n=40)**		**Study group (n=40)**		**Control group (n=40)**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Body Temperature								
Normal	33	82.5	25	62.5	36	90.0	26	65.0
Abnormal	7	17.5	15	37.5	4	10.0	14	35.0
Test & P-value	4.013 & **0.045***				8.352 & **0.004***			

Heart rate								
Normal	31	77.5	20	50	34	85.0	21	52.5
Abnormal	9	22.5	20	50	6	15.0	19	47.5
Test & P-value	6.545 & **0.011***				9.833 & **0.002***			
Blood pressure								
Normal	29	72.5	16	40	37	92.5	18	45.0
Abnormal	11	27.5	24	60	3	7.5	22	55.0
Test & P-value	5.584 & **0.003***				21.034 & **0.000***			
Respiratory rate								
Normal	28	70	17	42.5	34	85.0	18	45.0
Abnormal	12	30	23	57.5	6	15.0	22	55.0
Test & P-value	6.146 & **0.013***				14.066 & **0.000***			
Oxygen Saturation								
Normal	36	90.0	27	67.5	39	97.5	27	67.5
Hypoxemia	4	10.0	13	32.5	1	2.5	13	32.5
Test & P-value	3.818 &**0.014***				12.468 & **0.000***			
Urine output								
Normal	35	87.5	26	65	37	92.5	27	67.5
Abnormal	5	12.5	14	35	3	7.5	13	32.5
Test & P-value	5.591 & **0.018***				7.813 &**0.005***			

X^2=Chi-Square Test * P-value ≤ 0.05 Significant. P-value > 0.05= Non-Significant

Table (4): Distribution of the study and control groups according to their hemodynamic state (peripheral vascular assessment) (n=80).

Peripheral vascular Assessment	**Post Immediate nursing intervention**				**Post Follow up nursing intervention after 4 hrs.**			
	Study group (n=40)		**Control group (n=40)**		**Study group (n=40)**		**Control group (n=40)**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Peripheral skin temperature								
Normal	35	87.5	28	70	37	92.5	29	72.5
Abnormal	5	12.5	12	30	3	7.5	11	27.5
Test & P-value	3.660 & **0.056***				6.646 & **0.010***			
Peripheral skin color								
Normal	35	87.5	28	70.0	39	97.5	29	72.5
Abnormal	5	12.5	12	30.0	1	2.5	11	27.5
Test & P-value	3.660 &**0.056***				9.804 &**0.002***			
Peripheral skin moisture								
Moist	27	67.5	12	30.0	32	80.0	12	30.0
Dry	13	32.5	28	70.0	8	20.0	28	70.0
Test & P-value	11.257 & **0.001***				20.202 & **0.000***			
Peripheral skin turgor								
Normal	21	52.5	10	25.0	35	87.5	11	27.5
Decreased	19	47.5	30	75.0	5	12.5	29	72.5
Test & P-value	6.373 & **0.012***				29.463 & **0.000***			
Nail bed capillary refill								
Normal	37	92.5	30	75.0	38	95.0	30	75.0
Delayed	3	7.5	10	25.0	2	5.0	10	25.0
Test & P-value	4.501 & **0.034***				6.275 & **0.012***			

X^2=Chi-Square Test * P-value ≤ 0.05 Significant. P-value > 0.05= Non-Significant

Table (5): Distribution of the study and control groups according to the level of post dural puncture headache (PDPH) (n=80).

Level of Post Dural Puncture Headache (PDPH)	Post Immediate nursing intervention				Post Follow up nursing intervention after 4 hrs.			
	Study group		Control group		Study group		Control group	
	N	%	N	%	N	%	N	%
None	0	0.0	0	0.0	21	52.5	2	5.0
Mild	15	37.5	20	50.0	17	42.5	23	57.5
Moderate	21	52.5	11	27.5	2	5.0	13	32.5
Severe	4	10.0	9	22.5	0	0.0	2	5.0
Test & P-value	5.672 & **0.056***				26.662 &**0.000***			

X^2=Chi-Square Test * P-value ≤ 0.05 Significant. P-value > 0.05= Non-Significant

Table (6): Distribution of the study and control groups according to the grade of severity for post dural puncture headache's associated complications **post immediate nursing intervention** (n=80).

Questionnaire	Group	Post Immediate nursing intervention				X^2 test	P-value
		Yes		No			
		N	%	N	%		
Do you have Paresthesia	**Study**	7	17.5	33	82.5	66.000	**0.000***
	Control	25	62.5	15	37.5		
Do you have Stiff neck	**Study**	8	20	32	80	51.016	**0.000**
	Control	19	47.5	21	22.5		
Do you have Nausea and Vomiting	**Study**	17	42.5	23	57.5	56.462	**0.000***
	Control	22	55.0	18	45.0		
Do you have Tinnitus	**Study**	5	12.5	35	87.5	36.126	**0.000***
	Control	16	40.0	24	60.0		
Do you have Backache	**Study**	20	50.0	20	50.0	23.372	**0.000***
	Control	23	57.5	17	42.5		

X^2=Chi-Square Test * P-value ≤ 0.05 Significant. P-value > 0.05= Non-Significant

Table (7): Distribution of the study and control groups according to the grade of severity for post dural puncture headache's associated complications **Post Follow up nursing intervention after 4 hrs** (n=80).

Questionnaire	Group	Post Follow up nursing intervention after 4 hrs.				X^2 test	P-value
		Yes		No			
		N	%	N	%		
Do you have Paresthesia	**Study**	10	25.0	30	75.0	17.844	**0.000***
	Control	19	47.5	21	52.5		
Do you have Stiff neck	**Study**	14	35.0	26	65.0	17.694	**0.000**
	Control	28	70.0	12	30.0		
Do you have Nausea and Vomiting	**Study**	13	32.5	27	67.5	4.667	**0.000***
	Control	17	42.5	23	57.5		
Do you have Tinnitus	**Study**	34	85.0	6	15.0	5.630	**0.000***
	Control	23	57.5	17	42.5		
Do you have Backache	**Study**	31	77.5	9	22.5	2.560	**0.000***
	Control	26	65.0	14	35.0		

X^2=Chi-Square Test * P-value ≤ 0.05 Significant. P-value > 0.05= Non-Significant

II. Discussion

Regarding demographic characteristics of the studied patients of both study and control groups, the present study findings revealed that half of the study and control group respectively were in age group 20-<30 years. Also, majority of the study and control groups respectively were males. Besides, half of study group

versus almost two thirds of control group had university education. Additionally, majority of both groups were working. Moreover, two fifths and more than half of the study and control group respectively had mild occupation effort. In addition to, almost two thirds and more than two thirds of the study and control group respectively had normal body mass index and more than two fifths and two fifths of them respectively were smokers. Also, more than two fifths and half of study and control group respectively duration of smoking was ≥10 / years and were 3-<5 duration of smoking / years.

Results of the study indicated that there were no significant differences between study and control group regarding socio demographic characteristic. This indicated proper matching and using randomization to prevent biases and made the results fair between the two groups regarding those variables.

This finding was supported by **Bagle et al. (2023)** who conducted a prospective, randomized, and comparative study in India about "The effect of music therapy on hemodynamic parameter and pain score in patients undergoing abdominal and lower limb surgeries under spinal anesthesia", and reported that there were no significant differences between the two groups in baseline parameters (demographic characteristics) as a result of proper matching and using randomization. Similarly, **Agrawal et al. (2023)** who conducted A randomized controlled double-blind study in New Delhi about **"**Comparison of Nalbuphine versus Clonidine as an adjuvant to intrathecal hyperbaric Bupivacaine in orthopedic lower limb surgeries" and reported that there were no statistically significant differences in the demographic characteristics of the patients as a result of proper randomization between groups.

The present study findings show that, the mean age of the studied patients in both study and control groups was (34.00 ±11.67, 32.10±9.22) respectively. There are several factors supported these findings with younger demographic age could be explained as Lower abdominal surgeries, such as appendectomies, hernia repairs, and gynecological procedures, are common in younger adults due to higher incidences of conditions requiring such interventions in this age group. Also, Spinal anesthesia is often preferred for younger patients due to lower associated risks, faster recovery times, and fewer complications compared to general anesthesia.

This explanation was supported by **Demilie et al. (2023)** who reported in a multi- center prospective observational study in Ethiopia about "Incidence and factors associated with failed spinal anaesthesia among patients undergoing surgery" that the majority were under forty years old.

Concerning gender, majority of the study and control groups respectively were males. This finding may be due to Male-dominated occupations involving physical labor might lead to conditions such as hernias, which require surgical intervention. This aligns with the higher proportion of males observed in studies of similar surgical populations. This finding is in concord with **Esmat et al. (2021)** who conducted a randomized controlled study about "Post spinal anesthesia shivering in lower abdominal and lower limb surgeries" and reported that more than three fifths of the studied patients were may reflect the higher incidence of certain abdominal conditions or occupational risks among men, which necessitate surgical intervention. Addition to the male-to-female ratio for patients undergoing such procedures remains higher in regions where the types of surgeries (e.g., appendectomies or diagnostic laparoscopies) are often associated with male-dominated populations.

Regarding education, it was noticed that half and almost two thirds of them respectively had university education. Higher educational levels were associated with better understanding of anesthesia options and preference for spinal anesthesia due to perceived benefits such as faster recovery and fewer complications. Likewise, **Elsayed et al. (2019)** who conducted a collaborative study in Central Florida, Orlando, Florida about "Education level as a prognostic indicator at 12 months following decompression surgery for symptomatic lumbar spinal stenosis ", and indicated that more than two thirds patients had a college education, suggesting a higher education level among surgical patients and better understanding of anesthesia options and preference for spinal anesthesia due to perceived benefits such as faster recovery and fewer complications.

Concerning Body Mass Index, the current results found almost two thirds and more than two thirds of the study and control group respectively had normal body mass index. It is associated with patients with a normal BMI, the distribution of spinal anesthetic agents is generally more predictable. However, in patients with either low or high BMI, the distribution can be affected. For example, in individuals with high BMI (overweight or obese), the increased fat tissue may alter the spread of the local anesthetic, potentially making it more difficult to achieve the desired level of anaesthesia. This could require adjustments in dosing or technique.

Likewise**, Günkaya et al. (2022)** who conducted a study in Turkey about "Effect of waist circumference and body mass index on the level of spinal anaesthesia" and reported that patients with normal BMI experienced more predictable levels of spinal anesthetic distribution, leading to fewer complications and better outcomes during lower abdominal surgeries. This supports the observation that normal BMI is associated with smoother spinal anaesthesia administration.

Concerning smoking, the current results found that more than two fifths of study group versus two fifths of control group were smokers. Smoking is widely recognized as a risk factor for various complications in surgery, including delayed wound healing, increased risk of infections, and cardiovascular issues. Also, this can exacerbate issues during anesthesia, especially spinal anesthesia, where respiratory function can be further compromised because of the anesthetic agents on the diaphragm and chest muscles.

This result was consistent with **Fiddes, & McCaffrey, (2024).** who reported in a systematic review study entitled "Preoperative intervention for smoking cessation" that smokers are at higher risk for infections and other complications after abdominal wall reconstruction, particularly when compared to non-smokers. Interestingly, those who quit smoking for at least four weeks before surgery experienced fewer complications, suggesting that preoperative smoking cessation programs can be effective in mitigating these risks.

On the same scope, **Gräsbeck et al. (2023)** reported, in A machine learning-based big data study Finland about "Smoking is a predictor of complications in all types of surgery" that smoking increases the risk of surgical complications through several mechanisms. It promotes atherosclerosis by altering the lipid profile, damaging the vascular endothelium, and increasing oxidative stress, neutrophil count, and hypercoagulability. Further, cigarette smoke components impair wound healing, thereby increasing the risk of wound dehiscence and infection.

Regarding health relevant data, less than half of both groups had previous history of lower abdominal surgery. Also, more than one third of study group had cholecystectomy surgery but, less than one third of control group had appendectomy and hemorrhoids surgery. Additionally, about half of both groups currently had Hemorrhoid surgery. Cholecystectomy is highly common because gallstones and gallbladder disease are frequent conditions, and surgery is often the recommended treatment. It is typically performed laparoscopically, making it less invasive and more common in clinical practice. As a result, it might be grouped with other abdominal surgeries that address gastrointestinal or related issues.

This explanation agrees with **Radboud University Medical Center (2024)** who highlighted in study about "Cholecystectomy not always necessary for gallstones and abdominal pain" and reported that the various abdominal procedures, such as cholecystectomy, as commonly performed interventions. However, it also emphasizes that not all cases of abdominal pain linked to gallstones require surgery, and a more restrictive approach may be considered. This reflects a growing trend to weigh the necessity of surgery based on individual cases,

In addition to, **Bhardwaj, and Kaushal, (2020)** who conducted a retrospective study in India about "Epidemiological Study of Various Surgeries Performed under Spinal Anesthesia in a Secondary Health Care Institution" and reported that cholecystectomy and hernioplasty is the most common surgical procedure.

Concerning Hemodynamic State Pre and Post Nursing Interventions: The findings of this study indicate that there was no significant statistical difference between the study and control groups regarding their hemodynamic parameters (body temperature, heart rate, blood pressure, respiratory rate, oxygen saturation, and urine output) before the nursing intervention (P-value > 0.05). However, following the nursing intervention, both immediately after and during the 4-hour follow-up, there was a significant statistical difference in these parameters (P-value $\leq$ 0.05).

These findings suggest that nursing interventions can effectively stabilize and improve patients' hemodynamic status in acute care settings. A study by **Mostafa et al. (2021)** who compared in a randomized controlled trial study in Korean the hemodynamic effects of norepinephrine versus phenylephrine infusions in elderly patients undergoing hip fracture surgery under spinal anesthesia and found that both infusions effectively prevented spinal anesthesia-induced hypotension, with norepinephrine providing more hemodynamic stability.

Some studies suggest that with appropriate nursing care, the incidence of hypotension can be minimized regardless of pre-existing conditions. For instance, **Nysora, (2017)** emphasizes that good nursing care, including proper positioning and monitoring, can prevent complications associated with spinal anesthesia, such as peripheral nerve injury and total spinal anesthesia.

Role of Nursing: The improvement in hemodynamic parameters post-intervention in this study aligns with the findings of **Gebrargs et al. (2021),** who emphasized that nurses' proactive role in fluid management, administering vasopressors, and providing postural adjustments post-anesthesia can significantly reduce the incidence of hypotension and other complications. Nursing care goes beyond monitoring it actively contributes to stabilizing patient conditions during recovery from spinal anesthesia.

Conversely. For instance, **Han, and Xu, (2023)** who conducted A comparative, randomized clinical trial in China about "Effect of continuous spinal anesthesia on the hemodynamics of labor analgesia in hypertensive pregnant women" and concluded that continuous spinal anesthesia had less impact on the circulatory system compared to traditional spinal anesthesia, suggesting that the method of anesthesia administration can influence hemodynamic outcomes.

In addition to **Al Harazi et al. (2021)** who conducted study in Egypt entitled "Role of nursing post cesarean section women at woman's health hospital". emphasized that Nurse has an important, critical role in care of women undergoing to caesarean sections and improve their satisfaction.

Concerning complications associated with spinal anesthesia, the findings revealed that incidental complications were reported by most of the study group and majority of the control group, with Post-Dural Puncture Headache (PDPH) being the most common complication due to the leakage of cerebrospinal fluid through the puncture site leading to changes in intracranial pressures. In addition to, technique, needle size and type may be considered factors.

This explanation agrees with the findings of **Demilew et al. (2021),** who reported in a study in Ethiopia about "Incidence and associated factors of post dural puncture headache for parturients who underwent cesarean section with spinal anesthesia" reported that Post dural puncture headache is one of the most frequent adverse events following spinal anesthesia, depending on the population and procedural technique.

In addition to **Kumar, (2020).** Who reported in a study in India entitled "Incidence of Post Dural Puncture Headache (PDPH) Following Subarachnoid Block with 25G & 27G Quincke Spinal Needles in Patients Posted for lower Abdominal Surgery" who reported Post Dural Puncture Headache (PDPH) is a well-known complication following spinal Anaesthesia and the two principal determinant factors for development of PDPH are the type and the size of the spinal needles. It can be concluded from our study, large bore cutting type of spinal needle (25G Quincke), produces more PDPH than small bore cutting type of spinal needle (27G Quincke).

Contrarily, **López- Millán et al. (2023)** who reported in a study in In Spain entitled "Differential efficacy with epidural blood and fibrin patches for the treatment of post- dural puncture headache". Who emphasizes the epidural fibrin patches provides better outcomes than EBP for the treatment of obstetric PDPH in terms of efficacy, safety, and patient satisfaction. Despite epidural fibrin patches being able to be considered as a first-line treatment

Also, **Tomala et al., (2023)** who conducted a retrospective cohort study in Switzerland entitled "Risk factors for recurrence of post-dural puncture headache following an epidural blood patch" and reported that signs and symptoms of PDPH did not differ between groups. While needle size and multiple pregnancies were risk factors in the univariate analysis, mostly those related to the performance of the EBP remained significant following adjustment.

Concerning Post-Dural puncture headache for study and control groups, there was a significant statistical difference between both groups regarding their level of PDHD Post Immediate nursing intervention and Post Follow up nursing intervention after 4 hrs. at P-value ≤ 0.05. Also, more than half and minor of study group had moderate and severe level of PDHD post Immediate nursing intervention which improved to more than half had no PDHD and approximate two fifths of them had mild PDHD during Post Follow up nursing intervention after 4 hrs. While, less than third of control group had moderate and severe level of PDHD Post Immediate nursing intervention which compared to about third and minor of them had moderate and severe level of PDHD during Post Follow up nursing intervention after 4 hrs.

This explanation agrees with the findings of **Eldoushy, (2023)**who conducted study in Egypt entitled "Effect of Supine versus Sitting Position on Post-Dural Puncture Headache among Patients Receiving Spinal Anesthesia" found that Maintaining patients in supine position for the first 72 hours post spinal anesthesia as a management technique significantly improved their post-dural puncture headache's incidence, severity and associated complications. Conversely, **Kwak (2017)** suggested that nursing care might not sufficiently address

severe PDPH, particularly for patients with a prior history of headaches.

Concerning grade of severity for post-Dural puncture headache's associated complications for study and control groups, there was a significant statistical difference between both groups regarding grade of severity for post Dural puncture headache's associated complications post immediate nursing intervention at P-value ≤ 0.05. This finding was aligned with **Arevalo-Rodriguez et al. (2016)** who conducted a study in Madrid entitled "Posture and fluids for preventing post-dural puncture headache" and reported that there was a significant statistical difference between both groups regarding grade of severity for post Dural puncture headache's associated complications post immediate nursing intervention at P-value ≤ 0.05.

III. Conclusions

Based on findings of the study, it is showed that maintain hemodynamic stability and decrease the level of Post dural puncture headache and severity of post dural puncture headache associated complications among the patients who received designated nursing intervention which included (deep breathing exercise – coughing exercise – foot and leg exercise in bed and DISH10 (Deep Inspiration, Squeeze & Hold For 10 Seconds) Maneuver for post dural puncture headache in comparison with control group. In addition, the study demonstrated that designated nursing intervention are effective techniques to maintain hemodynamic stability and reduce the level of post dural puncture headache and severity of Post dural puncture headache associated complications among lower abdominal surgery patients undergoing spinal anesthesia.

IV. Recommendations

Based on these findings of the present study the researcher recommended;

Applying the designated nursing intervention which included (deep breathing exercises – coughing exercises – foot and leg exercises in bed –and DISH10 Maneuver for post dural puncture headache which includes (Deep Inspiration, Squeeze & Hold For 10 Seconds) before and after lower abdominal surgery for patients undergoing spinal anesthesia as routine and regular care to maintain hemodynamic stability, reduce the level of post dural puncture headache and severity of post dural puncture headache associated complications.

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