

Effect of Implementing a Protocol of Nursing Care on Clinical Outcomes for Patients Undergoing Lumbar Spine Disc Prolapse Surgeries

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Abstract

Background: Disc surgeries have seen a remarkable increase in the recent times that requires a prompt intervention of the nursing personnel to maintain the patients' quality of life and return to their normal life. **Aim of the study:** Evaluate the effect of implementing a protocol of nursing care on clinical outcomes for patients undergoing lumbar spine disc prolapse surgeries. **Design and Setting:** A quasi-experimental research design was used to collect data from neurosurgery departments at Main Tanta university hospitals. **Sample:** A convenience sampling of (60) patients who were undergoing lumbar disc prolapse surgeries in the previously mentioned settings. They were divided into two equal groups; study and control; each group consisted of (30) patients. **Tools:** Three tools were used for data collection, **Tool (I);** Structured Interview Schedule, **Tool (II);** Neuro-Vascular Assessment Tool, **Tool (III);** Post Lumbar Disc Surgery Clinical Outcomes Assessment Tool. **Results:** the main results revealed that there was a high significant improvement in the total levels of knowledge, neuro-vascular assessment, level of pain and Oswestery Disability Index among study group patients at the 2nd and 3rd week post the protocol of care compared to the control group. **Conclusion and Recommendation:** The implementation of protocol of nursing care had an effect on increasing the level of patients' knowledge, reducing the level of pain post-surgery and so improving ADLs among study group patients. It was recommended that nurses should follow rehabilitative nursing program as a routine care for patients undergoing discectomy surgery.

Key words:

Disc Prolapse, Lumbar Disc Surgeries, Protocol of Nursing Care

Introduction

A herniated or prolapsed disk is a condition that can occur anywhere along the spine, but most often occurs in the lower back “lumbar spine”. It is one of the most common causes of low back pain, as well as leg pain or “sciatica”. Lumbar herniated discs is a widespread medical problem, is the most common diagnosis among the degenerative abnormalities of the lumbar spine, and is the

principal cause of spinal surgery among the adult population⁽¹⁾.

According to the world health organization, it was estimated that nearly 400 million individuals are diagnosed with pathologic disc degeneration worldwide yearly. In 2019; the estimated incidence of the individuals diagnosed with lumbar degenerative disease was (12.3%) worldwide with the highest estimated incidence in the United States (8.6%)

(2). While in the year 2020, it was reported that the incidence of low back pain related to lumbar herniated disc ranged from 60-90% with annual incidence of 5% . In the year 2021; The overall prevalence of diagnosed spinal degenerative disease worldwide was 27.3% and increased with age ^(3,4). According to review of Neurosurgery Department at Tanta University Hospital statistical Records; it was revealed that around 390, 480 new lumbar herniated disc (LHD) patients were admitted during the year 2020 and 2021 respectively ⁽⁵⁾.

HLDD can be manifested by low back pain, numbness or a tingling sensation in the leg and/or foot, weakness in the leg and/or foot and sharp, shooting pain that extend from the buttock down the back of one leg referred to as “Sciatica” ⁽⁶⁾. Furthermore, HLDD may lead to neurological symptoms including foot drop, decreased reflexes at the knee or ankle and Spasm of the back muscles, permanent nerve damage and loss of bowel and bladder control. Another long-term complication is known as saddle anesthesia. In this case, the slipped disc compresses nerves and causes loss of sensation in the inner thighs, the back of legs, and around the rectum ⁽⁷⁾.

Treatments for a prolapsed disc can be ranged from conservative to surgical treatment. Initial treatment for a herniated disk is usually nonsurgical in nature that focuses on relieving pain. Non- surgical treatments may include; rest, Non- Steroidal Anti-inflammatory drugs (NSAIDs), Physical therapy and Epidural Steroid injections ⁽⁸⁾. While Spine surgery is typically recommended after a period of non-surgical treatment has not relieved painful symptoms or for patients who had developed complications of (HLDD) including; muscle weakness, difficulty walking and loss of bowel

and bladder control. Lumbar disc surgeries may include one or combination of the following surgeries; Laminotomy/laminectomy, discectomy/micro discectomy, endoscopic procedure called “Keyhole surgery” and Spinal disc fusion. These operations aim to remove spinal disc tissue that is pushing on the nerve so alleviating nerve compression and relieving leg pain ⁽⁹⁾.

Patients with lumbar disc prolapse who are undergoing spinal surgery need a protocol of nursing care and an efficient interventional and rehabilitation program to maintain the best clinical outcomes post-surgery. Key elements of the nursing care include; knowledge of the distinct surgical approaches and their respective advantages and disadvantages that allows nurses to individualize patient care and be alert to postoperative complications , monitoring of degree of patient motion, ability to perform activities of daily living and the neuro-vascular status ⁽¹⁰⁾. Postoperatively, the nursing care focuses on instructing the patient to perform deep breathing and coughing exercises and encouraging patient movement to avoid deep vein thrombosis. The nurse intervenes to minimize the degree of patient pain, improve the patient mobility, maintain the quality of respiration and maintain the asepsis status of wound ⁽¹¹⁾. Besides, the nurse prepares the patient for the rehabilitation phase that focuses on different positions and exercises the patient would assume and perform to help maintain the spine in its neutral position and avoid the recurrence of spinal discs ⁽¹²⁾.

Significance of the study: It is observed that the rate of lumbar spine disc prolapse surgeries is high, and despite the surgery there is a risk of post-surgery disc recurrence, presence of persistent pain that interferes with the

functional activities of daily livings on the short term and occurrence of complications on the long term. Hence patients undergoing lumbar spine disc surgeries should receive meticulous nursing care and follow ups to promote their recovery and help maintain their normal daily living without risk of disc recurrence, So this study will be done to evaluate the effect of implementing protocol of nursing care on clinical outcomes of patients undergoing lumbar spine disc prolapse surgery.

Aim of the study

To evaluate the effect of implementing a protocol of nursing care on clinical outcomes for patients undergoing lumbar spine disc prolapse surgeries.

Research hypothesis

- Patients undergoing lumbar spine disc prolapse surgery (study group) will exhibit improvement in their knowledge regarding disc surgery and rehabilitation exercise post implementation of the protocol of nursing care than control group.

- Patients undergoing lumbar spine disc prolapse surgery (study group) will exhibit improvement in their clinical outcomes post implementation of a protocol of nursing care than control group who will receive routine hospital care.

Research design

A quasi-experimental research design was used in the present research.

Setting

The study was conducted at the neurosurgery departments and its referral outpatient clinics at Main Tanta university hospitals..

Subjects

A convenience sampling of 60 patients who were undergoing lumbar disc surgery in the above previously mentioned settings. The

sample size was calculated based on Epidemiological Information 7 statistical Program. The final acceptable sample size was estimated to be 60 patients.They were divided into two equal groups; 30 patients for each group as following:

Group (1): Control group, Consisted of (30) patients who were exposed to routine hospital care.

Group (2): Study group, Consisted of (30) patients who were exposed to the protocol of care that was designed and implemented by the researcher.

Inclusion criteria:

- Adult male and female conscious patients.
- Newly diagnosed and planned to undergo lumbar disc prolapse surgery.

Exclusion criteria:

- Cancer patients, Spinal cord injured patients.
- Patients planned to receive cervical disc surgery

Tools of the study:

Three tools were used to collect the data for this study which included the following:

Tool (I): Structured Interview Schedule:

It was developed by the researcher after reviewing of the related literatures ⁽¹³⁻¹⁶⁾. It comprised of three parts:-

Part (1): Socio- demographic data of the patients: which included; patient's code, age, sex, marital status, level of education, occupation and residence.

Part (2): patients' clinical data: which included; present medical history, past medical history, past surgical history, current diagnosis, duration of disease, type of disc operation, and the use of analgesics or muscle relaxant drugs.

Part (3): Patients Knowledge Assessment Sheet:

- It was developed by the researcher after reviewing of the related literatures ⁽¹³⁻¹⁶⁾ to evaluate patients' knowledge regarding lumbar spine disc prolapse surgery pre and post protocol of nursing care as the following:

a- Knowledge about **herniated lumbar disc disease**; 14 MCQ questions which included structure of spine, function of spinal discs, definition of HLDD, causes, signs & symptoms, possible complications and methods of treatment.

b- Knowledge about **disc surgeries**; 13 MCQ questions which included types, indications, possible complications, signs & symptoms of possible complications and management of complications.

c- Knowledge about **preoperative care, post-disc surgery care and rehabilitation protocol** ; 23 MCQ questions which included preoperative preparation, post-operative care, goals of rehabilitation, precautions to be taken post-surgery, phases of rehabilitation with timing of each phase, recommended exercises, walking & standing & sitting adaptation and activities of daily living.

d- Knowledge about **pain**; 4 questions which included control measures and sleeping pattern disturbance management.

Total scoring system of knowledge

Correct and complete answer scored (2)

Correct and incomplete answer scored (1)

Don't know or incorrect answer (0)

The total scoring system of patients' knowledge was classified as the following:

-High level of knowledge > 75% of the total score

-Moderate level of knowledge $\geq 60\%$ - 75% of the total score

- Low level of knowledge < 60% of the total score

Tool (II): Neuro -Vascular Assessment tool.

It was adapted from Schreiber 2016 ⁽¹⁷⁾ and was modified by the researcher after review of literature ⁽¹⁸⁾ to evaluate the neurovascular status of the patient regarding; pulse, capillary refill, skin color, temperature, numbness, sensation and motor function

Scoring Items	0	1
Pulse	Weak	Full
Capillary refill	>3 sec.	<3 sec.
Skin color	Pale\cyano sed	Pink
Temperature	Hot\cold	Normal
Numbness	Present	Unpresent
Motor function	Not intact	Intact
Sensation	Poor	Good

Scoring system:

The total scoring system of patients' neurovascular status was calculated and classified as the following: **(0-2)** indicated **Poor** neurovascular status, **(3-5)** indicated **Fair** neurovascular status and **(6-7)** indicated **Good** neurovascular status.

Tool (III): Post Lumbar Disc Surgery Clinical Outcomes Assessment Tool.

It comprised of two parts:

Part 1: The Indiana Polyclinic Combined Pain Scale (IPCPS):

The Indiana Polyclinic Combined Pain Scale (IPCPS) was first developed and used by **Dimitry Arbuck (2001)** and updated **(2016)** ⁽¹⁹⁾ in the United States. It was used by the

researcher to evaluate the intensity of pain perceived by the studied group through the added descriptors to pain scales that increase its objectivity.

Scoring system: The IPCPS rated pain intensity on the familiar (**11-point scale**), According to the following; **0**:No pain , **1**:Un pleasant sensation, **2**:Minimal pain, **3**:Mild , **4**: Mild to moderate, **5**:Moderate, **6**: Moderate to severe , **7**: Severe, **8**:Debilitating , **9**:Agonizing and **10**: The worst imaginable pain.

Part 2: Oswestry Disability Index (ODI). The Oswestry Disability Index was first developed and used by **Jeremy Fairbank (1980)** and was published in the journal **Spine (2000)** ⁽²⁰⁾. It was modified by the researcher after a review of related literatures ⁽²¹⁾ and was used to measure a patient's permanent functional disability outcomes regarding 6 categories which included; ability to care for oneself, ability to walk, ability to sit, ability to stand, social life and sleep quality.

Scoring system

Each topic category was scored on a scale of (0–5) with the first statement was scored **zero** and indicated **the least amount of disability** and the last statement was scored **5** indicating **most severe disability**. The scores for all questions answered were summed, then were multiplied by two to obtain the index (range 0 to 60). Zero was equated with no disability and 60 was the maximum disability possible. **0% –12% indicated** Minimal disability, **13%-24% indicated** Moderate disability, **25%–36% indicated** Severe disability, **37%–48% indicated** Crippling back pain and **49%–60%:** These patients

were either bed-bound or had an exaggeration of their symptoms.

Methods

Ethical and legal consideration

Official letters from the faculty of nursing were delivered to the appropriate authorities in the selected area of the study; Permission to conduct the study was obtained from the directors of the neurosurgical department at the Main Tanta university hospital. An Informed consent was taken from all participants in this research after explanation the aim of the study and the right to withdrawal at any time. Confidentiality and privacy were taken into consideration regarding data collection. A code number was used instead of names.

Methods of data collection

1. All tools were tested for content validity and clarity of the questionnaire by a panel of (5) experts in the Medical Surgical Nursing, and Neuro-surgery field physician and accordingly needed modifications were done. It was calculated and found to be = (98%).
2. The reliability for the study tools was calculated by Cronbach's alpha test; it was 0.87 for tool (I) Part (iii) and 0.93 for tool (II), 0.918 for tool (III) Part (i), 0.926 for tool (III) Part (ii). The suitable statistical tests were used for testing questionnaire reliability.
3. The study tools were conducted before the study on (10%) of patients to test the feasibility, applicability, clarity, relevance and organization of the tools and to determine any obstacles that may be encountered during the period of data collection; accordingly, needed modification was done. The pilot study was excluded from the study subjects.

4. The collection of the data for the present study was carried out within the period from December 2020 to the end of July 2021.
5. The present study was conducted through four phases (Assessment, planning, implementation and evaluation) and it was continued with each patient individually through their follow ups.

Assessment phase;

Assessment of the baseline data for HLDD patients was carried out immediately once within admission to the department by using Tool (I), Tool II and Tool III to assess patients' knowledge, Neuro-Vascular status ,pain level and disability index before implementation of the protocol of care. Each interview questionnaire took approximately one hour.

Planning phase

Objectives of the study were prepared based on the needs of the patients. The protocol of care was designed by the researcher based on the study subjects' assessment and extensive reviews of related literature ⁽¹³⁻¹⁶⁾. An illustrative structured colored booklet was prepared and written in simple Arabic language supported by illustrative pictures as a guide for the study group and different methods were used as video, group discussion, power point and demonstration and re-demonstration for the practical part. The protocol of care was carried out in (4) sessions individually for every patient.

Implementation phase

A protocol of care was developed and carried out by the researcher for the study subjects throughout (4) basic sessions; **Session (1): Pre- operative phase** ;The researcher informed the patient about the disc prolapse definition, causes, signs &symptoms, the disc

surgery and its possible complications. The session took about 20-30 minutes. **Session (2): Immediate post- operative phase**; The researcher informed the patient about breathing &coughing exercises, pulmonary hygiene, pain management techniques, Sleep instructions and performing neurovascular assessment. This session took about 20-30 minutes. **Session (3): post- operative phase**; 1st day postoperatively, the researcher informed the patient about post- surgery rehabilitation protocol including the recommended exercises to be performed and precautions to be taken to avoid disc recurrence. This session took 20-30 minutes. **Session (4): On going post- operative and rehabilitation phase** ; on 2nd day post operatively, it included monitoring the condition of the drain, providing wound care with maintaining aseptic technique, monitoring for occurrence of complications, mobility instructions . This session took 20-30 minutes.

- **Control group** : the patients received the routine nursing care provided by neurosurgical nurses that included; providing pain control medications post operation, aiding the physician in wound care pre discharge of the patient and enhancing the patient minimal walking 1st day post-surgery to avoid DVT

Methods of data analysis

All data were collected, coded, tabulated and subjected to statistical analysis. Statistical analysis was performed by statistical Package SPSS in general (version 20), Data expressed as number and percentage. T-test is used to determine significant for numeric variable. A probability level of p-value ≤ 0.01 was adopted

as a level of significance for testing the research hypotheses ⁽²²⁾.

Results

Table (1) illustrated the distribution of the patients according to their Socio-demographic characteristics. It showed that half of the studied group patients were in the age group (30-< 40) years with their mean age 39.57 ± 8.123 and 40.97 ± 7.920 respectively. Also, approximately more than half of the studied groups (60 %) and (63.33%) of the control and study groups were males respectively. **Also**, more than three quarters (80%) and more than two thirds (70%) of both the control and study groups were married, while (46.67%) and (43.3%) from them had manual work respectively. **Additionally**, about more than one third (36.67%) and nearly one half (46.67%) of both control and study groups respectively were university educated and about more than half (56.67%) and two thirds (66.67%) of the control and study groups were from rural areas respectively.

Table (2) illustrated the distribution of the studied patients according to their clinical data. Concerning to the past medical history, it revealed that nearly two thirds (63.33%) , more than half (56.67%) and exactly half (50%) of the control group patients had fracture, obesity and diabetes mellitus respectively while more than half (53.33%) of the study group patients had fracture and osteoporosis. **Concerning to the past surgical history**, more than half (53%) and exactly half (50%, 50%) of the control group patients had previous exposure to spinal anesthesia, previous lumbar puncture and cholecystectomy respectively while nearly half (46.67 %, 43.33%) of the study group

patients had previous exposure to spinal anesthesia and cholecystectomy respectively. **Concerning to the smoking history and type of disc operation**, approximately more than half (60 %) and (63.33%) of the control and study groups had smoking history respectively and about (46.67%) and (43.33%) of the control and study group patients' had undergone laminotomy \laminectomy and discectomy operations respectively. **In relation to the duration of disease and use of analgesics**, it was found that all of the control and study group patients (100%) had lumbar disc disease since more than six months and all of them used analgesics respectively.

Table (3) illustrated the distribution of patients according to their total level of knowledge about herniated lumbar disc disease throughout all intervention periods of the study. Concerning to the control group; There was no significant improvement in their total level of knowledge about herniated lumbar disc disease throughout all periods of routine hospital care where (56.67%) of the patients had low level of knowledge pre implementation of routine nursing care whereas about (50%, 46.67%) of the patients had scored poor level of knowledge at the 2nd and 3rd week post the completion of routine care respectively. **On the other hand, Concerning to the study group;** there was a highly significant improvement in the patients' total level of knowledge about herniated lumbar disc disease where more than half of the patients (53.33%) had low level of knowledge pre implementation of the protocol of care, whereas about (86.67%, 76.67%) of the patients had scored high level of knowledge at the 2nd and 3rd week post implementation of protocol of care respectively

Table (4) illustrated distribution of the studied patients regarding their total Knowledge about disc surgeries throughout periods of study. Concerning to the control group; There was no significant improvement in their total level of knowledge about lumbar disc surgeries throughout all periods of routine hospital care where (73.33%) had low level of knowledge pre implementation of routine nursing care whereas about (53.33%, 50%) had poor level of knowledge at the 2nd and 3rd week post completion of routine care respectively. **On the other hand, Concerning to the study group;** there was a highly significant improvement in the patients' total level of knowledge about lumbar disc surgeries where more than three quarters of the patients (80%) had low level of knowledge pre implementation of the protocol of care, whereas about (83.33%, 70%) had scored high level of knowledge about lumbar disc surgeries at the 2nd and 3rd week post implementation of protocol of care respectively

Table (5) illustrated distribution of the studied patients regarding their total Knowledge about preoperative care, post-disc surgery care and rehabilitation protocol throughout periods of study. Concerning to the control group; There was no significant improvement in their total level of knowledge about preoperative care, post-disc surgery care and rehabilitation protocol throughout all periods of routine hospital care where (83.33%) of the patients had low level of knowledge pre implementation of routine nursing care whereas about (46.67%, 43.33%) had scored poor level of knowledge at the 2nd and 3rd week post the completion of routine

care respectively. **On the other hand, Concerning to the study group;** there was a highly significant improvement in the patients' total level of knowledge about preoperative care, post-disc surgery care and rehabilitation protocol where more than two thirds of the patients (66.67%) had low level of knowledge pre implementation of the protocol of care, whereas about (90%, 73.33%) had scored high level of knowledge at the 2nd and 3rd week post implementation of protocol of care.

Table (6) illustrated distribution of the studied patients regarding their total Knowledge about pain control measures and sleeping pattern disturbance management throughout periods of study. Concerning to the control group; There was no significant improvement in their total level of knowledge about pain control measures and sleeping pattern disturbance management throughout all periods of routine hospital care where (63.33%) of the patients had low level of knowledge pre implementation of routine nursing care whereas about (56.66, 50%) of the patients had scored poor level of knowledge at the 2nd and 3rd week post completion of routine care respectively. **On the other hand, Concerning to the study group;** there was a highly significant improvement in the patients' total level of knowledge about pain control measures and sleeping pattern disturbance management where two thirds of the patients (66.67%) had low level of knowledge pre implementation of the protocol of care, whereas about (93.33%, 83.33%) of the patients had high level of knowledge at the 2nd and 3rd week post implementation of protocol of care respectively.

Figure (1) illustrated distribution of the studied patients regarding their total level of neuro-vascular status throughout periods of study. Concerning to the control group; There was no significant difference in their total levels of neuro-vascular assessment throughout all periods of routine hospital care where (80%) of the patients had poor levels of neuro-vascular status pre implementation of routine nursing care whereas about (60% , 70%) of the patients had fair levels of neuro-vascular status at the 2nd day post- surgery and 2nd week of routine care respectively . **On the other hand, Concerning to the study group;** there was a highly significant improvement in the patients' total levels of neuro-vascular assessment where more than three quarters of patients (76.67%) had poor levels of neuro-vascular status pre implementation of the protocol of care, whereas about (93.33%, 83.33%) of the patients had fair and good levels of neuro vascular status at the 2nd day of surgery and 2nd week post implementation of protocol of care respectively.

Table (7) illustrated distribution of the studied patients regarding the Indiana Polyclinic Combined Pain Scale throughout periods of study. Concerning to the control group patients, Nearly half (46.67%) of the patients had debilitating level of pain pre routine nursing care ,while (43.33%, 53.33%) had moderate to severe and mild to moderate levels of pain at the 2nd and 3rd week of routine nursing care respectively. **Concerning to the study group,** (36.67%,33.33%) of the patients had severe and debilitating levels of pain pre implementation of the protocol of nursing care ,while (73.33% , 66.67%) had minimal

pain and no pain at the 2nd and 3rd week post implementation of the protocol of nursing care respectively. **Table (8) illustrated distribution of the studied patients regarding total level of Oswestry Disability Index throughout periods of study.** Concerning to the control group, It showed that near three quarters (73.33%) of them had crippling back pain pre routine hospital care , while (60% , 40%) of them had severe disability at the 2nd and 3rd week post routine hospital care respectively. There was no statistical significant difference regarding levels of (ODI) among control group patients at the 2nd and 3rd week post routine hospital care with p value= 0.067. **Concerning to the study group patients,** two thirds of the patients (66.67%) had crippling back pain pre implementation the protocol of care, while (90%, 93.33%) had moderate disability and minimal disability at the 2nd and 3rd week post implementation of protocol of care respectively. There was a high statistically significant improvement regarding levels of (ODI) among study group patients at the 2nd and 3rd week post protocol of nursing care with p value= 0.000.

Table (1) : Distribution of the studied patients according to their socio-demographic characteristics.

Characteristics	The studied patients (n=60)				χ^2 P
	Control group (n=30)		Study group(n=30)		
	N	%	N	%	
<u>Age (in years)</u>					
-<30	2	6.67	1	3.33	0.392
-30-<40)	15	50.00	15	50.00	
-(40-<50)	8	26.67	9	30.00	
-≥50	5	16.67	5	16.67	
Range	(29-55)		(29-57)		t=0.457
Mean ± SD	39.57±8.123		40.97±7.920		P=0.502
<u>Gender</u>					
-Male	18	60.00	19	63.33	FE 1.000
-Female	12	40.00	11	36.67	
<u>Marital status</u>					
-Married	24	80.00	21	70.00	5.846 0.119
-Single	3	10.00	4	13.33	
-Divorced	3	10.00	0	00.00	
-Widow	0	0.00	5	16.67	
<u>Educational level</u>					
-Read and write	6	20.00	0	0.00	6.752 0.080
-Primary education	5	16.67	7	23.33	
-Secondary education	8	26.67	9	30.00	
-University educated	11	36.67	14	46.67	
<u>Occupation</u>					
-Employee	7	23.33	11	36.67	1.526 0.466
-Manual work	14	46.67	13	43.33	
-House wife	9	30.00	6	20.00	
<u>Place of residence</u>					
-Rural	17	56.67	20	66.67	FE 0.606
-Urban	13	43.33	10	33.33	

Table (2): Distribution of the studied patients according to their clinical data.

Patient clinical data	The studied patients (n=60)				
	Control group(n=30)		Study group (n=30)		χ^2 P
	N	%	N	%	
<u>Past & present medical history</u>					
- Hypertension	9	30.00	9	30.00	1.086 0.435
- Diabetes Mellitus	15	50.00	11	36.67	
- Osteoporosis	11	36.67	16	53.33	
-Obesity	17	56.67	11	36.67	
-Fracture	19	63.33	16	53.33	
-Stroke	0	0.00	3	10.00	
- Anemia	14	46.67	9	30.00	
<u>Past surgical history</u>					
-Previous exposure to spinal anesthesia	16	53.33	14	46.67	0.611 0.434
-Previous lumbar puncture	15	50.00	11	36.67	
-Cholecystectomy	15	50.00	13	43.33	
-Appendectomy	0	0.00	6	20.00	
-Heart surgeries	0	0.00	8	26.67	
-Vascular surgeries	0	0.00	0	0.00	
<u>Smoking history</u>					
-Yes	18	60.00	19	63.33	FE
-No	12	40.00	11	36.67	1.000
<u>Duration of disease</u>					
-≥ 6 months	30	100.00	30	100.00	-
<u>Type of disc operation</u>					
-Laminectomy/laminotomy	14	46.67	11	36.66	0.500
-Discectomy	7	23.33	13	43.33	0.779
-Spinal disc fusion	9	30.00	6	20.00	
<u>Use of analgesics</u>					
-Yes	30	100.00	30	100.00	-

Table (3): Distribution of the studied patients regarding their total Knowledge about herniated lumbar disc disease throughout periods of study.

Total Knowledge about herniated lumbar disc disease	The studied patients (n=60)													
	Control group (n=30)						χ^2 P	Study group (n=30)						χ^2 P
	Pre routine care		2 nd week post routine care		3 rd week post routine care			Pre protocol of care		2 nd week post protocol of care		3 rd week post protocol of care		
	N	%	N	%	N	%		N	%	N	%	N	%	
-Low level of knowledge	17	56.67	15	50.00	14	46.67	6.611 0.175	16	53.33	0	0.00	0	0.00	63.931 0.000*
-Moderate level of knowledge	13	43.33	12	40.00	14	46.67		14	46.67	4	13.33	7	23.33	
-High level of knowledge	0	0.00	3	10.00	2	6.66		0	0.00	26	86.67	23	76.67	

Table (4): Percent distribution of the studied patients regarding their total Knowledge about disc surgeries throughout periods of study.

Total Knowledge about disc surgeries	The studied patients (n=60)													
	Control group (n=30)						χ^2 P	Study group (n=30)						χ^2 P
	Pre routine care		2 nd week post routine care		3 rd week post routine care			Pre protocol of care		2 nd week post protocol of care		3 rd week post protocol of care		
	N	%	N	%	N	%		N	%	N	%	N	%	
-Low level of knowledge	22	73.33	16	53.33	15	50.00	6.994 0.159	24	80.00	0	0.00	0	0.00	74.569 0.000*
-Moderate level of knowledge	8	26.67	10	33.33	12	40.00		6	20.00	5	16.66	9	30	
-High level of knowledge	0	0.00	4	13.33	3	10.00		0	0.00	25	83.33	21	70	

Table (5): Percent distribution of the studied patients regarding their total Knowledge about preoperative care, post-disc surgery care and rehabilitation protocol throughout periods of study.

Total Knowledge about preoperative care, post-disc surgery care and rehabilitation protocol	The studied patients (n=60)													
	Control group (n=30)						χ^2 P	Study group (n=30)						χ^2 P
	Pre routine Care		2 nd week post routine care		3 rd week post routine care			Pre Protocol of care		2 nd week post protocol of care		3 rd week post protocol of care		
	N	%	N	%	N	%		N	%	N	%	N	%	
Low level of knowledge	25	83.33	14	46.67	13	43.33	2.944 0.477	23	66.67	0	0.00	0	0.00	80.897 0.000*
Moderate level of knowledge	5	16.67	14	46.67	12	40		7	23.33	3	10.00	8	26.67	
High level of knowledge	0	0.00	2	6.66	5	16.66		0	0.00	27	90.00	22	73.33	

Table (6): Distribution of the studied patients regarding their total Knowledge about pain control measures and sleeping pattern disturbance management throughout periods of study.

Total Knowledge about pain control measures and sleeping pattern disturbance management	The studied patients (n=60)													
	Control group (n=30)						χ^2 P	Study group (n=30)						χ^2 P
	Pre routine care		2 nd week post routine care		3 rd week post routine care			Pre protocol of care		2 nd week post protocol of care		3 rd week post protocol of care		
	N	%	N	%	N	%		N	%	N	%	N	%	
-Low level of knowledge	19	63.33	17	56.66	15	50.00	0.824 0.772	20	66.67	0	0.00	0	0.00	76.532 0.000*
-Moderate level of knowledge	11	36.66	13	43.44	15	50.00		10	33.33	2	6.67	5	16.67	
-High level of knowledge	0	0.00	0	0.00	0	0.00		0	0.00	28	93.33	25	83.33	

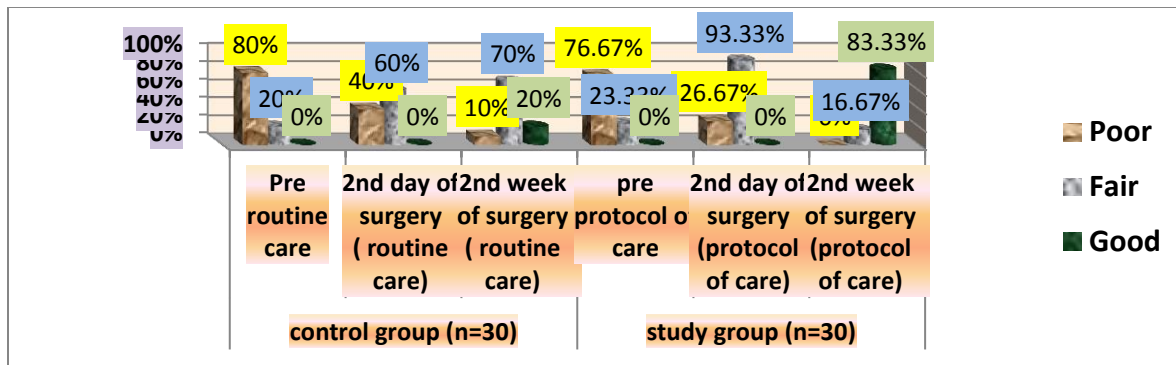


Figure (1): Distribution of the studied patients regarding their total level of neuro-vascular status throughout periods of study.

Table (7): Distribution of the studied patients regarding their level of the Indiana Polyclinic Combined Pain Scale (IPCPS) throughout periods of study.

IPCPS	The studied patients (n=60)												χ^2 P
	Control group (n=30)						Study group (n=30)						
	Pre routine care		2nd week post routine care		3rd week Post routine care		Pre protocol of care		2nd week post protocol of care		3rd week Post protocol of care		
	N	%	N	%	N	%	N	%	N	%	N	%	
No pain	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	20	66.67	3.711 0.172 180.00 0.000*
Un pleasant sensation	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	10	33.33	
Minimal	0	0.00	0	0.00	0	0.00	0	0.00	22	73.33	0	0.00	
Mild	0	0.00	0	0.00	7	23.33	0	0.00	8	26.67	0	0.00	
Mild to moderate	0	0.00	2	6.67	16	53.33	0	0.00	0	0.00	0	0.00	
Moderate	0	0.00	12	40.00	7	23.33	0	0.00	0	0.00	0	0.00	
Moderate to severe	4	13.33	13	43.33	0	0.00	6	20.00	0	0.00	0	0.00	
Severe	9	30.00	3	10.00	0	0.00	11	36.67	0	0.00	0	0.00	
Debilitating	14	46.67	0	0.00	0	0.00	10	33.33	0	0.00	0	0.00	
Agonizing	3	10.00	0	0.00	0	0.00	3	10.00	0	0.00	0	0.00	

Table (8): Distribution of the studied patients regarding their total level of Oswestry Disability Index (ODI) throughout periods of study.

Total ODI Level	The studied patients (n=60)												χ^2 P	
	Control group (n=30)						χ^2 P	Study group (n=30)						
	Pre routine care		2nd week post routine care		3rd week post routine care			Pre protocol of nursing care		2nd week post protocol of care		3rd week post protocol of care		
	N	%	N	%	N	%		N	%	N	%	N		%
Minimal Disability	0	0.00	0	0.00	4	13.33	5.170 0.067	0	0.00	0	0.00	28	93.33	180.00 0.000*
Moderate Disability	0	0.00	9	30.00	12	40.00		0	0.00	27	90.00	2	6.66	
Severe Disability	1	3.33	18	60.00	12	40.00		1	3.33	3	10.00	0	0.00	
Crippling back pain	22	73.33	3	10.00	2	6.67		20	66.67	0	0.00	0	0.00	
Exaggeration of Symptoms	7	23.33	0	0.00	0	0.00		9	30.00	0	0.00	0	0.00	

Discussion

Spine surgery has become a common surgery for herniated disc patients especially in various situations. Nursing care of the surgical patient focuses on promoting comfort and healing, preventing and monitoring for wound complications, as well as complications involving other organ systems. Recently, rehabilitation nursing intervention has been applied to clinical nursing care with the main aim to improve the efficacy of clinical nursing care, shorten hospital stay, reduce the incidence of complications and minimize physical dysfunction⁽²³⁾. So, the aim of the study is to evaluate the effect of implementing a protocol of nursing care on clinical outcomes for patients undergoing lumbar spine disc prolapse surgeries. **Concerning to**

Socio demographic characteristics of the studied patients, it revealed that half of the studied group patients (both control and study group) were in the age group (30-< 40) years and approximately more than half of the studied group patients were males. **As regard to marital status and educational level of the patients**, more than three quarters and more than two thirds of both control and study group patients respectively were married while about more than one third and nearly one half of them were university educated. **Concerning to the occupation and place of residence**, nearly half of both studied groups had manual work and more than half and two thirds of the control and study group patients were from rural areas respectively. This result

was in the same line with **Habllass et. al, (2021)** ⁽²⁴⁾ who reported that more than half of study and control group patients were in age 30-50 years old. *Also*, this result was in the same line with **Lorraine, et. al (2018)** ⁽²⁵⁾ who reported that more than half of both groups were male. *Moreover*, this result was in the same line with **Ahmed et.al, (2019)** ⁽²⁶⁾ who reported that the majority of the studied patients were married. *Additionally*, the result was inconsistent with **Abd Elwahhab, et al., (2019)** ⁽²⁷⁾, who reported that more than one third of the patients had secondary education. *Furthermore*, the result was in the same line with **Fareed et al., (2017)** ⁽²⁸⁾ who reported that half of the studied patients had manual work and three quarters of his studied patients were from rural areas. *As regard to the clinical data among the studied patients; In relation to the past medical history*, the study results revealed that nearly two thirds and more than half of the control group patients had fracture, obesity and diabetes mellitus while more than half of the study group patients had fracture and osteoporosis. *In relation to the past surgical history*, the study results revealed that the majority of the control group patients had previous exposure to spinal anesthesia, previous lumbar puncture and cholecystectomy, while nearly half of the study group patients had previous exposure to spinal anesthesia and cholecystectomy. *In relation to the smoking history*, the study result revealed that approximately more than half of the control and study group patients had smoking history. *In relation to the duration of disease and use of analgesics*, it was found that all of the control and study group patients had lumbar disc disease since

more than six months and all of them used analgesics respectively. *In relation to the type of disc operation*, it was found that nearly half of the control and study group patients had undergone laminotomy \laminectomy and discectomy operations respectively. This finding was consistent with **Mohammed and AboElfadl (2021)** ⁽²⁹⁾ who reported that more than one third of his studied disc surgery patients had chronic disease, more than half of them had diabetes mellitus and more than one third of them had previous surgical operations. *Also*, it was in the same line with **Kim et. al, (2020)** ⁽³⁰⁾ who reported that more than one third of the patients undergoing disc surgeries were smokers. *Furthermore*, it was in the same line with **Ali and Hamed (2019)** ⁽³¹⁾ who mentioned that two thirds of the studied group patients undergoing disc surgeries had a herniated lumbar disk from 6 to 9 months. *Regarding to all levels of knowledge throughout all intervention periods of the study*; the study results revealed that; *concerning to the control group*; there was no significant improvement in their total levels of knowledge throughout all periods of routine hospital care. This can be attributed to the lack of knowledge provided to the control group patients by the nursing staff and lack of communication channels between the nurse and the patient. *On the other hand, Concerning to the study group*; there was a highly significant improvement in the patients' total levels of knowledge; this finding may be attributed to the effect of the provision of educational booklet with clear and simple written information which given to them. The current result was in agreement with **Mohammed and AboElfadl (2021)** ⁽²⁹⁾

who stated that there was statistically significant improvement among the studied patients undergoing disc surgeries throughout the teaching program about regarding pain management techniques post herniated disc surgery, wound care proper positioning post-surgery and discharge instructions whereas nearly one third of patients had satisfactory level of knowledge pre-program which improved to more than three-quarters who had satisfactory level of knowledge post-program. **Regarding the total level of neuro-vascular status among the studied groups throughout periods of study. Concerning to the control group;** there was no statistical significant difference in their total levels of neuro-vascular assessment throughout all periods of routine hospital care. **On the other hand, Concerning to the study group;** there was a highly significant improvement in the patients' total levels of neuro-vascular assessment. This can be attributed to the care provided by the researcher including movement of the patient after return of limb sensation, instructions about appropriate movement and how to get out of bed and get into bed using logrolling technique. This finding was in agreement with **Abdel Mohsen et.al, (2019)** ⁽³²⁾ who reported that there was a highly statistically significant enhancement in the neurovascular status pre to post application of the nursing rehabilitation guide about (breathing exercises, teaching about getting in and out of bed , going up and down stairs) where the majority of the study group patients undergoing lumbar disc surgeries had developed good neurovascular status post application of the nursing rehabilitation guide compared to nearly two thirds of them had

poor neurovascular status pre implementation of the rehabilitation program.

Regarding the levels of pain among the studied patients throughout the study, concerning to the control group patients, the study results revealed that; there was no statistical significant difference among the control group patients at the 2nd week and 3rd week of routine nursing care. **Comparing to the study group patients,** there was a high statistical significant improvement among the study group patients at the 2nd week and 3rd week of protocol of nursing care. This may be attributed to the strengthening and stretching of the back muscles and utilization of proper body mechanics resulted in increased stability of the lumbar spine and reduction of the lower back pain intensity. This finding was in consistence with **Carol, et al, (2017)** ⁽³³⁾ who concluded that, there was an obvious improvement in the levels of pain among lumbar spine surgery patients , as the majority of the studied patients undergoing lumbar spine surgeries had developed variant improvement degrees of pain including; nearly one third of the patients reported a little to moderate improvement in pain, nearly half of the patients reported a lot of improvement in pain, and nearly one fifth of the patients reported complete recovery from pain. **Concerning to distribution of the studied patients regarding total level of (ODI) throughout periods of study; regarding to the control group,** there was no statistical significant difference regarding levels of (ODI) at the 2nd and 3rd week post routine hospital care. **Comparing to the study group;** there was a high statistically significant improvement regarding levels of (ODI) at the

2nd and 3rd week post protocol of nursing care. This may be attributed to the instructions and guidelines about exercise program in the rehabilitation period that was directed to the study group patients by the researcher, proper movement and body mechanics that should be followed to facilitate sitting, standing, walking, sleeping and social life. It was in agreement with **Mohammed et.al, (2013)** ⁽³⁴⁾ who mentioned that a significant difference in the functional status and all variables of (ODI) was evident between the preoperative period and post operatively after implementing the exercise program among post lumbar laminectomy patients.

Conclusion and recommendation

Based on the finding of the present study, it can be concluded that, the implementation of protocol of nursing care had an effect on

increasing the level of patients' knowledge about disc disease, disc surgeries and its complications. Also it had an obvious effect on reducing the level of pain post-surgery and so improving the functional activities of daily living among study group patients. Disc surgery patients should be recommended to attend teaching programs about disc surgeries and the recommended exercises in the rehabilitation period. Also, Nurses should be encouraged to attend workshop and seminars held for disc surgeries to be acquainted with the most common complications and recent advances and skills in the field.

References

- 1) Colin T. Prolapsed Disc, Slipped Disc. Available at: <https://patient.info/bones-joints-muscles/back-and-spine-pain/slipped-disc-prolapsed-disc>.
- 2) Fjeld O, Grøvle L, Helgeland J, Småstuen M, Solberg T. and Zwart J. Complications, reoperations, readmissions, and length of hospital stay in 34 surgical cases of lumbar disc herniation. *Bone Joint J.* 2019;101-104:470-477.
- 3) Al Qaraghli M and Jesus O. Lumbar Disc Herniation. StatPearls Publishing. 2022. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK560878/>
- 4) Dydyk A, Massa R and Mesfin F. Disc Herniation. StatPearls Publishing. 2022. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK441822/>
- 5) Statistical Records. Tanta Main University Hospital. January to December 2020-2021.
- 6) Hsu P. Lumbosacral radiculopathy: Pathophysiology, clinical features and diagnosis. Available at: <http://www.uptodate.com/home>. Accessed 12 /2021.
- 7) Sciatica. American Academy of Orthopaedic Surgeons. Available at: <http://orthoinfo.aaos.org/topic.cfm>. Accessed at: 5/ 2020
- 8) Informed Health. Cologne, Germany: Institute for Quality and Efficiency in Health Care. 2006-. Slipped disc: Non-surgical treatment options. Available from:

- <https://www.ncbi.nlm.nih.gov/books/NBK279469/>. Accessed at 7/2021
- 9) Bhatia A, Flamer D, Shah PS, Cohen SP. Transforaminal Epidural Steroid Injections for Treating Lumbosacral Radicular Pain from Herniated Intervertebral Discs. *Anesth Analg.* 2016; 122(3): 857-870.
 - 10) Hébert A, Marcus R. and Fritz M. Postoperative rehabilitation following lumbar discectomy. *The Journal of orthopaedic and sports physical therapy.* 2019; 40 (7): 402-412 .
 - 11) Dinesh K. Peri-operative nursing care pathway: Fragments to fusion, isolation to integration. *Indian Journal of Continuing Nursing Education .* 2019; 20(2):87
 - 12) Zhao, Tian and Zhang B. Effects of rehabilitation nursing care on deep vein thrombosis of the lower limbs following spinal fractures. *American journal of translational research.* 2021; 13(3):1877–1883.
 - 13) Johns Hopkins medicine. Lumbar disc disease, Available at: <https://www.hopkinsmedicine.org/health/conditions-and-diseases/lumbar-disc-disease-herniated-disc>. Accessed at: 3/2020
 - 14) Thackeray A, Fritz J, Brennan G, Zaman F ,Willick S. A pilot study examining the effectiveness of physical therapy as an adjunct to selective nerve root block in the treatment of lumbar radicular pain from disk herniation: a randomized controlled trial. *Physical Therapy.* 2010; 90(12):1717-1729
 - 15) North American Spine Society. Evidence based clinical guidelines for multidisciplinary spine care. Available at <https://www.spine.org/Portals/ResearchClinicalCare/Guidelines/Lumbar Disc Herniation.pdf>. Accessed at 4/2020.
 - 16) Lutchman M ,Firsching R. Lumbar disc herniation: Evidence-based guidelines: a review. *The Indian practitioner.* 2016; 69(3):36-41.
 - 17) Lippincott Nursing Center, Neurovascular assessment. Available at: <https://www.nursingcenter.com/getattachment/ClinicalResources/nursing-pocket-cards/NeurovascularAssessment/NeurovascularAssessment.pdf>. Accessed at 4/2020
 - 18) Alicia W. Nursing Clinical Guidelines Neurovascular Observation. Approved by: Nursing Clinical Effectiveness Committee. Available at: https://www.rch.org.au/rchcpg/hospital_clinical_guideline_index/Neurovascular_observations/. Updated: 5/2019. Accessed at 3/2020
 - 19) Arbuck D and Fleming A. Assessment and Monitoring of Pain: Current Tools. Opioid Prescribing and Monitoring: Primary Care Models for Pain Management. 2nd ed. Centers for Disease Control and Prevention. 2016. Available at: <https://www.practicalpainmanagement.com/resource-centers/opioid-monitoring-2nd-ed/assessment-monitoring-pain-current-tools>.
 - 20) Fairbank J. and Pynsent P. The Oswestry Disability Index. *Spine J.* 2000; 25(22):2940-2952
 - 21) Davidson M , Keating J. A comparison of five low back disability questionnaires: reliability and responsiveness. *Physical therapy.* 2002; 82(1):8-24.

- 22) Gerstman B. *Basic Biostatistics: Statistics for public health practice*. 7th ed. Canada: Jones and Bartlett publisher Co, 2018: 339.
- 23) Bono C, Leonard D and Cha T . The effect of short (2-weeks) versus long (6-weeks) post-operative restrictions following lumbar discectomy: a prospective randomized control trial. *Eur Spine J*. 2017;26(3):905-12.
- 24) Hablass A, Mahmoud, and El-Fadl M. Effect of Applying an Educational Program for Patients with lumbar laminectomy on Their Knowledge and Self-Care Activities. *Journal of Biology, Agriculture and Healthcare*.2021;5(2):17-34.
- 25) Lorraine A. Boakye T. and Mitchell S. Post-Decompressive Neuropathy”: New-Onset Post-Laminectomy Lower Extremity Neuropathic Pain Different from the Preoperative Complaint. *Asian Spine J*. 2018;12(6):1043-1052.
- 26) Ahmed G, Mamdouh N, and Khalil M. Effectiveness of Structured Nursing Teaching Program on Outcomes of Chronic Low Back Pain Patients Undergoing Radiofrequency Ablation. *Journal of Health, Medicine and Nursing*. 2019;96(2021):55-65.
- 27) Abd Elwahhab A., Shehata A, and Abd Elghaffar S. Effect of Rehabilitative Nursing Program on Functional Status among Patients with Discectomy. *IOSR Journal of Nursing and Health Science*. 2019;8(6):82-92.
- 28) Fared M , Abd-Elkader M, and Henidy S. Effect of Superficial Hot Versus Cold Application on Low Back Pain among Patients with Disc Prolapse. *International Journal of Novel Research in Healthcare and Nursing*. 2017;4(3):255-264
- 29) Mohammed S. and Abo El-Fadl N. Effect of Educational Program for Patients Post Herniated Cervical Disk Surgery on Their Knowledge and Daily Living Activities. *International Journal of Novel Research in Healthcare and Nursing*. 2021;8(1):310-328.
- 30) Kim, Choi, and Chung . Nonsurgical treatment outcomes for surgical candidates with lumbar disc herniation . *Sci Rep*. 2021;11(2) : 3931.
- 31) Ali H. and Hamed S. Effect of Patients' Education on Their Performance and Outcomes Regarding Lumbar Disk Herniation. *Evidence-Based Nursing Research* . 2019 ;1 (2):93-101
- 32) Abdel Mohsen S. Ammar S. and Mohammed S. Effect of Nursing Rehabilitation Guide on Outcomes of Patients Undergoing Lumbar Discectomy. *IOSR Journal of Nursing and Health Science*.2019;8(3):1-11
- 33) Carol S, Carrington R, and Federico. Improvement in Pain after Lumbar Spine Surgery: the Role of Preoperative Expectations of Pain Relief. *Clin J Pain*. 2017; 33(2): 93–98.
- 34) Mohammed L, Ismail L and Abo K. Impact of Exercise Program on Functional Status among Post-lumbar Laminectomy Patients. *Journal of Biology, Agriculture and Healthcare*. 2013;3(10):62-72