Effect of Applying an Educational Program on Knowledge and Self-Care Activities of Patients Undergoing Lumbar Discectomy

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Abstract

Today, lumbar herniation discs, are a prevalent problem with a sign of lumbar and foot pain in society. Previous studies show that patient education and follow-ups are important, therefore, this study **aimed to** evaluate the effect of applying an educational program for Patients Undergoing Lumbar Discectomy on Knowledge and Self-Care Activities. **Design:** A quasi-experimental design was used to conduct this study. **Subjects:** A convenience sample of 50 adult patients admitted to the Neurosurgery Department, Alexandria Main University Hospital, diagnosed with lumbar disc prolapse, and scheduled for disc surgery. **Tools:** Four tools were used in the study. Tool I: Patients' assessment, Tool II: knowledge assessment questionnaire, Tool III: Barthel Index of Activities of daily living and Tool IV: Visual Analogue Pain Scale. **Results:** there were statistically significant changes in knowledge percent scores were detected in the study group post implementation of the educational program than pre. Additionally, the percentages of patients 'complains were decreased among the study group post application of the educational program and all the study group became independent post program implementation. **Conclusion**: Providing an educational program for such group of patients is effective to improve their knowledge and self-care activities. The study group had marked improvement in a satisfactory level of knowledge post-program implementation compared to the control group. **Recommendation:** The developed booklet with colored pictures which involving instructions about self-care activities must be distributed to each patient, undergoing lumbar disc herniation surgery in the neurosurgery department and outpatient clinics. Patient's family member should be taught postoperatively about the precautions and exercises to improve patient outcomes and self-care activities. As well as replication of the study on large probability sample is recommended.

Keywords: Educational Program, Lumbar Discectomy, Knowledge, Self-care Activities.

Introduction

Lumbar disc disease (LDD) is one of the most common spinal disorders worldwide. It is considered one of the most crucial health system problems and becomes a costly burden on society. It often results in physical impairment requiring surgery. Lumbar disc prolapses (LDP) is a primary cause of back pain and sciatica, affecting 1% to 5% of the population annually. LDP is a degenerative disorder of the spine in which a tear in the outer, fibrous ring of an intervertebral disc allows the soft, central portion to bulge out beyond the damaged outer rings. Tears are mostly postero-lateral owing to the presence of the posterior longitudinal ligament in the spinal canal. This tear in the disc ring may result in the release of inflammatory chemical mediators, which may directly cause severe pain, even in the absence of nerve root compression **[Schweitzer, Castello, &William, 2019; Jiang, H.et al.2022].**

Despite continued advances in operative technique, a significant number of patients fail to achieve pain relief and endure multiple follow-up treatments, in an often-futile attempt to alleviate their everlasting discomfort and suffering, such as patients diagnosed with failed back surgery syndrome (FBSS). On the other hand, nonsurgical care remains the mainstay of initial treatment and most cases of herniated disc heal conservatively **[Jiang, et al.2022; Dydyk, Massa, Mesfin, 2022]**. Moreover, recent studies proved that most patients with low back pain respond well to conservative and complementary therapies and only1% to 2%

of patients require surgical intervention **[Yehia, 2018]**.

The most common types of surgery are laminectomy and discectomy. Laminectomy is a surgical procedure to remove the posterior arch of a vertebra. It is performed to relieve pressure from the spinal cord or nerve roots emerging from the spinal canal **[Sharon, Dirksen, Heitkemper, 2017; Gibson, Waddell, 2018].** Whereas discectomy is performed to decompress the nerve root, this is a microsurgical technique that uses a very small incision through which the herniated intervertebral disc material is dissected and extracted. Such technique has two types: percutaneous laser discectomy, and micro discectomy.

The perioperative management includes; explaining to the patient where and when to arrive, as well as surgery time, instructing the patient about eating and drinking restrictions, medications that should be taken on the morning of surgery with a sip of water, as well remind the patient to wear comfortable clothing and to leave jewelry and valuables at home, also, tell the patient to remove dentures, partial plates, eyeglasses, contact lenses, nail polish, and sculptured nails **[Scheweizer, Baker, 2016]**.Preoperative nursing care for patients undergoing lumbar discectomy is primarily focused on decreasing pain, neurological assessment, and ensuring adherence to a proper diet. Nurses' duties include providing the patient with information about the preoperative preparation for surgery, postoperative care, and patient reassuring. The first problems that occur after surgery are related to the patient's physical reaction to general anesthesia. So, care at this stage is centered on alleviating post anesthesia symptoms [**Goodman** &**Spry, 2017]**.

Patients should be taught about the postoperative exercises, and their role in preventing complications. The postoperative exercises include turning, deep breathing, coughing, and extremity movement. Turning in bed and early ambulation help the patients maintain blood circulation, stimulate respiratory functions, and decrease the stasis of gas in the intestines which cause discomfort. Practice such exercises before surgery usually makes it easier for the patient to do it postoperatively. In some instances, the patient may need special aids, such as a pillow between the legs, to help maintain body alignment. Deep breathing exercise helps prevent postoperative pneumonia and atelectasis (incomplete expansion of the lung or a portion of the lung). Extremity exercises help to prevent circulatory problems, such as thrombophlebitis, by facilitating venous return to the heart **[Christine, 2018]**.

The most common complications post-surgery include recurrent disk prolapse, arachnoiditis, and chronic neuritis due to adhesions and scarring. Urinary retention and paralytic ileus are common problems due to intraoperative sympathetic nerve stimulation. Also, problems associated with prolonged immobility as venous thromboembolism, and anesthesia-associated complications may occur **[Desai and O'Brien, 2018]**. Patients with lumbar discectomy may experience either the same preoperative pain or more severe pain in the immediate postoperative period. This pain usually persists for several weeks postoperatively. Also, the patients may have muscle spasms in the lower back, abdomen, and thighs for the first few days after surgery **[Zhang, Li, Yu, Wang, 2021].**

Self-care was described by Orem as one of the modules of self-care nursing philosophy. The value of the self-care conception is linked to human's needs for preserving health and supporting recovery. While the absence of healthcare education, with insufficient access to health facilities for the whole community, will improved expenditure of the healthcare services. Self-care educational actions improve symptoms, reduce complications, shorten recovery period, decrease hospital stay and re-hospitalization rate **[Mohamed and Mostafa, 2018]**. In the immediate postoperative period, the nurse must monitor vital signs and observe the surgical wound. Attention should be paid to the patient's neurological condition including pain intensity assessment, active range motion of limb, as well the sensory and bladder functions. The nurse participates in physiotherapy aiming to prevent thromboembolic and respiratory complications and help the patient to regain mobility.

Nursing care also provides basic information about self-care, wound care, and to provide clear information about patients discharged **[Adugbire and Aziato, 2018]**.

The unique role of the nurses is to help patients and their families learn new behaviors that have a positive impact on their health and their lives. Much of this is accomplished through patient's education. As the nurse works with the patient mutually deciding what to teach, when to teach, and how to teach. Furthermore, the nurse needs to share with patient's worries and concerns regarding long-term care by developing a nurse-patient relationship that is based on understanding and trust in order to assist the patients to cope with their stress and improve their quality of life [**Khorais, Ebraheim, & Barakat, 2018]**. Nurses play avital role in improving quality of care of orthopedic patients through effective education. Patient education has been described as a planned, organized learning experience designed to facilitate voluntary adoption of behaviors or beliefs conducive to health through influencing the patient's knowledge and health behavior. Traditionally patient education has focused on providing information and technical skills, however, there is a move towards self-management through directed education that facilitates patients taking an active role in identifying their problems, provides techniques and skills that help them to take the appropriate decisions and actions as they encounter changes in their health condition or circumstance **[Jones and Rivett, 2019]**. Also, there are insufficient patient regular education that related to orthopedic nursing, as well; there are a need to develop the educational practices which increased in the international nursing research.

Aim of the study:

The present study aimed to evaluate the effect of applying an educational program for Patients Undergoing Lumbar Discectomy on Knowledge and Self-Care Activities.

Research hypotheses:

1- Patients in the study group who exposed to the educational program will exhibited an improvement in the mean score of self-care activities than patients of the control group.

2- Patients' wo exposed to the educational program will exhibit an improvement in knowledge mean score than patients of the control group who do not exposed to the educational program.

Material and Methods

I-Material

Research design:

A quasi-experimental design was used in this study.

Setting:

This study was conducted at the Neurosurgery Department, Alexandria Main University Hospital. It contains three rooms, including 20 beds for patients with lumbar disc prolapse.

Subjects:

The study included a convenience sample of 50 patients, admitted to the above-mentioned study setting, diagnosed with lumbar disc prolapse and scheduled for disc surgery, and randomly assigned in two equal groups (study and control) 25 patients in each.

- **Group I:** (study group): received the developed educational program along with routine hospital care.
- **Group II:** (control group): received routine hospital care only.

The Epi info 7 program was used to estimate sample size using the following criteria:

- The total population is estimated at 136.
- Expected frequency: 50%.
- The maximum margin of error: 15%.
- Confidence coefficient: 95%.
- Estimated sample size (50).

Inclusion criteria of the patients:

- Adult patients, aged from 18 to 60 years old.
- Patient who is conscious and able to communicate verbally.
- Clinically diagnosed with lumber disc prolapse and undergoing lumber discectomy

- Patients willing to participate in the study.

Exclusion criteria of the patients: as evident from patients' file

- Patients with physical or mental handicapped.
- patients Disoriented & comatose.
- Patients on mechanical ventilation.
- Patients with hemiplegia or quadriplegia.

Tools: Data was collected using the following tools:

Tool I: Patients' Assessment

This tool was developed by researchers in the Arabic language after reviewing the relevant related literature (Adugbire,2018; Ali & Hamed, 2019) and it included two parts:

Part 1: Demographic Characteristics of Patients:

It included data related to; age, gender, marital status, level of education, residence, number of family members, occupation, and current work situation

Part 2: Patients' Health History

It was composed of twenty-four questions. It involved, the present health history, past medical and surgical history, family history, medications, allergy, bowel, and urinary assessment, and diagnostic studies.

Tool II: Knowledge Assessment structure interview schedule

This interview schedule was developed by the researchers after reviewing the related literature (Adugbire,2018; Ali & Hamed, 2019). It was composed of 45 closed-ended questions to assess the patients' knowledge. It involved knowledge about the following items:

- Definition of the lumbar disc "one question".
- Risk factors for lumbar disc prolapse "eleven questions".
- Signs &symptoms of lumbar disc prolapse "six questions".
- Postoperative precautions "seven questions".
- Postoperative exercises "ten questions".
- Postoperative complications must be followed by the physician "ten questions".

Scoring System:

Each item in the questionnaire was given one score with a total score being 45 scores (100%). One score was given for each correct answer and a zero score for the wrong answer. These scores were summed-up and converted into a percent score (%). It was categorized as follows:

- **Total score < 75 %** was considered "an unsatisfactory level of knowledge".
- **Total score ≥ 75 %** was considered "a satisfactory level of knowledge".

Tool III: **Barthel Index of Activities of Daily Living**

This tool was adapted from **(Jain, 2017)** and modified by the researchers to assess the patient's ability to perform activities of daily living independently. The scale was composed of ten categories (bowels, bladder, grooming, toileting, feeding, transferring, mobility, dressing, climbing stairs, and bathing). Each category has three Likert scale items "completely dependent, need assistance, and independent".

Scoring System:

The scores responses for every item were as follows: Completely dependent was scored zero, need assistant was scored 1, and Independent was scored two. The total scores for independency level ranged from 0-20, the higher scores reflect the higher independence level. It was categorized as the following:

- 0- 6 considered "completely dependent".
- 7-13 considered "need assistance ".
- 14-20 considered "independent".

Tool IV: Visual Analogue Pain Scale:

It was adopted by the researchers from **(Griensven, Strong, and Unruh, 2019)** to assess the intensity of pain levels for patients with lumbar discectomy. The scale was composed of five items ranging from "no pain" to "worst pain possible".

Scoring System:

The total scores on the visual analog pain scale ranged from (0-10), the higher scores

reflect the worst pain. It was categorized as the following:

- 0 considered "no pain".
- 1-3 considered "mild pain".
- 4-6 considered "moderate pain".
- 7-9 considered "severe pain".
- 10 considered "worse pain possible".

1. Approval from the ethics research committee, Faculty of Nursing Alexandria University was obtained.
2. Approval from research affairs committee was obtained.
3. An official letter was obtained from the Faculty of Nursing Alexandria University to the administrative authorities in Alexandria Main University Hospital, the Neurosurgery Department to take their permission to carry out the study after explaining its purpose.
4. An official approval was obtained from the administrative authorities' department heads in the identified setting to take permission to carry out the study after explaining its purpose.

Content validity

- The tools and the program were revised and ascertained by a panel of five experts (jury) from Medical Surgical Nursing Department, Faculty of Nursing, Alexandria University (one professor and three assistant professors), and Mansoura University (one professor). Their opinions were regarding the content, format, layout, consistency, accuracy, and relevancy of the tools. According to their opinion, minor modifications were applied.

Reliability

- Testing reliability of the developed tools was done statistically through Cronbach's Alpha test which was 0.96 for the patient's knowledge scheduled interview while 0.80 for the Barthel Index.

The educational program for patients undergoing lumbar discectomy. It aimed to improve the neurological status, decreased pain level, improve functional abilities, and absence of complaints, or problems in those patients. The program was developed by the researchers in the Arabic language based on patient assessed needs after reviewing the relevant related literature and it consisted of two parts:

Ethical Consideration:

- Witness informed written consent was obtained from patients after explanation of the aim of the study.
- Patients were informed that his or her participation in the study is voluntary and he/she can withdraw at any time.
- Privacy of the study participants was asserted.
- Data confidentiality was assured.

Pilot study:

A pilot study was conducted on 10% of the study sample (five) patients with a lumbar discectomy to test the feasibility, clarity, and applicability of the tools then necessary modifications were carried out. Also, the pilot study served to estimate the time needed for each patient to fill in the data collecting tools. The patients who were included in the pilot study were excluded from the study sample because minor modifications were done after conducting the pilot study.

Data collection:

The fieldwork was performed over six months starting from the beginning of March 2021 till the end of August 2021. The study was conducted in five phases: Preparatory, assessment, planning, implementation, and evaluation phase as follows**:**

1- Preparatory Phase:

- It included reviewing the current and past available literature. Using books, articles, and magazines to develop the tool for data collection. Official permission for data collection and implementation of the research was obtained from the Dean of the Faculty of Nursing to the chief administrator of Alexandria University

Hospital to request permission and cooperation to conduct the study.

- An informed consent was taken from patients after explaining the purpose of the study.

2- Assessment phase: (for both study and control group).

- During this phase the researchers interviewed each patient after his/her admission to the hospital to collect baseline data on demographic data, medical data, and knowledge assessment using tool I and II for both the study and control group.
- Both groups were assessed for the ability to perform activities of daily living independently using tool III (Barthel Index of Activities of Daily Living).
- Both groups were assessed for pain using tool IV (Visual Analogue Pain Scale).
- Both groups were assessed for activities of daily living and pain using tool II and tool III.

3- Planning phase: this phase started with designing an educational program:

4- Educational program: Lumbar discectomy Booklet

1- Designing an educational program for patients who participated in the study.

The expected outcome:

Improving knowledge and performing self-care activities related to Lumbar discectomy.

Content of the educational program:

1- Theoretical part: booklet was developed to be distributed to each patient.

It included brief anatomy about the spinal column, definition, indications for a lumbar discectomy, and related diagnostic procedures. Information about the preventive measures of postoperative complications, ADLs, how to deal with pain, wound care, follow-up, and discharge guidelines**.**

2- Practical part: demonstration was done for each patient as needed.

It included lifestyle modifications regarding weight control, rest, physical activity and exercises, smoking cessation, stress reduction, control of medical comorbidities such as diabetes mellitus and hypertension, etc. ….

Teaching methods:

All the patients received the same educational content using the same teaching methods, which included the following: lectures, Practical training, Group discussion and demonstration on patients.

The teaching aids:

Suitable teaching aids were specially prepared for the program as PowerPoint presentations, videotapes, posters, and booklets.

5- Implementation phase:

- The researchers start with a group (II) firstly to avoid contamination of data then the study group. The total number of the studied sample was 50 patients. It was difficult to take all patients at the same time. Thus, they were divided into 13 groups. Each group contains four patients in every session. The researchers attended two days a week Sunday -Wednesday from 9:00 AM to 4:00 PM.
- The researchers met the study group for five sessions: Two sessions for theory, two sessions for practice, and one session for revision. Each session lasted for 50-60 minutes, including the period of discussion. The program has been implemented through (72) sessions and total hours for sessions 36-48 hours.
- The patients presented all the time sessions, and the duration of each session was variable, according to its contents as well as the patient's response.
- An orientation to the educational program and its process was presented. Each session started with a summary of what had been given through the previous session, then the objectives of the new topics, taking into consideration the use

of simple language to suit the level of patients' education.

- Discussion, motivation, and reinforcement during the program sessions were used to enhance learning. All patients were cooperative with the researchers and at the end of each session the patients participated in the discussion to correct any misunderstanding. Also, they were informed about the time of the next session.

4- Evaluation phase: for the two group at the same time

- By using the same tools and at the same time the researchers reassessed the knowledge and self-care activities of the control group using the same tools and for the same topic.
- A comparison between both groups (study group (I) and control group (II) was done two times: first on admission before implementation of the educational intervention and the second time done after two weeks from intervention (Abboud, 2014).
- After two weeks the researchers evaluated both groups for self-care activities and assessed the patient's knowledge using tool (II) knowledge assessment questionnaire, tool III (Barthel Index of Activities of daily living and tool IV (Visual Analogue Pain Scale).
- Comparison was done between the two groups at the end of the study to evaluate the effect of applying the educational program for patients with lumbar discectomy on knowledge and self-care activities.

Statistical Analysis:

Results were collected, statistically analyzed by personal Computer using Statistical Package of Social Science (SPSS) version 25 and tabulated. A variety of statistical methods were used to analyze data as qualitative variables such as frequencies and percentage (%) and quantitative variables that were presented as mean (x) and standard deviation (SD).

The used test was:

The Chi-square test (x^2): was used to study the association between two qualitative variables.

Levels of significance:

Statistical significance was considered as follow:

- P-value > 0.05 = non-significant
- P-value < 0.05 = significant
- P-value < 0.001 = highly significant

Results:

Table 1 Showed the frequency distribution of patients of both groups according to the demographic characteristics. Regarding patients' age, the results revealed that the highest percentage of patients among the control and study groups 48.0%, and 36.0% respectively, were between 30<40 years old of age. Concerning patients' gender, the highest percentage of patients in the control group (68.0%) were female, while the highest percentage of patients in the study group (52.0%) were male. As regards occupation, the highest percentage of patients in the control group (52.0%) were housewives, while the highest percentages of patients in the study group (60.0%) were laborers. Regarding the educational level, the highest percentage of patients in both groups control and study were illiterate (40.0% and 56.0% respectively). Furthermore, the lowest percentage in both groups (4.0%) were primary school graduates. As regards marital status, the highest percentage of patients in both the control and study groups (84.0 % and 80.0% respectively), were married. Regarding the area of residence, the highest percentage of patients in the control group (56.0%) was from rural areas, while (60.0%) of the study group were from urban areas with no statistically significant difference between the two groups regarding all items, so both groups are homogenies.

Table 2 showed the frequency distribution of patients in both groups according to medical data. As regards to the chief complaints, the highest percentages were complaining from low back pain and sciatica

in both the control and study groups' 96.0% ,100.0% and 96%, 92%, respectively. Most patients in both the control and study groups 36. 0% and 24.0%, respectively, had previous hospitalization, while 16.0% of the control group and 4.0% of the study group, had previous back surgeries. In relation to the associated diseases, patients in the control group had DM and hypertension (24.0% and 20.0%, respectively), while only 8% of patients among the study group had hypertension. In relation to administration of prescribed current medication, the highest percentage of patients in both control and study groups 80.0% and 100.0%, respectively, were on pain killers/analgesic.

Table 3 showed distribution of patients in the control and study group regarding the characteristics of low back pain and its severity. In relation to the severity of low back pain, majority of patients in both control and study groups during the preoperative period, had severe low back pain (64%, and 72%, respectively). On the 3rd day postoperative, the highest percentages of patients in the control and study groups, (60%, and 48%, respectively) were developing moderate pain. On the 15th day postoperatively, (60.0%) of the control group had moderate pain, and (56.0%) of the study group had mild pain, with statistically significant difference between the detected pain scores for the studied group on the 15th day postoperatively, compering to the preoperatively assessed score with P=0. 0001.

Table 4 showed variation in the knowledge score among the control and study groups, and after the educational program than before. As evident from the table, there are statistically significant difference between knowledge percent scores which were elicited among the study group post educational program implementation than before regarding to, meaning of Lumber Disk Prolapse, predisposing factors, manifestations, and postoperative precautions after lumbar discectomy surgery, with p= 0.0001.

Table 5 This table showed the majority of the patients in the control and study groups 92. 0%, and 100%, respectively, had preoperative low back pain, and 80%, and 88%, respectively had impaired physical mobility. These percentages were decreased in the study group to 36%, and 8%, after implementation of the educational program. Postoperatively, high percentages of the controls 100%, and 68%, respectively, had a knowledge deficit regarding condition, and anxiety. There were highly statistically significant differences between the control and study group patients, regarding postoperative complaints, including; "pain", "impaired physical mobility", "anxiety", "ineffective tissue perfusion", "skin integrity impaired", as well as "knowledge deficit regarding condition".

Table 6 showed no statistically significant differences between study and control groups before and after program implementation regarding all items of Barthel Index Scale except in transferring and climbing stairs**.**

Figure 1 shows that nearly three quarter (74%) of the study groups patients need assistance with activity of daily living preprogram while all (100%) the study group became independent post program **implementation**.

Table (1): The Frequency Distribution of Patients of Both Groups According to The Demographic Characteristics:

Personal Characteristics	Control group (n=25)		Study group (n=25)	
	No.	%	No.	%
Age in years				
• 20<30			3	12.0
• 30<40	**12**	**48.0**	**9**	**36.0**
• 40<50	10	40.0	7	28.0
• 50≤60	3	12.0	6	24.0
Gender				
• Male	8	32.0	**13**	**52.0**
• Female	**17**	**68.0**	12	48.0
Occupation				
• Laborer	4	16.0	**15**	**60.0**
• Clerical	2	8.0		
• Professional	2	8.0		
• Housewife	**13**	**52.0**	10	40.0
• Retired	4	16.0		
Level of education				
• Illiterate	**10**	**40.0**	**14**	**56.0**
• Read &write	5	20.0	8	32.0
• Primary	1	4.0	1	4.0
• Secondary	6	24.0	2	8.0
• University	3	12.0		
Marital status				
• Single	2	8.0	4	16.0
• Married	**21**	**84.0**	**20**	**80.0**
• Divorced/widow	2	8.0	1	4.0
Area of residence				
• Rural	**14**	**56.0**	10	40.0
• Urban	11	44.0	**15**	**60.0**

* Statistically significant at $p \leq 0.05$ Insignificant at $p > 0.05$

Table 2: Frequency Distribution of patients of both groups according to Medical Data:

Medical condition	Control group (n=25)		Study group (n=25)	
	No.	%	No.	%
Chief complaints				
• Low back pain	**24**	**96.0**	**25**	**100.0**
• Sciatica	**24**	**96.0**	**23**	**92.0**
• Paresthesia	5	20.0	6	24.0
• Numbness in lower limbs	4	16.0	13	52.0
• Weakness in lower limbs	7	28	9	36
• Disability	16	64	5	20
Past history				
• Absent	12	48	**19**	**76**
• #Present	**13**	**52**	7	28
▪ Previous hospitalization	**9**	**36**	**6**	**24**
▪ Previous back surgery	4	16	1	4
Associated disease	**(n=9)**		**(n=2)**	
▪ DM	6	24	1	4
▪ IHD	1	4		
▪ Chronic constipation	1	4		
▪ Hypertension	5	20	2	8
Prescribed current medications				
• Corticosteroids	5	20	1	4
• Non-Steroidal Anti-Inflammatory (NSAI)	11	44	4	16
• Muscle relaxant	17	68	21	84
• Pain killer/analgesics	**21**	**84**	**25**	**100**

Categories are not mutually exclusive

Table 3: Distribution of patients in the control and study group regarding the characteristics of low back pain and its severity.

Severity of pain	Preoperative					3rd day postoperative					15th day postoperative				
	Control group (n=25)		Study group (n=25)		Sig	Control group (n=25)		Study group (n=25)		Sig	Control group (n=25)		Study group (n=25)		Sig
	No.	%	No.	%		No.	%	No.	%		No.	%	No.	%	
• None	3	12									1	4	10	40	
• Mild	2	8			0.107			11	44	0.0001*	7	28	14	56	0.0001*
• Moderate	4	16	7	28		15	60	12	48		15	60	1	4	
• Severe	16	64	18	72		10	40	2	8		2	8			

*Significant at P≤0.05

Table 4: Mean Percent Score of Patients level of Knowledge regarding Lumber Disk Prolapse among the Control and Study Groups.

Knowledge score (%)	Preoperative		Postoperative		Control group Z&P value (pre/post)	Study group Z&P value (pre/post)
	Control group (n=25)	Study group (n=25)	Control group (n=25)	Study group (n=25)		
Meaning and risk Factors of LDP					Z(W)=0.0 P=1.0	Z(W)=4.303 P<0.0001*
Min-Max	8.3-41.7	0.0-41.7	8.3-41.7	25.0-58.3		
Mean±SD	23.0±9.1	12.7±12.3	23.0±9.1	44.0±9.2		
Sig (control/study groups)	Z=3.43 P=0.001*		Z=5.372 P<0.0001*			
Signs & symptoms of LDP					Z(W)=0.0 P=1.0	Z(W)=4.311 P<0.0001*
Min-Max	33.3-66.7	0.0-66.7	33.3-66.7	33.3-83.3		
Mean±SD	38.6±9.3	20.7±18.2	38.6±9.3	53.3±13.6		
Sig (control/study groups)	Z=3.978 P<0.0001*		Z=4.0 P<0.0001*			
Postoperative Precautions					Z(W)=0.577 P=0.465	Z(W)=4.38 P<0.0001*
Min-Max	16.7-36.7	0.0-43.3	16.7-36.7	30.0-66.7		
Mean±SD	22.7±5.7	4.3±9.2	22.8±5.8	49.1±8.6		
Sig (control/study groups)	Z=5.602 P<0.0001*		Z=5.978 P<0.0001*			
Composite Score					Paired t=0.569 P=0.574	Paired t=19.825 P<0.0001*
Min-Max	16.7-35.4	0.0-45.8	16.7-35.4	33.3-60.4		
Mean±SD	24.8±5.4	8.4±9.8	24.8±5.5	48.3±7.6		
Sig (control/study groups)	t=7.276 P<0.0001*		t=12.511 P<0.0001*			

t: t-test or paired t-test Z: Mann Whitney test Z (W): Wilcoxon signed ranks test *significant at P≤0.05.

Table 5: The Frequency Distribution of Patients Complains of Both Groups Pre and Postoperative Discectomy Surgery.

Complaints	Control Group (n=25)				Study Group (n=25)				Significance
	Absent		Present		Absent		Present		
	No.	%	No.	%	No.	%	No.	%	
Preoperative									
1. Pain	2	8	23	92	0	0.0	25	100	FEP=0.49
2. Impaired physical mobility	5	20	20	80	3	12	22	88	FEP=0.702
3. Anxiety	6	24	19	76	1	4	24	96	FEP=0.098
Postoperative									
1. Pain	3	12	22	88	16	64	9	36	P<0.0001*
2. Impaired physical mobility	5	20	20	80	23	92	2	8	P<0.0001*
3. Anxiety	8	32	17	68	22	88	3	12	P<0.0001*
4. Ineffective tissue perfusion	15	60	10	40	24	96	1	4	P=0.002*
5. Constipation	18	72	7	28	24	96	1	4	P=0.747
6. Urinary retention	19	76	6	24	22	88	3	12	FEP=0.463
7. Skin integrity impaired.	25	100	0	0.0	24	96	1	4	P=0.001*
8. Knowledge deficit regarding condition	0	0.0	25	100	23	92	0	0.0	P<0.0001*

P: P value for Chi-Square test **FEP: Fisher's Exact test** ***significant at P≤0.05**

Table (6): Distribution of patients in both groups regarding their Barthel index scale pre and post program implementation

Barthel index scale	Pre -program				Post–program				Comparing between the studied groups		Comparing between the studied periods	
	Study (n = 50)		Control (n = 50)		Study (n = 50)		Control (n = 50)		χ^2_1 (p_1)	χ^2_2 (p_2)	p_3	$^{MH}p_4$
	No.	%	No.	%	No.	%	No.	%				
Bowel												
Independent	28	56.0	35	70.0	42	84.0	35	70.0	4.178 (0.124)	6.790* (^{MC}p=0.039*)	^{MH}p <0.001*	^{MH}p= 1.000
Need assistance	18	36.0	9	18.0	8	16.0	9	18.0				
Dependent	4	8.0	6	12.0	0	0.0	6	12.0				
Bladder												
Independent	35	70.0	35	70.0	43	86.0	35	70.0	7.551* (^{MC}p=0.021*)	7.154* (^{MC}p=0.027*)	^{MH}p= 0.021*	^{MH}p= 1.000
Need assistance	15	30.0	9	18.0	7	14.0	9	18.0				
Dependent	0	0.0	6	12.0	0	0.0	6	12.0				
Grooming												
Independent	16	32.0	16	32.0	36	72.0	16	32.0	0.971 (0.615)	18.277* (<0.001*)	^{MH}p <0.001*	^{MH}p= 1.000
Need assistance	22	44.0	18	36.0	11	22.0	18	36.0				
Dependent	12	24.0	16	32.0	3	6.0	16	32.0				
Toiling												
Independent	10	20.0	23	46.0	33	66.0	23	46.0	9.326* (0.009*)	8.266* (^{MC}p=0.015*)	^{MH}p <0.001*	^{MH}p= 1.000
Need assistance	25	50.0	21	42.0	17	34.0	21	42.0				
Dependent	15	30.0	6	12.0	0	0.0	6	12.0				
Feeding												
Independent	31	62.0	40	80.0	50	100.0	40	80.0	3.934* (0.047*)	11.111* (0.001*)	^{McN}p <0.001*	^{McN}p= 1.000
Need assistance	19	38.0	10	20.0	0	0.0	10	20.0				
Transferring												
Independent	4	8.0	11	22.0	32	64.0	11	22.0	5.095 (0.078)	30.283* (<0.001*)	^{MH}p <0.001*	^{MH}p= 1.000
Need assistance	28	56.0	19	38.0	18	36.0	19	38.0				
Dependent	18	36.0	20	40.0	0	0.0	20	40.0				
Mobility												
Independent	4	8.0	11	22.0	32	64.0	11	22.0	5.095 (0.078)	30.283* (<0.001*)	^{MH}p <0.001*	^{MH}p= 1.000
Need assistance	28	56.0	19	38.0	18	36.0	19	38.0				
Dependent	18	36.0	20	40.0	0	0.0	20	40.0				
Dressing												
Independent	21	42.0	16	32.0	37	74.0	16	32.0	4.597 (0.100)	25.127* (<0.001*)	^{MH}p <0.001*	^{MH}p= 1.000
Need assistance	22	44.0	18	36.0	13	26.0	18	36.0				
Dependent	7	14.0	16	32.0	0	0.0	16	32.0				
Stairs												
Independent	4	8.0	5	10.0	35	70.0	5	10.0	1.221 (^{MC}p=0.635)	41.649* (<0.001*)	^{MH}p <0.001*	^{MH}p= 1.000
Need assistance	28	56.0	32	64.0	15	30.0	32	64.0				
Dependent	18	36.0	13	26.0	0	0.0	13	26.0				
Bathing												
Independent	18	36.0	30	60.0	42	84.0	29	58.0	15.000* (0.001*)	8.208* (0.004*)	^{MH}p <0.001*	^{McN}p 1.000
Need assistance	20	40.0	20	40.0	8	16.0	21	42.0				
Dependent	12	24.0	0	0.0	0	0.0	0	0.0				
Overall												
Dependent	3	6.0	0	0.0	0	0.0	0	0.0	2.820 (^{MC}p=0.264)	61.290* (<0.001*)	^{MH}p <0.001*	^{McN}p 1.000
Need assistance	37	74.0	38	76.0	0	0.0	38	76.0				
Independent	10	20.0	12	24.0	50	100.0	12	24.0				

χ^2: **Chi square test** MC: **Monte Carlo MH: Marginal Homogeneity Test**

p_1: p value for comparing between the studied groups in **pre** period

p_2: p value for comparing between the studied groups in **post**-period

p_3: p value for comparing between the studied periods in **Study** groups

p_4: p value for comparing between the studied periods in **Control** groups

*: Statistically significant at $p \leq 0.05$

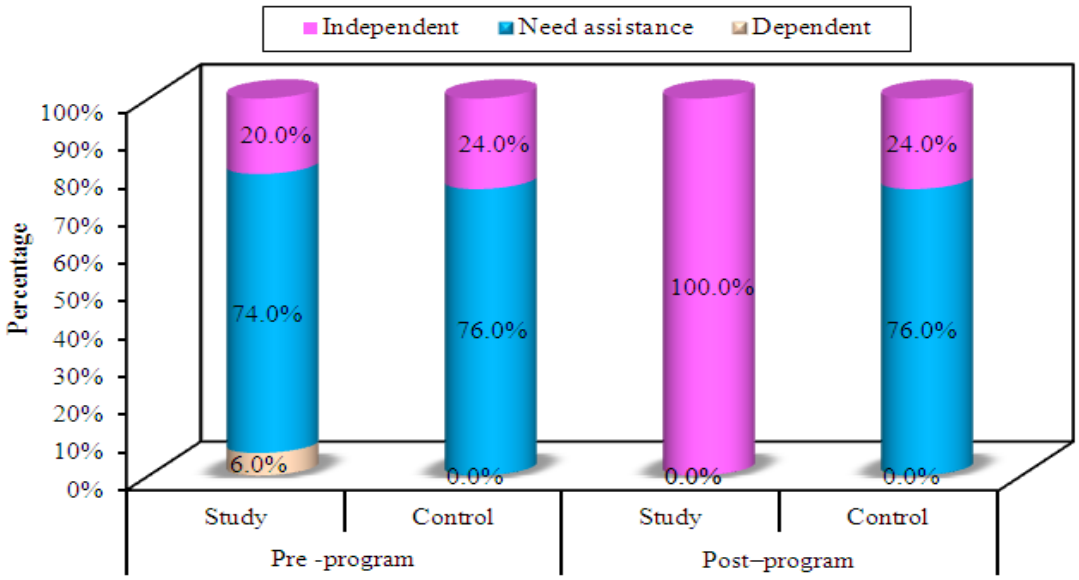

Figure (1): Distribution of patients among both groups regarding their overall Barthel index scale pre and post program implementation

Discussion

Nearly 80% of the population sustains an episode of LBP once during their lifetime. The most frequent potential causes of LBP is intervertebral disc degeneration, which causes degenerative disc disease (DDD) and lumbar disc herniation (LDH). Sciatica and lumbar intervertebral disc prolapse have received a lot of attention recently. The complexity of making the correct diagnosis not decreased despite the fact that spinal surgery has evolved significantly over the previous few decades. The frequency of unsuccessful back surgeries is rising even in the presence of cutting-edge radiological procedures like MRI (with or without contrast) and CT (with or without myelogram) **[Jain, Mathur, Sharma, Rawall, & Sharma,2020]**.

Lumbar discectomy is one of the most commonly performed spinal surgical procedures for the treatment of a wide variety of pathologies **[Karukonda, Mancini, Katz, Cote, et al., 2020]**. The need for information is reported to be a significant theme amongst qualitative spinal surgery studies, as the patients expressing a need for individualized information to be given in sufficient quantities and at the appropriate time. Perioperative education is a core component of enhancing recovery after surgery pathways that aims to empower patients and their families to undertake positive health actions and support autonomous decision-making. Providing patients with the necessary health-related information, teaching them skills aims to reduce discomfort, complications and offering psychological support, all that could improve their coping ability and subsequently engage in appropriate attitudes and behaviors toward their condition **[Burgess, Wainwright, 2019]**.

The success rates of lumbar disc surgery range from 60-97%, depending on the criteria selected for assessing the results of the surgery. In general, following lumbar disc surgery, the health team providers showed assessing postoperative pain intensity, disability, performance, and physical activity as subjective, components which affected by illness and treatment is critical. The postoperative evaluation also contributed to pain relief, and ultimately to surgical success. Traditionally, standard clinical assessments of lower back pain (LBP) after herniated disc surgery focused on the degree of impairment in the lower back, specifically the range of motion and muscle strength as they relate physically to patients back **[John M, Michael, William, 2016]**.

The findings of the current study showed that most of the studied patients in both groups were adults. In this context, the most clinically relevant herniation occurs between the ages of 30 and 50 years old, additionally, **[Fuji, 2013; Onget, N. Ogengo, Gakuu, 2019]** found that lumbar disc herniation occurs in every adult age, between 30-50 years old, but it is less frequent in /the elderly. This may be related to the strong association between adulthood and over activity as simply; adulthood is the active period of life. Adulthood period associated with many activities, responsibilities, and stressors. On the other hand, various psychological and social variables play a role in developing and increasing LDP in this period of life.

Considering the associated diseases, the current study declared that about one-third of the patients had hypertension. This may be related to effect of hypertension and diabetes on circulation and blood supply to the vertebrae. Furthermore, patients with diabetes may have coexisting diabetic neuropathy, and the associated microvascular disease that affects the spinal nerve roots, or to the failure of the nerve roots of such group of patients to be recovered after decompressive procedures. In this context **[Rahman, Karppinen, Arjas, 2017]** stated that no consistent associations were found between lumbar radicular pain and high blood pressure. In addition, most of the patients had diabetes mellitus. On the other hand, [**Jain, Mathur, Sharma, Rawall, Sharma, 2020.]** mentioned that diabetes mellitus and hyperlipidemia are one of the etiological factors of LDP because they affect the microcirculation of the disc.

In the current study, the majority of study patients had received preoperative analgesics, muscle relaxants, and NSAIDs. This finding confirms the data mentioned in paper done by **[Luchtmann & Firsching, 2016]** who mentioned that NSAIDs and acetaminophen (Parcetamol) are recommended during the first short-term period of pain. Strong analgesics such as opioids are reserved for patients with severe pain and should not be prescribed for longer than a few weeks. Moreover, this observation is in line with **[Huffman, Chou, 2017]** who found that the most prescribed medication for LDP are NSAIDs, skeletal muscle relaxants, and opioid analgesics. This may be related to that these medications are classical drugs to control back pain among those group of patients.

In relation to the severity of low back pain, the majority of patients in the preoperative period had severe low back pain. This confirms the diagnosis of LDP and consequent pressure. Moreover, **[Chang, Lai, Yip, 2019]** stated that lumbar intervertebral disc herniation is a common disease presenting with low back pain and radiculopathy. On the other hand, most of the studied patients had mild /or no low back pain during the 15th postoperative day period. This may be firstly related to the positive effect of the surgical maneuver and implementation of the educational program. This result is congruent with **[Steven, Robert, and Yen, 2018]** who stated that, patients surgically treated with a herniated lumbar disc relieved complete from leg pain with improvement in lumbar function and get satisfaction postoperatively.

Regarding the pain score, (JOA BPEQ), noticed that there was a statistically significant difference between the control and study groups during the 15th postoperative day period regarding low back pain. This result contradicts with **[Matthew, Giannina, &Garcés, 2019]** finding, who reported an increased incidence of long-term recurrent back and leg pain after discectomy. From the researchers' point of view, it may be return to decompression effect of surgery and positive role of educational program.

Concerning lumbar function, it was noticed that there was a statistically significant difference between control and study group subjects preoperative and on the 15th postoperative day period. This finding may be referred to the effect of educational program on improving level of activity of those group of patients. This result is in line with **[Postacchini, 2019]** who found that micro discectomy, results in reduced back pain, allows a more rapid functional recovery, faster return to sedentary work, and patient completely recovered after surgery.

Regarding walking ability, it was noticed that there was a statistically significant difference between the control and study

groups on the 15th postoperatively day period. This result is in line with **[Jansson, Németh,** and **Granath, 2019]** who investigated the preoperative and one-year postoperative health-related quality of life outcomes and concluded that before the operation 27% of the patients could walk more than 500 meters, while, after the operation 65%, of the patients were able to walk 500 meters or more. These findings may be related to positive effect of the educational program on walking ability of patients.

As regards social life functions, it was observed that there was a statistically significant difference between the control and study groups, on the 15th postoperative day period. From the researchers' point of view these may be related to the effect of symptoms especially pain which decrease patients' ability to be active on the social life. These finding are similar with **[Seidler, Bergmann, Jäger, 2019]** who concluded that the psychological strain at work, and in particular pressure time are more common among cases with symptomatic disc herniation than in healthy persons **[Lamp, 2018]** suggested that pronounced family problems play a role in the modulation of pain, but the empirical support for this assumption is insufficient. **Block, Ohnmeiss, Guyer, 2016,** in a study done by them, found that social support from the spouse in terms of overprotection, and family reinforcement of pain, have all been associated with a negative outcome after spine surgery.

Regarding mental health, it was evident that there was a statistically significant difference between the control and study groups in the 15th postoperative day period, these may be related to positive effect of both surgery and educational program to control patients' symptoms which affect secondly on the mental and psychological health. These results are in accordance with **[Merten, 2018]** who stated that psychological and mental key dimensions as distress, anxiety, and depression, all of which have a negative influence on the outcomes of patients after disc surgery. Cognitive components are represented by attitudes, beliefs, and cognitions concerning pain, disability, and perceived health. These factors play an important role in the development of non-specific low back pain disability after disc surgery.

The current study elicited that there were statistically significant differences between the control and study groups, during the 15th postoperative day period, concerning affection for traveling. This finding may be related to positive effect of both surgery and educational program. This result also is congruent with **[Häkkinen, Kautiainen, Järvenpää 2017] a study** carried out by them on ninety-eight female and male patients, pre and post-surgery for LDH. The results of this study concluded that preoperatively, females were more disabled regarding walking, sexual life, social life, and traveling activities compared to males. Most improvement occurred during the first 6 weeks after surgery by 88% among females and 80% among males, with minor changes among females. In males, the changes were greatest regarding pain, social life, and traveling activities. Thise could be related to decreased aggressive activity and hard work among females.

The current finding noticed a statistically significant improvement among patients during the 15th-day period post-surgery after implementing the educational program. Besides **[Silverplats, 2020]** reported that his studied patients were dissatisfied with the degree of information that they had received from their healthcare providers. In addition, **[Louw, Butler, and Diener, 2015]** carried out a cross-sectional survey on 200 surgeons, and concluded that surgeons use preoperative education as a means of providing better outcomes, answering patient questions, covering legal and ethical requirements, and reducing patient anxiety. These intentions correspond with studies showing that preoperative education helps to increase patients' knowledge about the surgical procedures, and reduces level of anxiety.

The current study revealed a statistically significant correlation between the level of patients' knowledge and the level of pain. This finding may be related to positive effect of educational program on improving patients' knowledge which secondly affect level of pain This result is in line with **[Louw, Butler, Diener, 2015]** who reported that preoperative

education helped in increasing knowledge about the surgical procedure, reducing postoperative pain, decreasing the length of hospital stay and facilitating faster return to preoperative functional levels.

According to **[Yildirim, Kara, Genc, 2018]** they reported that six weeks of postoperative exercise programs following lumbar disc surgery; facilitated lumbar function, improved postoperative recovery, positively affect pain intensity, return to work, and contributed to the regain the strength of the back muscles, functional restoration, and improve physical activities.

There was statistically significant improvement regarding pre and postoperative disc surgery patients' problems/ complaints, among the study group than the control group. In this context **[Ali& Hamed, 2019**] stated that their study results revealed that the educational program was effective, and its results showed a significant improvement on patient's knowledge, practice, satisfaction, and outcomes regarding lumbar disk herniation.

Regarding postoperative disc surgery patient's expected outcomes, the present study revealed that, there were statistically significant differences between studied patients and their controls. These results are in line with **[Tehranzadeh,2015]** who concluded that expected outcomes from rehabilitation guidelines for patients undergoing spinal surgery were; pre and postoperative patient reports of relief from leg pain, with significant decrease in back pain. Initially the expected outcomes during the period from 0-6 weeks showed that the patient gain knowledge about anatomy of the spine, spinal biomechanics, correct postures, awareness about the post-operative precautions, independent mobilization, and to perform safe independence with a basic exercise program, understanding self-management and pacing with ADLs, as well as return to driving after 6 weeks.

Conclusion:

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

Providing an educational program to the patients undergoing lumbar disk herniation shown to be effective in improving knowledge and self-care activities. Study group had marked improvement in a satisfactory level of knowledge post-program implementation compared to control group. Furthermore, study group had marked improvement regarding independence of activities of daily living post-program implementation compared to control group. Statistically significant differences were found between the study and control groups post-program implementation regarding pain intensity. Finally, statistical significant differences were found between study and control groups post-program implementation regarding all items of the Barthel index.

Recommendations:

Based on the results of the present study the following recommended could be stated:

- The developed booklet with colored pictures involving instructions on self-care activities must be distributed to each patient, undergoing lumbar disc herniation surgery in the neurosurgery department and outpatient clinics.
- A family member of the patient should be taught about the postoperative precautions and exercises, to improve patient outcomes postoperatively and self-care activities.
- Replication of the study on large probability sample is recommended.

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