Effect of Implementing an Educational Program on Clinical Outcomes for Patients with Laminectomy.

Abstract

Laminectomy is one of the most common procedures to decompress the spinal canal; it can be performed to relieve pressure from the spinal cord. Self-care activities help in recovery after lumbar decompression surgery, which can promote healing, reduce complications, and enhance long-term outcomes.

Aim of the study: Evaluate the effect of implementing an educational program on clinical outcomes for patients with lumbar laminectomy.

Research design: A quasi-experimental research design.

Setting: Neurosurgery department at El-Fayoum university hospital.

Methods: A purposive sample of (80) adult male and female patients who had laminectomy divided into study and control groups from previously mentioned setting.

Results: There was a statistically significant difference between both groups regarding knowledge, functional disability, depression, anxiety and stress and social dysfunction throughout the program phases.

Conclusion: Patients with laminectomy who received the educational program had improve clinical outcomes compared to those patients who received routine hospital care.

Recommendations: Education programs must be carried out regularly for laminectomy patients and should be involved in routine hospital care.

Key words:*Educational Program, Laminectomy, Outcomes.*

Introduction

Lumbar laminectomy, also called open decompression, it involves the removal of all or part of the lamina (posterior part of the vertebra) to provide more space for the compressed spinal cord and/or nerve roots. Lumbar laminectomy treats sciatica symptoms as well as more serious medical conditions, such as cauda equina syndrome. Laminectomy performed to relieve pressure from the spinal cord or nerve roots emerging from the spinal canal **(Abd-elwahed, et al., 2025)**.

Potential postoperative complications of laminectomy include cerebrospinal fluid (CSF) leakage, wound infection, epidural hematoma, and discitis. If a CSF leak, deep wound infection, or epidural hematoma occurs, surgical wound revision may be required to repair the leak, drain an abscess, or evacuate the hematoma. Lumbar instability after decompressive laminectomy is uncommon **(Song, & Davis, 2023).**

Preoperative educational interventions in patients undergoing lumbar laminectomy have been found effective in reducing postoperative anxiety, pain, and the use of analgesia. However, it has been argued that studies supporting the beneficial clinical, economic, and psychological outcomes of preoperative surgery educational interventions **(Feninets, et al.,2022).**

Patient education about disease processes and treatment modalities improves understanding, encourages healthy behaviors, lifestyle changes, and adherence to follow-up care. Nurses play an important role in teaching patients proper self-care, wound care, and complication prevention. After lumbar decompression surgery, self-care activities such as limiting movement, light walking, proper body mechanics, physical therapy, gradual low-impact exercise, and effective pain and wound management support healing, reduce complications, and improve recovery outcomes **(El-sead et al., 2022; Elkodosy, 2024).**

Significance of the study

The incidence of lumbar decompression surgery varies worldwide due to factors such as aging populations, improved healthcare access, and advances in diagnostic techniques. In the United States, approximately 600,000 lumbar decompression surgeries are performed annually. In Egypt, although no national statistics are available, records from the neurosurgical ward at El-Demerdash Hospital showed that about 120 patients underwent lumbar decompression surgery in 2022, representing 5% of the 2,400 patients admitted to the neurosurgical department during that year **(Lewandrowski et al., 2023; Statistical Record of El-Demerdash Surgical Hospital, Ain Shams University, 2023).**

From the clinical experience of the researcher in the neurosurgery department at El-Fayoum university hospital, the researcher found that there is lack of patient knowledge about self-care regarding lumbar laminectomy and lack of studies in our geographical area had addressed this problem. So, there was a lack of assessing the knowledge and self care practice among lumbar laminectomy patients.

Aim of the study

The study aimed to evaluating the effect of implementing an educational program on clinical outcomes for patients with lumbar laminectomy through:

- Assess the level of knowledge for patients with lumbar laminectomy**.**
- Assess clinical outcomes for patients with lumbar laminectomy**.**
- Design the education program for patients with lumbar laminectomy**.**
- Implement an education program for patients with lumbar laminectomy**.**
- Evaluate the effect of implementing the education program on patients' clinical outcomes for patients with lumbar laminectomy.

Research hypotheses:

- H1: At the end of this study the studied patients who received an educational program will have improve in mean score of knowledge than the control group**.**

- H2: At the end of this study the studied patients who received an educational program will have improve in their clinical outcomes than the control group.

Subject and Method

Research Design

A quasi-experimental research design was utilized to achieve the aim of this study. They are studies that aim to evaluate interventions but that do not use randomization. It was utilized to fulfill the aim of this study, which attempts to determine a causal relationship by applying intervention to one group and comparing the outcome with a control group, and the sample was selected non-randomly **(Polit & Beck, 2020).**

Setting

This study was conducted at Neurosurgery department at El-Fayoum university hospital.

Subject

Based on the sample size equation, a total of 80 patients who underwent laminectomy were included in this study and were equally divided into a study group (n = 40) and a control group (n = 40), recruited from the previously mentioned setting. The sample size was calculated by adjusting the power of the test to 80% and the confidence interval to 95% with margin of error accepted, adjusted to 5% **(Chow, et al., 2007)**

$$n = \frac{N \times p(1-p)}{\left[\left[N-1 \times \left(d^2 \div z^2\right)\right] + p(1-p)\right]}$$

Nxp(1-p)	=(180*(0.20*(1-0.20)))/
N-1	=(180-1)*
d^2/z^2	=0.0025 / 3.8416+
p(1-p)	=0.20*(1-0.20)
N	=80

- P= 0.5
- N= Total population
- Z= Z value “1.96”
- D= Standard Error
- n= sample size

According to the calculation above, 40 samples were needed for each group.

Inclusion criteria

Adult male and female patients are diagnosed with lumbar laminectomy and accept to participate in this study.

Exclusion criteria

Patients with mental disorders or comatose patients

Tools of Data Collection

Two tools were utilized to collect data for this study:

Tool I: Patients' Structures Interview Questionnaire

It was developed and translated by the researcher into Arabic language to assess knowledge of patients with laminectomy based on related and recent literature review **(Abd Elwahhab et al., 2019; Abd El-**

Aziz et al., 2024). It included the following parts:**Part I: Patients' demographic data:** This part which included age, gender, marital status, level of education, occupation, type of work, residence, and income.

Part II: Patients' clinical data: It used to assess patients' present, past and family history.

Part III: **Patients' knowledge assessment questionnaire:**

It was developed by the researcher after reviewing the related literature **(Abd Elwahhab et al., 2019; Abdel Mohsen al., 2019)** to assess patients' knowledge regarding laminectomy.

It was developed by the researcher in the light of related literatures **(Asa, et al., 2021;Korany, et al., 2022)** to assess knowledge of patient regarding thalassemia. It includes questions about understanding laminectomy surgery, post-laminectomy pain management, laminectomy complications and prevention, nutrition after laminectomy, lifestyle and physical activity after laminectomy, and wound care and infection prevention. It consisted of 23 items.

Scoring system: The total score ranges from 0 to 23 grades. Each question received one score for each correct answer and zero for the incorrect answer. So, the overall score was converted into a percentage and classified as follows:

- **Satisfactory knowledge level:**If the total score was deemed ≥ 75% (≥ 17 points).
- **Unsatisfactory knowledge level:**If the total score was deemed < 75% (< 17 points). **(Ali, & Hamed, 2019).**

Tool (II): Clinical outcomes assessment tools:It was comprised of three parts:

Part (1): Oswestry Disability Index (ODI): It was adopted from **Jeremy Fairbank (1980)** and modified by the researcher to measure a patient's permanent functional disability outcomes. The scale was translated into an Arabic language. This tool included 10 categories: pain intensity, personal care, lifting, walking, sitting, standing, sleeping, sex life, social life, and traveling.

Scoring system: The tool consisted of 10 categories. For each category, the total possible score was 5: selecting the first statement scored 0, while selecting the last statement scored 5.

- The total disability assessment score for every patient was summed to get an overall score of 50. The total score for all tests was converted into a percentage, and the scoring system was classified into 5 categories as follows:**Minimal disability level** (0-20%), **moderate disability level** (21-40%), **severe disability level** (41-60%), **crippling disability level** (61-80%), **complete disability level** (81-100%).

Part (2):Visual Analog Scale: This tool was adopted from **Jensen et al. (1986).** This scale was used to measure pain intensity.

Scoring system:Mild pain: 1–3, **moderate pain:** 4–6, **severe pain:** 7–10.

Part (3): Depression, Anxiety, and Stress Scale—21 Items (DASS-21)

The scale was used to assess the emotional states (depression, anxiety, & stress) of the patients with laminectomy. The scale was translated into an Arabic language and adopted from **Lovibond & Lovibond, 1995**. It was a set of three self-report scales designed to measure the emotional states of depression, anxiety, and stress. DASS-21 consisted of 21 items as follows: depression, anxiety & stress subscales.

The scoring system: The rating scale from 0 to 3. The higher the score, the worse the DASS. A possible response varied from 0 to 21 points. It was categorized as follows: **Mild level**(0-7), **moderate level**(8-15), **severe level** (16-21).

Part (4): Social Dysfunction Rating Scale: This scale was adapted from **Lozupone et al., 2018**,and used to measure the dysfunctional aspects of social adjustment of the patients with laminectomy. The scale was translated into an Arabic language. It was consisting of four categories. 21 items as follows: self-confidence, inner feeling, social performance system, and social needs.

Scoring system: The response for each item was measured by a 5-point Likert scale with values 0-4,a possible response varied from 0 to 84.

The result was classified into 3 categories: **Mild social dysfunction level** (0-28), **moderate social dysfunction level** (29-56), **severe social dysfunction level** (57-84).

Part (5): Postoperative Complications Checklist: This tool was developed by the researcher based on an extensive literature review **(El-Hajj et al., 2025; Djurasovic et al., 2022)** to assess the presence or absence of postoperative complications among patients undergoing laminectomy. The checklist includes common complications such as wound infection, epidural hematoma, cerebrospinal fluid (CSF) leakage, and discitis. Each complication is recorded as a dichotomous variable (present/absent) based on clinical observation, patient assessment, and medical records during the postoperative period.

Validity

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

Reliability

Reliability of the tool was tested to determine the extent to which the questionnaire items are related to each other. The Cronbach's alpha model, which is a model of internal consistency, was used in the analysis. Statistical equation of Cronbach's alpha reliability coefficient normally ranges between 0 and 1. Higher values of Cronbach's alpha (more than 0.7) denote acceptable reliability.

Cronbach's Alpha reliability analysis of the study tool

Construct	Cronbach's Alpha	P value
Tool (I): Part III: Patients' knowledge assessment questionnaire	0.81	<0.001*
Tool (II): Part 1:Oswestry Disability Index	0.74	<0.001*
Tool (II): Part 2: Visual Analog Scale	0.88	<0.001*
Tool (II): Part 3: Depression, Anxiety, and Stress Scale	0.71	<0.001*
Tool (II): Part 4: Social Dysfunction Rating Scale	0.77	<0.001*
Tool (II): Part 5: Postoperative Complications Checklist	0.79	<0.001*

**: Significant at P ≤ 0.05*

Ethical consideration

The research approval was obtained from the Scientific Ethical Committee (41)19/5/2024 in the Faculty of Nursing at Capital University before starting the study. The researcher was clarifying the objective of the study to patients included in the study to gain their confidence and trust. The researcher was assured of maintaining the anonymity and confidentiality of subjects' data. The patients are informed that they are allowed to choose to participate or not in the study and that they have the right to withdraw from the study at any time. Ethics, values, culture, and beliefs were respected.

Pilot study

The pilot study was done on 10% of the sample (8 patients) collected by the researcher to examine the clarity of questions and time needed to complete the study tools. No modifications were made after analysis of the answered sheets from patients, so the pilot study sample was included in the total sample.

Field Work

- After outlining the purpose of the study, the hospital director and nursing director of El-Fayoum University Hospital received a formal letter from Dean of Faculty Nursing at Capital University asking for permission to conduct the study.
- Data collection was started and completed with nine months in the period from the beginning of July 2024 to completed by the end of March 2025.
- Data collection was done 2 days/week by the researcher in the morning and in the afternoon shift.
- The study tools took about 30-45 minutes to complete. This time is approximately the same the researcher calculated in pilot study, about (4 to 5) questionnaire sheet fills out /day.
- The researcher conducted interviews with the studied patients, introduced himself to the patients with laminectomy, and gave them a brief idea about the aim of the study, its components, and expected outcomes.

Results

Table (1): Frequency and Percentage Distribution of Demographic Data for the Studied Patients (n=80).

Demographic data	Control group (n=40)		Study group (n=40)		X^2	P-value
	N	%	N	%		
Age group						
<40 years	9	22.5	5	12.5	1.39	0.499
40>50 Years	21	**52.5**	24	**60.0**		
50≥60Years	10	25.0	11	27.5		
Mean ± S.D	**42.9± 11.72**		**43.52±12.32**			
Gender						
Male	**21**	**52.5**	23	**57.5**	0.21	0.64
Female	19	47.5	17	42.5		
Marital Status						
Single	5	12.5	2	50.	5.87	0.055
Married	29	72.5	37	92.5		
Widowed	6	15	1	2.5		
Divorced	0.0	0.0	0	0.0		
Level of Education						
Not read and write	4	10	4	10.0	.223	0.974
Primary education	19	**47.5**	17	**42.5**		
Secondary education	9	22.5	10	25.0		
University education	8	20.0	9	22.5		
Post graduated education	0	0.0	0	0.0		
Occupation:						
Work	15	37.5	22	**55.0** 45.0	2.46	0.116
Doesn't work	25	**62.5**	28			
Type of work						
Office-work	10	**66.6**	14	**63.5** 36.5	2.499	0.287
Manual/Artisanal work	5	33.3	8			
Place of residence						
Urban	12	30.0	12	30.0	0.50	0.740
Rural	28	**70.0**	28	**70.0**		
Income						
Sufficient	11	27.5	14	35.0	0.52	0.469
Insufficient	29	**72.5**	26	**65.0**	8	

Table 1,illustrates that; 52.5% and 60% the control and study group were in the same age group from 40 to less than 50 years with mean ± standard deviation 42.9± 11.72 and 43.52±12.32 respectively. 52.5% and 57.5% of the control and study group were male. Regarding marital status72.5% and 92.5% of the control and study group were married. In relation to level of education, 47.5% and 42.5% of the control and study group had primary education. As regard to occupation, 62.5% of control group don't work, while 55% of the study group were working. 66.6% and 63.5% of the control and study group had office work. As regard to place of residence70% of both groups were living in rural area. In relation to income 72.5% and 65% of the control and study group had insufficient income. There were no satisfactory differences between the two groups regarding their demographic data.

Table (2): Comparison of Mean Score of Patients' Total Knowledge Score among the Study Groups Pre-Post and Follow-Up Program Implementation (n=40).

Total knowledge	Mean ± SD	Mean ± SD	t-Test	P-Value
Pre-test vs. post test	6.6±6.16	18.55±6.5	7.11	**<0.001***
Pre-test vs. Follow-up test	6.6±6.16	16.67±5.81	6.145	**<0.001***

**Significant at P ≤ 0.05.* *Not significant p> 0.05.*

Table (2),clarifies that; there was a significant difference regarding total knowledge of the patients in the study group regarding laminectomy with significant increase in mean of knowledge among the study group within posttest and follow up program implementation p> 0.05.

Figure (1): Percentage Distribution of Total Satisfactory Level of Knowledge among Control and Study Group within Pre, Post and Follow-Up Program Implementation (n=80).

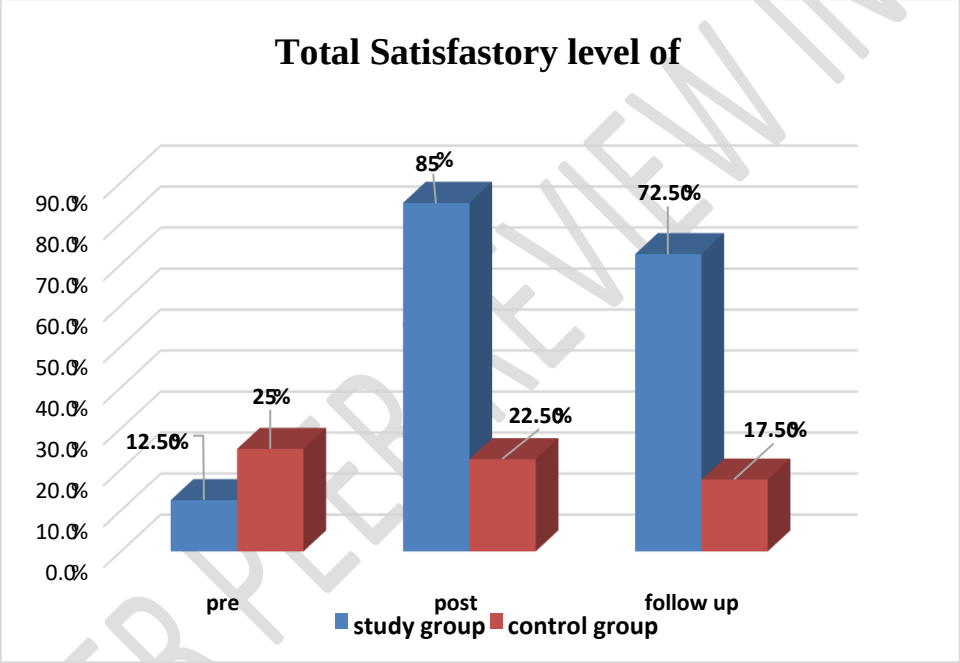

Figure (1),shows that; only (12.5%) of study group had total satisfactory level of knowledge. Preprogram implementation and improved to (85.0%) of them post program and 72.5% of theme follow up program. While (25.0%) of control group have satisfactory knowledge preprogram and this percentage still low post program (22.5%) and follow-up program (17.5%).

Figure (2): Percentage Distribution of Total Functional Disability Level among the Study throughout Study Phase(n=40)

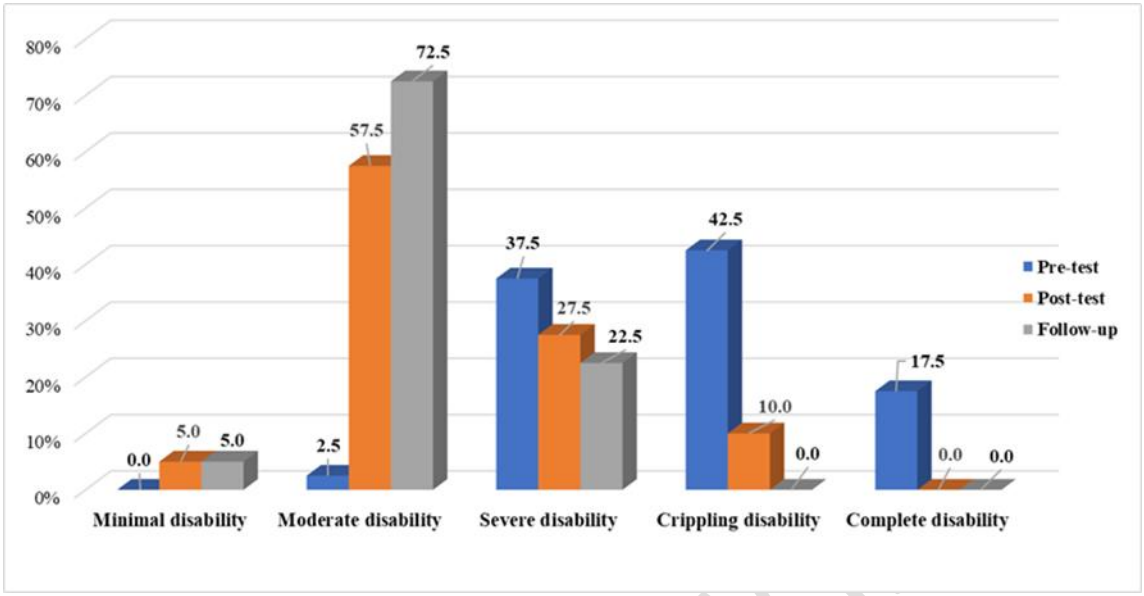

Figure (2),demonstrates that marked improvement in functional disability levels among the study group following program implementation and during follow-up assessment. Before the intervention, the highest percentages of patients were classified as having crippling disability (42.5%) and severe disability (37.5%), while no patients had minimaldisability. Post intervention, the percentage of patients with moderate disability increased substantially to (57.5%), whereas crippling disability decreased to (10.0%), and complete disability disappeared completely (0.0%). At follow-up, further improvement was observed, with (72.5%) of patients classified as having moderate disability, while no patients remained in the crippling or complete disability categories.

Figure (3): Percentage Distribution of Total Pain Level among the Study throughout Study Phase (n=40)

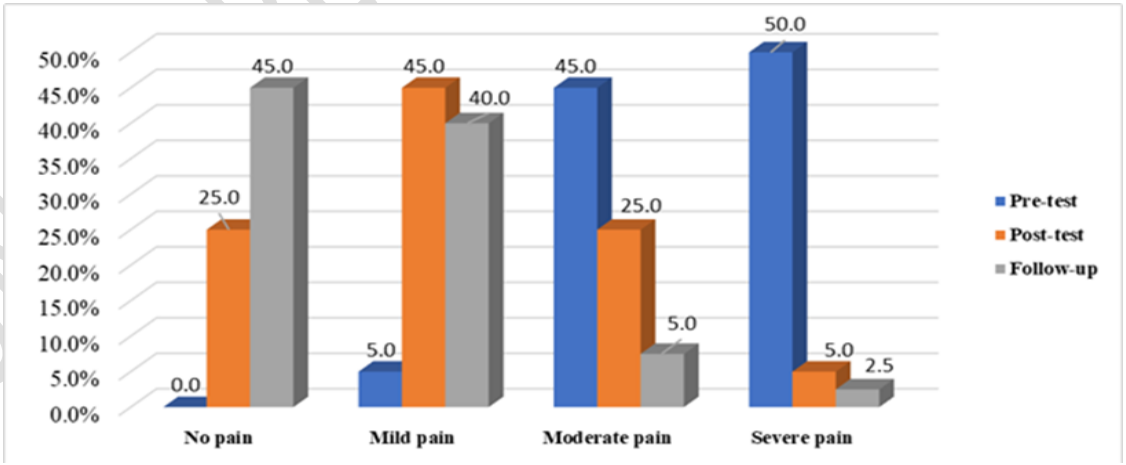

Figure (3),at baseline pre-test, (45.0%) patients had moderate and (50.0%) of them had severe pain with no one reporting no pain. post intervention pain levels improved markedly: severe pain dropped to (5.0%) and moderate pain to (25.0%), while (25.0%) of them reporting no pain. At follow-up, the improvement continued, with (45.0%) reporting no pain and only (2.5%) still having severe pain.

Table 2:Distribution of Total Mean Score Regarding the Studied Patients' Depression, Anxiety and Stress Scale (DASS) (n=80).

Variable	Studied patients (n = 80)		T-Test	P-Value
	Control group(n=40)	Study group(n=40)		
Pretest				
Depression	12.3±2.69	13.5±1.19	0.245	0.92
Anxiety	14.7±3.55	15.4±2.92	0.984	0.56
Stress	11.7±3.69	12.4±4.02	1.34	0.57
Posttest				
Depression	13.4±2.78	10.02±1.53	7.96	**0.00***
Anxiety	15.8±3.53	12.1±2.13	6.43	**0.00***
Stress	11.4±3.31	8.2±2.73	9.88	**0.00***
Follow Up				
Depression	11.5±2.81	6.9±3.33	11.52	**0.00***
Anxiety	14.5±3.48	9.7±3.77	10.05	**0.00***
Stress	10.1±4.33	8.9±2.88	9.59	**0.00***

**Significant at P ≤ 0.05.Not significant p> 0.05.*

Table 2, illustrated that, there was no significant difference between the control and study groups regarding depression, anxiety and stress score within pretest with (p- value 0.92, 0.56, and 0.57 respectively), while there was a significant difference between the control and study groups regarding depression, anxiety and stress score within posttest and follow up test with (p- value 0.00*).

Table 3:Frequency and Percentage Distribution of Total Social Dysfunction Level among Control and Study Groups within Pretest, Posttest, and Follow-Up (n=80).

Total Patient's Social Dysfunction	Studied patients (n = 80)				χ^2	P-Value
	Control group (n=40)		Study group (n=40)			
	N	%	N	%		
Pretest:						
Mild social dysfunction Moderate social dysfunction. Severe social dysfunction.	1 27 12	2.5 67.5 30	0 21 19	0 52.5 47.5	3.33	0.189
Posttest:						
Mild social dysfunction. Moderate social dysfunction Severe social dysfunction.	0 27 13	0 67.5 32.5	12 28 0	30 70 0	18.28	**0.000***
st:						
Mild social dysfunction. Moderate social dysfunction Severe social dysfunction.	0 28 12	0 70 30	20 18 2	50 4.5.5 5	28.34	**0.000***

**Significant at P ≤ 0.05.Not significant p> 0.05.*

Table 3,illustrated that, there was no significant difference between the control and study groups regarding total Social Dysfunction level within pretest with (p- value 0.189), while there was a significant difference between the two group within posttest and follow up test with (p- value 0.00*) with significant increase of social dysfunction among control group.

Figure (4): Percentage Distribution of Postoperative Complications among the Study throughout Study Phase (n=40)

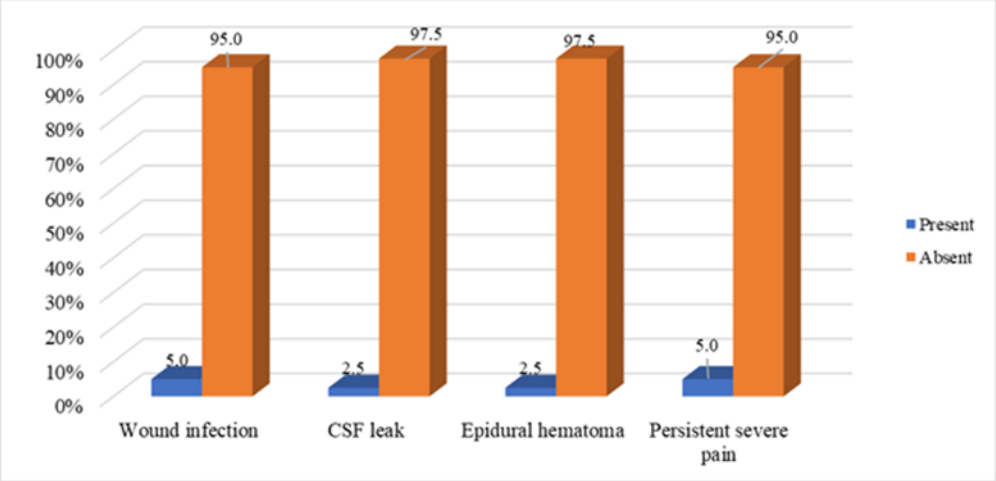

Figure (4),shows that wound infection occurred in 5% of patients, while CSF leak and epidural hematoma were rare (2.5% for each). Persistent severe pain was also reported in only (5.0%) of cases.

Table 4:Correlation between Study Group Total Knowledge, Functional Disability, DAS (Depression, Stress and Anxiety) and Total Social Dysfunction.

Pretest						
		Total knowledge	**Total functional disability**	**Depression**	**Anxiety**	**Stress**
Total functional disability	**r**	-0.377				
	P-value	**0.001***				
Depression	**r**	-.452	0.516			
	P-value	**0.00****	**0.000***			
Anxiety	**r**	-0. 25	0.43	.650		
	P-value	**0.04***	**0.008***	**0.000***		
Stress	**r**	-.256	0.25	.589	.574	
	P-value	**.022***	**0.001***	**0.000***	**0.000***	
Total social dysfunction	**r**	-0.31	0.49	0.558	.675	.655
	P-value	**0.005***	**0.000***	**0.000***	**0.000***	**0.000***
Posttest						
		Total knowledge	**Total functional disability**	**Depression**	**Anxiety**	**Stress**
Total functional disability	**r**	-0.02				
	P-value	0.551				
Depression	**r**	-.052	0.63			
	P-value	0.67	**0.000***			
Anxiety	**r**	-0. 215	0.33	0.750		
	P-value	0.09	**0.000***	**0.000***		
Stress	**r**	-.036	0.30	0.489	0.421	
	P-value	.099	**0.001***	**0.000***	**0.000***	

Total social dysfunction	**r**	-0.081	0.57	0.758	0.637	0.455
	P-value	0.962	**0.000***	**0.000***	**0.000***	**0.000***
Follow up						
		Total knowledge	**Total functional disability**	**Depression**	**Anxiety**	**Stress**
Total functional disability	**r**	-0.287				
	P-value	**0.001***				
Depression	**r**	-0.611	0.516			
	P-value	**0.00****	**0.000***			
Anxiety	**r**	-0. 45	0.49	.750		
	P-value	**0.000***	**0.000***	**0.000***		
Stress	**r**	-0.756	0.63	.489	0.434	
	P-value	**.000***	**0.000***	**0.000***	**0.000***	
Total social dysfunction	**r**	-0.48	0.77	0.858	0.472	0.60
	P-value	**0.000***	**0.000***	**0.000***	**0.000***	**0.000***

**Significant at P ≤ 0.05.Not significant p> 0.05.*

Table 4,illustrated that, there was a significant negative correlation between patients' knowledge and total functional disability, DASs (depression, anxiety and stress), and total social dysfunction within pretest and follow up test. There is a significant positive correlation between patients' total functional disability and DASs, total social dysfunction within pretest, posttest and follow up test. Also, there is significant positive correlation between patients' total DASs and total social dysfunctionwithin pretest, posttest and follow up test.

Discussion

Laminectomy Postoperative nursing care is equally critical in promoting recovery after laminectomy. Current evidence highlights the effectiveness of early mobilization, wound monitoring, and pain management in preventing complications and enhancing functional recovery **(Özden & Koçyiğit, 2024; Aziz et al., 2024).**

The current study findings revealed that, both the control and study groups were demographically homogenous, ensuring comparability in subsequent analyses. The demographic characteristics observed are consistent with the typical profile of patients undergoing laminectomy for degenerative lumbar spine conditions in middle-income countries such as Egypt.

Concerning age; the current study revealed that, more than half of the studied patients in both groups from forty to less than fifty years old. These findings agree with an Egyptian study by **Abd El-Aziz et al., (2024)** titled as "Discharge Plan for Patients Undergoing Herniated Lumbar Disc Surgery;" they clarified over two thirds of intervention group and over three quarters of control group aged less than fifty years.

The result also revealed that, more than half of the patients in both groups were males. The current study findings agree with**Atya et al. (2024)**, who conducted a study in Egypt on their title " Effect of Nursing Rehabilitation Protocol on self-care Agency and Daily Living Activities in Patients undergoing Lumbar Discectomy" and reported that the about two thirds of intervention group and above two thirds of control group were males.**From the researcher's point of view**, the predominance of male patients undergoing laminectomy in both groups may be attributed to occupational and lifestyle factors. Men are more likely to engage in physically demanding activities or heavy manual labor, which increases the risk of spinal strain and degenerative changes in the lumbar region.

On the other hand, are contradicted with a study conducted by **Abd-Ella et al., (2021)** in their study about "effect of discharge plan on satisfaction of patients with lumbar disc herniation surgery", and stated that more than half of patients were female this could be due to that stressor of daily life as household and outside work. Also, females had weaker muscle strength than males. This discrepancy could be attributed to differences in the study population,

Regarding marital status the current results showed that, majority of the studied patients in both groups were married. This aligns with the findings of **Hablass et al.(2020),** who conducted a study in Egypt about" Effect of Applying an Educational Program for Patients with lumbar laminectomy on Their Knowledge and Self-Care Activities" and reported that most of the study group and about three quarters of the control group were married. This could be due to that most of the study subjects were in the marriage age and the married people have many duties and responsibilities that enhance their physical and psychological stress.

Concerning the education level, the current study revealed that nearly half of the studied patients in both groups had only primary education. This result was consistent with **Hablass et al.(2020),** who reported that lower educational attainment was common among patients undergoing lumbar spine surgery. On the other hand, the current findings disagree with those **Abd Elzaher et al., (2023)** in their study entitled " Coping Strategies among Adult Patients with Lumber Disc Herniation " and reported that their study illustrated the majority of the patients had secondary education in their study about coping strategies among adult patients with lumber disc herniation. It can be explained that most patients are from rural areas where agriculture or farming is the main aspect of work; this could what makes them ignore completing their education.

As regards occupation, less than two thirds of the control group were not working, while more than half of the study group were working. These findings are supported with **Ebrahem et al., (2022)** in study titled "Activities of Daily Living among Adult Patients with Lumbar Disc" who showed that majority of adult patient with lumbar disc were worker. **From the researcher's point of view**, workers in occupations that involve prolonged periods of sitting experienced a high incidence of work-related low back pain because sitting for one-hour results in significant changes in the lumbar intervertebral discs.

Pertaining the residence, the current study findings showed that about three quarters of both study and control groups lived in rural areas. These results corroborated with **Abd-Elzaher et al., (2023),** who pointed out that over two thirds of the study's patients were from rural areas. Within the same framework **Atya, et al., (2024),** who noted that over two thirds of both groups were rural residents. **The researcher views** that patients may have difficulties in attaining the health care services. This can be attributed to the setting, specifically free governmental hospitals which typically serve a large number of patients because it is the only hospital in the governate that have specialty of neurosurgery department.

In relation to income, the present study revealed that nearly three quarter of the control group and two thirds of the study group had insufficient income. These findings are consistent with **Mohamed et al.,** (**2023),** who studied "Effectiveness of Applying an Educational Program on Health Outcomes for Patients with Cervical Disc Herniation" and found that most spinal surgery patients in Egypt had low-income levels, which limited their ability to afford continuous medical care and rehabilitation services.

According the present study; there was no significant difference between the two groups regarding the total knowledge of patients about laminectomy before the implementation of the educational program. This indicates that both groups had a comparable baseline level of knowledge prior to the intervention.**From the researcher's point of view**, this could be due to that patients were not provided any education before the phases of the study.

This result agrees with **Gullet & Tastan (2025),** whoconducted study about "The effect of discharge training based on the teach-back method on discharge readiness and satisfaction: A randomized controlled trial. Worldviews on Evidence-Based Nursing" and demonstrated that there was no significant difference was found between the LDH discharge training information test pretest scores of the patients in the intervention and control groups.

Regarding patients' level of knowledge, post and follow-up program implementation, the study revealed presence of highly statistically significant improvement in all items of knowledge with a marked increase in the mean knowledge score among the study group compared to the control group. These findings reflect the strong positive effect of the implemented educational program, which enhanced patients' understanding of laminectomy, postoperative care, possible complications, and preventive measures. The sustained improvement at follow-up further suggests that the educational sessions promoted long-term knowledge retention.

This finding agreed with **Weheida et al., (2022),** reported that structured educational interventions led to a remarkable increase in patients' awareness immediately post-intervention, though some decline was noticed months later, emphasizing the need for ongoing patient education.

Furthermore, the present findings were consistent with studies by **Seo and Cho (2025),** who applied "a Self-Management Program for Patients Undergoing Lumbar Spinal Stenosis Surgery "and showed that a

significant increase in self-management information scores in the experimental group after the intervention. They also noted that regular follow-up sessions help in sustaining gained knowledge and promoting adherence to postoperative care.

On the other hand, the current study's findings are inconsistent **MacLean et al. (2024)** argued that a single educational session without ongoing reinforcement may lead to only temporary gains in patient knowledge, as information retention tends to decline over time if not supported by continuous education or follow-up.

The discrepancies between the current results and some previous studies could be attributed to variations in the content, duration, and delivery methods of educational programs. The present study applied a comprehensive nursing rehabilitation guide that included individualized teaching, demonstrations, written materials, and follow-up evaluation, all of which likely contributed to sustained improvement. In contrast, studies reporting minimal impact often relied solely on verbal or one-time educational sessions without reinforcement, limiting their long-term effectiveness.

Overall, the present results confirm that the structured nursing educational program was effective in improving and maintaining patients' knowledge about laminectomy surgery. This highlights the critical role of continuous patient education in achieving better understanding, cooperation, and postoperative outcomes.

According to functional disability, the present study result showed a marked improvement in disability score was observed between the two groups during both post-program and follow-up assessments with a marked decrease in the severity of functional disability among the study group. This improvement suggests that the provided explanations and instruction to the patients concerning living habits and activities. Also, it laid a good foundation for their life after discharge. After discharge, the patients knew how to seek benefits of safe performance of the activity of daily living and avoid disadvantages of malpractice such activity, that was significantly reduced recurrence of diseases or complications.

These findings are consistent with those of **Liang et al., (2024)** who conducted study in China about "The impact of nursing interventions on the rehabilitation outcome of patients after lumbar spine surgery" found that the implementation of postoperative nursing rehabilitation programs contributed to a significant improvement in patients' ability to perform daily activities and decreased dependence levels.

Additionally, **Vu et al. (2025)** who conducted study in Vietnam about "The impact of nursing interventions on postoperative rehabilitation in lumbar spine fusion patients: a study at central military hospital" and emphasized that continuous nursing education and follow-up sessions play a vital role in maintaining long-term functional improvement after spinal surgery, as patients gain better understanding of body mechanics, exercise routines, and wound care.

Thus, the current study confirms that well-structured, educational programs can effectively reduce functional disability, improve physical independence, and enhance overall recovery among patients undergoing laminectomy.

The present study demonstrated a significant reduction in pain levels among patients in the study group compared to the control group following implementation of the educational program. At pre-intervention, both groups showed comparable pain levels, indicating homogeneity at baseline. However, after the intervention and during follow-up, a marked improvement was observed in the study group, these differences were statistically significant indicating the effectiveness of the educational program in improving pain outcomes.

This improvement may be attributed to the role of the educational program in enhancing patients' knowledge regarding pain management strategies, early mobilization, proper positioning, and adherence to postoperative instructions. Education likely reduced fear and anxiety, improved coping mechanisms, and promoted active participation in recovery, all of which contribute to better pain control.

These findings are consistent with those reported by **Abd- Ella et al. (2021)**, who found that patients receiving structured postoperative education after spinal surgery experienced significantly lower pain scores compared to those receiving routine care. Similarly, **Çalişkan et al. (2025)**, reported that patient education programs significantly improved pain management outcomes in postoperative orthopedic patients.

The current study was discovered that, there was no significant difference between the control and study groups regarding depression, anxiety, and stress scores during the pretest phase indicating that both groups were homogeneous and had similar psychological conditions prior to program implementation.

However, a statistically significant difference was observed between the two groups in the posttest and follow-up phases where the study group exhibited a marked reduction in depression, anxiety, and stress scores compared with the control group. This finding reflects the strong and sustained positive effect of the nursing educational and rehabilitation program on improving the patients' psychological well-being following laminectomy.

The improvement in the study group's psychological status could be attributed to several factors, including increased knowledge about the surgical procedure, improved coping mechanisms, and enhanced self-efficacy gained through education and supportive nursing interventions.

These results are consistent with **Seo & Cho (2025),** who reported that patients receiving the structured self-management program after laminectomy demonstrated significantly lower depression and anxiety levels compared with those receiving routine care.Moreover, This results was consistent with **Mohamed et al ., (2023)** found that postoperative nursing rehabilitation that include psychological support and relaxation training effectively reduce emotional tension and stress levels.

Conversely, this result disagreed with **Morone et al., (2019),** who conduct a study in the USA entitled "Mindfulness meditation for the treatment of chronic low back pain in older adults" and found that the majority of studied patients had stress post-program implementation. Conversely, this result was incongruent with the study conducted by **Cherkin et al., (2019),** who found that there was no statistically significant difference in total stress level in the post-program implementation.

The findings of the current study therefore underscore the essential role of nursing educational programs in addressing not only the physical aspects of postoperative recovery but also the psychological dimensions. Sustained improvement across posttest and follow-up assessments demonstrates the long-term effectiveness of such interventions in promoting holistic recovery among laminectomy patients.

The findings of the current study revealed that there was no statistically significant difference between the study and control groups regarding the patient's Social Dysfunction Scale during the preprogram implementation phase. This finding indicates that both groups were comparable before applying the educational and rehabilitation intervention in terms of their ability to engage in social activities, maintain relationships, and perform daily social roles. The similarity in pretest scores suggests that both groups initially experienced a similar degree of social dysfunction, likely due to pain, physical limitations, and psychological distress resulting from their spinal condition and the recovery process after laminectomy.

These findings are consistent with those of **Scandelli et al. (2024)**, who carried out a study on "Effects of supervised rehabilitation on psychosocial and participation-related outcomes after lumbar spine surgery: A systematic review and meta-analysis" and reported that supervised rehabilitation programs after lumbar spine surgery significantly enhanced psychosocial and participation-related outcomes, including social adjustment and confidence.Similarly, **Li et al. (2024)** found that continuous nursing care programs contributed to better social functioning, reduced pain, and improved overall quality of life among postoperative patients.

Conversely, some studies presented divergent findings. For instance, **Özden (2024)** reported no significant differences in social functioning within six months after surgery between study and control group, emphasizing that the duration of the rehabilitation program and the timing of follow-up assessments play crucial roles in determining outcomes.

However, the results revealed that, there was a highly significant difference between the two groups during the posttest and follow-up phases with a marked decrease in the mean score of social dysfunctions among the study group compared to a significant increase among the control group. This outcome demonstrates that the nursing educational and rehabilitation program successfully improved the social functioning of patients in the study group by enhancing their self-confidence, emotional stability, social interaction, and perceived social support after laminectomy. Conversely, the control group, which did not

receive structured guidance, experienced a deterioration in social adjustment over time, possibly due to persistent pain, reduced mobility, and limited coping strategies.

These findings are in line with **Mohmad et al. (2023),** who demonstrated that applying a nursing rehabilitation program significantly reduced social dysfunction and improved social participation among patients after spinal surgery.

The current study revealed that the incidence of postoperative complications was significantly lower in the study group compared to the control group. Although some complications such as CSF leakage, epidural hematoma, and persistent severe pain showed lower rates in the study group, the difference was not statistically significant. However, a significant reduction was observed in wound infection and overall complication rates, favoring the study group.

This reduction may be explained by the effect of the educational program in improving patients' awareness of wound care, infection prevention measures, early detection of warning signs, and adherence to aseptic techniques and follow-up care. In addition, improved mobility and self-care practices may have contributed to reducing postoperative risks.

These findings are in agreement with **Fan et al. (2022)**, who reported that structured educational interventions significantly reduced postoperative wound infection and overall complications among surgical patients. Similarly, **Liang et al. (2024)** found that patient education programs in spinal surgery significantly reduced postoperative infection rates and improved recovery outcomes.

The findings of the current study revealed a significant negative correlation between patients' knowledge and their total functional disability, psychological distress and total social dysfunction during both the pretest and follow-up phases. This indicates that patients with higher levels of knowledge about their condition, surgical procedure, and postoperative care experienced lower levels of physical disability, emotional distress, and social dysfunction. Such findings highlight the crucial role of patient education in promoting psychological stability, physical recovery, and social reintegration following lumbar laminectomy.

These findings are consistent with **Abd- Ella et al. (2021)** who emphasized that illustrate a highly statistically significant relationship between the patient's total knowledge and their lower extremity functional status three months after implementing the discharge plan. This result may be because the patients who acquired knowledge about the importance of exercise and how to perform it were.

This result was supported by **Seers et al. (2020),** who stated that there was a negative correlation between the knowledge and stress of the studied patients. This result may be due to that satisfactory knowledge of patients regarding vertebral disc makes them able to manage the problem and improve psychological well-being.

Moreover, this finding is in line with **Mohamed et al. (2023)**, who noted that education improved social adjustment among patients undergoing spinal surgeries, as informed patients were more likely to participate in social activities and return to work earlier than those with limited understanding of their recovery process.

The results also demonstrated a significant positive correlation between patients' total functional disability and their psychological distress (DASs) and total social dysfunction during the pretest, posttest, and follow-up assessments. This indicates that patients with greater functional limitations tended to exhibit higher levels of depression, anxiety, and stress, as well as greater impairment in social functioning. These findings reflect the interconnected nature of physical and psychological well-being, where physical disability can contribute to emotional disturbances and withdrawal from social interactions. Reduced mobility and dependency on others may lead to feelings of helplessness, frustration, and social isolation. Similar patterns were reported by **Zain et al. (2024)** who found that postoperative patients with severe functional limitations often experienced persistent psychological distress and decreased social participation.

Furthermore, a significant positive correlation between total psychological distress (DASs) and total social dysfunction was observed across the pretest, posttest, and follow-up phases. This suggests that patients experiencing higher levels of depression, anxiety, and stress also tended to report greater social impairment and difficulty maintaining interpersonal relationships. Psychological distress may lead to reduced motivation, poor social engagement, and avoidance behaviors, all of which hinder social reintegration during recovery. This agrees with **Zain et al. (2024),** who concluded that psychological well-being plays a pivotal role in restoring social function following spinal surgery.

Conclusion

Based on the current findings, it can conclude that, the educational program improved the clinical outcomes for the patients with laminectomy compared to those patients who received routine hospital care.

Recommendations

Based on the findings of the present study, the following are recommended:

- Education programs must be carried out regularly for laminectomy patients and should be involved in routine hospital care.
- Replicate the study with larger and more diverse samples in different healthcare settings to enhance the generalizability of the results and ensure that the findings are applicable to broader patient populations.

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