

Effect of Discharge Plan on Outcomes of Patients with Lumbar Disc Herniation Surgery

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ABSTRACT

Context: Discharge planning for patients undergoing lumbar disc herniation surgery is considered a strategy for promoting their home and community outcomes.

Aim: This study aimed to evaluate the discharge plan's effect on patients' outcomes with lumbar disc herniation surgery.

Methods: A quasi-experimental design was utilized to conduct this study. The study was conducted in the neurosurgical ward at El-Demerdash hospital and outpatient clinic at Ain Shams University Hospital, affiliated to Ain Shams University. A purposive sample of 60 patients with lumbar disc herniation surgery was selected according to specific inclusion criteria. The sample size was determined statistically by power analysis considering the total number of patients with lumbar disc herniation surgery in El Demerdash hospital (2016). Tools of the study included patients' interviewing questionnaire regarding patients' demographic characteristics, assessment of patients' knowledge, and patients' outcomes assessment tools that include Oswestry disability index, the lower extremity functional scale, and the social dysfunction scale and SF36 to assess psychological outcome.

Results: The present study revealed that the mean age of the patients under study was 39.58±8.69, 60% of them were females, and there was a highly statistically significant difference among patients under study throughout discharge planning phases regarding their knowledge, their level of disability, their lower extremity functional scale, total social dysfunction, and total psychological outcomes pre and at follow-up. There were statistically significant relations between patients' level of knowledge and their outcome pre and three months after implementing the discharge plan.

Conclusion: Application of discharge planning regarding lumbar disc herniation surgery improved patients' outcomes. The discharge plan should be available in the neurosurgical department and clinic for all patients who will be undergoing lumbar disc herniation surgery should be updated periodically.

Keywords: Discharge planning, outcomes, lumbar disc herniation surgery

1. Introduction

Degeneration of intervertebral discs is the most frequently known cause of lower back pain all over the world. In developed countries, low back pain is somewhat common. It is the most common reason for disability above forty and the most frequent cause of seeking medical advice. Occupational back pain affects functional capacity and quality of life and leads to limitations of construction workers' daily physical activities (Salama et al., 2016).

Lumbar disc herniation (LDH) is a common spinal disorder that usually favorably responds to conservative treatment. In those cases with refractory complaints, surgical intervention may become obligatory. The rate of spinal surgery for the treatment of symptomatic degenerative disc disease (DDD) has increased dramatically in recent decades. It can be associated with catastrophic complications and long-term disability.

Appropriate patient selection with proper surgical planning can play the most critical role in improving surgical outcomes and avoiding complications (Omidi-Kashani et al., 2016).

Before the patient with lumbar spine surgery prepares to leave the acute care setting, the nurse provides a thorough discharge planning to promote continuity of therapeutic regimen and active participation in the rehabilitation process. Thus, the nurses' unique role is to help patients and their families learn new behaviors that positively impact their health and lives. As the nurse enters the patient's world, she works with the patient in mutually deciding what to teach, when to teach, and how to teach (Marchand et al., 2016).

A discharge plan has been applied to clinical nursing care. The principal idea of the intervention is to improve the efficacy of clinical nursing care, shorten hospital stay, reduce the incidence of complications, minimize physical dysfunction, improve social, psychological wellbeing and accelerate the recovery of patients by optimizing surgical and perioperative management (Guo et al., 2019).

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Discharge planning is a process in which patients' needs are identified and plans are written to facilitate continuity of health care. Discharge planning is, therefore, an integral component of patients' care in the hospital. Appropriate and effective discharge planning can maintain patients' quality and continuity of care from hospital to home, reduce their length of hospital stay and readmission rates, and achieve anticipated physical, social, and psychological patient outcomes (Mabire et al., 2019).

2. Significance of the study

Lumbar disc herniation is rapidly emerging as a global health problem among the population and a significant cause of medical expenses. It is a frequent complaint among individuals in society. It significantly affects the daily activities, the social and psychological life aspects, leading to an economic health burden. However, in Egypt, the statistics about lumbar disc herniation surgery limited. The prevalence rate of this disease remains unclear in our country due to a lack of systematic data. Otherwise, through three months, cases were admitted to the orthopedic department, and the outpatient spine clinic at Assiut University Hospital for lumbar discectomy was 22 cases (Abd-El Mohsen et al., 2019). Meanwhile, the medical records of the neurosurgical ward at El Demerdash Hospital revealed that the number of patients who had undergone lumbar disc herniation surgery in the year (2019) was 400 patients from 1300 patients admitted to the neurosurgical department, it represented 30.7% of the total cases diagnosed with neurosurgical problems (Medical records of neurosurgical department at El-Demerdash hospital, 2019).

3. Aim of the study

This study aimed to assess the effect of discharge plan on outcomes of patients with lumbar disc herniation surgery through the following:

- Assessment of the needs of patients with lumbar disc herniation surgery.
- Developing and implementing a discharge plan for patients with lumbar disc herniation surgery based on needs assessments.
- Assess the discharge plan's effect on clinical outcomes of patients with lumbar disc herniation surgery.

3.1. Research hypothesis

The current study hypothesized that implementing the discharge plan will positively affect the outcomes of patients exposed to lumbar disc herniation surgery.

3.2. Operational definition

Patient clinical outcomes

It describes the patient consequence that is responsive to nursing intervention covering biopsychosocial educational dimensions of patient care. This emphasis on identifying and measuring interventions and practice results as the patient outcomes is the ultimate definition of

effectiveness and efficiency. It will include aspects of physical, psychological, social outcome

4. Subjects & Methods

4.1. Research design

A quasi-experimental design, one group pre/post, and the follow-up test were utilized to meet this study's aim. The quasi-experimental design is an empirical interventional study used to estimate an intervention's causal impact on the target population without random assignment. Quasi-experimental research shares similarities with the traditional experimental design or randomized control trial, but it specifically lacks the element of random assignment to treatment or control.

4.2. Research Setting

The study was conducted in a neurosurgical ward at El-Demerdash hospital, containing 57 beds on the second floor, two operating rooms, an intensive care unit, and an outpatient clinic at Ain Shams University Hospital affiliated to Ain Shams University.

4.3. Subjects

A purposive sample of 60 patients with lumbar disc herniation surgery was selected according to specific inclusion criteria. The sample size was determined statistically by power analysis considering the total number of patients with lumbar disc herniation surgery in El Demerdash hospital during the year (2016) (Medical records of El- Demerdash Surgical Hospital, neurosurgical Departments, 2016).

Sample size

Sample size calculated by using Epicalc 2000 software with the following inputs:

- The sample size is 60 patients.
- Type I error (α) =5% with a confidence level of 95%
- Study power 90 % (power of test) with type error II 10% (Beta)
- The significance level (α) at 0.05

Patients were selected according to the following inclusion criteria:

Adult patients, from both genders, conscious, had first-time lumbar disc surgery, with chronic low back and lower extremity pain of at least six months with pain intensity limiting function. Patients with different surgical techniques for lumbar disc herniation (e.g., standard discectomy, microdiscectomy, laser discectomy, spinal fusion) were included. Also, those with no critical or psychotic disorders comprehend instructions and agree to participate in the study.

4.4. Tools of the study

The study data was collected through the following tools:

4.4.1. Patients' Interviewing Questionnaire

It was developed by the researcher based on a review of relevant recent literature, Weheida et al. (2016); Lewis

et al. (2014). It was translated into Arabic and back translation to ensure its stability; validity and reliability were tested. It includes two parts as follows:

The first part was concerned with the patient's data, including age, gender, marital status, educational level, occupation, residence, weight, and height.

The second part was used to assess patients' knowledge related to lumbar disc herniation and included 38 MCQs, which were grouped into seven subgroups as the following: Anatomy and function of the disc (4 questions), lumbar disc herniation (5 questions), lumbar disc herniation surgery (3 questions), instruction and precautions to be followed after surgery (7 questions), correct body position and physical exercise (5 questions), nutritional allowed related to patient's condition (8 questions), and medication and follow up compliant to plan (6 questions).

Scoring system

In the scoring system, one grade was given for the correct answer and zeroed for the incorrect answer, with a total mark of 38 marks. The total level of patient's knowledge was categorized as follows:

- $\geq 60\%$ was considered satisfactory. It equals ≥ 23 grades.
- $< 60\%$ was considered unsatisfactory. It equals less than 23 grades.

4.4.2. Patients' Outcomes Assessment Tools

Three assessment tools were used, including physical outcome, social outcome, and psychological outcome.

4.4.2.1. Oswestry Disability Index (ODI)

The physical outcome

This tool was adopted from *Fairbank and Pynsent* (2000), and it was used to assess pain-related disability in persons with low back pain. The test is considered the 'gold standard of low back functional outcome tools. It consists of ten sections covering pain intensity, personal care, lifting, walking, sitting, standing, sleeping, social life, traveling, and employment/homemaking.

Scoring system

Each section was scored from zero to five with higher values indicating a more severe impact on daily living, then all points in all sections were summed up and plug it into the following formula to calculate the level of disability. The level of disability is calculated as $(\text{Total points}/50 \times 100 = \%)$, then the percentages were classified as

- Minimal disability (Ranging from 0% to 20%). The patient can cope with most living activities.
- Moderate disability (Ranging from 21% to 40%). The patient experiences more pain and difficulty with the activity of daily living (ADL).
- Sever disability (Ranging from 41% to 60%). Pain remains the main problem, and ADL are severely affected.
- Crippled (Ranging from 61% to 80%). Back pain impinges on all aspects of the patient's life.
- Bed bounds or exaggerating their symptoms (ranging

from 81% to 100%).

4.4.2.2. The Lower Extremity Functional Scale (LEFS)

It was adopted from *Binkley et al.* (1999). It was used to assess lower extremity function status for patients with lumbar disc herniation surgery. It was composed of 20 statements about a person's ability to perform everyday tasks. The 20 statements were measured against a three-point Likert scale ranging from full assistance (1 score) to without help (3 scores). An example for the activities assessed were (any of your usual work, housework, or school activities affected; Your usual hobbies, recreational or sporting activities, getting into or out of the bath).

Scoring system

The total score is 60, with a lower score is 20, and the higher score means the high Lower Extremity Functional status. The responses for the total statements were as follows:

- Low assistant ($>75\%$) = >45 grades.
- Moderate assistant (50-75%) = $>30-45$ grades.
- High assistant ($<50\%$) = ≤ 30 grades.

4.4.2.3. The Social Dysfunction Scale

The social outcome

The social dysfunction scale was adopted from *Matteson et al.* (1997). It was added to assess social outcomes only for patients with lumbar disc herniation surgery. It was composed of 14 statements. The 14 statements were measured against a four-point Likert scale ranging from no social dysfunction (3 scores) to severe social dysfunction (0 scores). An example for the statements assessed was (surgery caused problems in work, problems with family, surgery affect care for children, preventing them from communicating with others and obstacles in attending social events). It was translated into Arabic, and back translation to ensure its stability, validity, and reliability were tested.

Scoring system

The response for each statement was measured against four points Likert scale (None=3, Mild=2, Moderate=1, Sever=0). The total score was 42 marks. The higher the score, the better the social function, it was categorized as follows:

- 0-10 equal severe social dysfunction.
- 11-20 equal moderate social dysfunction.
- 21-30 equal to mild social dysfunction.
- 31 equal no social dysfunction

4.4.2.3. The Short Form 36 Scale

The psychological outcome

It was adapted from *Ware & Sherbourne* (1992) and modified by the researcher to assess the patients' psychological status with lumbar disc herniation surgery. It was composed of 10 statements, and the other scales in this tool that assess the functional health and physical health component were excluded because the Oswestry Disability Index tool assesses the same parts (physical and

social outcome) to avoid repetition. Thus, psychological outcomes are only used from such a tool. An example of the statements assessed was felt full of indolence, feel that in a state of continuous depression, feel that I am not happy, have no desire to take care of my appearance, and afraid and worried about complications of the surgery.

Scoring system

Each statement's response was as follows (most of the time=3, somewhat=2, not at all=1). The total score was 30 grades. It was considered that a higher score means a bad psychological outcome, and a lower score better psychological outcome. The total score was categorized as follows:

- Unsatisfactory outcome ($> 75\% = >23-30$ marks).
- Average ($50-75\% = 15-23$ marks).
- Satisfactory outcome ($<50\% = <15$ marks).

4.5. Procedures

An official letter was issued from the Faculty of Nursing, Ain Shams University, to the director of the inpatient neurosurgery department and neurosurgery outpatient clinics, explaining the study's purpose to obtain their permission to conduct this study.

The preparatory phase included reviewing the current and more recent relevant national and international literature reviews concerning outcomes of patients undergoing lumbar disc herniation surgery regarding the various aspects of this issue to prepare data collection tools. Some of the tools were translated from English into Arabic; then, back translation was done.

The validity of proposed tools was done using face and content validity to inspect the items to determine whether the tools measure what was supposed to measure and conducted to determine whether the tools cover the aim. Validity was tested through a jury of 7 experts from the medical surgical nursing department, Ain Shams University (3 professors, three assistant professors, and one lecturer). The experts revised the tools for clarity, relevancy, comprehensiveness, simplicity, and applicability. Minor modifications were done based on the expert's opinion.

The reliability testing was done by the alpha Cronbach test, which was used to examine whether the tools had internal consistency. The test reached the following (Knowledge section was 0.856; physical outcome section was 0.910; social outcome section was 0.888; psychological outcome section was 0.890).

A pilot study was carried out on a group of 6 patients (10%) to test the feasibility of the research process and clarity of the designed questionnaires and estimate the time needed to answer the study tools. Some modifications were made for the study tools. Then the final form was developed. Patients of the pilot study were not included in the study sample, and another six patients were selected based on the sample criteria to be included in the study subject instead of the excluded group.

Fieldwork included two phases: The implementation phase and the evaluation phase. The implementation phase

started preoperatively at the neurosurgical department by interviewing the studied patients with lumbar disc herniation and following the inclusion criteria to explain the study's aim and nature and take their approval to participate in the study before data collection. Data collection was started and completed within a year, from June 2018 to June 2019.

The patients' telephone numbers were obtained for the first time to contact them to determine the other appointments to complete the data collection process.

The study tools were filled in and completed by the researcher in 3 phases (pre, after the operation, and post three months period). The patients' assessment sheet was used to determine the patients' needs regarding lumbar disc at discharge. The patients' interviewing questionnaire was used to assess patients' level of knowledge. It was filled in by the researcher or by the patients according to their education level. It took about 30-45 minutes to fill in for every patient. The researcher or patients also filled in the biopsychosocial outcomes assessment tool according to their education level. It took about 30 minutes to fill in for every patient. The total time needed to fill in the study tools was from 1 to 1.45 hours.

Data collection was done three days/week (Monday, Tuesday, and Wednesday) at the previously mentioned settings in the morning and afternoon shifts. Wednesday was the outpatient clinic day, and Monday and Tuesday were the pre and postoperative days for patients with lumbar disc herniation surgery.

Based on patients' needs, the researcher developed the discharge plan and designed it as a booklet in the Arabic language, including the following items: lumbar disc herniation surgery (definition, indication, types, preparation), pain management strategies, a method to protect back and spine while practicing everyday activities, physical exercise, nutrition, weight management strategies, follow up and medication, stress management strategies aiming at improving the physical, psychological and social outcomes.

The content of discharge plan for patients with lumbar disc herniation surgery was adapted from *Elkwood et al. (2017); Lall, (2017); Wang et al. (2017); Linton, (2016); Bajwa, & Haldar, (2015); Dewit, & Kumagai, (2014); Tarnanen et al. (2014)*. Moreover, the contents were modified by the researcher according to the aim of the study and patient clinical condition. The discharge plan was distributed to all patients after assessing patients' needs in June 2018 after explaining its content and how to go through the discharge plan for the educated patients and caregivers for illiterate patients.

Sessions of the discharge plan (5 sessions) were conducted in a classroom in the inpatient department. The classroom was quiet, well ventilated, well furnished, had adequate lighting, adequate spacing, and supplies for implementation of the discharge planning.

Sessions of the discharge plan included three theoretical sessions and two practical sessions, starting with a greeting and assuring patients' privacy and assessing their motivation for learning. Orientation about

the discharge plan purpose, time, and content was done by the researcher using simple words and a tone of voice that shows interest and concern. Each session of the discharge plan took about 45-60 minutes per day for two days per week. Sometimes the sessions were conducted individually or for small groups; each group did not exceed three patients.

The sessions were carried out for every patient according to their education and understanding, and the teaching methods included demonstration, small group discussion, and role-play, supported by posters and booklets. Patients were allowed to ask questions in case of misunderstanding while listening and expressing interest for them. At the end of the sessions, the researcher emphasized the importance of follow-up visits. The patients were instructed to come after three months for a follow-up test.

The evaluation phase started after three months of implementing the discharge plan. Written assessment tools (patients' interviewing questionnaire "knowledge part," patients' outcomes assessment tool) were used again after three months. Tests were done to evaluate discharge planning's effect on the studied patients' outcomes (physical, social, and psychological).

4.6. Data analysis

The data were collected, coded, and entered into a suitable excel sheet. Data were transferred into SPSS. Quantitative data were presented as a mean standard deviation; the comparison was made using the X² test. Qualitative data were presented as percentages. r-Pearson Correlation Coefficient test was used to assess the association between variables. The observed differences and association were considered as follows:

- Non-significant at $p > 0.05$.
- Significant at $p \leq 0.05$.
- Highly significant at $p < 0.001$.

5. Results

Table 1 shows that the mean age of the studied patients was 39.58 ± 8.69 . Also, 60% of them were females, and 85% of them were married. Regarding the education level, 30% could not read and write or had a secondary school diploma, 43.3% had heavy work. 58.3% of them from urban and 66.7% were overweight.

Figure 1 reveals that the satisfactory level of knowledge for the studied patients was 93.3% after implementing the discharge plan compared to pre that was 8.3%.

Table 2 shows a highly statistically significant improvement three months after implementing the discharge plan compared to pre according to their level of pain-related disability with a p-value (< 0.001).

Table 3 illustrates a highly statistically significant improvement in lower extremity functional status three months after implementing the discharge plan compared to their pre-intervention level at p-value (< 0.001).

Table 4 shows a highly statistically significant improvement of social function three months after implementing the discharge plan compared to their pre-intervention level at p-value (< 0.001).

Table 5 shows a highly statistically significant improvement of total psychological outcomes three months after implementing the discharge plan compared to their pre-intervention level at p-value (< 0.001).

Table 6 shows highly statistically significant relations between patients' total satisfactory level of knowledge and their level of pain-related disability, at pre and three months after implementing the discharge plan at p-value < 0.001 .

Table 7 shows statistically significant relations between patients' total knowledge and their lower extremity functional status pre implementing discharge plan at p-value 0.017 and highly statistically significant relation three months after implementing the discharge plan at p-value < 0.001 .

Table (1): Frequency and percentage distribution of patients with lumbar disc herniation surgery according to their demographic data (N=60).

Demographic data	No.	%
Age (years)		
20-≤35 years	19	31.7
35-≤50 years	30	50.0
≥50 years	11	18.3
Mean±SD	39.58±8.69	
Gender		
Male	24	40.0
Female	36	60.0
Marital status		
Married	51	85.0
Not Married	9	15.0
Education		
Cannot read and write	18	30.0
Read and write	15	25.0
Secondary school	18	30.0
University Education	9	15.0
Occupation		
Not working	25	41.7
Sedentary work	9	15.0
Heavy work	26	43.3
Residence		
Urban	35	58.3
Rural	25	41.7
Weight (kg)	75.36±10.34	
Height (cm)	165.35±9.27	
BMI [wt/(ht)²]		
Underweight	0	0.0
Normal weight	13	21.7
Overweight	40	66.7
Obese	7	11.6
Mean±SD	27.67±3.78	

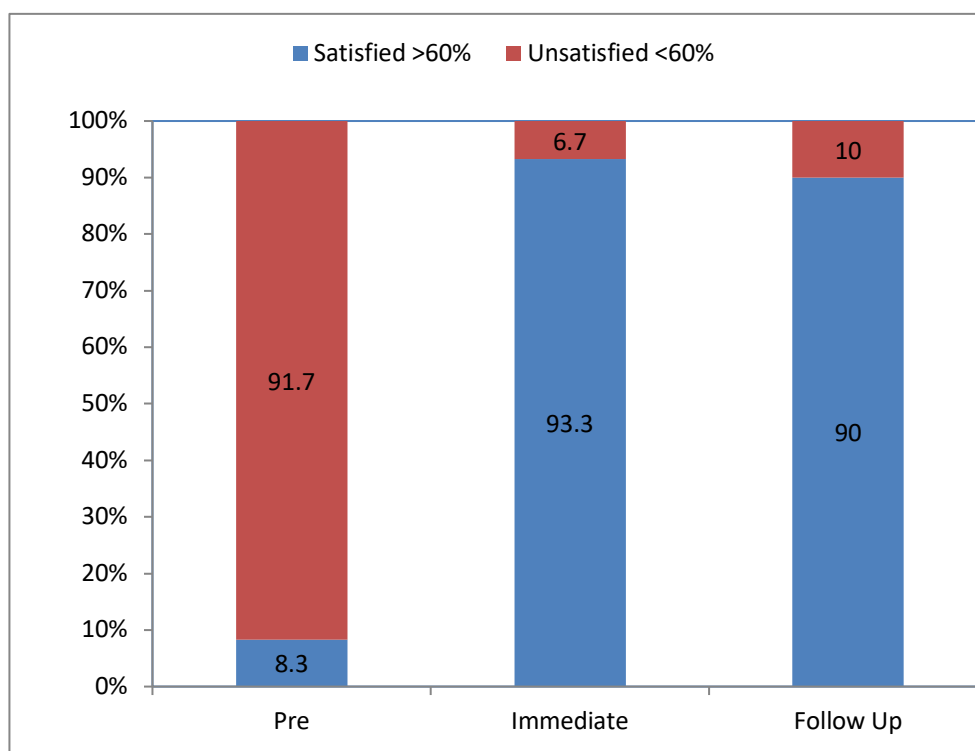


Fig. (1): percentage distribution of Patients' satisfactory level of knowledge during the three phases of the study

Table (2): Comparison of studied patients' pain-related disability between the pre and follow-up phases.

Physical Disability	Pre		Follow Up		χ^2	p-value
	No.	%	No.	%		
Minimal disability	2	3.3	7	11.7	75.544	<0.001
Moderate disability	4	6.7	46	76.7		
Severe disability	21	35.0	5	8.3		
Crippled	23	38.3	2	3.3		
Bed bounds	10	16.7	0	0.0		
Total	60	100.0	60	100.0		

Table (3): Comparison of studied patients' lower extremity functional status between pre and follow-up phases.

Lower Extremity Function	Pre		Follow Up		χ^2	p-value
	No.	%	No.	%		
Low Assistant	19	31.7	49	81.7	31.533	<0.001
Moderate Assistant	36	60.0	11	18.3		
High Assistant	5	8.3	0	0.0		
Total	60	100.0	60	100.0		

Table (4): Compares patients' total social dysfunction between the two phases of the study (n=60).

Social outcome	Pre		Follow Up		χ^2	p-value
	No.	%	No.	%		
No social dysfunction	4	6.7	32	53.3	53.327	<0.001
Mild social dysfunction	13	21.7	22	36.7		
Moderate Social dysfunction	28	46.7	6	10.0		
Sever social dysfunction	15	25.0	0	0.0		
Total	60	100.0	60	100.0		

Table (5): Comparison of patients' total psychological outcomes between the two phases of the study (n=60).

Level of Psychological	Pre		Follow Up		χ^2	p-value
	No.	%	No.	%		
Unsatisfactory	36	60.0	2	3.3	56.842	<0.001
Average	24	40.0	33	55.0		
Satisfactory	0	0.0	25	41.7		
Total	60	100.0	60	100.0		

Table (6): Relation between patients' total satisfactory level of knowledge and their level of pain-related disability pre and three months post implementing the discharge planning (n=60).

Pain-related disability level	Total patient knowledge											
	Pre-intervention					Follow up						
	Satisfactory		Unsatisfactory		χ^2	p-value	Satisfactory		Unsatisfactory		χ^2	p-value
No.	%	No.	%	No.			%	No.	%			
Minimal disability	2	40	0	0.0	50.182	<0.001	7	13.0	0	0.0	51.111	<0.001
Moderate disability	3	60.0	1	1.8			46	85.2	0	0.0		
Severe disability	0	0.0	21	38.2			1	1.9	4	66.7		
Crippled	0	0.0	23	41.8			0	0.0	2	33.3		
Bed bounds	0	0.0	10	18.2			0	0.0	0	0.0		
Total	5	100	55	100			54	100	6	100		

Table (7): Relation between patients' total knowledge and their level of lower extremity functional status pre and three months post implementing discharge planning (n=60).

Level of Lower Extremity Functional Scale	Total patient knowledge											
	Pre					Follow Up						
	Satisfactory		Unsatisfactory		χ^2	p-value	Satisfactory		Unsatisfactory		χ^2	p-value
No.	%	No.	%	No.			%	No.	%			
Low Assistant	4	80.0	15	27.3	8.138	0.017	48	88.9	1	16.7	10.402	<0.001
Moderate Assistant	1	20.0	35	63.6			6	11.1	5	83.3		
High Assistant	0	0.0	5	9.1			0	0.0	0	0.0		
Total	5	100	55	100			54	100	6	100		

6. Discussion

Lumbar intervertebral disc herniations are the most common causes for working-age individuals to undergo lumbar spine surgery. Patients with a family history of disc disease or are in physically demanding jobs, or specific medical comorbidities such as obesity are at an increased risk of developing a lumbar disc herniation. Symptomatic herniations present as lumbar radiculopathy from mechanical compression and chemical irritation of the nerve root (Schroeder et al., 2016).

The present study has been designed to assess discharge plans' effect on outcomes of patients with lumbar disc herniation surgery. It has also been hypothesized that the discharge plan's implementation will positively affect the outcomes of patients exposed to lumbar disc herniation surgery.

Regarding the patient's demographic characteristics, the present study's result revealed that the studied patients' mean age was 39.58±8.69. This result can be explained by increasing lumbar disc herniation and recurrent exposure to life stressors in younger adults, in which this age group represents the working-age population. This finding is inconsistent with what was reported by Ahmed et al. (2019) in a study entitled: "Effectiveness of structured nursing teaching program on outcomes of chronic low back pain in patients undergoing radiofrequency ablation". They found that more than half of studied patients have an age ranged

from 18 to less than 55 years old and less than half of studied patients were older adults their age ranged from 55 and more.

Furthermore, a study conducted by Hey et al. (2018) entitled "The predictive value of preoperative health-related quality-of-life scores on postoperative patient-reported outcome scores in lumbar spine surgery," revealed that the mean age for patients with disc herniation was the youngest (40 years). On the other hand, Hartvigsen et al. (2018) reported that low back pain affects all age groups, from children to the elderly population.

Regarding gender, the present study result clarified that more than half of the study sample were females. This finding may be due to the stresses of everyday life as females' musculature are weaker than males; this can also be attributed to the accumulation of household chores and outside work and women's anatomical and functional characteristics. This finding was supported by Ahmed et al. (2019), who stated that the highest percentage of cases and control groups were females. Otherwise, this was on the contrary with Weheida's et al. (2016) study entitled "The effect of implementing an educational program about proper body mechanics on low back pain and activities of daily living among patients with disc prolapse" who pointed that the prevalence of low back pain affects a large proportion of the male population.

Concerning marital status, the results showed that more than three-quarters of the patients were married. This

finding may reflect that married people were liable to lumbar disc herniation more than singles because they always face the physical demand and psychological stress of their social role. This finding is consistent with what was reported by *Abd-El Mohsen's et al. (2019)* study entitled "Effect of nursing rehabilitation guide on outcomes of patients undergoing lumbar discectomy" who pointed that more than two-thirds of the studied sample were married.

Concerning the educational level, the current study illustrates that more than one-quarter of the studied patient could not read or write or had a secondary school diploma. This finding may be related to the study conducted in a governmental hospital with a high percentage of low social standards patients attending at Ain Shams University hospital for getting medical treatment. This result goes in the same way with *Fareed et al. (2017)* entitled "Effect of superficial hot versus cold application on low back pain among patients with disc prolapse" who pointed that; the majority of the studied sample was illiterate and had diploma education.

Regarding occupations and nature of work, the present study results show that more than two-fifths of the patients under study had heavy work that requires physical effort; this may reflect the work's nature, which causes mechanical stress on the back and acts as a risk factor to develop lumbar disc herniation. This finding follows *Fareed et al. (2017)*, who concluded that the type of work significantly affects low back pain occurrence. Also, heavy manual work that demands lift, bending, twisting, and repetitive moments can cause back pain and increase the risk of lumbar disc herniation.

Concerning body mass index, the present study results show that more than two-thirds of the studied patients were overweight. This result may be because most of the studied patients were females with a sedentary lifestyle, not practicing exercise, and not eating a healthy diet that maintains optimal weight. This finding agrees with a study conducted by *Morcos et al. (2018)*, entitled "Predictive factors for discharge destination following posterior lumbar spinal fusion: A Canadian Spine Outcome and Research Network (CSORN) Study, which revealed that about two-thirds of the studied patients had a high body mass index. Furthermore, it stated that obesity could complicate postoperative recovery and delay rehabilitation.

The present study result shows a highly statistically significant improvement in disability score among patients under study three months posts implementing discharge planning regarding patients' total pain-related disability score. The majority of the patients under study had a severe and crippling disability, which improved to become more than three quarters with moderate disability. This result may be due to 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.

This result goes in the same way as *Weheida et al. (2016)*. They concluded that the educational program for patients with disc prolapse improved daily living activities and reduced low back pain. A highly statistically significant difference among study and control groups was revealed regarding the Oswestry Low Back Pain Disability Questionnaire at post-teaching. Most of the patients under study improved from severe to minimal disability after implementing the educational program.

Additionally, *Ahmed et al. (2019)* added that a structured nursing teaching program had an effective strategy to improve patients' outcomes by increasing patients' knowledge and decreasing pain intensity and physical disability in the case group versus the control group. Furthermore, *Archer et al. (2016)* stated that participants with the education group at the 3-month follow-up had significantly greater decreases in pain and disability and increased general health and physical performance and postoperative outcomes.

Moreover, the result shows a highly statistically significant difference regarding lower limb functional status throughout the discharge planning phases. More than four-fifth of the studied patient had low assistant level three months after implementing the discharge plan compared to one-third before discharge planning intervention. From the researcher's point of view, the educational intervention effectively informs patients undergoing spinal surgery with the methods that can reduce pain, proper positioning and body mechanics, benights of exercising, and weight reduction strategies.

This finding is congruent with a study done by *Hebert et al. (2016)*, entitled "Predictors of clinical outcome following lumbar disc surgery: The value of historical, physical examination, and muscle function variables." They stated that the patients show more significant improvement in functional status level, mobility, lower extremity strength leading to more independence and decrease functional disabilities for the concerned patients.

The current results show a highly statistically significant improvement among patients under study throughout discharge planning phases regarding the level of social dysfunction as most of the patients under study had moderate and severe social dysfunction pre-intervention, which improved to become more than half of the patient under the study had no social dysfunction three months after implementing the discharge plan.

This finding is congruent with a study done by *Mancuso et al. (2018)*, entitled " Psychosocial variables contribute to the length of stay and discharge destination after lumbar surgery independent of demographic and clinical variables SPINE, " who pointed out that less social support was independently associated with longer length of stay and worse functional status.

Concerning psychological outcomes, the current study reveals a highly statistically significant improvement three months after implementing the discharge plan compared to the pre-intervention level. Three-fifth of the studied patient had an unsatisfactory outcome, which improved to more than half, and two-fifth of the patient under study had an

average and satisfactory psychological outcome level, respectively.

From the researcher's perspective, this could be attributed to the psychological stress during the perioperative period to psychologically healthy patients. Stressors include the following: The financial costs of treatment, the potential loss of income while off from work, and the individual's compromised function, which may tax relationships or family dynamics.

In the same line, after lumbar disc herniation surgery, physical activities helped patients take precautions to avoid recurrence of disc herniation, complications and adhere to follow-up care and visits. This result asserts that meeting the patients' educational needs would help fulfill the obligatory changes in daily living activities, supporting the research hypothesis.

Additionally, *Madera et al. (2017)*, entitled "The role of physical therapy and rehabilitation after lumbar fusion surgery for degenerative disease: A systematic review," reported that patients who undergo lumbar fusion had been shown to have a significant fear of movement and (re)injury. Also, approximately 80% of the study's patients who underwent lumbar spinal fusion had comorbid anxiety or depression. These patients also had a lower health-related quality of life and higher levels of pain.

Regarding the relation between patients' total satisfactory level of knowledge and physical outcomes three months after implementing discharge planning, the current result reveals highly statistically significant relations between patients' total knowledge and their pain-related disability. These results may be due to preoperative explanations provided to understand the patient's intervertebral disc's basic physiological structure, helping the patients understand the normal reactions that will occur after the operation. Moreover, it prepared the patients for early functional recovery and safe performance of the daily living activity without fear of complication.

These results are in agreement with a study done by *Mohamed et al. (2013)*, entitled "Impact of exercise program on functional status among post-lumbar laminectomy patients." After implementing the exercise program, the study concluded a highly significant improvement in functional capacity among the studied subjects at two weeks and six weeks postoperative recovery. It decreased the Oswestry Low Back Pain Disability score compared to the preoperative period.

Furthermore, *Burgess et al. (2019)*, entitled "The effect of preoperative education on psychological, clinical, and economic outcomes in elective spinal surgery: A systematic review," who stated that a preoperative education session improving clinical outcomes (pain, function, and disability), and increased levels of physical activity.

The current study illustrates 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

helped practice exercises safely without fear, which improves the lower limb's muscle strength.

These results are in agreement with a study done by *Zhang et al. (2018)*, entitled "Postoperative functional exercise for patients who underwent percutaneous transforaminal endoscopic discectomy for lumbar disc herniation." The study reported that early functional exercises of passive and autonomic activities were beneficial to the rehabilitation of patients with lumbar disc herniation, which can significantly improve their living quality after an operation and increase strength in the lower extremity. Finally, the hypothesis of the current study was accepted. The discharge plan positively affects physical, psychological, and social outcomes for patients with lumbar disc herniation surgery.

7. Conclusion

This study concluded that the application of discharge planning regarding lumbar disc herniation surgery has a positive, improving effect on patients' outcomes, and there were statistically significant relations between knowledge and patients' outcomes three months after implementing discharge planning. The results of the study support the research hypothesis.

8. Recommendations

In research:

- Replication of the current study on a larger probability sample is recommended to achieve generalization of the results.
- Further research is recommended periodically to be carried out using new approaches in managing patients undergoing lumbar disc herniation surgery and evaluating its effect on patients' outcomes.
- Studying factors affecting patients' compliance with the therapeutic regimen after lumbar disc herniation surgery.

In services

- Providing copies of the discharge plan in the neurosurgical department and clinic to be readily available for all patients planned to undergo lumbar disc herniation surgery and should be updated periodically.
- Follow-up cares for patients with lumbar disc herniation through phone calls and clinical visits to pinpoint post-discharge patients' problems and solve them.
- Establishment of a multidisciplinary approach in the management of patients undergoing lumbar disc herniation surgery.

In community

- Health education through mass media concerning lumbar disc herniation and proper use of body mechanics is recommended.

9. References

- Abd-El Mohsen, S. A., Ammar, S., & Mohammed, S. (2019)*. Effect of nursing rehabilitation guide on outcomes of patients undergoing lumbar discectomy, *Journal of Nursing and Health Science*, 8(3), 01-11 <https://doi.org/10.9790/1959-0803050111>

- Ahmed, H. G., Mostfa, M. N., Khalil, S. S., Abozeid, A. H., Fahmy, H. M., Elawamy, A. (2019).** Effectiveness of structured nursing teaching program on outcomes of chronic low back pain patients undergoing radiofrequency ablation, *Journal of Health, Medicine and Nursing*, 65(2019), 1. <https://doi.org/0.7176/JHMN/65-08>
- Archer, R. K., Devin, J. C., Vanston, W. S., Koyama, T., Phillips, E. S., George, Z. S., McGirt, M. J., Spengler, D. M., Aaronson, O. S., Cheng, S. J., & Wegener, S. T. (2016).** Cognitive-behavioral-based physical therapy for patients with chronic pain undergoing lumbar spine surgery: A Randomized Controlled Trial, *The Journal of Pain*, 17(1), 76-89. <https://doi.org/10.1016/j.jpain.2015.09.013>
- Bajwa, S. J., & Haldar, R. (2015).** Pain management following spinal surgeries: An appraisal of the available options, *Journal of Craniovertebral Junction Spine*, 6(3), 105–110. <https://doi.org/10.4103/0974-8237.161589>
- Burgess, L., Arundel, J., & Wainwright, T. (2019).** The effect of preoperative education on psychological, clinical, and economic outcomes in elective spinal surgery: A systematic review. *Healthcare*, 7(1), 48. <https://doi.org/10.3390/healthcare7010048>
- Dewit, S., & Kumagai, C. (2014).** *Medical-Surgical Nursing. E-Book: Concepts & Practice*, 2nd ed, Elsevier Health Sciences.
- Elkwood, A., Kaufman, M., & Schneider, L. (2017).** *Rehabilitative Surgery: A Comprehensive Text for an Emerging Field*, E-Book. Springer Nature.
- Fairbank, J. C., & Pynsent, P. B. (2000).** The Oswestry Disability Index. *Spine*, 25(22), 2940-52. <https://doi.org/10.1097/00007632-200011150-00017>
- Fareed, E. L. M., Abd-Elkader, EL. H., Henidy, M. W., & Abd Elwahhab, S.A. (2017).** Effect of superficial hot versus cold application on low back pain among patients with disc prolapse, *International Journal of Novel Research in Healthcare and Nursing*, 4(3), 264 -255.
- Guo, X., Hou, X., Ding, S., & Chang, S. (2019).** Rehabilitation nursing for patient rehabilitation after minimally invasive spine surgery, *Int J Clin Exp Med.*, 12(3), 2450-2455 <http://www.ijcem.com/files/ijcem0085631.pdf>, accessed on November 16, 2019.
- Hartvigsen, J., Hancock, M. J., Kongsted, A., Louw, Q., Ferreira, M. L., Genevay, S., Hoy, D., Karppinen, J., Pransky, G., Sieper, J., Smeets, R. J., & Underwood, M. (2018).** What low back pain is and why we need to pay attention. *The Lancet*, 391(10137), 2356–2367. [https://doi.org/10.1016/s0140-6736\(18\)30480-x](https://doi.org/10.1016/s0140-6736(18)30480-x)
- Hebert, J. J., Fritz, J. M., Koppenhaver, S. L., Thackeray, A., & Kjaer, P. (2016).** Predictors of clinical outcome following lumbar disc surgery: the value of historical, physical examination, and muscle function variables. *European Spine Journal*, 25(1), 310-317. <https://doi.org/10.1007/s00586-015-3916-z>
- Hey, H. W. D., Luo, N., Chin, S. Y., Lau, E. T. C., Wang, P., Kumar, N., Lau, L-L., Ruiz, J. N., Thambiah, J. S., Liu, K-P. G., & Wong, H-K. (2018).** The predictive value of preoperative health-related quality-of-life scores on postoperative patient-reported outcome scores in lumbar spine surgery. *Global Spine Journal*, 8(2), 156–163. <https://doi.org/10.1177/2192568217701713>
- Lall, M. P. (2017).** Nursing care of the patient undergoing lumbar spinal fusion. *Journal of Nursing Education and Practice*, 8(5), 44. <https://doi.org/10.5430/jnep.v8n5p44>
- Lewis, S., Dirksen, S. R., Heltkemper, M. M., Bucher, L., & Camera, L. M. (2014).** *Medical-surgical nursing assessment and management of clinical problems*, 10th ed, Elsevier Mosby, Canada.
- Linton, A. D. (2016).** *Introduction to medical-surgical nursing*, 6th ed., Elsevier Saunders, Canada.
- Mabire, C., Bachnick, S., Ausserhofer, D., & Simon, M. (2019).** Patient readiness for hospital discharge and its relationship to discharge preparation and structural factors: A cross-sectional study, *International Journal of Nursing Studies*, 90 (1), 13-20. <https://doi.org/10.1016/j.ijnurstu.2018.09.016>
- Madera, M., Brady, J., Deily, S., McGinty, T., Moroz, L., Singh, D., Tipton, G., & Truumees, E. (2017).** The role of physical therapy and rehabilitation after lumbar fusion surgery for degenerative disease: A systematic review. *Journal of Neurosurgery: Spine*, 26(6), 694-704. <https://doi.org/10.3171/2016.10.spine16627>
- Mancuso, C. A., Duculan, R., Craig, C. M., & Girardi, F. P. (2018).** Psychosocial variables contribute to length of stay and discharge destination after lumbar surgery independent of demographic and clinical variables. *SPINE*, 43(4), 281-286. <https://doi.org/10.1097/brs.0000000000002312>
- Marchand, A. A., O’Shaughnessy, J., Châtillon, C. É., Sorra, K., & Descarreaux, M. (2016).** Current practices in lumbar surgery perioperative rehabilitation: A scoping review. *Journal of Manipulative and Physiological Therapeutics*, 39(9), 668-692. <https://doi.org/10.1016/j.jmpt.2016.08.003>
- Matteson, M. A., Connell, E. S. & Linton, A. D. (1997).** *Gerontological nursing concept and practice*, 2nd ed., USA: WB, Saunders Company, p. 98.
- Medical Records of El- Demerdash Surgical Hospital, Neurosurgical Departments, (2016).** Ain shams University; Ain Shams University Hospital.
- Medical Record of The Neurosurgical Ward at El-Demerdash Hospital, (2019).** Ain shams University; Ain Shams University Hospital
- Mohamed, A. L., Ismail, N. M. L., Elsawi, AB. K., & Sawan, EMS (2013).** Impact of exercise program on functional status among post-lumbar laminectomy patients, *Journal of Biology, Agriculture and Healthcare*, 3(10). <https://www.iiste.org/Journals/index.php/JBAH/article/view/7238>

- Morcos, M. W., Jiang, F., McIntosh, G., Ahn, H., Dea, N., Abraham, E., Paquet, J., Natara, A., Johnson, M., Manson, N., Fisher, C., Rampersaud, R., Thomas, K., Hall, H., & Weber, M. (2018).** Predictive factors for discharge destination following posterior lumbar spinal fusion: A Canadian Spine Outcome and Research Network (CSORN) Study. *Global Spine Journal*, 9(4), 403-408. <https://doi.org/10.1177/2192568218797090>
- Omidi-Kashani, F., Hejrati, H., & Ariamanesh, S. (2016).** Ten Important Tips in Treating a Patient with Lumbar Disc Herniation. *Asian Spine Journal*, 10(5), 955. <https://doi.org/10.4184/asj.2016.10.5.955>
- Salama, A. A., Alarabawy, R. A., Dawoud, M. M., Zayed, H. A., Soliman, A., & El-Tantawy, A. (2016).** Functional disability of occupational-related lumbar disc degeneration: Evaluation by magnetic resonance imaging with surgical correlation. *The Egyptian Journal of Radiology and Nuclear Medicine*, 48(1), 189–199. <https://doi.org/10.1016/j.ejrn.2016.11.010>
- Schroeder, G. D., Guyre, C. A., & Vaccaro, A. R. (2016).** The epidemiology and pathophysiology of lumbar disc herniations. *Seminars in Spine Surgery*, 28(1), 2–7. <http://doi.org/10.1053/j.semss.2015.08.003>
- Tarnanen, S. P., Neva, M. H., Häkkinen, K., Kankaanpää, M., Ylinen, J., Kraemer, W. J., Newton, R. U., & Häkkinen, A. (2014).** Neutral spine control exercises in rehabilitation after lumbar spine fusion. *Journal of Strength and Conditioning Research*, 28(7), 2018–2025. <https://doi.org/10.1519/jsc.0000000000000334>
- Wang, M., Strayer, A., Harris, O., Rosenberg, C., & Mummaneni, P. (2017).** *Handbook of neurosurgery, neurology, and spinal medicine for nurses and advanced practice health professionals*, E-Book. Routledge Taylor & Francis Group.
- Ware Jr, J. E., & Sherbourne, C. D. (1992).** The MOS 36-item short-form health survey (SF-36): I. Conceptual framework and item selection. *Medical care*, 30(6), 473-83. <https://pubmed.ncbi.nlm.nih.gov/1593914/>
- Weheida, S., Abd Elgaphar, S., & Abd Elalem, S. (2016).** The effect of implementing an educational program about proper body mechanics on low back pain and activities of daily living among patients with disc prolapse. *Journal of Nursing and Health Science*, 5(6 ver II), 59-67, www.iosrjournals.org.
- Zhang, R., Zhang, J. S., & Wang, J. X. (2018).** Postoperative functional exercise for patients who underwent percutaneous transforaminal endoscopic discectomy for lumbar disc herniation, *European Review for Medical and Pharmacological Sciences*, 22(1), 15-22. https://doi.org/10.26355/eurrev_201807_1535