

Effect of Rehabilitative Nursing Program on Functional Status among Patients with Discectomy

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Abstract: Low back pain related to disc prolapse is localized in the lumbar area and it may be radiated to the lower extremities, starting from neurons near or around the spinal canal. Most of the population may be affected with low back pain within their lifetime and leads to lost productivity and disability and loss of function. Therefore this study was conducted to examine the effect of rehabilitative nursing program on functional status among patients with discectomy. Design: a quasi-experimental research design was utilized. Setting: The study was carried out at neurosurgery department and out patient's clinic of Menoufia University and Teaching hospitals at Menoufia governorate, Egypt. A purposive sample of 100 adult patient undergoing discectomy surgery assigned randomly into two equal groups, 50 patients for each: Study group (1): received rehabilitative nursing program. Control group (2): received routine hospital care only. Four Instruments were used for data collection: Structured interviewing questionnaire, Functional assessment instrument, Observational check list, and Oswestry low back pain disability questionnaire. Results: There was an improvement in functional status and lumbar flexibility of study group (80 %) than control group (30%). Conclusion: Application of rehabilitative nursing program for patient with discectomy had proven apposite effect in relation to functional ability Recommendation: A supervised rehabilitative nursing program should be carried out for all patients immediately after discectomy surgery.

Key words: Disc prolapse, Lumbar flexibility Rehabilitative nursing program.

Date of Submission: 17-12-2019

Date of Acceptance: 31-12-2019

I. Introduction

Most of the population may be affected with low back pain caused by disc prolapse within their lifetime and leads to lost productivity and disability. Disc prolapse pain is localized in the lumbar area and it may be radiated to the lower extremities, starting from neurons near or around the spinal canal that are injured or irritated by one or more pathological problems (Robert & Robert, 2018)

About 80% intervertebral disc prolapse are caused by trauma. A tear of the posterior longitudinal ligament caused by sudden severe strain, so that the tense nucleus pulposus bulges backwards through the annulus fibrosus. Increased tension- nucleus pulposus may absorb fluid and swell, this bulges the annulus or even bursts through it. Such absorption of fluid may occur in some physical illness and emotional stress. The weakened disc cannot resist body weight and is liable to be herniated. (Evlyn, 2010).

Symptoms of disc prolapse that vary from individual to individual include, pain in the back that may go down to the back of the leg passing through buttocks , numbness or tingling down the back of the leg or in buttocks , loss of bladder and/or bowel control, and increasing pain levels during sitting for long period or bending or coughing or sneezing. (Scott, 2018).

Spine surgery is only an option after more conservative measures like medications, physical therapy, and injections have failed or if serious neurological deficits are present like weakness, or loss of bowel/bladder control, (Deyo et al., 2010).

Lumbar discectomy can alleviate symptoms from a herniated disc in the low back. The main goal of discectomy surgery is to remove the part of the disc that is putting pressure on a spinal nerve root. Taking out the injured portion of the disc also reduces chances that the disc will herniate again (Danielsen M., Johnsen R., Kibsgaard S. and Hellevik E., 2015).

Rehabilitative nursing program for postoperative management of patients undergoing discectomy emphasize effective pain relief through adequate pain killer and suitable positioning in addition to patient education and advice on sitting related to patient's function, on building activities and on appropriate reinforcing self-management, (Dvorak J., Junge A. and Ahrens S., 2016).

Previous studies found that rehabilitation programs implemented after lumbar disc herniation surgery effectively reduce postoperative pain and disability, improve general health status, facilitate early return to daily activities and improve the quality of life (Junge A., Dvorak J., and Ahrens S., 2016).

The role of nurse is a vital in preparatory teaching of patient with disc surgery. Nurses in their central position can ensure the best possible functional abilities for the post spinal surgery patients through the application of rehabilitative nursing intervention

Significance of the Study

it has observed from clinical experience in neurosurgery department in menoufia university that most patient undergoing rehabilitative nursing program are liable to decrease of functional status postoperatively and need post operative program to improve activity of daily living

Epidemiological studies have indicated that the diagnoses of disc prolapse and related low back pain is increasing. The incidence of low back pain over the course of a person's life is approximately 60% to 90%. The prevalence rate of low back pain is approximately 1 in 45 or 2.21% or 6 million people in USA (Medical Disability Advisor, 2013). In Egypt, the prevalence is 1,679,060 out of 76, 117, 4212 estimated population used (Right Diagnosis from health grades, 2013) and according to Statistical records of Menoufia University Hospital which illustrated that 250 patients were admitted to neurosurgery department for discectomy at the year of 2015, so, the current study aimed to examine effect of rehabilitative nursing program on functional status for patients who underwent discectomy for lumbar disc prolapse.

Research Hypothesis:

- Patients in the study group with discectomy who receive rehabilitative nursing program had improvement in performance of lower limb and spinal exercise than patients in the control group.
- Patients in the study group with discectomy who receive rehabilitative nursing program had improvement in lumbar flexibility and functional status than patients in the control group.

II. Methods:

Research design:

A quasi experimental research design (study and control) was utilized to achieve the purpose of this study.

Research Setting:

The study was carried out at neurosurgery department that contain about 4 rooms each room contain about 6 beds and out patient's clinic of Menoufia University and Teaching hospitals at Menoufia governorate, Egypt.

Subjects:

A purposive sample of 100 patients undergoing discectomy surgery was assigned randomly into two equal groups (50 patients for each group).

- Study group (1): received rehabilitative nursing program.
- Control group (2): received routine hospital care only.

The sample size was determined and calculated using Epi-info program using the equation : $n = [(Z_{\alpha/2} + Z_{\beta})^2 \times \{2(\delta)^2\}] / (\mu_1 - \mu_2)^2$ and it was 60 patients at coefficient interval 95%. The sample size was increased up to 100 patients in order to increase power of the study

Inclusion criteria

- Adult and conscious patients from both sexes with age range from 19 to 60 years and willing to participate in this study.
- Radiological diagnosis of disc herniation by Magnetic Resonance Imaging.

Exclusion criteria

- Patient with osteoporosis, rheumatoid arthritis, and / or fracture was excluded from the study due to its effect on pain level.
- Patient with previous lumbar surgery with poor surgical outcomes.

Instruments:

To achieve the purpose of the study , four instruments was used by the researcher for collecting the necessary data, these instruments were:

Instrument 1: structured Interviewing Questionnaire: It was developed by researcher after reviewing the related literature (Ismail, 2011, McGregor, Dore, Morris, Morris and Jamrozik, 2010 & Lin et al., 2015) to assess sociodemographic and medical data and patient's knowledge. It included three parts as the following.

- **Part one:** Patient's sociodemographic data as age, gender, level of education, occupation, marital status and residence.
- **Part two:** Medical data: it was included; patient's past, present history, family history, preoperative treatment and length of hospital stay.
- **Part three:** It included patient's knowledge about :-
 - The disease process such as definition, causes, signs and symptoms and treatment either medical or surgical.
 - Discectomy such as definition, indications, types and preoperative care.
 - Rehabilitation nursing program such as breathing and coughing exercise, lower extremities and spinal exercise.
 - Knowledge regarding proper posture assumed during sleeping, sitting, standing, bending, and performing house hold activities.

Scoring system:

Scoring system of the instrument was as the following:

Performance	Score
Completely correct answer	2
Incompletely correct answer	1
Incorrect answer	0

Instrument II: Functional Assessment Instrument:

It was used to assess lumbar flexibility which was measured by **Straight Leg Raising (SLR) test** that was developed by D'Amico and Barbarito, 2007 in which the patient was lying supine, the foot was lifted to flex the hip passively with the knee kept straight. Then, the angle between the couch and the flexed leg was measured to determine any limitation. **Scoring System:** less than 65° was considered as reduced flexibility and equal or

Instrument III:-Observational check list: It was developed by the researcher to evaluate patient's performance of ROM after reviewing of the related literature (Kozier ,Erb's and berman,2011). It was composed of the performance of: lumbar spine and lower extremities

Scoring system:-

Scoring system of the instrument was as the following:

Performance	Score
Correct , competent and complete	2
Correct, competent and in complete	1
Incorrect performance	0

Instrument IV: Oswestery back pain disability questionnaire: It was developed by Fairbank and Pynsent, (2000) and was utilized by the researcher to assess the effect of pain on daily living activities. It included 10 sections to describe the pain and its impact on the activities of daily living.

Ethical Consideration: A written and oral consent was obtained from all patients' to participate in this study after explanation of the purpose of the study. Each patient was reassured that any information obtained would be confidential and would only be used for the study purpose. The researcher emphasized that participation in the study was entirely voluntary and anonymity of the patients were assured through coding of data. Patients were also informed that refusal to participate in the study wouldn't affect their care

Validity: All instruments were tested for their content validity by 5 experts four of them in the field of Medical Surgical Nursing and one expert in the field of community health nursing.

Reliability: - Test retest and a person correlation coefficient formula used to ascertain reliability of this instrument, the period between each test was 2 weeks and these patients were excluded from the sample. . It was 0.97 for instrument one, 0.89 for instrument two, 0.83 for instrument three, 0.763 for instrument IV and 0.73 for instrument V.

Pilot study: a pilot study was conducted on 10% of the study sample (10) patients to test feasibility, clarity and applicability of the instrument then necessary modification was carried out.

Procedure:

Data collection was extended over a period of six months from September 2018 to the end of February 2019. It was conducted in four phases namely assessment, planning, implementation and evaluation

An official permission to carry out the study was obtained from the directors of the selected setting after submitting an official letter from the Dean of the faculty of nursing at Menoufia University explaining the purpose of the study and methods of data collection to obtain the acceptance for data collection. Then, this letter was provided to the head of department.

- Patients were divided into study and control group 50 patients each. Study group (1) received rehabilitative nursing program besides the routine hospital care and control group (2) received routine hospital care only.
- The study was conducted through four phases as the following:

I- Assessment Phase:

- □ In the assessment phase the researcher initiated data collection by interviewing each participant of both groups separately for assessing patient's sociodemographic and medical data by using instrument I part one and two.
- Patients of both groups were assessed for their knowledge about disease process, rehabilitation program, knowledge regarding proper posture assumed during sleeping, sitting, standing, bending, and performing house hold activities were assessed using part three of instrument I.
- Functional Assessment was done using instrument II for every patient of both groups.
- Performance of range of motion exercise that was composed of the performance of lumbar spine and lower extremities was assessed using observational check list (Instrument III) for both groups.
- The researcher used low back pain disability questionnaire (instrument IV) to assess the impact of low back pain on the activities of daily living for each subjects.

II- Planning phase

- The researcher went through extensive literature review literature (Ismail, 2011, McGregor, Dore, Morris, Morris and Jamrozik, 2010 & Lin et al., 2015) to prepare the rehabilitation program for study group based on the needs identified in assessment phase, Goals, priority of care and expected outcomes were formulated and taking first in consideration. An illustrative structured colored booklet was prepared to be introduced to study group as a guide for all of pertinent data related to interventions.

III- Implementation Phase:

- The developed rehabilitation program for the study group was conducted and applied individually to each patient or within group in neurosurgery department and was continued in the outpatient clinic using demonstration and redemonstration using colored booklet.

The program was consisted of the following:-

A. Initial program : Preoperative period, first and second weeks post-operative

1. Starting the program preoperatively by providing the patient with basic knowledge regarding anatomy, physiology of the lumbar region, risk factors, manifestation of lumbar disc, stages of disc, preoperative preparation and post-operative management including rehabilitation program.
2. Teaching the patient how to get out of bed using log rolling technique by bending knee and roll moving shoulders and hips at the same time like a log.
3. Patients of the study group was instructed to perform the active assistive range of motion of the lower extremities 10 minutes 3 time daily for hip, knee, ankle and toes joints.

B- Intermediate program: Third and fourth weeks

It was continued after the initial program and it included

1. Sitting activities for 10 minutes 3 times daily
2. Standing activities for 10 minutes 3 times daily
3. Performing isometric exercise 10 minutes 3 times daily such as: Ankle Pumps, heel slides, abdominal contraction, Wall squats, Straight leg raising, Hamstring stretch, Single Knee to Chest Stretch

C- Advanced program: Fifth and six weeks

1. Ambulation for 10 minutes 3 times daily and was increased according to patient need.
2. Instruction regarding proper posture assumed during sleeping, sitting, standing, bending, car driving and performing house hold activities.
3. Instruction about healthy diet after the operation. Postoperatively, each patient was visited once daily till discharge. During these visits patients were reassessed and given necessary encouragement to demonstrate exercises. Immediately before discharge patients were visited to re-emphasize them with the importance of performing all the learned activities of exercises at home, instruction of activity of daily living as well as the important of home exercises, also importance of follow up visits to avoid and detect any complications.

IV- Evaluation Phase.

- Finally, for evaluating the effectiveness of the program, further assessment of patient's outcome was carried out at 2, 4 and 6 weeks post operatively. The first and second evaluation were carried out during follow-up at outpatient clinic by previously mentioned instruments to evaluate the acquisition of knowledge and the effectiveness of rehabilitation program on patient's outcome. Third evaluation of patient's outcome was carried out 6 weeks by telephone using the previously mentioned tool.

Statistical Analysis

The collected data were organized, tabulated and statistically analyzed using SPSS software (Statistical Package for the Social Sciences, version 19, SPSS Inc. Chicago, IL, USA).

- For quantitative data, the range, mean and standard deviation were calculated.
- For qualitative data, which describe a categorical set of data by frequency, percentage or proportion of each category, comparison between two groups and more was done using Chi-square test (χ^2).
- For comparison between means of two groups of parametric data of independent samples, student t-test was used.
- For comparison between means of two groups of non-parametric data of independent samples, Z value of Mann-Whitney test was used.
- For comparison between more than two means of parametric data, F value of ANOVA test was calculated.

P-value at 0.05 was used to determine significance regarding:

- P-value > 0.05 to be statistically insignificant.
- P-value ≤ 0.05 to be statistically significant.
- P-value ≤ 0.001 to be highly statistically significant.

III. Results

Table I revealed that, the mean age for study group was 42.68±8.76 years, while for control group was 40.66±9.09 years. More than half of both groups were male (56% for study group, 70% for control group). The majority of both groups were married (82% and 88% respectively). **Regarding** to educational level, it was observed that more than one third of study group & control group had secondary education (40% and 36% respectively). **As regard** occupation, 44% of study group and 52% of control group worked manually. About three fourth of both groups (72% and 78% respectively) lived in rural areas.

Table 2 showed that causes of hospitalization in 50% of study group and 58% of control group due to heavy lifting. Also more than three fourth of study group and the majority of control group didn't hospitalized before. More than one third of both groups (37% & 40% respectively) didn't have family history of chronic diseases.

Figure (1): This figure showed that 14% of study group & 2% of control group had complete correct answer about rehabilitation program preoperatively while 6 weeks after rehabilitation program 66% of study group had complete correct answer compared with zero % of control group..

Table3:This table showed that all patients of both groups had lumbar flexibility <65° before rehabilitation program while 6 weeks after the program the majority of study group (80%) had normal flexibility compared to 30% of control group. So there was highly statistically significant improvement in lumbar flexibility among study group than control group after rehabilitation program than before (p = 0.0001*) which support hypothesis (IV).

Table 4 showed that there was highly statistically significant difference in lower limb performance among study group than control group at 3 intervals (2, 4 and 6 weeks) post rehabilitation program (p = 0.0001*).This support hypothesis III.

Table 5:This table showed that the majority of study and control group (88%) had moderate disability before the program while 6 weeks after the program 16% of control group had moderate disability compared to zero % of study group. There was statistically significant improvement in total disability score among study group than control group (P=0.0001*).

Table (1): Distribution of study and control group regarding to social characteristics:

Social characteristics	The studied sample (n=100)						χ^2	P
	Study group (n=50)		Control group (n=50)		Total (n=100)			
	n	%	N	%	N	%		
Age years:	23-60		23-58		23-60			
Range	42.68±8.76		40.66±9.09		41.67±8.94			
Mean±SD	1.132							
t-test	0.261							
P								
Sex:								
Male	28	56.0	35	70.0	63	63.0	2.102	0.147
Female	22	44.0	15	30.0	37	37.0		
Marital status:								
Single	3	6.0	3	6.0	6	6.0	1.106	0.776
Married	41	82.0	44	88.0	85	85.0		
Widow	4	8.0	2	4.0	6	6.0		
Divorced	2	4.0	1	2.0	3	3.0		
Educational level:								
Illiterate	12	24.0	11	22.0	23	23.0	1.559	0.816
Read and write	7	14.0	6	12.0	13	13.0		

Primary educ.	4	8.0	8	16.0	12	12.0		
Secondary educ.	20	40.0	18	36.0	38	38.0		
High educ.	7	14.0	7	14.0	14	14.0		
Occupation:								
Hand work	22	44.0	26	52.0	48	48.0	4.037	0.257
Office work	15	30.0	17	34.0	32	32.0		
Not work	0	0	1	2.0	1	1.0		
House wife	13	26.0	6	12.0	19	19.0		
Residence:								
Urban	14	28.0	11	22.0	25	25.0	0.480	0.488
Rural	36	72.0	39	78.0	75	75.0		

Table (2): Distribution of study and control group regarding to medical data

Medical data	The studied sample (n=100)						χ^2	P
	Study group (n=50)		Control group (n=50)		Total (n=100)			
	N	%	N	%	N	%		
Causes of hospitalization:							2.346	0.504
Trauma	5	10.0	5	10.0	10	10.0		
Falling	7	14.0	9	18.0	16	16.0		
Heavy lifting	25	50.0	29	58.0	54	54.0		
Incorrect movement	13	26.0	7	14.0	20	20.0		
History of chronic disease:							0.508	0.476
Yes	13	13.0	10	10.0	23	23.0		
No	37	37.0	40	40.0	77	77.0		
IF yes, what is the disease?:							2.654	0.448
Hypertension	5	38.5	5	50.0	10	43.5		
Diabetes Mellitus	5	38.5	5	50.0	10	43.5		
Cardiac dis.	1	7.7	0	0	1	4.3		
Liver dis.	2	15.4	0	0	2	8.7		
Previous hospitalization:							1.961	0.161
Yes	10	20.0	5	10.0	15	15.0		
No	40	80.0	45	90.0	85	85.0		
If yes, number of hosp.:							0.857	0.651
One	4	40.0	3	60.0	7	46.7		
Two	5	50.0	2	40.0	7	46.7		
Three	1	10.0	0	0	1	6.7		

Study group=Patients received rehabilitative nursing program

Figure (1): Distribution of study and control group regarding total knowledge score about discectomy at 4 different intervals (preoperative, 2,4 and 6 week

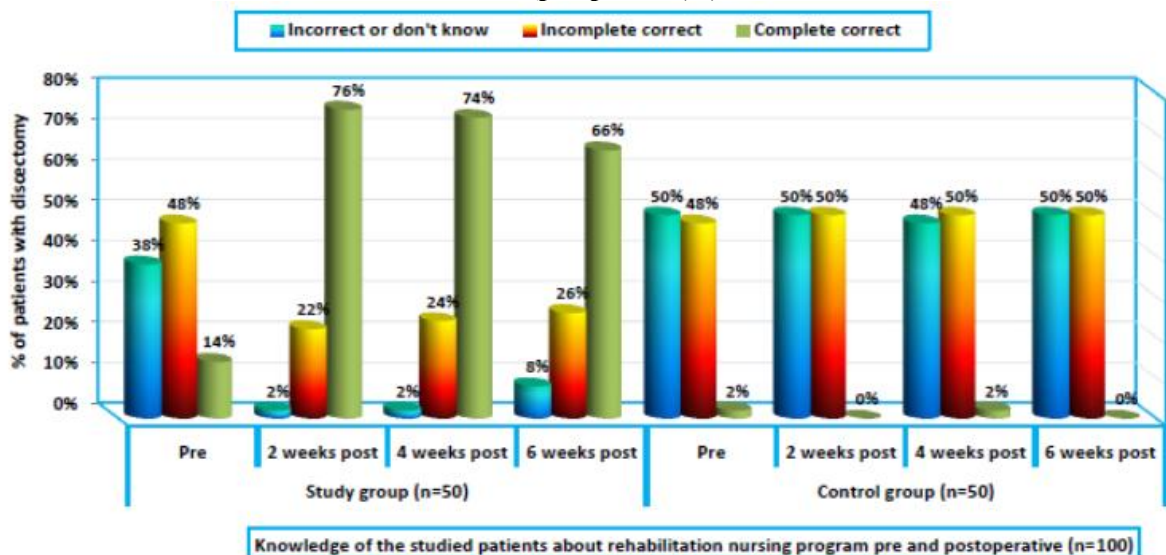


Table (3): Comparison between study and control group regarding Lumbar flexibility at 4 different intervals (preoperative, 2, 4 and 6 weeks post-operative)

Lumbar flexibility Pre and postoperative	Degree of lumbar flexibility among the studied patients with (n=100)								(Study vs Control group)	
	Study group (n=50)				Control group (n=50)				χ^2	P
	Reduced flexibility (<65°)		Normal flexibility (65° & more)		Reduced flexibility (<65°)		Normal flexibility (65° & more)			
	n	%	n	%	n	%	N	%		
Lumbar flexibility: Pre	50	100	0	0	50	100	0	0	-	-
Two weeks post	26	52.0	24	48.0	50	100	0	0	29.000	0.0001*
Four weeks post	10	20.0	40	80.0	38	76.0	12	24.0	29.210	0.0001*
Six weeks post	10	20.0	40	80.0	35	70.0	15	30.0	23.270	0.0001*

Table (4): Comparison between study and control group regarding to performance of lower limb exercises at 4 different intervals (preoperative, 2,4 and 6 weeks) post rehabilitation program.

Performance of lumbar spine exercises Pre and postoperative	The studied sample (n=100)											(Study vs Control group)		
	Study group (n=50)						Control group (n=50)						χ^2	P
	Incorrect or not performed		Correct, competent & incomplete		Correct, competent & complete		Incorrect or not performed		Correct, competent & incomplete		Correct, competent & complete			
	n	%	n	%	n	%	n	%	n	%	n	%		
Performance of lumbar spine exercises: Pre	21	42.0	28	56.0	1	2.0	29	58.0	21	42.0	0	0	3.280	0.194
Two weeks post	6	12.0	17	34.0	27	54.0	27	54.0	23	46.0	0	0	41.264	0.0001*
Four weeks post	7	14.0	17	34.0	26	52.0	27	54.0	23	46.0	0	0	38.665	0.0001*
Six weeks post	7	14.0	17	34.0	26	52.0	27	54.0	23	46.0	0	0	38.665	0.0001*
χ^2	43.792						0.242							
P	0.0001*						0.970							

Table5: Comparison between study and control group regarding to Level of disability at 4 different intervals (preoperative, 2,4and 6 weeks post-operative)

Level of disability Pre and postoperative	The studied sample (n=100)																χ^2 P (Study vs Control group)			
	Study group (n=50)								Control group (n=50)								Pre	Two weeks	Four weeks	Six weeks
	Pre		2 weeks post		4 weeks post		6 weeks post		Pre		2 weeks post		4 weeks post		6 weeks post					
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%				
•Level of disability:																				
Minimal disability (0%-20%)	2	4.0	1	2.0	46	92.0	50	100	4	8.0	0	0	12	24.0	42	84.0	5.853	1.010	47.492	8.696
																0.054	0.315	0.0001*	0.003*	
Moderate disability (21%-40%)	44	88.0	49	98.0	4	8.0	0	0	44	88.0	50	100	37	74.0	8	16.0				
Severe disability (41%-60%)	4	8.0	0	0	0	0	0	0	8	16.0	0	0	1	2.0	0	0				
χ^2	182.212								124.126											
P	0.0001*								0.0001*											

IV. Discussion:

Discectomy is an elective procedure rather than emergency surgery performed to widen and relieve pressure placed on the spinal cord or nerve roots,. Reducing the restrictions on postoperative activity and starting intensive physical training 4-5 weeks post operatively has led to improvements in work capacity and a reduction in patients' self-related disability and led to better outcomes (Overdevest et al., 2012).

Many studies suggested that a postoperative rehabilitation programs have lead to a more rapid return to work. Also, rehabilitation programs help the patients to move and do routine activities without putting extra strain on the backs. So, post-laminectomy patient must receive vigorous and extensive rehabilitation program in strengthening and stretching exercises and lifestyle modification program (Knight and Draper, 2008), So the present study was carried out in order to determine the effect of rehabilitative nursing program on pain intensity and functional status among patients with discectomy.

The result of the present study revealed that there was no statistical difference present between the study and control group patients regarding all sociodemographic characteristics .This indicates that both study and control groups are homogenous.

Regarding to Socio-demographic characteristics & medical data of the studied sample:

The findings of the present study revealed that, the majority of both study and control groups were among age group between 30 to 50 years old. This finding was in line with (Abdelwahhab, 2014).

The present study also, revealed that the majority of study subjects were within the age group 30-50 years. This might be due to this age represent working-age population. This coincide with McGregor (2010) who explained that after the age of thirty the intervertebral disks tend to lose their moisture content and become thinner as people get older and become prone to injury. Ahmed, (2008) concluded that the risk of experiencing low back pain from disc disease or spinal degeneration increases with age. While, Harwood, (2013) reported that LBP can be experienced by people in all age groups.

Concerning sex: the present study found that, men are at a higher risk of low back pain than women. Gender differences may be a result of differences in lifting patterns and work methods between males and females. This agree with (Taori, 2011 and Mohamed, 2010) who found that the prevalence of LBP affects at one time or another, a large proportion of the male population. However Hill, (2006) reported that men and women are equally affected with LBP. But the males experience an earlier onset of symptoms than females. Bertilsson and Jensen, (2006) reported that women are at greater risk, probably because of the development of osteoporosis.On contrary (Taylor, Goode, George and Cook, 2014) stated that risk of low back pain increase with female than male. This may be due to the sample of (Taylor, Goode, George and Cook, 2014) was from working women.

Regarding to occupation the present study found that hard work increase the risk for disc prolapse This findings was in line with (Schelerud, 2006) who concluded that type of work has a significant effect on LBP and suggest that repetitive work involving lifting heavy object bent positions , twisting, and working with vibrating tools increases the risk of future chronic low-back pain. This finding is also supported byManusov, (2012).Also several studies have coincided that heavy physical work and prolonged standing are associated with

increased risk of disability (Lahelma ,Laaksonen , Lallukka , Martikainen ,(2012). and Tuchsén et al., 2010)..This result also in line with Ahsanetal (2016) who reported that more than two third of disc prolapse patients had manual work.

Regarding to residence, the incidence of lumbar disc prolapse was more common in people from rural area. This was agreed with the conducted study (Lahelma et al., 2012). But Ismail, (2011) who study the effect of rehabilitation intervention after laminectomy surgery revealed that the majority of patients of her study were coming from urban areas, that was maybe due to this study was conducted in urban area.

Regarding causes of hospitalization the present study findings denoted that more than half of subjects reported that lifting heavy objects was considered as the main cause of low back pain. This finding in line with Seif El-Naser, (2008) who found that the most factors aggravating LBP were lifting heavy object, sitting, bending back for long periods of time and prolonged unchanged positions with bending increase strain on the muscles of lower back. Also this findings agree with (Tuchsén , Feveile , Christensen , Krause , 2010) who stated that heavy physical work and prolonged standing are associated with increased risk of disability .The current study revealed lack of knowledge and self-care practices to follow at home regarding post-laminectomy among the control and study subjects. This might be related to some factors e.g., educating patient may not be perceived as integral part of patient care by either nurses or physiotherapist.

This study revealed that the majority of study subjects had no history of chronic diseases and didn't hospitalized before . This may be due to the researcher exclude patients with recurrent disc prolapse and chronic diseases isn't a risk factor for disc prolapse.

Regarding to patients knowledge about the disease, discectomy and rehabilitation program, the current study found that there was no statistically significance differences between study groups and control group regarding their knowledge and practice before rehabilitation program and most of might be related to some factors e.g., educating patient may not perceived as integral part of patient care by either nurses , doctors or physiotherapist, but there was statistically significant improvement in knowledge of study group than control group 4 weeks post program .While after 6 weeks the patient knowledge less than 4 weeks due to the effect of time. This finding in line with (Davies,Williams, Graham, Dagg et al., 2010). It also was consistent with (Bach and Holten, 2009) they stated that, a brief educational session resulted in an increase in patients' knowledge of disc prolapse and rehabilitation program. Also, Mohamed, (2011) concluded that instruction to the patient about different aspect of low back pain problems and how to manage so the patient can take more active role in the treatment process compared with a control group that received no intervention. **From the researcher point of view** this is may be related to providing rehabilitation program about disease, discectomy and rehabilitation program which supported by illustrative colored booklet.

The current study revealed that after implementing exercise program the postoperative degree of lumbar flexibility of the study subjects especially after 6 weeks was significantly higher than preoperative, this result could explain that, the functional status of the study subjects was improved. This support the hypotheses of the study that post participation in the rehabilitation program, the study subjects will show higher improvement in functional status level than before implementing the program. Also, it fulfill the goal of the exercise program to maximize normal spinal stability, coordination, mobility; lower extremity strength and endurance which all increase leading to more independence and decrease functional disabilities for the concerned patients. This can be manifested by decreased pain intensity; improvement in functional activities (personal care, lifting, walking, sitting, standing, sleeping....) and increased lumbar flexibility. This result is in agreement with Tarakci , Yeldan , Huseyinsinoglu , Zenginler , Eraksoy (2013) in a study demonstrated that exercise training is effective in improving balance, functional status, and quality of life in moderately affected people with no worsening of their clinical status. Purepong , Jitvimonrat, Boonyong , Thaveeratitham , Pensri (2012) mentioned that stretching and strengthening exercises of back muscles on patients with chronic low back pain dysfunction and after disc surgery resulted in improvement of Range of Motion, reduction of pain level, and enhancement of physical abilities. The same authors concluded that after two weeks of continuous lumbar flexibility exercise, there were improvements of lumbar angles and back pain symptom.

Regarding to lower limb and spinal exercise the current study found that there was highly statistically significance difference regarding performance of lower limb exercise among study group than control group after rehabilitation program. This in line with Tarakci ,Yeldan , Huseyinsinoglu , Zenginler , Eraksoy (2013) in a study demonstrated that exercise training is effective in improving balance, functional status, and quality of life in moderately affected people with no worsening of their clinical status. Purepong , Jitvimonrat, Boonyong , Thaveeratitham , Pensri (2012) mentioned that stretching and strengthening exercises of back muscles on patients with chronic low back pain dysfunction and after disc surgery resulted in improvement of Range of Motion. This finding also in agreement with Mohamed, Ismail, ElSawi and Sawan, (2013) who study the Impact of Exercise Program on Functional Status among Post-Lumbar Laminectomy Patients.

Regarding to Oswestry Low Back Pain disability questionnaire that was utilized by the researcher to assess the impact of patient's low back pain on the activities of daily living. It included 10 sections to describe the pain and its impact on the activities of daily living such as pain intensity, personal care, walking, lifting, sitting, standing, sleeping, sex life, social life, and traveling.

As regard to first section (pain killer), the current study revealed that all subjects study group could tolerate pain without pain killer while half of control group couldn't tolerate pain without pain killer so, the results of this study showed a significant statistical difference between study and control group regarding pain intensity; this showed that the selected rehabilitation program had better outcomes than the traditional program applied for the control group subjects. So, the result of this study supported the first hypothesis which expected that the studied group had decreased intensity of pain as compared to a control group. This finding coincides with a study performed by Senegas, (2008) to investigate the effect of postoperative dynamic back exercises after first lumbar laminectomy. The study showed that the patients experienced greater success with regard to the pain intensity and work capacity and resulted in improvement of the patient disability.

In relation to second section (personal care); the present study revealed an improving in personal care among study group than control group. It may be due to teaching patient the basic principles and rules relating to good body mechanics, result in assuming the various postures associated with everyday activities with less pain intensity and less disability. This finding coincides with Mohammed, (2009). Also, Purepong, Jitvimonrat, Boonyong, Thaveeratitham, Pensri (2012) mentioned that stretching and strengthening exercises of back muscles on patients with chronic low back pain dysfunction and after disc surgery resulted in improvement of Range of Motion, reduction of pain level, and enhancement of physical abilities and improving personal care.

In relation to lifting ability: the current study showed significant differences among study and control group 6 weeks postoperatively in which more than two thirds of study group could lift any objects without extra pain. This result is in line with Mohammadi, Eslami, Yousefi and Tabesh, (2015) who study the effect of continuing care on patient's quality-of-life after disc surgery.

Regarding to walking, standing, sitting and sleeping the current study showed significant improvement of these daily living activities. This improvement was due to the effect of rehabilitation program that maximize normal spinal stability, coordination, mobility and lead to positive effect on daily living activities. These findings are in agreement with Frontera et al (2014) and David (2015) they found that excellent functional abilities can be maintained post lumbar surgery if the patients are active participants in exercise and self-care activities.

In relation to travelling and social life this study revealed that there was significant improvement in that aspect of daily living activities and majority of study group could participate in social activities without extra pain. This finding is in agreement with Ismail, (2011) and Mohamed, Ismail, Elswawi and Sawan, (2013).

In relation to total disability score, the current study showed that there was significant improvement in level of disability among study group compared with control group after 6 weeks of rehabilitation program. This finding is in agreement with Guo, Hou, Ding, and Chang, (2019). So there was significant improvement in all aspects of activities of daily living among study group compared with control group after rehabilitation nursing program.

Regarding to the relation between socio-demographic characteristics of the studied groups & pain level, the result of the current study showed that there was no relation between age, education level, occupation and residence and pain level. These results are supported by Moradi and Hajbaghery, (2015).

Regarding to the relationship between socio-demographic characteristics of the studied groups and other study variables such as lower limb and spinal exercise performance, lumbar flexibility and total score of disability, the result of the current study showed that there was no relation between socio-demographic characteristics and those variables. This finding was in line with Uzun, Vural, Uzun & Yokusoglu, (2008); Aboalizmet et al., (2016).

From the foregoing discussion it can be concluded that patients with discectomy exposed to rehabilitation program showed an improvement in functional status and activities of daily living than the same patients who exposed to routine medical treatment only.

Conclusions: The rehabilitation nursing program was effective in improving Knowledge, lumbar flexibility, functional status and activities of daily living among patient after discectomy surgery

Recommendations: It is suggested for rehabilitative nursing program as a routine care for patients undergoing discectomy surgery. Supervised health teaching program should be carried out for patients with discectomy in the neurosurgery department and outpatient clinics about effect of rehabilitation nursing program to improve functional status, lumbar flexibility and performing activities of daily living

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