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Impact of Exercise Program on Functional Status among Post-Lumbar Laminectomy Patients

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Abstract: A laminectomy is a surgical incision performed to remove herniated intervertebral discs. Strengthening and stretching exercise program helps post-laminectomy patients to move and do routine activities without putting extra strain on their backs, relieve their pain leading to improvement of functional status. Aim: to evaluate the impact of exercise program on functional status among post-lumbar laminectomy patients'. *Design;* quasi-experimental design. *Setting:* This study was conducted at the neurosurgery department of El-Manial University Hospital, Cairo. *Sample:* A purposive sample of 30 male and female adult patients undergoing lumbar laminectomy was recruited in this study. *Tools*: data were collected utilizing the following tools: 1) The Structured Interview Questionnaire, including socio-demographic and related medical data. 2) Physical Assessment Sheet, and 3) Oswestry Low Back Pain Disability Questionnaire. *Results:* the study findings revealed that the majority of study subjects were males, married and have normal musculoskeletal posture. All participants had severe low back pain and high level of functional disabilities preoperatively. A significant difference in pain intensity and functional ability was evident between the preoperative period and six weeks postoperatively after implementing the exercise program. *Recommendations;* A written hospital clinical guideline on the common causes and safe post-laminectomy exercises is recommended to be established. Replication of this study on a larger sample and in different hospital settings with increasing the duration of implementing the postoperative exercise program treatment.
Keywords: exercise program, functional status, lumbar laminectomy

1-Introduction:

Low back pain (LBP) is a major health and socioeconomic problem in the world frequently associated with disability and absence from work. It is localized in the lumbar region, with or without radiating pain to the lower extremities, originating from neurons near or around the spinal canal that are injured or irritated by one or more pathological problems (Robert & Robert, 2012 and Durstine, Moore, Painter & Roberts, 2009). It affects the spine's flexibility, stability, and strength, which can cause discomfort, and stiffness, (Delitto,etal., 2012).

Low back pain is caused by strain which can occur immediately after some type of strenuous physical activity, or sedentary life styles with too little exercise (Shiel, 2013). Herniated disc and degenerative disc are most commonly occurring in the lumbar spine, or lower back (Lahelma etal. 2012). Disc disease or spinal degeneration increases with age, (Hoy etal. 2012). It can interfere with everyday activities and impair physical performance, (Nordeman, Gunnarsson, & Mannerkorpi 2012). LBP symptoms may range from muscle ache to shooting or stabbing pain, limited flexibility and/or range of motion, or inability to stand straight, (National Institute of Neurological Disorders and Stroke, 2012).

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 etal., 2010). Laminectomy is an elective procedure rather than emergency surgery performed to remove a portion of the vertebra called the lamina which covers the spinal canal. The purpose is to widen and relieve pressure placed on the spinal cord or nerve roots, (Overdevest et al. 2012). Reducing the restrictions on postoperative activity and starting intensive physical training 4-5 weeks post operatively has lead to improvements in work capacity and a reduction in patients' self-related disability and led to better outcomes, (Schuchmanm, 2006).

Functional status is the ability of the patient to perform certain tasks and functions, it includes physical, social, emotional and role functioning. In the spinal surgery population, it has been measured as a predictor variable and outcome measurement, (Asgeir etal. 2010). However, functional status as an outcome variable is often measured in terms of the ability to return to work, (Clarke, 2001). The patient's physical condition, psychological response to pain and surgery, physical impairments, age, osteoporosis, and smoking, these variables have been considered when making decisions about how to proceed with a patient's post lumbar surgery rehabilitation program (Schuchmanm, 2006).

The process of care and rehabilitation can be made more manageable through use of a system to assess functional abilities and activities that incorporates selected diagnostic, performance (skills/tasks) and social role descriptors (D'Orazio, 2007). Thus, functional assessment is a method for describing abilities and activities in order to measure an individual's use of the variety of skills included in performing the tasks necessary to daily living, vocational pursuits, social interactions, leisure activities, and other required behaviors,(Clarke, 2001). A change in functional status is often the first sign of illness or exacerbation of a chronic condition. The purposes of functional assessment is to indicate presence and severity of disease, to measure a person's need for care, to monitor change over time, and to maintain an optimally cost effective clinical operation, (Saltzman 2013).

Exercise is one of non-pharmacologic therapies, non invasive modality used for the treatment of low back pain, (Millehan 2011). It is considered the first part of rehabilitation program and prescribed to assist in returning normal activities and maximizing the patient's capabilities to promote optimal functioning related to physical, mental and social well-being. (Deen etal, 2013, Nabil, 2007 and Samy, 2007). It is easily administrated for improving function and work and is considered as a widely used treatment option and an effective solution for patients with LBP, (Farid, 2005). Stretching and strengthening exercises of back muscles on chronic low back pain dysfunction and after disc surgery result in improvement of ROM, reduction of pain level, and enhance physical abilities (Schuchmanm, 2006 and Seif-El Naser, 2002). Also, many strengthening programs of the back muscles were prescribed for treatment of LBP patients which led to reduction of pain, disability and improve the stability of the spine (Pudner, 2000).

After the surgery, therapeutic exercises are needed to regain full function. Strengthening exercises for back muscles is a common component of exercise program which are effective in rehabilitation of post-laminectomy patients. They are useful in increasing back muscles strength, increase the stability of the spine and improving patients' symptoms, (Steve 2013).

Rehabilitation nurses are concerned with the functional performance of individuals who have a temporary, progressive, or permanent impairment that interferes with ability to carry out self-care tasks and fulfillment of social roles. Nurses are in position to implement exercise programs that contribute to the achievement of prevention of secondary complications and the restoration of physical and psychological health of patients, (McGregor, et al. 2010).

1.1. Significance:

Epidemiological studies have indicated that the incidence of low back pain is high and diagnoses of spinal stenosis and disc prolapsed are increasing. A recent study shows that lower back pain and osteoarthritis are now ranked second only to cancer as the leading cause of disease burden, (Peter 2013 and Buchbinder 2012).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).

Laminectomy is a common low back pain surgery. Back training programs was recommended as an effective treatment to reduce disability and improve physical function for patients with low back pain undergoing back surgery. There is strong evidence that exercise therapy is more safe and effective than the usual care, and that exercises therapy and conventional physiotherapy are equally effective for lumbar disc surgery. However, it is still unclear whether exercise therapy is more effective than inactive treatment for lumbar disc surgery to improve functional outcome and quality of life following the disc surgery, (Durstine, etal., 2009). Therefore this study was conducted to find out the effectiveness of an exercise program for these patients as a main part in nursing management to encourage them returning to normal activities. In addition hopefully this work may add valuable results to ensure the effectiveness of this exercise program on functional status for post-laminectomy patients’.

1.2. Aim of this study

The aim of the current study is to evaluate the impact of exercise program on functional status among post-lumbar laminectomy patients’.

1.3. Hypotheses:

The following research hypotheses were formulated to achieve the aim of the study:

H 1 - Post participation in the exercise program, the study subjects will show higher improvement in functional status level than before implementing the program.

H 2 - Post participation in the exercise program, the study subjects will show lower mean pain score than before implementing the program.

2. Subjects and Methods:

2.1. Design: A quasi-experimental study design was utilized. It is a type of evaluation which aims to determine whether a program or intervention has the intended effect on a study’s participants, (Burns & Grove, 2007).

2.2. Setting: This study was conducted at the neurosurgery department of El-Manial University Hospital, which is affiliated with Cairo University in Egypt.

2.3. Sample:

A purposive sample of 30 male and female adult patients undergoing lumbar laminectomy who meet the inclusion criteria of (a) being of more than 30 years of age (b) have been exposed to conservative therapy that failed to respond after three months (c) showed MRI or CAT scan documentation of contained non-sequestered intervertebral disc herniation (d) do not have osteoporosis, rheumatoid arthritis, fracture; or having prior lumbar surgery without improvement (e) agree to participate in the study.

2.4. Tools: Data of this study was collected using the following tools:

2.4.1. The Structured Interview Questionnaire (SIQ): It was designed by the researchers based on literature review, it included two parts: the first part includes Socio-demographic data; namely; age, sex, marital status, etc... and the second part includes medical background data such as diagnosis, history of low back pain (onset, duration, intensity, location, radiating, aggravating or alleviating factors), past medical / surgical history and diagnostic studies, etc..,

2.4.2. Physical Assessment Sheet: designed by the researchers based on related literature review that includes three parts: Part (1) which includes measurements of Height, weight, vital signs, musculoskeletal posture (lumbar spine posture), and extremities condition. Part (2) which include The Modified Schober Test that intends to measure spine flexibility. It was first described in 1937 by Dr Paul Schober, (The free encyclopedia, 2013). The test is performed by using a pen to mark the midpoint between the posterior superior iliac spines (PSIS). Then use the tape measure to identify and mark two points: first one that is 10cm superior to the PSIS and second is 5cm inferior to the PSIS. The patient instructed to flex forward and or extend backward, and then the distance between superior and inferior marks is measured and recorded. Scoring System: Lumbar flexion norm is (7cm ± 1.2), less than 5cm should be considered abnormal / limitation of lumbar flexion. In extension, the decreased distance after maximal extension of the spine was subtracted from the starting distance of 15cm and the norm is (1.6 cm ± 0.7), less than 1.6cm should be considered abnormal / limitation of lumbar extension. Part (3): is Pain visual analogue scale (PVAS), to measure pain intensity. It is graduated on10 cm line, with anchors at the endpoints of Zero that indicates (no pain at all) to 10 (worst pain).

2.4.3. Oswestry Low Back Pain Disability Questionnaire (OLBPDQ): adopted from Dr. Fairbank, Couper, Davies, O'Brien (1980), to measure how much low back pain has affected the patient's ability to manage daily activities. This tool was translated into Arabic version, and tested for reliability in many Arabic studies (Mohamed, 2010; Mohammed, 2009; Mokhtar, 2008; Kamal, 2007; Nabil, 2007; Kotb, 2006; Mahmoud, 2006; and Micheal, 2003). It includes ten sections, each containing six items. The first section rates the effect of analgesics in relieving pain. The remaining nine sections cover the disabling effect of increasingly severe levels of pain on typical daily activities: personal care, lifting, walking, sitting… etc. The patient selects one statement in each section that most accurately describes the effect of pain. Scoring System: Each section scores ranked from (zero) indicating the lowest score, to (5) indicating the highest score of disability. The total score provides a disability score of: Minimal disability= (0% to < 20%), Moderate disability = (20% to < 40%), Severe disability = (40% to < 60%), Crippled = (60% to < 80%) and Bed-bound or exaggerating symptoms = (80% to ≤ 100%). The questionnaire takes 10 to 15 minutes to complete and one minute to score. For patients with reading problems it takes 20 to 30 minutes for an assistant to complete the form.

2.5. Ethical Consideration:

Permission to conduct the study was obtained from the hospital authorities of El-Manial University Hospital which is affiliated with Cairo University. Prior to the initial interview, the researchers introduced themselves to patients who met the inclusion criteria; each potential patient was fully informed with the purpose and nature of the study, and then an informed consent was obtained from participants who accept to participate in the study. The researchers emphasized that participation in the study is entirely voluntary and withdrawal from the study would not affect the care provided; anonymity and confidentiality were assured through coding the data.

2.6. Pilot Study*:*

A pilot study was carried out on 10 % of patients representing the study sample to test the feasibility and clarity of the used tools; modifications were done based on the results. The sample included in the pilot study was excluded from the final study sample.

2.7. Procedure:

The study proceeded using the following steps: *1st step;* designing the program to be implemented through review of related literature and research results regarding post-laminectomy exercises. It was build on provision of exercise program to prevent recurrence of low back pain and to enhance early ambulation; restore normal range of motion exercises for upper and lower extremities with maintaining of lumbar stability. Experts in nursing and medical fields in general and neurosurgical management were sought to ensure content

comprehensiveness, clarity, relevancy and applicability. *2nd step*; the researchers met with the selected patient preoperatively. The purpose and nature of the study was explained and the patient consent obtained. Base line data was established using the Structured Interview Questionnaire, physical assessment sheet, and Oswestry Index Questionnaires were performed .Time consumed was about 30-45 minutes. *3rd step*; the exercise program was carried out throughout a period of 6 weeks. It involved precautionary aerobic fitness, stretching, strengthening and endurance exercise, together with advice about measures when doing daily activities. Videos about ROM exercises for lumbar spine and lower extremities (hip, knee, ankle, and foot); as flexion, dorsiflexion, planter flexion, extension, hyperextension, hip flexion with knee flexed, abduction, adduction, internal and external hip rotation, hyperextension, eversion, and inversion were played and written instructional booklet was provided to help patients retain the learned material throughout the preoperative phase, postoperative phase, and at home. The program was given on an individual or groups basis. The researchers approached the study subjects' daily from admission until discharge during the morning or afternoon shift. Patient's families were involved to ensure patient support and facilitate achieving the program goals. Moreover, the researchers met the physician and physiotherapist to discuss patient's progress and needs. Number of sessions varied from one patient to another according to their learning capacity that ranged from six to nine consecutive sessions. *4th step*; evaluating the effectiveness of the program through reassessment of subjects' functional status using Oswestry Index Questionnaire at outpatient clinic. Patient was evaluated postoperatively at two weeks and 6 weeks.

3. Results

The study came up with the following results:

3.1-Subjects' Characteristics:

The study results revealed that the majority of studied subjects (96.7%) were males, their age ranged between 30 to 68 years; with a mean of (45.6 ±11.67). The majority (93.3%) were married, equal percentage (50%) coming from urban and rural regions. In relation to educational level, the highest frequency (43.3%) had secondary / technical school (industry or commercial) and higher education / university), followed by (23.3%) who were illiterate. As regards to occupation, higher percentages (46.7%) were working in manual heavy duty work; followed by (23.3%) governmental employee. Two thirds (66.7%) of the study subjects were smokers, and (60%), had hospital stay of more than 3 weeks. MRI results revealed that more than half of subjects (56.7%) had lumbar disc in L4-L5, followed by (36.6%) had multilevel affection (L4-L5-S1/L3 - L4-L5-S1).

3.2- Medical and Physical Assessment Variables:

The majority of study subjects (90%) showed normal vital signs. Their height ranged from 152cm to 188cm ; with mean (171.23 + 6.15); and their weight ranged from 62 kg to 97kg.with mean (79.67+10.20) More than half of the subjects reported that they had weight loss during the disease process; compared to one quarter who maintained normal weight. Regarding musculoskeletal posture, this study revealed that the majority of study subjects (93.3%) were having normal musculoskeletal posture, symmetrical lumbar spine with presence of pain during palpation. No other abnormalities were evident.

Table (1) presents that on admission, more than half (53.3%) of the study subjects reported chronic low back pain for more than 7 weeks, the majority (93.3%) had gradual onset of pain, (76.7%) had continuous pain. More than half (56.7%) reported burning pain sensation. All subjects of the study group reported the presence of radiating pain. The highest frequency (40%) denoted that their pain is caused by lifting heavy objects. The highest frequency of study subjects (17.4%) reported that their pain was aggravated by standing for a long time, followed by (14.8%) that have their pain aggravated by walking for a long distance. Half of the study subjects use a combination of pharmacological and non-pharmacological measures to alleviate their pain.

Figure (1) shows that all the study subjects (100%) experienced severe pain on admission; distributed as [severe pain (26.70%), very severe pain (40.0%), and worst possible pain (33.3%)]. There is significant difference in pain between all phases; preoperative and 2 weeks post operatively $t = (3.194)$ $p< 0.003$, preoperative and 6 weeks post operative $t= (8.858)$ $p< .000$ and 2 weeks and 6 weeks post operative $t = (5.651)$ $p<.000$.

Table (2) shows physical examination results indicating that all subjects (100%) had limited flexion at preoperative period which decreased to (63.3%) after two weeks postoperative. Also, (86.6%) of study subjects had limitation of extension preoperatively that was decreased to be (36.7%) after two weeks. A statistically significant difference was found between preoperative and two weeks post operative periods; which indicated improvement in lumbar spine flexibility (flexion, extension, right and left lateral bending) after surgery and with exercise program.

3.3- Functional status and pain experience:

Table (3) presents a marked decrease in the mean score for all variables of Oswestry Low Back Pain Disability Questionnaire (OLBPD) in six week postoperatively compared to preoperative period. A high significant difference between preoperative and six weeks postoperative periods was found.

Table (4) presents the mean of total score of disabilities among the study subjects at preoperative phase was (34.57 ± 9.14) and decreased to (22.43±6.53) after two weeks postoperatively; and after six weeks postoperatively it was markedly decreased (14.50 ±5.80). There is statistical differences between preoperative period and two weeks postoperative; preoperative period and six weeks postoperative and two weeks postoperative and six weeks postoperative (t-test=7.32; 10.11 and 4.98 respectively) at p= 0.00, regarding Oswestry Low Back Pain Disability Questionnaire after implementing exercises program.

4. Discussion

The discussion of this study was presented in the following sequence:1st part describes subjects' characteristic, 2nd part displayed the findings that highlight variables related to medical and physical assessment, and 3rd part presents Functional status and pain experience.

Part I: Subject Characteristics:

The current study findings showed that more than three quarters of the patients were males. This could reflect that male population has low back pain because of the nature of their work requiring hard physical labor. This finding is consistent with Ibrahim (2006) who found that the prevalence of LBP affects a large proportion of the male population. The present study also, revealed that the majority of study subjects have an age that ranged between 30-50 years. This could be explained that this age represent working-age population. This coincide with Kamel, etal.(2003) study of workers of Egyptian Electric and Plastic Company that the highest prevalence of LBP was among age groups of 40 to 50 years. While, Harwood (2013) reported that LBP can be experienced by people in all age groups. McGregor (2010) 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. The majority of study subjects were married, this finding is expected with their age group. Had either secondary / technical school education or university education, coming from urban areas and their work needs the exertion of physical / manual heavy duty tasks and employee doing clerical work that require them to sit for longer hours during the day. Several studies have coincided that heavy physical work and prolonged standing are associated with increased risk of disability (Lahelma etal.2012 and Tuchsen etal.2010). in addition to 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 (Sterud 2013). In relation to work history, around half of study subjects had a work history of 30 years, and others have between 10 to 19 years. This indicated that LBP may have occurred as a result of cumulative adverse effect on the vertebra during the course of their work. This finding is supported by Schelerud (2006) who concluded that duration of work has a significant effect on LBP occurrence.

Part II: Medical and Physical Assessment Variables

The present study finding showed that more than half of subjects have chronic low back pain on admission that is characterized by gradual mode of onset, continuous duration persistence, starts gradually with burning sensation; and all the study subjects complain of pain radiation to the lower extremities. Knight and Draper (2008) explained that LBP is a condition of herniated or ruptured disc that presses on the sciatic nerve; this compression causes burning low back pain combined with pain through the buttocks and down one leg to below the knee, occasionally reaching the foot. Elprince (2008) added that the pressure may cause symptoms of LBP which runs down the back of legs, causing numbness or tingling between the legs.

This study finding denoted that the majority of subjects reported that lifting heavy objects was considered as the main cause of low back pain, while, minority of them reported the cause as sitting or standing for a long time. Albertsen et al (2007) reported that prolonged standing has some support in the literature as a risk factor for LBP. Moreover, Seif-El-Naser (2008) found that the most factors aggravating LBP were sitting and bending back for long periods of time and prolonged unchanged positions with bending increase strain on the muscles of lower back. Lin, etal.(2011) supported the result that sitting for long periods of time is associated with increase severity of LBP. Schneider, Schmitt & Zoller (2005) added that continuous sitting increases tendency for bending back which leads to increase intradiscal pressure and places tension on low back.

Due to the nature of LBP reported by the study subjects as severe; the majority of them reported that they resorted to pharmacological measures as the first action to alleviate their pain followed by rest for long time. While, the minority reported using physiotherapy as a non-pharmacological measure; this coincide with Seif-El - Naser (2008) who found that the first action patients reported was taking analgesics followed by physiotherapy sessions in order to relieve LBP and assist them to resume normal life and continuity of work.

Regarding physical assessment, the current study showed that the majority of participants were having normal vital signs and normal musculoskeletal posture with symmetrical lumbar spine. Hussien (2006) found that posture can give a graphic representation of many spinal disorders and should be analyzed; it may be a sign of a possible sciatic scoliosis, secondary to a herniated disc. The present study results of MRI revealed that the

majority of study subjects had lumbar disc in L4-L5. Salah Eldin (2006) reported that inter-vertebral lesions include prolapsed inter-vertebral disc, which occurs at the fourth and fifth inter-vertebral spaces 98% of the time.

Part III: Functional status and pain experience:

The current study revealed that pain intensity among the study subjects were significantly decreased from preoperative period to two weeks postoperative; and from two weeks to six weeks post operative /after implementing the exercise program; this could explain that strengthening and stretching of the back muscles resulted in increased stability of the lumbar spine and reduction of the LBP intensity. This coincide with a study performed by Senegas (2008) to investigate the effect of postoperative dynamic back exercises after first lumbar laminectomy ,it showed that the study group had significant difference regarding pain intensity compared to control group; these resulted in long-term improvement of the patient disability.

Deen etal.(2013) and Heymann etal. (2013) emphasizing that the primary goals of a rehabilitation program following a laminectomy are to maximize normal spinal stability, coordination, mobility, lower extremity strength, and endurance. Moreover , Bee , (2011) emphasized that for the first one to two weeks following surgery, it is important to begin with spinal mobility exercises known as pelvic tilts.

The current study revealed that after implementing exercise program the postoperative disability score of the study subjects was significantly lower than preoperative, this result could explain that, the functional status of the study subjects was improved. This indicate the acceptance of the hypotheses of the study that post participation in the exercise 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, etal.(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, et al. (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.

5. Conclusion and Recommendation:

After a laminectomy, the patient must practice exercises of how to get in and out of bed in addition to how to perform other routine daily activities safely and comfortably. For the first one to two weeks following surgery, it is important to begin with spinal mobility exercises. The primary goals of exercise program following a laminectomy are to maximize normal spinal stability, coordination, mobility, lower extremity strength and endurance which all increase independency and decrease functional disabilities. The current study revealed that all patients were admitted to the hospital with severe low back pain, and limitation of flexion and extension of the spine pre implementing the exercise program. After implementing the exercise program, there was a highly significant improvement in functional capacity among the studied subjects at two weeks and six weeks postoperative, and decreased Oswestry Low Back Pain Disability score compared to preoperative period. In comparison between preoperative phase and two weeks postoperative; after implementing exercise program there are statistical significance differences regarding to pain intensity; Modified Schober test (flexion and extension); right and left side bending and functional disability among the study subjects.

Based on the findings of the current study, it is recommended that all patients undergoing disc surgery especially post-laminectomy should adhere to preoperative plan in which the patients' is given instructions to patients supported by illustrative guide that should be provided to all patients including postoperative training exercises and follow-up instructions. A written hospital clinical guideline of practice on the common causes and safe exercises post-laminectomy should be available for health care professionals. Replication of this study on a larger sample and in different hospital settings with increasing the duration of treatment is suggested.

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Table (1): Frequency and percentage distribution of chief complaint of low back pain among the study subjects on admission (n=30).

Pain characteristics	Study subject (30)	
	No	%
Type of pain:		
- Acute (< 7 days)	1	3.3
- Subacute (> 7 days- ≤ 7 weeks)	13	43.3
- Chronic (> 7 weeks)	16	53.3
Mode of onset:		
Sudden	2	6.7
Gradual	28	93.3
Nature of pain:		
Continuous	23	76.7
Intermittent	7	23.3
Quality of pain:		
Heavy	6	20.0
Burning	17	56.7
Aching / numbness / Throbbing / stabbing	7	23.3
Causes of pain:		
Improper position / Bending	5	16.6
Lifting heavy object	12	40.0
Sitting / standing for long time	3	10.0
Without / undetermined cause	10	33.3
Aggravating factors**:		
Standing for a long time	27	17.4
Walking for a long distance	23	14.8
Sitting for a long period.	22	14.2
Bending / twisting	22	14.2
Walk up and down stairs	16	10.3
Constipation	14	9.1
Heavy work	11	7.1
Coughing / sneezing	9	5.8
Movement from chair / ground	6	3.9
Sleeping on bed	4	2.6
Menses	1	0.6
Total	155	100
Alleviating factors / measures:		
Pharmacological	8	26.7
Non-pharmacological	7	23.3
Both measures	15	50.0
Presence of pain radiation:		
Yes	30	100
No	0.0	0.0
Location of radiating pain :		
Upper lumbar spine	4	13.3
Lower extremities	26	86.7
Associated features or symptoms:		

No	13	43.3
Sphincter deficit (urine / stool)	14	46.7
Paresthesia / Paresis	2	6.7
b and c	1	3.3

** Participant gives more than one response

Table (2) Frequency and percentage distribution of physical assessment using Modified Shobber test at the three phases among the study subjects (n=30).

Shobber test Items	Preoperative N= 30	Two weeks Post op. N=30	Six weeks Post op. N= 15**	t-test (p-value)
Flexion / cm : Less than 5 cm. Minimum Maximum	 30 (100%) 1.10 4.00	 19 (63.3%) 2.40 5.00	 4 (26.7%) 3.7 8	Pre & two: 9.176 (S*) Pre & Six: 3.123 (S*) Two & Six: 7.324 (S*)
X ± SD	1.97±0.64	3.87±1.07	8.39 ± 0.64	
Extension / cm : Less than1.6 cm. Minimum Maximum	 26 (86.7%) 0.30 1.60	 11 (36.6%) 0.80 2.30	 4 (26.7%) 1.02 3.04	Pre & two: 7.793 (S*) Pre & Six: 4.451 (*S) Two & Six: 6.215(S*)
X ± SD	1.04±0.33	1.60 ± 0.40	3.16±0.23	
Right side bending: Less than 40cm. Minimum Maximum	 1(3.3%) 38 62	 23 (76.6%) 35 52	 11(36.6%) 23 41	Pre & two: 11.441 (S*) Pre & Six: 7.002 (S*) Two & Six: 9.166 (S*)
X ± SD	52.37±4.60	38.93±4.35	28.35 ± 1.09	
Left side bending: Less than 40cm. Minimum Maximum	 0(0.0%) 42 60	 20(66.6%) 35 55	 11(36.6%) 26 43	Pre & two: 9.275 (S*) Pre & Six: 5.177 (S*) Two & Six: 6.423 (S*)
X ± SD	51.70 ±5.95	39.47±3.88	30.22 ± 1.65	

S*= significant at p<0.05. ** Total number of the study subject is 15 because others can't come for follow up because they live in remote areas.

Table (3): Total mean score of Oswestry Low Back Pain Disability Questionnaires (OLBPDQ) variables in relation to preoperative, two weeks and six weeks postoperative among the study subjects (n=30).

Variables	Preoperative (X ± SD)	Two weeks post op. (X ± SD)	Six weeks postop. (X ± SD)	t –test (p value)
Pain Intensity	3.10±1.44	2.43±1.07	0.47±0.68	Pre &two weeks= 7.324 (S*) Two weeks & 6 weeks= 4.982 (S*) Pre & six weeks= 10.112 (S*)
Personal Care	3.60±1.59	2.90±0.61	2.00±0.91	
Lifting	4.23±1.45	3.63±0.49	3.20±0.76	
Walking	3.67±1.54	1.90±1.42	1.47±0.73	
Sitting	3.20±1.65	1.57±2.01	0.60±0.86	
Standing	3.67 ± 1.63	2.37±1.10	1.53 ±0.78	
Sleeping	2.40±1.90	1.17±0.79	0.60±0.77	
Sex Life	4.03±1.85	3.43±0.82	2.57±1.17	
Social Life	3.40±1.73	1.40±1.19	1.07±1.01	
Travelling	3.67±1.97	2.03±1.27	1.13±1.00	
Total mean Score (X ± SD)	34.57 ±9.14	22.43±6.53	14.50 ±5.80	

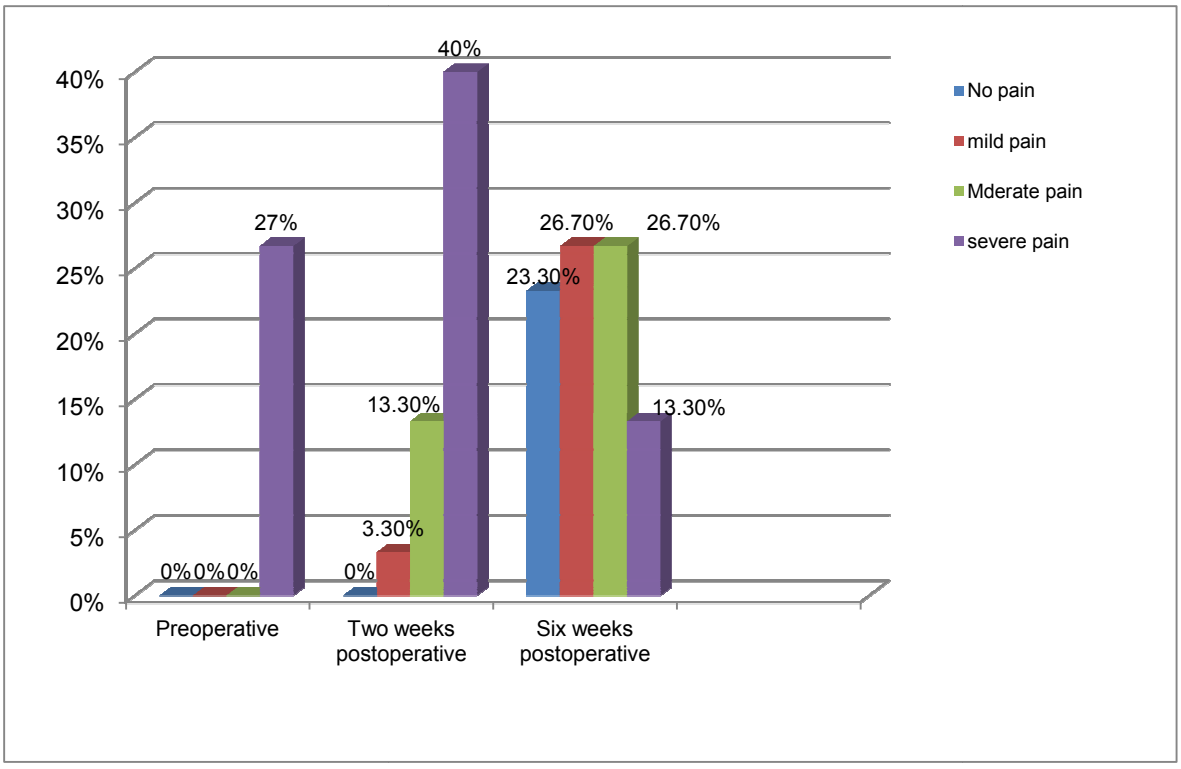
* Significant at p < 0.00 probability level

Table (4) Frequency and percentage distribution of the disabilities scores according to OLBPDQ among the study group in three phases (n=30).

Disabilities score	Preoperative		Two weeks post operative		Six weeks postoperative		t-test (p-value)
	No	%	No	%	No	%	
Minimal disabilities (0-)	1	3.3	0	0.0	8	26.7	Pre. & two: 7.324 (S*)
Moderate disabilities (20% -)	1	3.3	11	36.7	14	46.7	
Severe disabilities (40% -)	4	13.3	13	43.3	8	26.7	Pre & six : 10.112 (S*)
Crippled disabilities (60% -)	14	46.7	6	20.0	0	0.0	
Confined to bed (80% -100%)	10	33.3	0	0.0	0	0.0	Two & six: 4.982 (S*)
Mean Total Score (X ± SD)	34.57 ±9.14		22.43±6.53		14.50 ±5.80		
Rang of score	9 - 49		11 - 36		8 – 27		

* Significant at the p < 0.05 probability level NS= Not Significance

Figure (1):Total mean score of Pain Visual Analogue scale on preoperative, two weeks and six weeks postoperative among study subjects (n=30).



*Preoperative & two weeks, t= 3.194, (P< 0.003),

*Two weeks postoperative & 6 weeks postoperative, t=8.858, (P< 0.000)..

*Preoperative & 6 weeks postoperative, t=5.651, (P<0.000).