The Effect of Nursing Rehabilitation Program on Quality of Life for Patients with Vertebral Disc in Beni-suef City

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Abstract

Background: Intervertebral disc disease is a common chronic condition characterized by the breakdown (degeneration) of one or more of the discs. Chronic low back pain, which is the primary symptom of spinal degenerative illnesses and has a major negative impact on a patient's health-related quality of life (HRQoL), has become more common. **Aim:** The study aimed to evaluate the effect of a nursing rehabilitation program on the quality of life for patients with the vertebral disk. **Design:** A quasi-experimental design was applied in this study. **Sample:** convenience sample was equal to 120 vertebral disk patients. **Setting:** The outpatient physiotherapy and orthopedic clinics of University Hospital (Beni-Suef, Egypt). **Tools:** Five tools were used, **first tool:** It was socio-demographic characteristics. **Second tool:** is the patient's knowledge. **Third tool:** Numerical pain rating scale. **Fourth tool:** WHOQOL. **Fifth tool:** Perceived stress scale. **Result:** The study showed that 75.8% of studied patients had a good level of knowledge post-program, 0% of studied patients had severe pain post-program, 66.7% of studied patients had a high level of quality of life post-program, and 0.0% of studied patient had a high level of stress at post-program. **Conclusion:** there was a highly significant positive correlation between knowledge and quality of life of studied patients and also there was a significant negative correlation between their knowledge and stress and pain scores. **Recommendation:** Conduct research to evaluate the effect of the rehabilitation program on specific types of vertebral disc disease as lumbar disc herniation is recommended.

__Key Words:__ Patients, Quality of life, Rehabilitation program & Vertebral Disc.

Introduction

Intervertebral discs (IVDs), which connect nearby vertebral bodies to provide spinal motion, are intricate fibrocartilaginous tissues. Over 80% of IVDs in adults over 50 show degeneration- related alterations, and IVD degeneration (IDD) worsens with age. IDD is a well- known contributor to mobility issues that come with neck and back discomfort. IDD causes IVD cells to produce more pro-inflammatory cytokines. Degeneration also causes the extracellular matrix to degrade and hydrophilic matrix molecules to disappear. This can result in structural and biomechanical alterations and is a major contributor to increased inflammation, nerve ingrowth, and the production of pain- inducing chemicals **(Lyu et al., 2021).**

Intervertebral disc degeneration (IDD), which includes disc herniation, discogenic back pain, and spinal stenosis clinically, is one of the most frequent causes of low back pain. IDD results in individual suffering such as acute/chronic pain, disability, and psychological issues, posing a significant social and economic burden. With the acceleration of the modern socialization process, IDD prevalence is not only found in the middle-aged and elderly population but also tends to be younger. Incidence rates for IVDD in adults are around 30% worldwide.

This issue has developed into a severely debilitating ailment that necessitates high medical costs and has placed a certain economic weight on nations all over the world **(Zhao et al., 2019).**

The most common health issue in the world is low back pain (LBP). Between 85% and 90% of people in developed and poor nations are affected. In the United States of America, it is the most common reason for activity restriction, the fifth most common reason for hospitalization, and the third most common reason for surgery. Additionally, LBP is a growing source of direct and indirect social system expenses in many industrialized nations. In addition, the high morbidity of LBP is associated with lower HRQoL and high medical expenses, resulting in increased suffering and high socioeconomic costs. LBP has economic consequences because of increased costs, decreased productivity, frequent sick leave, as well as the inability to perform the assigned tasks **(Tagliaferri et al., 2020).**

Both the etiology and the pathophysiology of IDD have not been fully clarified yet. The majority of degeneration begins in adults and advances with age. Some people believe that the degenerative process begins to manifest itself when the nucleus pulposus' (NP) big vacuolated notochordal-like cells begin to vanish at a younger age than normal, around the age of 10 **(Lyu et al., 2021).**

The main risk factors of the intervertebral disc include obesity, smoking, lack of exercise, aging, trauma, physical inactivity, mechanical loading, and sex are considered to be responsible for IDD. In addition, genetics, bacteria, and viruses may also be involved in the IDD process. The loss of water in the matrix, degradation of proteoglycans, and barriers to the supply of nutrients to the intervertebral disc cells are considered to be major events leading to the

progression of IDD. However, the exact cause and pathogenesis of IDD have not yet reached a consensus **(Yu et al., 2020).**

Treatment for IVD degeneration consists of conservative, medication, and surgical procedures. Surgery may be used if conservative measures are unsuccessful. Both a fusion procedure, in which the intervertebral cage is installed after the disc has been completely removed, and a partial excision of the herniated disc that is compressing the nerve roots are surgical options. Both have demonstrated poor efficacy because they do not alter the pathophysiological cascade leading to IDD, thus slowing the degenerative process instead of arresting or reversing it **(Xin et al., 2022).**

Patients' education is a part of the rehabilitation process for patients having IVD and LBP, so it can be managed by educational nursing interventions. In the last decade, an educational nursing intervention has been addressed as the first management of choice, as it can alleviate LBP effectively. In addition, clinical trials revealed that effective educational interventions that combine exercise therapy, can maximize patients' quality of life, and reduce the incidence of work-related LBP. Education consists of basic information about the vertebral column, low back pain, risk factors modification, like body posture during work, sitting, moving objects, and joint protection. Regular exercise, body weight control, and maintaining correct posture can also decrease pain intensity and improve the quality of life of patients with LBP **(Ibrahim et al., 2023).**

Health-related Quality of life (HRQOL) can be recognized as a dynamic concept representing an individual's responses to the physical, mental, and social effects of illness which influence the extent to which personal satisfaction with life

circumstances can be achieved. Also, HRQOL refers to how individuals subjectively assess their well-being within several dimensions of life, including physical, psychological, and social functions. HRQOL is a multidimensional dynamic concept and includes multiple components, such as an individual's physical health, psychological state, level of independence, and social relationships, and their relationships to the salient features of their environment. These are health related to the extent they are influenced by illness, injury, and treatment **(Sarker et al., 2020).**

Community health nurses play important role in the provision of information, training, counseling, and support services to the patient with IVD on how to manage this problem. In addition, nurses have a key role in improving the QOL and knowledge of patients regarding IVD. Also, nurses have significant responsibilities in the evaluation of the existing conditions, management of IVD, reduce stress, and the prevention of negative effects of IVD. Also, nurses have a key role in offering referral services to patients **(Li et al., 2021).**

<u>Significance of the study:-</u>

Intervertebral disc disease is a chronic common clinical disease among middle age and older adults and the main underlying cause of low back pain that is critical to be diagnosed and treated as soon as possible, as it can cause many psychological consequences and economic burdens on the patient's family and society. Intervertebral disc disease can have a serious negative effect on the health-related quality of life of patients and their families **(Kusma et al., 2019).**

In Egypt, there is no existing document regarding the real incidence of intervertebral disc disease among middle

age and older adults. Though, according to a study done by **(Ebrahim et al., 2023)** the prevalence of lumber disc herniation in Egyptian patients (35 to 60 years) was 81.4% and 97.4% of them had low back pain. Another Egyptian study by **(El-Baz et al., 2019)** found that the prevalence of cervical disc disease in patients (40- 60 years old) was 44%. Another Egyptian study by **(Abd El-Hay et al., 2019)** found that the prevalence of low back pain in patients (30- 60 years old) was 83.3%. Another Egyptian study showed that the prevalence rate of degenerative discogenic low back pain was range between 25 and 60%, with a higher frequency for women than men (79% versus 21% correspondingly) **(El-Hady et al., 2023).** Therefore, this study will be done to evaluate the effect of a nursing rehabilitation program on the quality of life for patients with the vertebral disk.

<u>Aim of the study:</u>

This study aims to evaluate the effect of a nursing rehabilitation program on the quality
of life for patients with vertebral disk in
out-patient physiotherapy clinics and orthopedic clinics at Beni-Suef University Hospital.
This aim was achieved through some specific objective

- To assess the quality of life for patients with vertebral disk

- To evaluate pain and stress management of patients with vertebral disk

- To assess community health nurse's role in rehabilitation program on the quality of life for a patient with a vertebral disk

<u>Hypotheses of the study:</u>

- Quality of life for patients with vertebral disk improves after receiving the nursing rehabilitation program.

- Pain and Stress management of patients with vertebral disk improves after receiving the nursing rehabilitation program.

- The role of community health nurses in nursing rehabilitation program improves the quality of life for a patient with a vertebral disk.

Subjects and Methods:

The study portrayed under the four main items as follows:

I. Technical design.

II. Operational design.

III. Administrative design.

IV. Statistical design.

I. Technical design:

The technical item included the research item, setting, subjects, and tools for data collection.

Research Design:

A quasi-experimental design was applied to achieve the aim of this study.

Setting

The outpatient clinics at Beni-Suef University Hospital, it is a separate building of 3 floors and consists of 36 outpatient clinics with different specialist as a medical outpatient clinic, general surgery outpatient clinic, ear, nose and throat outpatient clinic, dermatology outpatient clinic, ophthalmology outpatient clinic, cardiac outpatient clinic, endocrine outpatient clinic, orthopedic outpatient clinic, neurological outpatient clinic, chest outpatient clinic, and physiotherapy outpatient clinic. The study was conducted at the physiotherapy and orthopedic outpatient clinic on the second floor at Beni-Suef University Hospital. This outpatient clinic provides treatment and follow-up services for a patient with a vertebral disk at Beni-Suef City. So, choose this place due to it covers a large number of

patients with vertebral disk who attended physiotherapy and orthopedic outpatient clinic.

Sample:

A convenience sample was used to achieve the aim of the study. The study sample consists of 120 patients with the vertebral disk, for 6 months from the beginning of the study, an average of 3 days/week, and was selected according to the following inclusion criteria.

-Patients with vertebral disk aged 35-60 years, oriented persons, both sex, and agreed to participate in this study

Data collection tools:

Five tools of data collection were used to carry out the current study.

The tool I: Interviewing questionnaire:

This tool was itemized by the investigator based on the literature review and contains two parts:

First part:

Part (1): Personal data; this part includes data about the patient's age, gender, level of education, marital status, occupation, and residence.

Part (2): Medical data; this part included data about the patient's family history of the vertebral disk, onset of the vertebral disk, and body mass index.

Tool II: Patient's knowledge regarding vertebral disk:

This tool is concerned with knowledge of patients about vertebral disk pre and post-program such as meaning, risk factors, types, clinical manifestations, complications, diagnosis, treatment methods of prevention, the goal of therapeutic nutrition, food avoided and food could be eaten **(Wagner Et al. (2020); Taşpınar, Et al., (2023); Salah, Et al., (2020); & Mohamed, Et al., (2022).**

Scoring system: knowledge of the patient regarding vertebral disk was classified as don't know scored 0, incorrect answer that was scored 1, and correct answer that was scored 2.

Total knowledge scores were calculated as the following:

- Poor ----------------< 60% of total knowledge score.

- Average ------------60-75 % of total knowledge score.

- Good ------------- > 75% of total knowledge score.

Tool III: Numerical rating scale:

It was developed **(McLean, 2004)** to assess the pain intensity of patients with the vertebral disk.

- **Scoring system:** The scale consists of a 10 cm line, and the patient was asked to rank their pain score from 0 to 10.

No pain   0.
Mild pain   1-3
Moderate pain   4-6
Severe pain   7-10.

Tool IV: WHOQOL-BREF, (1997):

This tool is used to assess QoL for patients with the vertebral disk. It consists of 26 items of satisfaction that were divided into five domains of QoL

Domain 1: Physical health with 7 items
included

- To what extent do you feel that physical pain prevents you from doing what you need to do?
- How much do you need any medical treatment to function in your daily life?
- Do you have enough energy for everyday life?
- How well are you able to get around?
- How satisfied are you with your sleep?

- How satisfied are you with your ability to perform your daily living activities?
- How satisfied are you with your work capacity?

Domain 2: Psychological health with 6 items includes,

- How much do you enjoy life?
- To what extent do you feel your life is meaningful?
- How well are you able to concentrate?
- Are you able to accept your bodily appearance?
- How satisfied are you with yourself?
- How often do you have negative feelings such as blue mood, despair, anxiety, and depression?

Domain 3: Social relationships with 3 items includes

- How satisfied are you with your relationships?
- How satisfied are you with your sex life?
- How satisfied are you with the support you get from your friends?

Domain 4: environmental health with 8 items includes,

- How safe do you feel in your daily life?
- How healthy is your physical environment?
- Have you enough money to meet your needs?
- How available to you is the information that you need in your daily-to-day life?
- To what extent do you have the opportunity for leisure activities?
- How satisfied are you with the condition of your living place?
- How satisfied are you with your access to health services?
- How satisfied are you with your transport?

Domain 5: quality of life with 2 items:
includes

- How satisfied are you with your health?
- How would you rate your quality of life?

Scoring system: Each item of the WHOQoL is scored from 1 to 5 on a response scale, which is stipulated as a five- point ordinal scale. Items in the same scale are averaged together. The scores are then transformed linearly to a 0-100 scale. These two questions include five-point response categories for QoL: «very poor", "poor", "neither poor nor good, "good" and "very good" and for Satisfaction with Health: "very dissatisfied", "dissatisfied","" neither satisfied nor dissatisfied", satisfied" and "very satisfied". Analysis was performed after collapsing the bottom two categories (i.e., for QoL "very poor" and "poor'; for Satisfaction with Health "very dissatisfied" and "dissatisfied") and comparing them to the top three. This approach produced the following derived variables: "poor QoL" vs. "good QoL" and "dissatisfied with own health" vs. "satisfied with own health" Therefore, unlike the 4 domains, these two questions are treated as binary outcomes.

-Total quality of life scoring was calculated as the following:

- Low quality of life   <60% of total quality of life scores.

- Moderate quality of life   60-75 % of total quality of life scores.

- High quality of life ------ > 75% of total quality of life scores.

Tool VI: Perceived Stress Scale (PSS):

This tool is used to measure one's perception and appraisal of life events as stressful. It was developed by **(Cohen, 1983)**. The questions of PSS ask about feelings and thoughts during the last month. **Scoring system:** in this tool, respondents are asked how often they felt a certain way on a 5-point Likert-type from 'never' to

'very often'. Each item was rated 0 (never), 1 (almost never), 2 (sometimes), 3 (fairly often), or 4 (very often).

Total scores can range from 0-40 with higher scores indicating greater impairment/challenges.

-Total stress scoring

- No stress   0

- Low stress   1-10

- Moderate stress 11   20

- Sever stress   > 20

Validity

The study tools would be revised for clarity, relevance, comprehensiveness understanding, and applicability by a panel of five experts from the faculties of nursing at Beni-Suef University to measure the content validity of the tools.

Reliability

The reliability of the tool was tested to determine the extent to which the questionnaire items related to each other. Cronbach's Alpha in this study was found to be (.885) for knowledge, (0.897) for pain scale, (0.955) for health-related quality of life, and (0.918) for stress scale.

Ethical consideration

Before the pilot study ethical approval was obtained from the Scientific Research Ethical Committee at the Faculty of Medicine Beni-Suef University. Patients in the study were given complete full information about the purpose of the study and their role before signing the informed consent. The investigator was the emphasis that participation in the study is entirely voluntary; anonymity and confidentiality were assured through coding the data and the patient has the right to withdraw at any time.

II- Operational design A- Preparatory phase:

It included reviewing past, current, national, and international related literature and theoretical knowledge of various aspects of the study using books, articles, the internet, periodicals, and magazines to develop tools for data collection.

B- Pilot study:

The pilot study has been conducted to test the clarity of questions, applicability, and understanding of the tool. It has been conducted on 10 % (12) of patients. The results of the pilot study helped in refining the interview questionnaire and to schedule the time framework. The participants of the pilot were included in the main study sample. **C- Fieldwork:**

Data collection for the study consumed 6 months from the beginning of May 2022 until the end of October 2022; the study was carried out in a specialized room in the physiotherapy and orthopedic outpatient clinics at Beni-Suef University Hospital. The investigators attended the outpatient clinics from 9 am to 12 pm; 3days/a week (Saturday, Monday, and Thursday) to collect patients' data. The program was implemented with 120 patients divided into 6 groups in each group 20 patients. The program contains 9 sessions that were explained to each group over three days and needed 45 minutes. The investigators introduced themself to patients, explained the aim of the study and its implication, and ensure their cooperation. Informed consent was obtained from the patients.

General objectives:

Evaluate the effect of a nursing rehabilitation program on the quality of life for a patient with a vertebral disk in physiotherapy and orthopedic outpatient clinics at Beni-Suef University Hospital **Content of rehabilitation program:**

- The concept of rehabilitation (being as independent as possible in everyday activities, enabling participation in education, work, recreation, and meaningful life roles such as taking care of family and providing social skills training).

- Physical exercise training to improve muscle strength, voluntary movements, and balance in persons with the vertebral disc.

- Health education regarding vertebral disc disease (meaning, risk factors, types, sing and symptoms, complications, diagnosis, treatment, and prevention methods).

D- Planning phase:

After identifying the needs of patients from the assessment phase, the investigator identifies the needs of the sample and also starts to develop the program items (session times, course outline, course content, prepare the method of teaching and education, design the program, booklet, and prepare the pre and post-test).

E- Implementation phase:

The investigators attended the outpatient clinics from 9 am to 12 pm; 3days/a week (Saturday, Monday, and Thursday) to collect patients' data. The program contains 9 sessions that were explained to each group over three days and needed 45 minutes. The investigators explained the data of the questionnaire to the patients and needed time to fill this questionnaire is about (30 -45) minutes to complete. There were some patients unable to read and fill out the questionnaires, but the investigator helped them read the questionnaires and asked the patients to answer. The investigator explained the same information in each group.

The investigators assesses patients' awareness before applying for the rehabilitation program by using a pretest, after finishing and completing the

rehabilitation program the investigator evaluates the effect of the program on patients' knowledge, pain, quality of life, and stress level. The rehabilitation program was then started on a pre-determined schedule, in which every patient was notified about one week before the actual meeting date. To ensure that the patient understand the program content, each session was started with a summary of what was given through the previous one, and the objectives of the new one were mentioned taking into consideration using simple language to suit all patients. To make sure exposure of all subjects to the same learning experience, all patients received the same program content using the same teaching methods, discussion, and booklet.

F- Program evaluation:

After the implementation of the program, the investigator had done post-test to evaluate the level of improvement in the patient's knowledge and quality of life and decreased level of pain and stress using the same tools of pretest evaluation.

III- Administrative design:

After an explanation of the study's aim and objectives, official permission was obtained from the Dean of the Faculty of Nursing and the general manager of Beni- Suef university hospital asking for cooperation and permission to conduct the study.

IV- Statistical design:

The collected data were organized, coded, computerized, tabulated, and analyzed by using Statistical Package for Social Science (SPSS) program (version 25). Data were presented using descriptive statistics in the form of frequencies and percentages for categorical data: the arithmetic mean (X) and standard deviation (SD) for quantitative data. While the

qualitative variables were compared using the Chi-Square test (X^2) and (t-test) which were used for relation tests and the person correlation coefficient (r) was used for correlation analysis.

The degree of significance of results was identified at:

- The significant result when the P-value < 0.05.

- The highly significant result when the P-value < 0.001.

- The non-significant result when the P-value > 0.05.

Results:

Table (1): Frequency distribution of socio-demographic characteristics among the studied patient (n=120)

socio-demographic characteristic	Frequency	%
Age in years		
35-<45	30	25.0
45-<55	57	47.5
≥55	33	27.5
Mean ±SD	**Mean ± SD 51.23±2.16**	
Gender		
Male	44	36.7
Female	76	63.3
Educational level		
Don't read and write	27	22.5
Read and write	7	5.8
Basic education	18	15.0
Secondary education	47	39.2
University education	21	17.5
Marital status		
Married	76	63.3
Divorced/widowed	20	16.7
Single	24	20.0
Occupational status		
Housewife	60	50.0
Employed	27	22.5
Farmer	16	13.3
Retired	17	14.2
Residence		
Rural	82	68.3
Urban	38	31.7

Table (1), reveals that nearly half of the studied patients 47.5% they had aged 45-<55 years old, 63.3% of the patient were female, 39.2% had a secondary education, 63.3% of them were married, and half of them were housewives. Moreover, more than two third of them 68.3% of them lived in rural settings.

Table (2): Frequency distribution of vertebral disc history among the studied patients (n=120)

Vertebral disc history	No	%
Family history of the vertebral disc		
Yes	21	17.5
No	99	82.5
The onset of vertebral disc:		
1-< 3	69	57.5
3-<5	40	33.3
≥5	11	9.2
Body mass index		
Normal body weight	23	19.2
Overweight	74	61.7
Obese	23	19.1

Table (2), indicates the vertebral disc history, the majority of the patients 82.5% have no history of a vertebral disc, more than half of them 57.5% had a vertebral disc from 1 to 3 years ago, and 61.7% of them were overweight.

Table (3): Frequency distribution of vertebral disc knowledge among the studied patients through the program phases (n=120).

Knowledge	Pre-program						Post-program						Paired t-test	P value
	Don't know		Incomplete correct		Complete correct		Don't know		Incomplete correct		Complete correct			
	No	%	No	%	No	%	No	%	No	%	No	%		
Meaning of vertebral disc	73	60.8%	47	39.2%	0	0.0%	13	10.8%	27	22.5%	80	66.7%	127.26	<0.001**
Risk factors for vertebral disc	79	65.8%	41	34.2%	0	0.0%	5	4.2%	21	17.5%	94	78.3%	165.64	<0.001**
Types of the vertebral disc	76	63.3%	34	28.3%	10	8.4%	4	3.4%	25	20.8%	91	75.8%	131.13	<0.001**
Symptoms of the vertebral disc	77	64.2%	33	27.5%	10	8.3%	3	2.5%	23	19.2%	94	78.3%	138.08	<0.001**
Complications of the vertebral disc	65	54.2%	33	27.5%	22	18.3%	4	3.3%	26	21.7%	90	75.0%	96.04	<0.001**
Diagnosis of the vertebral disc	71	59.2%	35	29.1%	14	11.7%	3	2.5%	29	24.2%	88	73.3%	116.73	<0.001**
Management for vertebral disc	70	58.3%	34	28.4%	16	13.3%	4	3.3%	26	21.7%	90	75.0%	111.59	<0.001**
Methods of Prevention of the vertebral disc	64	53.3%	33	27.5%	23	19.2%	4	3.3%	20	16.7%	96	80.0%	100.91	<0.001**
Aim of therapeutic nutrition for a vertebral disc patient	64	53.3%	36	30.0%	20	16.7%	3	2.5%	25	20.8%	92	76.7%	103.80	<0.001**
Foods should a vertebral disc patient avoid	56	46.7%	37	30.8%	27	22.5%	5	4.2%	21	17.5%	94	78.3%	84.15	<0.001**
Foods a vertebral disc patient can be eaten	61	50.8%	42	35.0%	17	14.2%	6	5.0%	21	17.5%	93	77.5%	104.65	<0.001**

Table (3), shows that there was a highly statistically significant difference between vertebral disc knowledge items, including meaning, risk factor, types, symptoms, complication, diagnosis, management, and methods for prevention of vertebral disc knowledge pre and post-program phases (p<0.001**).

Figure (1), illustrates that 75.8% of studied patients had a good level of knowledge post-program as compared with 12.5% at pre-program. Moreover, the poor level of knowledge decreased to 4.2% in the post-program from 56.7% in the pre-program phase.

Figure (1): Percentage distribution of total vertebral disc knowledge among studied patients at pre and post- program phases.

Table (4): Distribution of pain score among studied patients through program phases

Time of assessment	Pain score								X^2	P value
	No pain		Mild pain		Moderate pain		Severe pain			
	No	%	No	%	No	%	No	%		
Pain score pre-program	5	4.2%	9	7.5%	28	23.3%	78	65.0%	133.61	<0.001**
Pain score post–program	31	25.8%	59	49.2%	30	25.0%	0	0.0%		

Table (4), reveals that there was a highly statistically significant difference between the severity of pain through the program phases, as the severity of pain decreased from 65.0% of severe pain to 0% in the post-program phase.

Figure (2), illustrates that the severity of pain decreased from 65.0% of severe pain to 0% in the post-program phase, in addition, 4.2% of them had no pain during the pre-program as compared with 25.8% in the post- program phase.
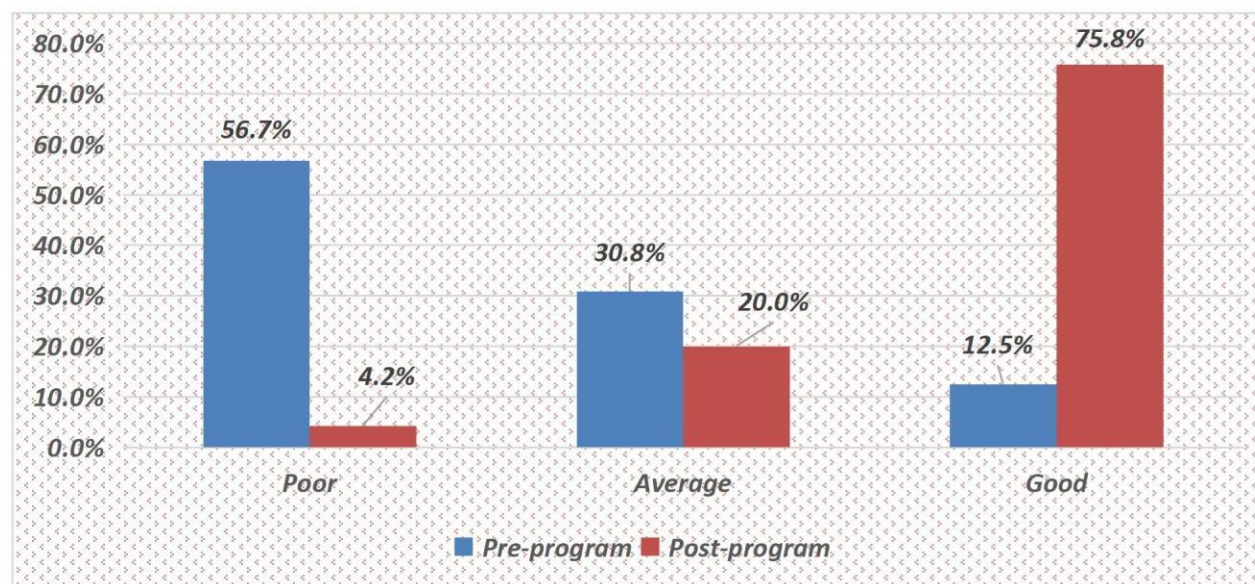
Figure (2): Percentage distribution of total pain score among studied patients at pre and post-program phases.

Table (5): Distribution of total quality of life domains WHOOOL-100 through program phases (n=120).

Quality of life domain	Pre-program	Post-program	Paired t-test	P value
	Mean ±SD	Mean ±SD		
Total physical health	39.5750±6.674	60.0083±8.660	-20.232	<0.001**
Total psychological health	25.1917±8.748	63.28330±8.02	-33.951	<0.001**
Total Social relationships	16.9083±13.81	71.0917±11.83	-30.854	<0.001**
Total Environmental Health	25.4417±10.15	74.1833±9.26	-37.255	<0.001**
How satisfied are you with your health?	2.2917±.72640	3.6333±1.0365	-11.253	<0.001**
How would you rate your quality of life?	2.3000±1.0892	3.4083±.95702	-8.417	<0.001**
Total quality of life	111.708±26.17	275.6083±26.4	-45.066	<0.001**

Table (5), shows the distribution of total quality of life domains WHOOOL-100 through program phases, it was indicated that there was a highly statistically significant difference between different mean scores of domains of quality of life among studied patients through phases of the program (p<0.001**). Moreover, the highest improvement in the quality domain was environmental health, as pared t-test was 37.25, and the p-value was
<0.001**.

Figure (3), illustrates that the quality of life was improved as 66.7% of them had a high level of quality of life in the post-program phase, compared with 0.0% of them in the pre-program. on the other hand, the level of low quality of life among studied patients decreased from 61.7% in the pre-program phase to 5.0% in the post-program phase.
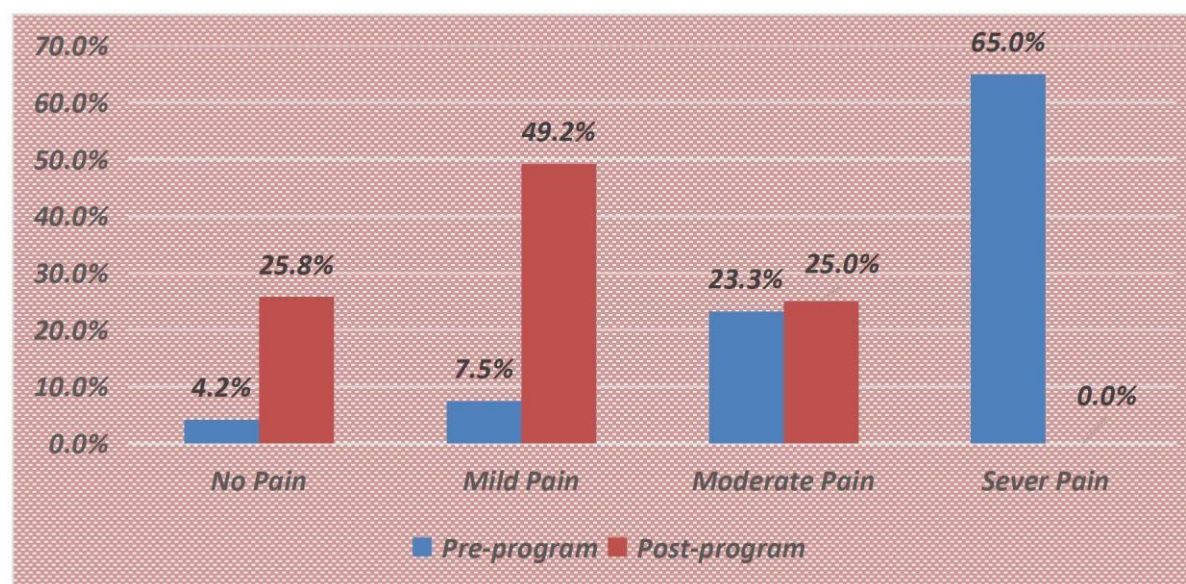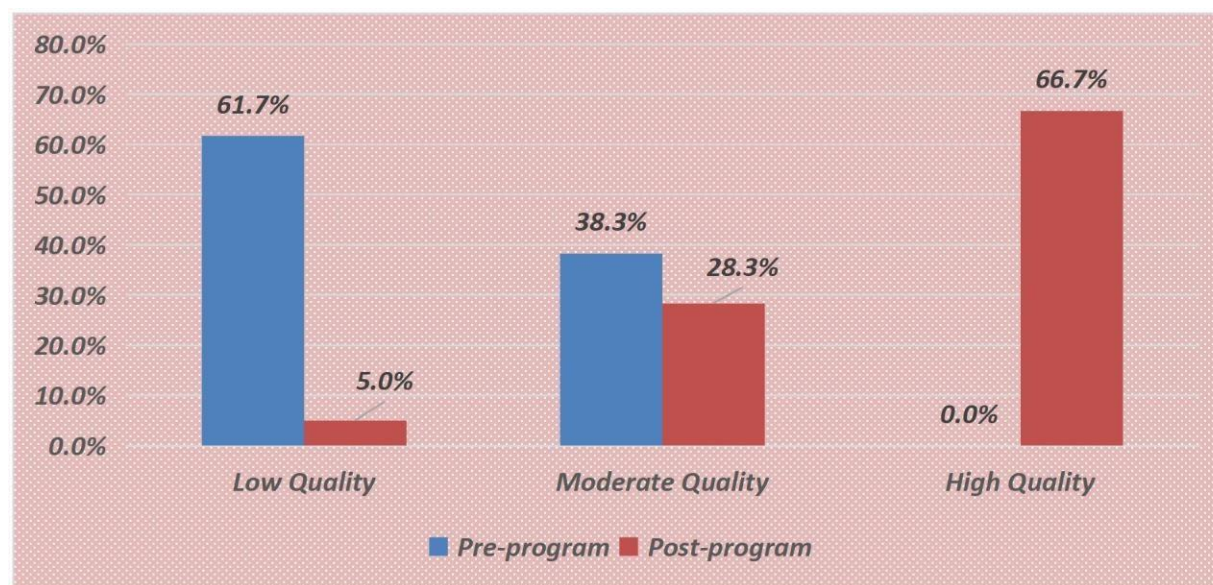

Figure (3): Percentage distribution of total quality of life score among studied patients at pre and post- program phases.

Table (6): Distribution of mean score of stress among the studied patient through program phases (n=120).

Items	Pre-program Mean ±SD	Post-program Mean ±SD	Paired t-test	P value
How upset have you been because something unexpected happened?	3.4333±.89568	.5333±.95207	23.983	<0.001**
To what extent did you feel unable to control the important matters in your life?	3.6500±.70592	.5167±.86950	31.002	<0.001**
To what extent did you feel stressed?	3.5000±.91670	.5917±1.00833	23.758	<0.001**
How confident have you been in your ability to deal with your problems?	3.1083±.85794	1.8417±.98728	3.022	<0.001**
To what extent did you feel that things were going as you wanted?	3.2333±.83750	1.8250±.90435	7.402	<0.001**
To what extent did you find yourself unable to cope with all the things you had to do?	3.3333±1.0235	.3417±.75030	27.665	<0.001**
To what extent have you been able to control the things that bother you?	2.9917±1.4171	1.9917±.80436	2.688	<0.001**
To what extent did you feel that you had control over all your affairs?	2.8833±1.5458	1.9250±.90899	2.612	<0.001**
To what extent have you felt angry because of things beyond your control?	3.5333±.86901	.4083±.91207	28.715	<0.001**
To what extent did you feel that the difficulties were piling up on you to the point that you could no longer overcome them?	3.2333±1.2416	.3333±.70214	21.970	<0.001**
Total stress score	32.9000±3.91	10.3083±3.2637	38.296	<0.001**

Table (6), shows the distribution of mean score of stress among the studied patient through program phases, it was revealed that there was a highly statistically significant difference between stress levels between studied patients through phases of the program (p<0.001**).
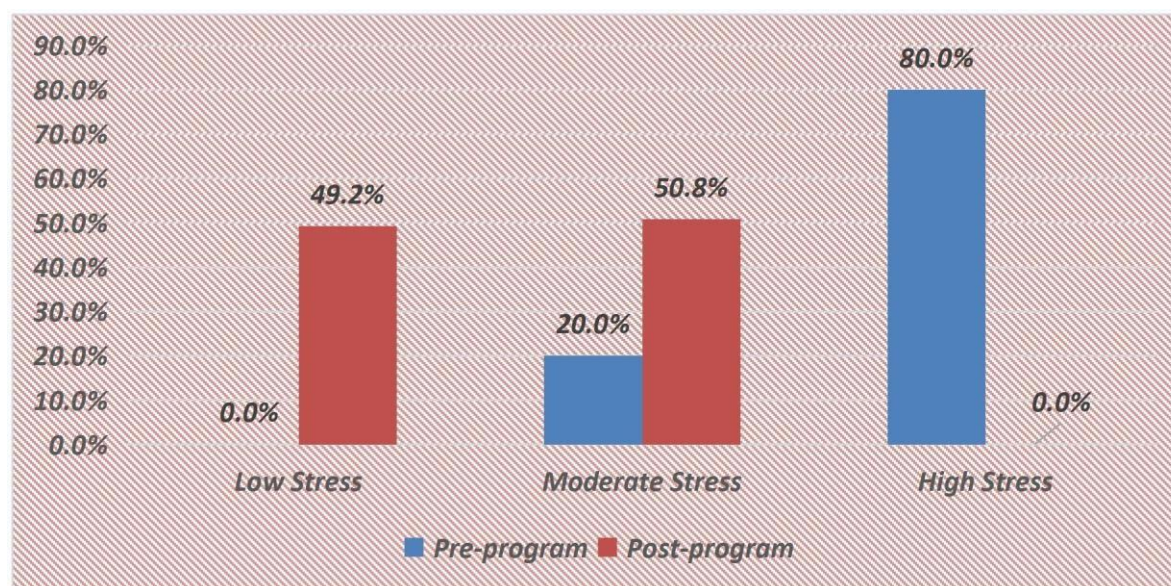
Figure (4): Percentage distribution of total stress score among studied patients at pre and post-program phases.

Figure (4), illustrates that the total stress score was highly decreased among the studied patient as 80.0% of them had a high level of stress at the pre-program phase as compared with 0.0% of them in the post-program. On the other hand, the level of low stress among studied patients increased from 0.0% in the pre-program phase to
49.2 % in the post-program phase.

Table (7): Distribution of relation between total knowledge scores and personnel characteristics of the studied patients through program phases.

socio-demographic characteristic	Pre-program						X²	P value	Post-program						X²	P value
	Poor		Average		Good				Poor		Average		Good			
	No	%	No	%	No	%			No	%	No	%	No	%		
Age in years							7.90	>0.05							114.72	<0.001**
35-<45	16	53.3%	9	30.0%	5	16.7%			5	16.7%	24	80.0%	1	3.3%		
45-<55	39	68.4%	13	22.8%	5	8.8%			0	0.0%	0	0.0%	57	100.0%		
≥55	13	39.4%	15	45.5%	5	15.2%			0	0.0%	0	0.0%	33	100.0%		
Gender							2.46	>0.05							66.05	<0.001**
Male	29	65.9%	11	25.0%	4	9.1%			5	11.4%	24	54.5%	15	34.1%		
Female	39	51.3%	26	34.2%	11	14.5%			0	0.0%	0	0.0%	76	100.0%		
Educational level							16.44	<0.05*							112.82	<0.001**
Don't read and write	17	63.0%	9	33.3%	1	3.7%			5	18.5%	22	81.5%	0	0.0%		
Read and write	1	14.3%	4	57.1%	2	28.6%			0	0.0%	2	28.6%	5	71.4%		
Basic education	9	50.0%	8	44.4%	1	5.6%			0	0.0%	0	0.0%	18	100.0%		
Secondary education	29	61.7%	8	17.0%	10	21.3%			0	0.0%	0	0.0%	47	100.0%		
University education	12	57.1%	8	38.1%	1	4.8%			0	0.0%	0	0.0%	21	100.0%		
Marital status							10.34	<0.05*							10.53	<0.001**
Married	44	57.9%	22	28.9%	10	13.2%			3	3.9%	13	17.1%	60	78.9%		
Divorced/widowed	12	60.0%	3	15.0%	5	25.0%			1	5.0%	9	45.0%	10	50.0%		
Widow	12	50.0%	12	50.0%	0	0.0%			1	4.2%	2	8.3%	21	87.5%		
Occupation							9.72	<0.05*							5.22	>0.05
Housewife	33	55.0%	19	31.7%	8	13.3%			3	5.0%	11	18.3%	46	76.7%		
Employed	16	59.3%	7	25.9%	4	14.8%			1	3.7%	6	22.2%	20	74.1%		
Farmer	5	31.3%	8	50.0%	3	18.8%			1	6.3%	1	6.3%	14	87.5%		
Retired	14	82.4%	3	17.6%	0	0.0%			0	0.0%	6	35.3%	11	64.7%		
Residence							0.864	>0.05							2.62	>0.05
Rural	46	56.1%	27	32.9%	9	11.0%			5	6.1%	17	20.7%	60	73.2%		

	n	%	n	%	n	%	χ²	p	n	%	n	%	n	%	χ²	p
Urban	22	57.9%	10	26.3%	6	15.8%			0	0.0%	7	18.4%	31	81.6%		
Family history of the vertebral disc							6.03	<0.05*							5.18	>0.05
Yes	10	47.6%	5	23.8%	6	28.6%			2	9.5%	7	33.3%	12	57.1%		
No	58	58.6%	32	32.3%	9	9.1%			3	3.0%	17	17.2%	79	79.8%		
The onset of vertebral disc:							2.13	>0.05							1.41	>0.05
1-< 3	40	58.0%	21	30.4%	8	11.6%			4	5.8%	13	18.8%	52	75.4%		
3-<5	24	60.0%	11	27.5%	5	12.5%			1	2.5%	9	22.5%	30	75.0%		
≥5	4	36.4%	5	45.5%	2	18.2%			0	0.0%	2	18.2%	9	81.8%		
Body mass index							3.91	>0.05							1.97	>0.05
Normal body weight	16	69.6%	4	17.4%	3	13.0%			1	4.3%	7	30.4%	15	65.2%		
Overweight	42	56.8%	24	32.4%	8	10.8%			3	4.1%	13	17.6%	58	78.4%		
Obese	10	43.5%	9	39.1%	4	17.4%			1	4.3%	4	17.4%	18	78.3%		

Table (7), indicates the distribution of relation between total vertebral knowledge scores and personnel characteristics of the studied patient through program phases, it was revealed that there was a highly statistically significant relation between studies patients' level of knowledge and their age, gender and educational level at the post-program phase (p<0.001**). regarding the relationship between studied patients' knowledge and onset of vertebral disc and body mass index, the present study findings revealed no significant relation (p>0.05) at the pre- and post-program phase.

Table (8): Distribution of relation between total pain scores and personnel characteristics of the studied patients through program phases.

socio-demographic characteristic	Pre-program									X^2	P value	Post-program						X^2	P value
	No pain		Mild pain		Moderate pain		Severe pain					No pain		Mild pain		Moderate pain			
	No	%	No	%	No	%	No	%				No	%	No	%	No	%		
Age in years										13.71	<0.001**								<0.001**
35-<45	1	3.3%	3	10.0%	12	40.0%	14	46.7%				0	0.0%	16	53.3%	14	46.7%		
45-<55	4	7.0%	6	10.5%	10	17.5%	37	64.9%				19	33.3%	25	43.9%	13	22.8%		
≥55	0	0.0%	0	0.0%	6	18.2%	27	81.8%				12	36.4%	18	54.5%	3	9.1%		
Gender										11.86	<0.001**								<0.001**
Male	4	9.1%	6	13.6%	13	29.5%	21	47.7%				4	9.1%	16	36.4%	24	54.5%		
Female	1	1.3%	3	3.9%	15	19.7%	57	75.0%				27	35.5%	43	56.6%	6	7.9%		
Educational level										38.33	<0.001**							33.86	<0.001**
Don't read and write	1	3.7%	2	7.4%	11	40.7%	13	48.1%				0	0.0%	15	55.6%	12	44.4%		
Read and write	1	14.3%	1	14.3%	1	14.3%	4	57.1%				1	14.3%	1	14.3%	5	71.4%		
Basic education	3	16.7%	5	27.8%	4	22.2%	6	33.3%				6	33.3%	5	27.8%	7	38.9%		
Secondary Education	0	0.0%	1	2.1%	6	12.8%	40	85.1%				18	38.3%	26	55.3%	3	6.4%		
University education	0	0.0%	0	0.0%	6	28.6%	15	71.4%				6	28.6%	12	57.1%	3	14.3%		
Marital status										11.17	<0.05*								>0.05
Married	3	3.9%	9	11.8%	17	22.4%	47	61.8%				17	22.4%	38	50.0%	21	27.6%		
Divorced/widowed	2	10.0%	0	0.0%	7	35.0%	11	55.0%				6	30.0%	9	45.0%	5	25.0%		
Widow	0	0.0%	0	0.0%	4	16.7%	20	83.3%				8	33.3%	12	50.0%	4	16.7%		
Working										11.23	<0.05*							7.0	>0.05
Housewife	2	3.3%	8	13.3%	15	25.0%	35	58.3%				13	21.7%	33	55.0%	14	23.3%		
Employed	2	7.4%	0	0.0%	8	29.6%	17	63.0%				11	40.7%	12	44.4%	4	14.8%		
Farmer	1	6.3%	1	6.3%	3	18.8%	11	68.8%				4	25.0%	6	37.5%	6	37.5%		

	N	%	N	%	N	%	N	%	X²	p	N	%	N	%	N	%	X²	p
Retired	0	0.0%	0	0.0%	2	11.8%	15	88.2%			3	17.6%	8	47.1%	6	35.3%		
Residence									2.40	>0.05								>0.05
Rural	3	3.7%	5	6.1%	17	20.7%	57	69.5%			20	24.4%	39	47.6%	23	28.0%		
Urban	2	5.3%	4	10.5%	11	28.9%	21	55.3%			11	28.9%	20	52.6%	7	18.4%		
Family history of the vertebral disc									5.04	>0.05								>0.05
Yes	2	9.5%	0	0.0%	3	14.3%	16	76.2%			4	19.0%	8	38.1%	9	42.9%		
No	3	3.0%	9	9.1%	25	25.3%	62	62.6%			27	27.3%	51	51.5%	21	21.2%		
The onset of vertebral disc:									12.13								6.24	>0.05
1-< 3	2	2.9%	8	11.6%	19	27.5%	40	58.0%			17	24.6%	36	52.2%	16	23.2%		
3-<5	1	2.5%	1	2.5%	7	17.5%	31	77.5%			10	25.0%	16	40.0%	14	35.0%		
≥5	2	18.2%	0	0.0%	2	18.2%	7	63.6%			4	36.4%	7	63.6%	0	0.0%		
Body mass index									6.56	>0.05							3.41	>0.05
Normal body weight	1	4.3%	0	0.0%	9	39.1%	13	56.5%			7	30.4%	12	52.2%	4	17.4%		
Overweight	3	4.1%	8	10.8%	14	18.9%	49	66.2%			19	25.7%	38	51.4%	17	23.0%		
Obese	1	4.3%	1	4.3%	5	21.7%	16	69.6%			5	21.7%	9	39.1%	9	39.1%		

Table (8), shows the distribution of the relation between total pain scores and personnel characteristics of the studied patient through program phases, it was revealed that there was a highly statistically significant relation between studies patients' level of pain and their age, gender, and educational level at the pre and post-program phase (p<0.001**). regarding the relationship between studied patients' pain score and family history of a vertebral disc, the onset of a vertebral disc, and body mass index, the present study findings revealed no significant relation (p>0.05) at the pre-and post-program phase.

Table (9): Distribution of relation between total quality of life scores and personnel characteristics of the studied patient through program phases.

socio-demographic characteristic	Pre-program				X^2	P value	Post-program						X^2	P value
	Low quality		Moderate quality				Low quality		Moderate quality		High quality			
	No	%	No	%			No	%	No	%	No	%		
Age in years					5.62	>0.05							6.46	>0.05
35-<45	14	46.7%	16	53.3%			3	10.0%	9	30.0%	18	60.0%		
45-<55	35	61.4%	22	38.6%			3	5.3%	19	33.3%	35	61.4%		
≥55	25	75.8%	8	24.2%			0	0.0%	6	18.2%	27	81.8%		
Gender					7.72	<0.05*							10.98	<0.05*
Male	20	45.5%	24	54.5%			6	13.6%	12	27.3%	26	59.1%		
Female	54	71.1%	22	28.9%			0	0.0%	22	28.9%	54	71.1%		
Educational level					10.47	<0.05*							27.05	<0.001**
Don't read and write	13	48.1%	14	51.9%			3	11.1%	7	25.9%	17	63.0%		
Read and write	2	28.6%	5	71.4%			0	0.0%	3	42.9%	4	57.1%		
Basic education	9	50.0%	9	50.0%			3	16.7%	9	50.0%	6	33.3%		
Secondary Education	35	74.5%	12	25.5%			0	0.0%	15	31.9%	32	68.1%		
University education	15	71.4%	6	28.6%			0	0.0%	0	0.0%	21	100.0%		
Marital status					11.98	<0.05*							10.91	<0.05*
Married	38	50.0%	38	50.0%			6	7.9%	24	31.6%	46	60.5%		
Divorced/widowed	16	80.0%	4	20.0%			0	0.0%	8	40.0%	12	60.0%		
Widow	20	83.3%	4	16.7%			0	0.0%	2	8.3%	22	91.7%		
Occupation					4.54	>0.05							4.58	>0.05
Housewife	42	70.0%	18	30.0%			4	6.7%	20	33.3%	36	60.0%		
Employed	16	59.3%	11	40.7%			0	0.0%	5	18.5%	22	81.5%		
Farmer	7	43.8%	9	56.3%			1	6.3%	4	25.0%	11	68.8%		

	N	%	N	%	X2	p	N	%	N	%	N	%	X2		p
Retired	9	52.9%	8	47.1%			1	5.9%	5	29.4%	11	64.7%			
Residence					0.965	>0.05									>0.05
Rural	53	64.6%	29	35.4%			4	4.9%	23	28.0%	55	67.1%	0.022		
Urban	21	55.3%	17	44.7%			2	5.3%	11	28.9%	25	65.8%			
Family history of the vertebral disc					5.98	>0.05							1.90		>0.05
Yes	8	38.1%	13	61.9%			2	9.5%	4	19.0%	15	71.4%			
No	66	66.7%	33	33.3%			4	4.0%	30	30.3%	65	65.7%			
The onset of vertebral disc:					7.65	>0.05							1.89		>0.05
1-< 3	39	56.5%	30	43.5%			4	5.8%	22	31.9%	43	62.3%			
3-<5	24	60.0%	16	40.0%			2	5.0%	9	22.5%	29	72.5%			
≥5	11	100.0%	0	0.0%			0	0.0%	3	27.3%	8	72.7%			
Body mass index					8.18	<0.05*							1.97		>0.05
Normal body weight	10	43.5%	13	56.5%			1	4.3%	5	21.7%	17	73.9%			
Overweight	53	71.6%	21	28.4%			4	5.4%	24	32.4%	46	62.2%			
Obese	11	47.8%	12	52.2%			1	4.3%	5	21.7%	17	73.9%			

Table (9), indicates the distribution of the relation between total quality of life scores and personnel characteristics of the studied patient through program phases, it was revealed that there was a statistical and highly statistically significant relation between studies patient's total quality of life scores and their gender and educational level at the post-program phase (p<0.05*, < 0.001**) respectively. Regarding the relation between the studied patient's quality of life score and the onset of a vertebral disc, the present study findings revealed no significant relation (p>0.05) at the pre-and post-program phase

Table (10): Distribution of relation between total stress scores and personnel characteristics of the studied patient through program phases.

personnel characteristics	Pre-program				X²	P value	Post-program				X²	P value
	Moderate stress		High stress				Low stress		Moderate quality			
	No	%	No	%			No	%	No	%		
Age in years					1.51	>0.05					63.42	<0.001**
35-<45	5	16.7%	25	83.3%			0	0.0%	30	100.0%		
45-<55	10	17.5%	47	82.5%			26	45.6%	31	54.4%		
≥55	9	27.3%	24	72.7%			33	100.0%	0	0.0%		
Gender					0.009	>0.05					67.19	<0.001**
Male	9	20.5%	35	79.5%			0	0.0%	44	100.0%		
Female	15	19.7%	61	80.3%			59	77.6%	17	22.4%		
Educational level					12.19	<0.05*					90.88	<0.001**
Don't read and write	4	14.8%	23	85.2%			0	0.0%	27	100.0%		
Read and write	2	28.6%	5	71.4%			0	0.0%	7	100.0%		
Basic education	5	27.8%	13	72.2%			0	0.0%	18	100.0%		
Secondary education	4	8.5%	43	91.5%			38	80.9%	9	19.1%		
University education	9	42.9%	12	57.1%			21	100.0%	0	0.0%		
Marital status					0.219	>0.05					23.74	<0.001**
Married	16	21.1%	60	78.9%			35	46.1%	41	53.9%		
Divorced/widowed	4	20.0%	16	80.0%			3	15.0%	17	85.0%		
Widow	4	16.7%	20	83.3%			21	87.5%	3	12.5%		
Working					2.05	>0.05					0.896	>0.05
Housewife	10	16.7%	50	83.3%			29	48.3%	31	51.7%		
Employed	8	29.6%	19	70.4%			15	55.6%	12	44.4%		
Farmer	3	18.8%	13	81.3%			8	50.0%	8	50.0%		
Retired	3	17.6%	14	82.4%			7	41.2%	10	58.8%		
Residence					0.472	>0.05					1.69	>0.05
Rural	15	18.3%	67	81.7%			37	45.1%	45	54.9%		
Urban	9	23.7%	29	76.3%			22	57.9%	16	42.1%		
Family history of the vertebral disc					0.14	>0.05					9.23	<0.05*
Yes	4	19.0%	17	81.0%			4	19.0%	17	81.0%		
No	20	20.2%	79	79.8%			55	55.6%	44	44.4%		
The onset of vertebral disc:					3.37	>0.05					0.288	>0.05
1-< 3	14	20.3%	55	79.7%			33	47.8%	36	52.2%		
3-<5	10	25.0%	30	75.0%			21	52.5%	19	47.5%		

≥5	0	0.0%	11	100.0%			5	45.5%	6	54.5%		
Body mass index					1.20	>0.05					2.35	>0.05
Normal body weight	3	13.0%	20	87.0%			8	34.8%	15	65.2%		
Overweight	17	23.0%	57	77.0%			39	52.7%	35	47.3%		
Obese	4	17.4%	19	82.6%			12	52.2%	11	47.8%		

Table (10), shows the distribution of the relation between total stress scores and personnel characteristics of the studied patient through program phases, it was revealed that there was a highly statistically significant relation between studies patient's total stress score and their age, gender, and educational level at the post- program phase (p<0.001**). Regarding the relation between the studied patient's stress score and onset of vertebral disc and body mass index, the present study findings revealed no significant relation (p>0.05) at the pre-and post-program phase.

Table (11): Correlation among studies of total knowledge, quality of life, stress, and pain through program phases.

Variables	Pre-program		Post-program	
	Knowledge		Knowledge	
	r	P value	r	P value
Quality of life	0.128	>0.05	0.367	<0.001**
Stress	0.034	>0.05	-0.289	<0.05*
Pain	0.008	>0.05	-0.295	<0.05*

Table (11), illustrates the correlation among studies' total knowledge, quality of life, stress, and pain through program phases, it was revealed that there was no significant positive association between studied patient knowledge score and their quality of life, stress, and pain at the pre-program phase, while at the post-program phase, there was a highly significant positive association between their knowledge and quality of life, and also there was a significant negative association between their knowledge and stress and pain scores, which meant that increase knowledge was associated with a decreased level of stress and pain.

Discussion: A degenerative change known as intervertebral disc degeneration (IDD) is the
aging process and damage to the
intervertebral disc (IVD) brought on by several intricate molecular pathways, which ultimately results in severe clinical symptoms. One of the most prevalent causes of disability and one of the typical clinical indications of intervertebral disc degeneration is low back pain. The expenditures of treating patients with chronic low back pain (direct costs) as the decline in social production (indirect costs) place a heavy strain on the social economy **(Liu, et al, 2023).**

Health-related quality of life is a multidimensional construct for which different definitions exist. A widespread definition describes the health-related quality of life as physical, emotional, mental, and social aspects of well-being and functioning from the patient's perspective concerning disease and related aspects such as medical intervention. Health-related quality of life is an important area of study that attracted, an ever-increasing amount of interest over the past two decades, particularly in the area of health, rehabilitation, and social services **(Wagner, et al, 2023).** Therefore; this study was conducted to evaluate the effect of a nursing rehabilitation program on the quality of life of patients with the vertebral disk in outpatient physiotherapy and orthopedic clinic.

The study revealed that more than half of the studied patients have poor knowledge levels regarding vertebral disc at the preprogram phases. From the researcher's point of view, this could be due to that patients were not provided any education before the phases of the study. But there was an improvement in post-program implementation whereas more than three-

quarters of them have a good level of knowledge regarding IVD. Also, there were highly statistically significant differences between pre and post-program implementation. From the investigator's point of view, these results might be due to the positive impact of the rehabilitation program on improving patients' knowledge regarding vertebral disc.

This was in agreement with the study done by **Abd-El Mohsen et al., (2019),** who conducted a study in Egypt entitled "Effect of nursing rehabilitation guide on outcomes of patients undergoing lumbar discectomy" reported that there was a highly statistically significant difference between patients' knowledge before and after the rehabilitation program. This finding agreed with a study performed by **Mohammed & El-Fadl, (2021),** who stated that more than half of the studied patients have poor knowledge levels regarding vertebral disc at the preprogram phases. But there was an improvement   in
                                post-program
implementation whereas more than three-quarters of them have a good level of knowledge regarding IVD. Also, there were highly statistically significant differences between pre and post-program implementation. While, disagreed with **Mohamed et al., (2022),** who stated that, there was an improvement in a satisfactory level of knowledge post-program implementation compared to the control group.

Regarding the pain of the studied patients, the results of the current study clarified that less than two third of studied patients have severe pain levels preprogram compared to less than half of the studied patients who have mild pain levels at the post-program phase. Also, there were highly statistically significant differences between pre and post-program implementation. From the investigator's point of view, these results

might be due to the effect of the rehabilitation program in decreasing pain severity which supports the second research hypothesis.

These results agreed with a study performed by **Akca et al., (2021),** whose conduct study in Turkey entitled "Effect of body mechanics brief education in the clinical setting on pain patients with lumbar disc hernia" stated that there were highly statistically significant differences pre-and post-program implementation. These results agreed with the study performed by **Mohammed & El-Fadl, (2021),** who conducted a study in Egypt entitled "Effect of the educational program for patients post herniated cervical disk surgery on their knowledge and daily living activities" and stated that more than two third of studied patients have severe pain level preprogram. It was reduced to more than half of the studied patients having mild pain levels at a post-program phase in 6 months.

Moreover, this result was in the same line with **Guo et al., (2019),** who conducted a study in China entitled "Rehabilitation nursing for patient rehabilitation after minimally invasive spine surgery" and reported that there was no significant difference in pain score between the two groups before the nursing intervention but after the nursing intervention, the pain scores of both groups were highly statistical significance difference at P value <0.001**. This result is in disagreement with **Demoulin et al., (2021),** who conducted a study in France entitled "Effectiveness of preventive back educational interventions for low back pain" and found that there was no statistical significance in pain level post- program implementation.

Concerning differences between the total quality of life pre and post-program the current study shows that there is highly improvement in all total domains of quality of life among the studied patients post- program than preprogram with a high statistical significance difference. This result explained the importance of the education and rehabilitation program to IVD patients pre and post-surgery. Nurses take responsibility for educating patients about the disease, treatment recommendations, potential side effects, and other important information.

From the investigator's perspective, these findings may be related to the fact that IVD patients rely on healthcare professionals to provide rehabilitation, the knowledge they need to manage their condition and other services. As members of the treatment team, nurses play a crucial role in the diagnosis, treatment, and care of patients with IVD. They also spend more time with patients than the other members of the treatment team, which improves the patient's quality of life. These results might be due to the effect of management and the program content.

IVD affects all levels of function. Physical and psychological distress can cloud a patient intellectual function. The more information about possible symptoms they receive the better their ability to cope. This finding supports the first and third research hypotheses that assumed improvement in patients' quality of life post- program implementation.

In this respect, **Cuesta & Gonzalez, (2021),** conduct a study in Spain entitled " Patients with chronic non-specific neck pain who underwent an 8-week multimodal physiotherapy course showed changes in disability, physical and mental health status, and quality of life" who found that there was a highly statistically significant difference in the total quality of life of study patients post-program implementation.

Similarly, the results done by **Mbada et al., (2022),** who conducted a study in Nigeria entitled "Mckenzie

protocol and two types of endurance activities' effects on individuals with chronic mechanical low-back pain's quality of life " found that there was a highly statistically significant difference in overall quality of life, general health perception of study patients post-program. However, **Aldemir & Gürkan, (2021)),** who conducted a study in Turkey entitled "The effect of pedometer-supported walking and telemonitoring after disc hernia surgery on pain and disability levels and quality of life" found that there was a highly statistically significant difference in overall quality of life of study patients post-program implementation.

This study is supported by the research study done by **Nambi et al., (2020),** who conduct a study in India entitled "Changes in pain intensity and health-related quality of life with Iyengar yoga in nonspecific chronic low back pain" and found that there was a significant reduction in patient's total domains of quality of life after one month of the program, while after six months there was a highly statistically significant difference in all domains of quality of life; physical, psychological, social, environmental and general status. While another research by **Sarker et al., (2020),** who conduct a study in India entitled "Comparative clinical effects of spinal manipulation, core stability exercise, and supervised exercise on pain intensity, segmental instability, and health-related quality of life among patients with chronic nonspecific low back pain" who reported that the total domains of quality of life of patients in group 1 showed significant improvement compared to other 2 groups.

The current study revealed that the majority of the studied patients had a high level of stress during the pre-program phase. But there was an improvement post-program implementation whereas nearly half of them

have a low level of stress. Also, there were highly statistically significant differences between pre and post-program implementation. This finding supports the second research hypothesis that assumed improvement in patients' stress level post-program implementation. From the investigator's point of view, these results might be due to the positive impact of the rehabilitation program on decreasing patients' stress levels also patients had desired to enhance their feelings and thoughts.

This result was in agreement with **Yüksel et al., (2021),** who conduct a study in Turkey entitled "The effect of mindfulness-based therapy on psychiatric symptoms, psychological well-being, and pain beliefs in patients with lumbar disk herniation" and found that there was a highly statistically significant difference in anxiety and stress level of patients post-implementation leading to a positive impact on their pain beliefs and psychological well-being. Conversely, this result was in disagreement with **Morone et al., (2019),** who conduct a study in the USA entitled "Mindfulness meditation for the treatment of chronic low back pain in older adults" and found that the majority of studied patients had stress post-program implementation. This result was congruent with the study performed by **Young & Baime, (2020),** who mentioned that, there was a highly statistically significant difference in the total stress level of studied patients post-implementation. Conversely, this result was incongruent with the study conducted by **Cherkin et al., (2019),** who found that there was no statistically significant difference in total stress level in the post-program implementation.

Regarding the relation between the total vertebral knowledge scores of patients and their demographic characteristics, the current study showed that there is a highly

statistically significant relation between the total knowledge of patients and their age, gender, and educational level. This result was in accordance with **Ahmed et al., (2019),** who conduct a study in Egypt entitled "Effectiveness of Structured Nursing Teaching Program on Outcomes of Chronic Low Back Pain Patients Undergoing Radiofrequency Ablation" and found that there was a highly statistically significant relation between knowledge of patients and their age, gender and educational level. Conversely, this result was congruent with **Mohammed & El-Fadl, (2021),** who conduct a study in Egypt entitled "Effect of the educational program for patients post herniated cervical disk surgery on their knowledge and daily living activities" and found that there was no statistically significant relation between knowledge of patients and their age, gender and educational level. This result may be due to cognitive changes among patients aged forty-five and more which are affected by their diminished learning abilities. Moreover, patients who had a high educational level enable them to read more and acquire additional knowledge regarding vertebral disc.

Regarding the relation between the total pain scores of patients and their demographic characteristics, the current study showed that there is a highly statistically significant relation between the total pain of patients and their age, gender, and educational level. Conversely, this result was congruent with **Hablass et al., (2020),** who conduct a study in Egypt entitled "Effect of Applying an Educational Program for Patients with lumbar laminectomy on Their Knowledge and Self-Care Activities" and found that there was no statistically significant relation between patient's pain and their socio-demographic characteristics. This result may be due to physiological changes; aging may result in progressive

degenerative changes in the spinal column. It may result in wear of the musculoskeletal system causing painful episodes which suggested that older individuals have greater risks of problems in the lumbar spine. In addition, the pain level was increased in females due to women's anatomical and functional characteristics.

Regarding the relation between patients' total quality of life score and their demographic characteristics, the current study showed that there is a highly statistically significant relation between patients' total quality of life score and their gender and educational level. This result was in accordance with **Youssef et al., (2020),** who conduct a study in Egypt entitled "Effects of Educational Nursing Interventions on Pain, and Quality of Life among Nurses with Low Back Pain" and found that there was a highly statistically significant relation between patient's total quality of life score and their socio-demographic characteristics. This result may be due to the patient's gender and educational level influencing the quality of life of patients with vertebral disc because there is a difference was found when comparing the quality of life for male or female patients and the patient had a high or secondary education.

Regarding the relation between patients' total stress score and their demographic characteristics, the current study showed that there is a highly statistically significant relation between patients' total stress score and their age, gender, and educational level. These results agreed with the study performed by **Gaskell et al., (2021),** who mentioned that, there was a highly statistically significant relation between patients' total stress score and their socio-demographic characteristics. This result may be due to the present relation

between patients' total stress score and their demographic characteristics.

Regarding the correlation between total knowledge and the quality of life of the studied patients, the current study revealed that there is a highly statistically significant positive correlation between knowledge and the quality of life of the studied patients. This result was in accordance with **Taşpınar et al. (2023),** who stated that there was a positive correlation between knowledge and quality of life of the studied patients. This result may be due to that the program has a positive effect on patients' knowledge and their quality of life. So, this result supports the first and third research hypothesis.

Regarding the correlation between total knowledge and the pain level of the studied patients, the current study revealed that there is a significant negative correlation between knowledge and the pain of the studied patients. This result was supported by **Heba & Safaa, (2019),** who conduct a study in Egypt entitled "Effect of Patients' Education on Their Performance and Outcomes Regarding Lumbar Disk Herniation" and found that there was a negative correlation between knowledge and pain of the studied patients. On the other hand, this result was incongruent with the study performed by **Salah et al. (2020),** who mentioned that, there was a positive correlation between the knowledge and pain of the studied patients. This result may be due to the effect of the rehabilitation program in increasing patients' knowledge about the vertebral disc and also decreasing pain severity post-program implementation.

Regarding the correlation between total knowledge and stress levels of the studied patients, the current study revealed that there is a significant negative correlation between knowledge and stress of the studied patients. This result was supported by **Seers et al. (2020),** who stated

that there was a negative correlation between the knowledge and stress of the studied patients. This result may be due to that satisfactory knowledge of patients regarding vertebral disc makes them able to manage the problem and improve psychological well-being.

Conclusion

Based on the results of the present study, the researcher can conclude that a rehabilitation program has a great effect on improving quality of life as there is a highly significant improvement regarding all domains of quality of life with a high statistical significance difference in physical, psychological, social, environmental domains and total quality of life at the post- program implementation. The rehabilitation program is also effective in increasing knowledge and decreasing pain and stress levels which are associated with quality of life. There is a highly significant positive correlation between knowledge and quality of life of studied patients and also there was a significant negative correlation between their knowledge and stress and pain scores. However, there is a highly statistically significant relation between studied patients' level of knowledge and their (age, gender, and educational level). There is a highly statistically significant relation between studied patients' total quality of life and their educational level. Additionally, there is a highly statistically significant relation between studied patients' total stress score and their (age, gender, and educational level).

Recommendations

Based on the previous results of the present study and conclusion, the following recommendations are suggested: In nursing practice:

o Stress management training program should be given to patients with

vertebral disc disease to relieve their psychological problems and enhance their quality of life.

o   Develop illustrated booklets to be available and distributed for each vertebral disc patient attend to physiotherapy and orthopedic outpatient clinics.

In the nursing program:

o   Establish educational seminars for health care providers, community health nurses, and graduated nurses and under graduated students about the utilization of rehabilitation programs for those patients with the vertebral disc.

o   Establish special nursing courses for all nurses who work with vertebral disc patients about the psychological consequences and the scientific base of managing it.

In further research:

o   Conduct research to evaluate the effect of the rehabilitation program on specific one type of vertebral disc disease as lumbar disc herniation.

o   Replication of study using large study sample in different correction settings to generalize the results.

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