

Assessment of the Impact of Yoga Therapy on Functional Disabilities in the Subjects with Degenerative Lumbar Disc Disorder

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Abstract

Degenerative Lumbar Disc disorder is characterized by pain and functional disabilities due to structural changes in the Lumbar disc area which significantly affects a person's quality of life. Yoga Therapy can be defined as the systematic application of the yogic techniques in curative and preventive aspects in the people by understanding the condition of the person. The objective of the present study is that to analyze the impact of selected yogic technique's to alleviate the functional disabilities. There were total 80 subjects (n=80) selected for the present study based on accidental sampling method. Total duration of the yoga therapy application for each subject were three months. The subjects were divided in to experimental and control group consisting forty numbers in each group. Assessments of the impact of selected yogic techniques were done by assessing the Range of Lumbar Flexibility and Numerical Pain Disability Questionnaire. To analyze the statistical significance of the collected data we were applied student t test. In the present study based on statistical analysis we could observe that there is a statistically significant improvement ($p < 0.05$) in the selected parameters in the experimental group. Based on the analysis the study has been concluded that the three months of yoga therapy application could reduce the functional disabilities in the experimental group.

Key words: Yoga therapy, Functional Disabilities, Degenerative Lumbar Disc Disorder, Range of Lumbar Flexibility.

Introduction

The Degenerative Lumbar Disc Disorder (DLDD) is one such affliction highly prevalent as age increase, and it is characterized by structural, biochemical and pathological changes in the body. Pain in lumbar disc area is the first and foremost symptom of DLDD. Pain affects, impedes and impairs our daily activities, as the intensity grows and finally it disturbs our very thinking and mental peace. Also it detrimentally impacts occupational activities and life

becomes restricted, sometimes even debilitated [1,2,3].

Yoga Therapy

There are various treatment options available for the management of ailments and ill health. In today's time and age, the public awareness about diseases and their prevention, the significance of a healthy lifestyle and good health, is tremendous. Yoga is a way of life which has the unique capability to prevent and help cure various disorders. Also, evidently, Yoga is best

equipped to provide a holistic impact on the human life. Yoga Therapy can be defined as the systematic application of the yogic techniques in curative and preventive aspects in the people by understanding the condition of the person[4]

Impact on quality of life

Evidently, the degenerative disc symptoms affect daily activities and the quality of life gets impacted after getting DLDD and the associated pain. The pain associated functional disabilities, affects various levels in the patient's daily life. It is evident that the patients as having difficulties and compromising in their daily activities, house work, profession, entertainment activities etc[5].

Objective of the study

The primary objective of the present study is that, to assess the impact of Yogic intervention in the subject with functional disabilities with degenerative lumbar disc disorder by assessing the collected data.

Materials and Method

The present study was carried out in the Department of Human Consciousness and Yogic Sciences, Mangalore University, Mangalagangothri, Karnataka, India. The duration of yoga therapy application on each subject was three months.

Subjects

There was a total number of 80 subjects (n=80),(40 male and 40 female) age group between 45 to 60 years of age, who expressed their interest voluntarily to participate in the program. The patients were residing in the premises of Mangalore, Karnataka.

Study Design

The selection of the subjects was done based on first come-first serve basis and from amongst those who expressed their willingness to participate in the study (accidental sampling method)the first 80

people (first 40 male and first 40 female)were chosen. The subjects were divided into experimental and control groups comprising 40 members each, including equal proportion of male and female subjects.

Medical Assessment

Assessment of the physical condition and diagnosis of Degenerative Lumbar Disc Disorder of each subject was done by the Medical Field Expert (OrthopaedicSurgen) in the present study

Ethical Clearance

The study design of the present study was approved by the Institutional Human Ethical Committee.A written consent from all the subjects were obtained after explaining all the details about the present study including about purpose of the study, sample collection, application of yoga therapy, duration, etc (Appendix).

Criteria

• Inclusion criteria

The subjects with a history of chronic low back ache with degenerative disc disorder symptoms, suffering for more than 1 year and in the age group of 45 to 60, were included in the present study.

• Exclusion Criteria

The subjects with acute disc prolapses and neurological deficit and acute low back ache were excluded from the present study.

Case history recordings:

A detailed Case History about the present condition of all the subjects was recorded methodically. Main complaints, history of present condition, past history of illness, Family History, occupational history, general physical conditions like appetite, sleep, micturition, bowel movement, and menstrual cycle, locomotion, kinesthetic sense etc. are recorded by asking to the subjects. Also Blood Pressure, Height, Weight etc. were measured with appropriate instruments.

Assessment of the Variables

- **Range of Lumbar flexibility**

Assessment of “Range of Lumbar Flexibility” done by using the “Goniometer”. [7]

Procedure

Sit in the “samasthiti” position (normal)

Place the goniometer parallel to the body

Position the scale that leads 180 degree, parallel to the legs in straight position

Position the scale leads 90 degree straight to the shoulder joint.

Instruct to the person to sit erect.

Instruct to the person to bend slowly and adapt “pascimottanasana” position.

Measure the maximum level of bending by observing the “protractor” in the device.

Instruct to the person to come back to normal position.

- **Pain Disability Questionnaire (PDQ)**

A questionnaire consisting of 15 questions that represents pain and other complications of DLDD [9], were given to the subjects before and after the yoga therapy application to assess the impact of yoga therapy on pain and functional disabilities in both experimental and control group. Each question was provided with a ten point numeric scale so that the subject could indicate/ mark the severity of pain and complications according to his/her condition in the scale. Total Range of score of the questionnaire varied from 0 to 150.

Yoga Therapy Application

The first step of the implementation of Yoga therapy was, to frame a systematic treatment strategy, based on the case history obtained. The practice protocol that helps strengthen the supporting muscles, improves the elasticity of the muscles and spinal column, yoga practice that provides

extension and rotation to the body, decompression of lumbar vertebral disc, improvement in nutrients supply, especially in the vertebral disc area etc were considered to finalize the yogic techniques and practice protocol for treatment. The yogic techniques applied in the experimental group were done in such a way that, there were no physical difficulties to perform the given practices. Also personal attention was given to all the participants during the Yoga therapy sessions. Total duration of the therapy session was approximately one hour. Following techniques were applied in the experimental group.

Applied asanas:

Swatikasana, Vjrasana, Suptavjrasana, Ūrdhwavajrasana, Tadasana I,II, Ardha-candrasana, Trikonasana, parswakonasana, Paswottanasana, Virabhadrasana, Pascimottanasana, Pūrvvottanasana, Janus-irsasana, Vrksasana, Marjjalasana, Suptakonasana, Baddhakonasana, Pavanamuktasana, Bhujangasana, Salabhasana, Dhanurasana, Uttanapadasana.

Pranayamas:

Ujjayi, anulomaviloma, bhastrika, sitali
Also So^ham- meditation and relaxation techniques are applied.

Result and analysis

The details of the result and analysis have been captured below. To analyze the statistical significance we have applied student t test in the present study. The difference in the values of the parameters after the treatment and before treatment indicates the effect of the treatment on the value of the parameters. The difference was expected to be larger in the experimental group than in the control group. These differences were subjected to statistical tests to find out whether the difference is statistically significant or not. The summary of the statistical analysis are given below.

Table 1 : Statistical summary of Experimental Group before Treatment

| Parameter | Subjects | Minimum | Maximum | Mean | SD |
|-----------|----------|---------|---------|-------|-------|
| RLF | 40 | 85.00 | 110 | 96.3 | 5.66 |
| PDQ | 40 | 30 | 107 | 61.70 | 16.94 |

Table 2 : Statistical summary of Experimental Group after Treatment

| Parameter | Subjects | Minimum | Maximum | Mean | SD |
|-----------|----------|---------|---------|--------|------|
| RLF | 40 | 92 | 116 | 107.10 | 6.49 |
| PDQ | 40 | 13 | 54 | 23.12 | 9.94 |

Table 3 : Statistical summary of Control Group Pre

| Parameter | Subjects | Minimum | Maximum | Mean | SD |
|-----------|----------|---------|---------|-------|-------|
| RLF | 40 | 86 | 110 | 97.42 | 6.01 |
| PDQ | 40 | 28 | 105 | 60.73 | 19.82 |

Table 4 : Statistical summary of Control Group Post

| Parameter | Subjects | Minimum | Maximum | Mean | SD |
|-----------|----------|---------|---------|-------|-------|
| RLF | 40 | 88 | 110 | 97.85 | 6.01 |
| PDQ | 40 | 31 | 95 | 58.27 | 17.85 |

Table 5: Result of t test

| Parameter | Sample Size | Differential mean value | | t-test | |
|-----------|-------------|-------------------------|---------|--------|---------|
| | | Experimental | Control | t-stat | p value |
| RLF | 40 | 11.7 | 0.42 | -13.56 | 0.00 |
| PDQ | 40 | -38.58 | -2.45 | 13.55 | 0.00 |

Discussion

In the present study the results of the total analyses of the data show a remarkable improvement in the experimental group across the defined parameters, indicating that Yoga therapy can create a positive impact on functional disabilities related to Degenerative Lumbar Disc Disorder.

RLF (Range of lumbar flexibility)

Mobility of the lumbar area is an important factor for an active lifestyle. Due to degenerative changes there is increased possibility of stiffness in the lumbar area that affects the flexion and extension of the lumbar region [8]. Studies indicate that these functional disabilities are common

amongst people with degenerative disc disorder [9].

In the statistical analysis it was observed that a significant improvement occurred in the range of lumbar flexibility (Table 1,2,3,4,5) post the Yoga therapy module. The mean value of RLF in the experimental group was 96.03 degree before the study and it improved to 107.10 degree after the intervention of yoga therapy. However, in the control group the values recorded were 97.42 degree before the study and 97.85 degree after the study with the statistical significance of 0.00 (p=0.00)

Pain disability Questionnaire

Assessing the pain and disability was an important data source for the study. Here a questionnaire that captured functional disabilities due to degenerative lumbar disc disorder were administered before and after. The obtained score indicates a statistically significant improvement in the (reduction in) functional disabilities in the experimental group as compared to control group (Table 1,2,3,4,5).

The mean value of PDQ in the experimental group shows score of 61.70 before the study and 21.12 after the study.

In comparison, in the control group the score is 60.73 before the study and 58.27 after the study. There is a statistically significant improvement with the p value of 0.00 (p=0.00).

Categorized Assessment of the Pain Disability Questionnaire.

The pain disability questionnaire was administered to assess the functional disabilities in the subjects. To analyze categorically the impact of Yoga therapy against the functional disabilities within the group in the experimental group, the tables, of before and after are given below.

Table 6: Level of Functional Disability before Yoga therapy

| Number of Subjects | Obtained Score | Assessment |
|--------------------|----------------|----------------------------------|
| 0 | 0 | No functional Disabilities |
| 1 | 1 – 40 | Mild Functional disabilities |
| 26 | 41 – 80 | Moderate Functional Disabilities |
| 13 | 81 – 120 | Severe Functional Disabilities |
| 0 | 121 – 150 | Critical Functional Disabilities |

The reduction in the level of functional disabilities after Yoga therapy intervention is given below.

Table 7: Level of Functional Disability after Yoga Therapy

| Number of Subjects | Obtained Score | Assessment |
|--------------------|----------------|----------------------------------|
| 0 | 0 | No functional Disabilities |
| 33 | 1 – 40 | Mild Functional disabilities |
| 7 | 41 – 80 | Moderate Functional Disabilities |
| 0 | 81 – 120 | Severe Functional Disabilities |
| 0 | 121 – 150 | Critical Functional Disabilities |

The Effectiveness of Yoga in improving the functional disabilities

The obtained result of RLF and Pain Disability index indicate that three months of yoga therapy can make a significant reduction in the pain related functional disabilities in the subjects. Difficulty in forward flexion is one of the most common complications in the people with DLDD. The improvement in the RLF shows the improvement in the strength and elasticity of the vertebral disc and supporting muscle groups of spinal cord

and also indicates improvement in the muscle tone in the concerned area.

Based on the observations during the yoga therapy application, it is found that above explained Asanas strengthened the supporting muscular groups and improved the elasticity and mobility of the spine. The strategic and systematic sequenced method of the Asanas application improved the elasticity and muscle tone of lateral, peripheral and extrinsic and intrinsic back muscles. The radical

improvements in the parameter RLF and P&DQ illustrate the above explained observation [10,11].

Practice of Yoga provides muscular resistance by giving isotonic and isometric contractions in the supporting muscle groups of low back region. Specific Asanas capable of providing vacuum pressure in the lumbar disc area thereby enhancing nutrients supply and the osmosis mechanism in the concerned area, were applied in the practice protocol [10].

Asanas like Tadasana, Ardha Chandrasana, and Trikonasana series etc helped to improve the kinesthetic sense of the body and lateral extension of the spine and stretching of the peripheral muscles in the subjects. Paschimotanasana and Purvottanasana gave the compressed-decompressed impact on the lumbar vertebral disc. The same benefit can be observed in the Pavanamuktasana, Bhujangasana, Salabhasana, Dhanurasana and Marjaryasana also. Similarly asanas like Ustrasana, Pavanamuktasana, Dhanurasana etc improved the trunk coordination and improved the muscular resistance in the concerned area.

Pranayama regulates the sympathetic and parasympathetic mechanism and purifies the body. The meditation and relaxation facilitates a relaxed state of mind and enhances the healing process. The practice of pranayama followed by meditation after the practice of Asana was an ideal sequence. The practice of asana

predominantly stimulates the sympathetic activity in the body and pranayama & meditation stimulates the parasympathetic system that ultimately produces more alpha waves (α waves) significant to the regenerative mechanism in the body [12,13].

Therefore, the combined application of Asana, Pranayama, Meditation and Relaxation could regulate the physical, physiological and biochemical activities in our body to facilitate a strong immune system that prevents degenerative mechanisms in our body. The **potential results** of therapeutic application of Yoga gets realized only when it is administered collectively and in an appropriate sequence.

Conclusion

The data analysis in the present study clearly demonstrates that the three months of Yoga therapy application could reduce pain and functional disabilities caused by DLDD. Practice of Yoga can improve the strength and stability as well as the endurance of the spine. Based on the above explained evidence in the present study, it can be concluded that the three months of yoga therapy application improved the alleviated the complications of DLDD.

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