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Original Research Article

Effect of physical therapy on posture and quality of life in subject with parkinson's disease

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ABSTRACT

Background: It is a chronic progressive degenerative disorder of extra pyramidal system caused by loss of dopaminergic neurons in the substantia nigra and characterized by tremors, rigidity, bradykinesia, and disturbance of gait and posture.

The neuropsychiatric symptoms of PD may include depression, psychosis, apathy, impulse control disorders that are linked with the poor quality of life due to the progression of disease. Despite, cognitive impairment in PD is of great significance in terms of therapeutic approaches in order to deal with motor deficits of disorder. Multiple studies have revealed that exercise has been proven to be effective for the maintenance of health and well-being in Parkinson's. More importantly it is shown to play a significant role in addressing secondary prevention based on strength, flexibility, functional independence as well as gait and balance respectively.

Purpose of Study: To evaluate the effect of physical therapy on posture and quality of life in subject with Parkinson's disease

Materials and Methods: Source of Data: Radha multispecialist Hospital, Shreeji Hospital, Parul Shevashram, Venus. Sampling Method: Convenience, sampling Sample Size: 30 subject were included (15 in) each groups Selection of Sample: convenient Study Design: experimental Study Duration: 30 min/day/7 week

Procedure: Post intervention assessment will be done by body posture questionnaire and SF-36, for posture and quality of life assessment in 30 subjects meeting inclusion and exclusion criteria dividing in to two group by convenience. Group A Group B

Inclusion Criteria: (1) Patient with 50 to 75 years of age (2) Participants patient diagnosed with Parkinson's diseases (3) Both gender are included (4) The participants were at stage 3 of Parkinson's disease, according the Hoehn and Yahr scale.

Exclusion Criteria: (1) The examined patients did not have other coexisting neurodegenerative. (2) Mentally challenged (3) Orthopedic deformity.

Out Come Measure: (1) Short form health survey. (2) Body posture questionnaire.

Result : This study included 30 patient 18 male and 12 female giving a sex ratio. Mean age of participant was 62 year. There were 15 patients in control group and 15 patients in experimental group. All patients completed treatment and evaluated at baseline and at the end of study. Mean value of sf-36 was 50.59 and 52.59 for experimental and control group respectively. These means later increase to 74.90 and 59.00 respectively with p value 0.001. Mean value of body posture questionnaire was 47.27 and 50.07 for experimental and control group respectively. These mean later increase to 72.47 and 59 respectively with p value 0.001 Statistically significant change was present for posture and quality of life with p<0.001 for both group.

Conclusion: The obtained results revealed that the influence of applied program had a positive influence on posture and quality of life in people with Parkinson's disease. When functional movement is applied on a regular basis, improvement of quality of life and everyday life activities can be noticed.

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1. Introduction

Parkinson disease (PD) is a motor disease with an unknown etiology occurs due to the degeneration of neurons and receptors, subsequently lacking the dopamine. It was listed as the 2nd most wide spread neurological disorder, estimated to affect 6.5 million people that is expected to double in next 10-20 years. It was found that in 2015, men are 50% more likely to develop PD than women whereas the overall risk for women appears to increase with age. The neuropsychiatric symptoms of PD may include depression, psychosis, apathy, impulse control disorders that are linked with the poor quality of life due to the progression of disease. Despite, cognitive impairment in PD is of great significance in terms of therapeutic approaches in order to deal with motor deficits of disorder. Multiple studies have revealed that exercise has been proven to be effective for the maintenance of health and well-being in Parkinson's. More importantly it is shown to play a significant role in addressing secondary prevention based on strength, flexibility, functional independence as well as gait and balance respectively. For PD, exercises based on neurology protection that typically lies on endurance and motor learning principles approaches that are found to be effective in early stages of the disease for the prevention of adverse consequences. However, management of PD is more likely to be effective if an individual diagnose it early in the development of disease. For this reason, an early identification is crucial in Parkinson's. However, limited evidence is available to determine the association of posture, cognition and fall risks in PD in-context to the anti-Parkinsonism medications that control the disease manifestation.

Number of studies demonstrated that people with disease that are subtle and pronounced that may leads to painful positions, postural instability and recurrent falling. Despite of the consequences of falling still there is a lacking in identification in risk of fall prediction. The pharmacological management of PD consisted of Levodopa (L-POPA), a dopamine replacement therapy introduced in 1960's that is the most effective drug till date. It is best at controlling the symptoms of the condition that particularly slower the movements and stiff, rigid body parts. However, due to its long term usage it has lost the efficacy and leads to the severe. According to NICE guidelines patients of PD should be quickly referred to neurologist where they may prescribe Dopamine agonists to younger patients in order to avoid Levodopa induced motor complications.

On the other hand, physiotherapy has long term effects in dealing the issues like muscular weakness, gait impairment and falling frequently. According to the recent studies, 4 weeks of gait training showed significant impact that may last for 3 to 12 months. Moreover, programs of sustained

training may help in maintaining strength and posture as well as reduced the depression among PD patients. However studies based on modified therapies and psychological treatment is still unavailable. It has been evident that risk of fall may be decreased with exercises targeting the potential factors. Furthermore, resisted and balance training is found to be effective in reducing anxiety and thus improves the QOL. Therefore, this systemic review aims to provide an insight about the physiotherapy treatments effective in reducing risk of fall, improving posture and QOL in PD to identify the gap in therapeutic management of disease.¹

Core areas of motor impairment in PD, such as the Inability to initiate movement, difficulties with balance and gait control, falls, and deficits in the pacing of rhythmic movements. The patients did not receive any other physical therapy intervention during the course of the study.²

Physical therapy as described by world physiotherapy is a health care profession concerned with human function and movement and maximizing physical potential. It is concerned with identifying and maximizing quality of life and movement potential within the spheres of promotion, prevention, treatment/intervention and rehabilitation. It uses physical approaches to promote, maintain and restore physical, psychological and social well-being, taking into account variations in health status. It is science-based, committed to extending, applying, evaluating and reviewing the evidence that underpins and informs its practice and delivery. The exercise of clinical judgment and informed interpretation Examples of definitions of physiotherapy from around the world indicate that there is a consensus that 'movement' is the core expertise. Physical Therapists (PTs) work within a wide variety of health settings to improve a broad range of physical problems associated with different 'systems' of the body. In particular they treat neuromuscular (brain and nervous system), musculoskeletal, cardiovascular and respiratory systems (heart and lungs and associated physiology) .physical therapy work autonomously, often as a member of a team with other health or social care professionals. Physiotherapy practice is characterized by reflective behavior and systematic clinical reasoning, both contributing to and underpinning a problem-solving approach to patient-centric care.

People are often referred for physical therapy by doctors or other health and social care professionals. Increasingly, as a result of changes in health care, people are referring themselves directly to physical therapy (first-line access) without previously seeing any other health care professional. Trends in Canada and Australia, for example, are even exploring the role of the physical therapist within the triage system of emergency departments³

Posture is defined as the attitude assumed by the body either with support during the course of muscular activity, or as a result of the coordinated action performed by a group

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of muscles working to maintain the stability. There are two types⁴

Static posture is how you hold yourself when you are not moving, like when you are sitting, standing, or sleeping. Body segments are aligned and maintained in fixed positions. This is usually achieved by co-ordination and interaction of various muscle groups which are working statically to counteract gravity and other forces.⁵

Dynamic posture is how you hold yourself when you are moving, like when you are walking, running, or bending over to pick up something. It is usually required to form an efficient basis for movement. Muscles and non-contractile structures have to work to adapt to changing circumstances⁶

1.1. Some of the examples of faulty posture can be as follow

Lordotic posture- Lordosis refers to the normal inward

1. Curvature of the spine. When this curve is exaggerated it is usually referred to as hyperlordosis. The pelvis is usually tilted anteriorly.
2. Sway back posture- In this type of posture, there is forward head, hyper-extension of the cervical spine, flexion of the thoracic spine, lumbar spine extension, posterior tilt of the pelvis, hip and knee hyper-extension and ankle slightly plantar flexed.
3. Flat back posture- In this type of posture, there is forward head, extension of the cervical spine, extension of the thoracic spine, loss of lumbar lordosis and posterior pelvic tilt.
4. Forward head posture - Describes the shift of the head forward with the chin poking out. It is caused by increased flexion of the lower cervical spine and upper thoracic spine with increased extension of the upper cervical spine and extension of the occipital on C1.
5. Scoliosis - A deviation of the normal vertical line of the spine, consisting of a lateral curvature and rotation of the vertebrae. Scoliosis is considered when there is at least 10° of spinal angulations on the posterior-anterior radiograph associated with vertebral rotation. This is a three dimensional C or S shaped sideways curve of the spine.
6. Kyphosis - An increased convex curve observed in the thoracic or sacral regions of the spine. Physical, mental and social. In the field of medicine, researchers and physicians have often used health-related quality of life concept, which specifically focuses on the impact of an illness and/or treatment on patient's perception of their status of health and on subjective well-being or satisfaction with life. We have described the Quality of Life of post-stroke patients and their caregivers in our first report, Quality of Life in Multiple Sclerosis and QOL in Alzheimer Disease⁷

Quality of Life (QOL) is a multi-dimensional construct, which consists of at least three broad domains: physical, mental and social. In the field of medicine, researchers and physicians have often used health-related quality of life concept, which specifically focuses on the impact of an illness and/or treatment on patients' perception of their status of health and on subjective well-being or satisfaction with life. Parkinson's Disease (PD) can cause a variety of symptoms. Early in the course of the disease, the most obvious symptoms are movement-related, including shaking, rigidity, slowness of movement and difficulty with walking and gait. Later, cognitive and behavioral problems may arise, with dementia commonly occurring in the advanced stages of the disease. Other symptoms including sleep and emotional problems, depression, difficulties in coordination and speech, severe fatigue, problems with balance and pain will have an impact on the patient's QOL. We must also take into account complications caused by treatment with levodopa, like dyskinesias, dystonias, and fluctuations. QOL measures are suitable as well for an outcome measure of a new treatment such as rehabilitation. Subjective factors in QOL in PD patients include perception of symptoms, level of fitness, self-image, satisfaction with family life, work, the economic situation, the interaction with other people, social support, and life in general. To the objective factors, we should include the clinical picture of disease, social status, social and living conditions and the number and intensity of social contacts. The scales used to assess the QOL in PD include either subjective or objective indicators, or both. The questionnaire may be completed by the patient in person or by telephone interview, family members, or close persons, by the health professionals. The most desirable and reliable is the assessment by the patient himself, especially when the subjects of measurement are subjective aspects of QOL. QOL scales for patients with PD could be divided into universal (general - generic) and Specific for the disease.⁸

The postural deviations associated with the changes in the habits of young people have increased over the last decades. Investigating the subject by way of a self-perception questionnaire allows one to understand the level of awareness the individual has concerning his/her postural habits. Concerning to the validation of content, the questionnaire presented a total coefficient of 0.28 and 72% concordance was observed amongst the reviewers. The interclass correlation coefficient (test-retest) indicated acceptable reproducibility values ($R = 0.66, 0.74$ and 0.59 ; $p < 0.001$), with a decrease in the object-carrying dimension ($R = 0.32$; $p = 0.04$). The questionnaire was considered suitable, quick and easy to fill in. The internal consistency presented a value of 0.80. The questionnaire on body awareness of postural habits in young people is a valid instrument with good repeatability and reliability, its use can be recommended with teenagers showing the same profile as

those used in this study.

2. Materials and Methods

2.1. Source of data

1. Radha Multispecialist Hospital
2. Shreeji Hospital
3. Parul Shevashram
4. Venus

2.2. Inclusion criteria

1. Patient with 50 to 75 years of age
2. Participants patient diagnosed with Parkinson's diseases
3. Both gender are included
4. The participants were at stage 3 of Parkinson's disease, according the Hoehn and Yahr scale.

2.3. Exclusion criteria

1. The examined patients did not have other coexisting neurodegenerative.
2. Mentally challenged
3. Orthopedic deformity

2.4. Method of collection of data

1. Sampling method: Convenience sampling
2. Sample size: 30 subject were included (15 in) each groups
3. Selection of sample: Convenient study
4. Study design: experimental
5. Intervention duration: 30 min/day/7week

2.5. Materials used

1. Pen
2. Pencil
3. Rubber
4. Data collection sheet
5. Participants' information
6. Consent form
7. Pillow
8. Plinth

2.6. Outcome measure

1. Short form health survey
2. Body posture questionnaire

2.7. Study flow chart

3. Procedure

The study sample consist of 30 subjects having a Parkinson diseases. The subjects in the study were inclusion and

exclusion criteria, after this demographic data and other relevant information were obtained from the subjects along with informed consent. The study was conducted with the prior permission of the hospital and peoples themselves, and after approval of the permission, the study was conducted in the allotted time. Detail instruction of the study regarding the benefits, aim, objective dangers and purposes of study was explained to them clearly.

Subject was assessed one by using SF 36, body posture questionnaire. All the participants were evaluated with the, SF 36, body posture questionnaire.

Subjects who met the inclusion criteria were informed about the study and a written consent was taken subjects were randomly allocated and assigned to either two group with 30 subjects in each Group respectively.

1. Group A
2. Group B

3.1. Sequence of therapeutic exercise for both the groups

Subjects were divided into two groups: group A and group B In order to determine the exact clinical conditions of patients, body posture questionnaire were applied. The level of quality of life was assessed by means of the scale SF 36(quality of life in Parkinson's disease questionnaire) Subjects from the 1 group A participated in 60 minutes of functional movement rehabilitation exercises twice a week. Physiotherapeutic exercises were carried as task training, in sit to stand positions. Turning around and rolling over on a mattress, getting up from a sitting position, initiating motion in a standing position, walking with a loud counting, turning around in a standing position, fastening buttons, catching an of object, and object manipulation. Applied exercises were functionally justified and help in coping with everyday life. Furthermore, participants were provided with a set of daily exercises to be performed individually at home. They took 30 min to perform each day. The patients in the group B, chosen by the criterion of the age, did not participate in the rehabilitation sessions. In order to evaluate the endurances of the applied exercises on the physical fitness of the subjects, assessment of clinical symptoms was conducted prior to and after the intervention period, which all together lasted for 7 weeks.

3.2. Exercise protocol

The subjects in the study were included based on the inclusion criteria.

All exercise was first demonstrated by the therapist.

After that the collected information or data was used for further analysis of study and to interpret the outcome of the study.⁹

3.3. Statistical analysis

3.3.1. Statistical method

Descriptive statistics of frequency and percentage were used to analyze and interpret the results.

The data was analyzed as three sections demographic, SF-36 and Body posture questionnaire

3.3.2. Statistical software

The statistical software namely SPSS .20 were used for analysis of data and Microsoft word and excel have been used to generate graphs, tables, etc.

3.3.3. Statistical test

Wilcoxon test is used for between group comparison and mannwhitny test is used for Within group comparison with use of calculation of values obtained as data during study.

3.4. Group A

Table 1:

Exercise	Repetitions
Ankle toe movement	1 set of 10 repetitions
Upper limb ROM exercise	1 set of 10 repetitions
Lower limb ROM exercise	1 set of 10 repetitions
Reach out activity	1 set of 10 repetitions
Sit to stand activity	1 set of 10 repetitions
Fastening buttons	1 set of 3 repetitions
Mat activity	
Walking	
Object manipulation	

3.5. Group B

Home based exercise

Table 2:

Exercise	Repetitions
Straight leg raising	1 set of 10 repetitions
Ankle toe movement	1 set of 10 repetitions
Static glutei	1 set of 10 repetitions
Static quadriceps	1 set of 10 repetitions
Knee bending	1 set of 10 repetitions
Mobility exercise	1 set of 10 repetition

Table 3: Gender group distribution

Gender	Female	Male
Number of Subjects	12	18

Table 4: Age group distribution

Age	50-55	56-60	61-65	66-70	71-75
Number of Subject	7	9	7	7	0

Table 5: SF-36 Group A

	Pre	Post
Mean	50.59	74.90
SD	6.04362	7.47010
Z	3.408b	3.408b
P	0.001	0.001

Table 6: SF-36 Group B

	Pre	Post
Mean	52.5940	0.5900
SD	5.80640	0.6302
Z	3.408b	3.408b
P	0.001	0.001

Table 7: Body posture questionnaire group A

	Pre	Post
Mean	0.4727	0.7247
SD	0.06787	64.7953
Z	3.416b	3.416b
P	0.001	0.001

Table 8: Body posture questionnaire group B

	Pre	Post
Mean	0.5007	0.5900
SD	0.06408	0.6302
Z	3.413b	3.413b
P	0.001	0.001

Table 9: Comparison of both Group SF-36

	Difference SF-36 Group A	Difference SF-36 Group B
Mean	24.3153	12.2013
SD	7.91928	5.10853
Z	4.323	4.323
P	0.000	0.000

Table 10: Comparison of both group body posture

	Difference BP Group A	Difference BP Group B
Mean	0.2520	0.0893
SD	0.09190	0.04832
Z	4.321	4.321
P	0.000	0.000

4. Result

This study included 30 patient 18 male and 12 female giving a sex ratio. Mean age of participant was 62 year. There were 15 subjects in group B and 15 subjects in group A. All patients completed treatment and evaluated at baseline and at the end of study. Mean value of sf-36 was 50.59 and 52.59 for group A and group B respectively. These means later increase to 74.90 and 59.00 respectively with p value 0.001. Mean value of body posture questionnaire was 47.27 and 50.07 for group A and group B respectively. These mean later increase to 72.47 and 59 respectively with p value 0.001. Statistically significant change was present for posture and quality of life with $p < 0.001$ for both group.

5. Discussion

The obtained results confirm the alternative hypothesis of significant effect of physical therapy Effect of physical therapy on posture and quality of life in subject with Parkinson's disease Significant differences were observed in the 1 group A with regard to the results of all conducted tests between before and after the intervention period. In the group B, no significant differences were noted.

Referring to the data which may be found in the literature, this study presented a different approach to physical fitness in which the emphasis was laid on the activities performed in everyday life. The rehabilitation program and applied tests were oriented towards this specific aim. The results showed a high response of the subjects to the applied physical exercises. Furthermore, evaluation of the quality of life revealed its improvement. In the case of elderly people, Physical activity prevents aging processes. This is also the case for people suffering from the Parkinson's disease, although physical activity should be oriented towards improvement of fitness in everyday life activities through functional movement rehabilitation, patients be

Able to lead their normal lives longer. When patients start rehabilitation at an early stage of the disease, there is a high probability to slow down its progress. The following conclusions can be drawn based on the findings of this study:

1. Due to regular, physical therapy in the groupA , in comparison with the group B, showed improvement of physical fitness and a lack of escalation of PD's symptoms.
2. When physical therapy is applied on a regular basis, improvement of quality of life and everyday life activities can be noticed.

6. Conclusion

The obtained results revealed that the influence of applied program have a positive influence on posture and quality

of life in people with Parkinson's disease. When physical therapy is applied on a regular basis, improvement of quality of life and everyday life activities can be noticed.

7. Summary

This study was carried out to know the effect of physical therapy on posture and QOL in Parkinson's disease. This consisted of 30 subjects including male and female between 50-75 years. Prior to the participation in this study, After considering the inclusion and exclusion criteria the subjects were selected. This study concluded that the obtained results revealed that the influence of applied physical therapy program had a positive influence on posture and quality of life in people with Parkinson's disease.

7.1. Limitations of study

1. The study size taken for the study was small
2. Limited numbers of factors were selected
3. Long term follow-up was not taken

7.2. Further recommendation

1. The study can be further continuing with a larger population
2. The study can be further continuing by using a different age group
3. The study can be further continuing with other stage of horn-yard classification
4. The study can be further continued with other disease

8. Source of Funding

None.

9. Conflict of Interest

None.

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