Content available at: https://www.ipinnovative.com/open-access-journals

IP Indian Journal of Clinical and Experimental Dermatology

Journal homepage: https://www.ipinnovative.com/journals/IJCED

Original Research Article

Effect of exercise therapy in multi disiciplainary approach of parkinson disorder: A short review

Mohammad Sheebakauser[1,*], Satish Vandanapu[2], Ali Irani[3], Priyadarshini Kodurupaka[4], Mansi Bhartiya[5], V Sharmila Devi[6]

[1]*Apex University, Jaipur, Rajasthan, India*
[2]*Dept. of Neurosurgery, Asram Medical College, Eluru, Andhra Pradesh, India*
[3]*Dept. of Physiotherapy and Sports Medicine, Nanavati Super Specialty Hospital, Mumbai, Maharashtra, India*
[4]*Dept. of Physiology, Surabhi Institute of Medical Sciences, Mundrai, Telangana, India*
[5]*Dept. of Physiotherapy, Sunandan Divatia School of Science University, Mumbai, Maharashtra, India*
[6]*Pondicherry Cue Sports Association, Puducherry, India*

ARTICLE INFO

Article history:
Received 24-09-2020
Accepted 21-10-2020
Available online 30-11-2020

Keywords:
Excercise therapy
Parkinson
Multidisciplinary

ABSTRACT

Parkinson being an progressive disorder has drew many challenges in physical therapy management, and having wide variety of signs and symptoms it has always proven as challenging to the therapists, however in last five years there was extremely good progress in management of Parkinson disease. But due to its heterogeneity signs from individual to individual, hardly literature has been proven useful for practice. In multidisciplinary team approach exercise therapy has drastically proven to support and maintain quality of life in daily activities.
This review provides the importance of exercise therapy in Parkinson in multi disciplinary approach.

1. Introduction

The multidisciplinary practice is promising yet inadequately contemplated restorative method in Parkinson's Disease (PD). Implementation in clinical practice and future examination needs to consider with accompanying contemplations: patients, evaluation and result measures, remedial intercessions, interdisciplinary execution, and development.

Despite the very fact that multidisciplinary care is progressively suggested for PD,[1,2] there's no standard proof-based layout the way to map out this. A good scope of experts could also be included. Without a doubt, quite 20 controls may have expected an incentive for PD care,[3] alongside with physiotherapists neurologists, neurosurgeons, medical caretakers, speech therapists, discourse language specialists, dietitians, social laborers, sexologists, and neuropsychologists, it's obscure which mixes is right, or what the relative commitment is for each pro inside a gaggle. Brooding about the heterogeneous clinical introduction among PD patients and their various individual needs, an independently customized approach appears to be best over a one-size-fits-all methodology, yet there's no proof to assist this supposition. Partnered human services can supplement standard clinical administration, in any event, for manifestations that are to an excellent extent impervious to pharmacotherapy or procedure. Treatment objectives and hidden working instrument of unified medicinal services vary from standard clinical treatment.[4] As lately, a couple of united well-being disciplines became more proof-based. The proof evaluation is most elevated for physiotherapy[5] and discourse language treatment,[6] trailed by word related treatment. Different orders are assessed hardly and stay hooked into training based proof.

There is proof in writing to help the utilization of physical therapy administrations in Parkinson's ailment,

* *Corresponding author.*
E-mail address: sheebaishaq.doc@gmail.com (M. Sheebakauser).

https://doi.org/10.18231/j.ijn.2020.052

Parkinson's disease-related signs that don't generally respond to the developed pharmacological drugs, yet also to soothe impedance, decay inadequacy, and overhaul individual fulfillment. In any case, there are a lot of examinations on the ampleness of such treatment. This article discusses the approaches of importance of physiotherapy after clinical intervention along the multidisciplinary treatment of Parkinson's.

Parkinson's is an unremitting, progressive degenerative disorder as one of the challenging diseases of clinical. The disease impacts around seven out of every 1000 individuals beyond 40 years old three out of every hundred individuals and its recurrence increases dramatically with age.[7,8] Regardless of the way the path indication of the disease is the loss of the dopaminergic neurons in the principles compact of the substantia nigra and has the opportunity to progress, logically including structures of the cerebrum with different limits.[9–13]

1.1. Objectives of multidisiciplainary set up

Though a segment of these insufficiencies has been vanquished, there is a non standardization of the therapeutic approach that not simply limits one's ability. A past effective review of the enduring composition on the suitability of rehabilitative medicines in PD[14,15] discovered examinations including exercise-based recovery, speech preparing,[16] and multidisciplinary,[17] everything aside from one displaying improvement in at any rate outcome measure. The makers contemplated that such interventions show up beneficial.

A later review[18,19] shown the evidence for a multidisciplinary approach with effective exercise therapy rehabilitative program for PD and discovered that patients has shown considerable improvement in the quality of life in their daily activities we will endeavor to discuss the current confirmation of importance .

Considering the speculation supporting the multidisciplinary approach, a plan for standardization, mulling over the better assessment of results, ought to think about the going with examinations:

1. Parkinson's patients
2. Assessment
3. Exercise therapy

According to WHO's a multidisciplinary approach includes Overall Classification of Functioning, Disability, and Health (ICF) model.[20–23] A couple of models are driving limits to activities of step by step living, and evaluation for significant brain stimulation. Upon reviewing the current examinations of multidisciplinary intercessions in PD again,[24,25] it becomes clear that open-minded decisions excluded a requirement for an evident need, and a goal of the multidisciplinary intercession was not described, other than therefore measure, typically prosperity related individual fulfillment measure. The nonattendance of such a declared goal in any of the dispersed assessments renders interpretation of their results inconvenient and may underpin a part of the reasonable legitimate irregularities and abnormalities.

1.2. Assessment

Clinical signs of Parkinson generally can be distinguished as motor symptoms and, Non-motor symptoms, but hardly both are seen in same patient. the mixed symptoms of PD

like hypomimia, dysarthria, dysphagia, arm-swing, festinations, freezing, getting up from sitting posture, difficulty in moving in the bed, micrographia, neatness conciousness, glabellar reflex, blepharospam or dsystonia, camptocormia which as reffered motor symptoms.[26]

1.3. Non-Motorsymptoms

Depressions, dementia, anxiety, anhedonia, apathy, psychosis (hallucination) cognitive dysfunction, panic attacks, confusion, sleep disorders, bowel bladder dysfunction, drooling of saliva, erectile dysfunction, smell and visual disturbances, hand eye movements.

1.4. Measuring scales of Parkinson

Generally due to its heterogeneity nature of signs Parkinson is rated with help of many scales, few are mentioned below

1.5. Physical rehabilitation

The benefits of activity-based recovery interventions in PD have been all around chronicled in the current composing.[27–32] Because of the wide collection of modalities that have been mulled over and the little size of the assessments, the available verification is consistent, yet neither strong nor particularly helpful paying little mind to its clear consistency. For example, the 'Huge' non-nosy treatment show has been found to improve part III (motor score) of the Unified Parkinson's Disease Rating Scale (UPDRS).[33,34] while equivalent social events getting a Nordic walking framework, or train-ing in a home exercise program didn't experience any upgrades.[35] Of course, separate examinations of Nordic walking have exhibited improved advance speed in PD patients[36] and of treadmill walking have shown upgrades in target extents of adjustment,[37,38] while studies of privately arranged exercise programs have exhibited a decline in a repeat of close falls[39] and PD-related fall chance.[40] As demonstrated by the UK National Clinical Guideline for diagnosis and the leading body of PD, expected concentrations for dynamic recovery may fuse any of the going with:[11]

1. Gait training ,tilting forward correction
2. improved sway limit

Table 1:

MDS-owned rating scales	The European Parkinson's Disease Association (EPDA)
Global assessment scale for Wilson's disease	Unified Parkinson's disease rating scale (UPDRS)
MDS-unified Parkinson's disease rating scale (MDS-UPDRS)	Schwab and England activities of daily living (ADL) scale
Modified bradykinesia rating scale	PDQ-39
Nonmotor symptoms scale (NMSS)	PD NMS questionnaire
Nonmotor symptoms questionnaire (NMSQ)	NMS survey
PKAN disease rating scale (PKAN-DRS)	Parkinson's disease composite scale
Quality of life essential tremor questionnaire	King's PD pain scale
Rating scale for psychogenic movement disorders	Parkinson's disease sleep scale-PDSS-2
Rush dyskinesia rating scale	Lindop Parkinson's assessment scale
Rush video-based tic rating scale	Short-form 36 (SF-36)
UFMG Sydenham's Chorea Rating scale (USCRS)	Sickness impact profile (SIP)
Unified dyskinesia rating scale (UDysRS)	Mini-mental state examination (MMSE)
Unified dystonia rating scale (UDRS)	Montreal cognitive assessment scale (MoCa)
Unified multiple system atrophy rating scale (UMSARS)	Caregiver strain index (CSI)

Note: Based on the European Parkinson's disease Association[27] and International Parkinson and Movement Disorder Society[28] websites.

1.6. Exercise therapies involved

1.6.1. Strength training

Strength training or resistance enhancement is having great impact on non motor signs, basic principle involved is REPEATION and relax, which makes the disuse muscle to gain strength by activating the motor unit of muscle, but in few studies like saltychev et al[41] shown no evidence for importance of strength and resistance training.

Aerobic exercises quadriceps bicycle can also be done with relieves lot of oxidative stress and stabilize calcium homeostasis in brain and initiate synaptogenesis in brain.

With rest time intervals of 2mintues followed by 10 minutes of workout has been shown beneficial results in elderly patients of PD.

Multimodal exercise therapy is useful for cognitive training and function balance, it is actually the combination of many activities.

This can be implemented individually or in Group approach also, groups are generally divided based on similary demand of patients and shall be effective and encourage each other.

1.6.2. TENS (Transcutaneous Elecrical Stimulation)

Tens is used for treating TREMORS like deep brain stimulation is utilized for treating tremors with an 200 microns pulse at 250hz frequency.Many studies has shown that electrotherapy is very useful for treating.[42] xu and coworkers has done an lot of work showing[43] inhibitory effect on propriospinal neurons which reduces the tremors.

1.7. Hydrotherapy

Hydrotherapy or aquatic therapy is very useful for gait rehabilitation of patients ,water acts as natural resistant in improving resistance as it reduces the rigidity of the muscles.[44] Ai Chi method, Hallwick method ,Bad Ragaz method have been useful too.[45]

1.8. Exergames

Combination of exercises along with video gaming is called as EXERGAMES, which uses commercial devices such as Nintendo Wii Fit System, X-box 360 degrees etc are used in this as softwares for virtual reality.[46]

Virtual games or reality has now been developed which are showing good results in improving functional independence of the patients, it also have been a great impact on the hand and eye movement.[47] However the evidences are very low.[46]

An virtual reality or exergame developed by Gomez Jordana and co[48] which had a combination of different spatial and temporal information could create different step lengths, which gave an great impact in gait training and balance training with decreased risk of falling.

1.9. Cellphones or Tablets

Smart phones with developed apps are now trending a new development in physical therapy,however the efficacy is in doubt[49] and are partial published .Apps on swallowing, voice mood, speech, memory shown on UK page of Parkinson.[50]

2. Discussion

A basic explanation of the multidisciplinary model is interdisciplinary execution.[51,52] The avocation is that correspondence between the various controls will synergistically influence the consequence of the intercession. One may along these lines battle, with reason, that thoughts that support an association between disciplines, for instance, the physical region of the various disciplines, receptiveness, straightforwardness of correspondence, and arranging versatility, will furthermore improve the likelihood of a positive outcome. Gathering studies of cases are the standard of care for inpatient

reclamation undertakings and there is no inspiration to not get an equivalent procedure in the outpatient setting.

Thought of patients and care associates, or family members in the multidisciplinary meetings will also ensure future execution of proposition past discharge from the program.

Among all the ways available portable setting is well encouraged for PD patients. A huge piece of the current composing for the issue needs follow-up. Long stretch preferences of the remedial controls referenced above. As such, it is reasonable to ask, for example, whether or not early interest in a sorted out exercise program will improve a patient's expectation to the extent fall-related opposing sickness results. Individual will have the choice to better handle the balance troubles of front line PD. It has been speculated, taking everything into account, that there may be physiological changes realized by training that may have long stretch effects in the pathophysiological structures shrouded the signs of PD.[53] It would be as such alluring that future studies of multidisciplinary interventions in PD fuse a type of both short-and long stretch follow-up assessments.

3. Conclusion

In summary, effect of exercise therapy in the multidisciplinary treatment of PD remains beneficial and focused at this point, similar to a necessity for extra investigation, yet moreover to the extent improving the lives of PD patients and their families. In evidence-based prescription, new assessments must be grasped with considerations discussed in this article and using best standards that are much needed.

4. Source of Funding

No financial support was received for the work within this manuscript.

5. Conflict of Interest

The authors declare they have no conflict of interest.

References

1. Bloem BR, Laar TV, Keus SHJ, Beer HD, Poot E, Buskens E, et al. Multidisciplinaire richtlijn Ziekte van Parkinson [Multidisciplinary guideline for Parkinson's disease]. *Alphen aan de Rijn*. 2010;.
2. Stewart DA. NICE guideline for Parkinson's disease. *Age Ageing*. 2007;36(3):240–2. doi:10.1093/ageing/afm040.
3. Keus SH, Munneke M, Nijkrake MJ, Kwakkel G, Bloem BR. Physical therapy in Parkinson's disease: Evolution and future challenges. *Mov Disord*. 2009;24(1):1–14. doi:10.1002/mds.22141.
4. van der Marck MA, Munneke M, Mulleners W, Hoogerwaard E, Borm G, Overeem S, et al. Integrated multidisciplinary care in Parkinson's disease: a non-randomised, controlled trial (IMPACT). *Lancet Neurol*. 2013;12(10):947–56. doi:10.1016/s1474-4422(13)70196-0.
5. van der Marck MA, Bloem BR, Borm GF, Overeem S, Munneke M, Guttman M, et al. Effectiveness of multidisciplinary care for Parkinson's disease: A randomized, controlled trial. *Mov Disord*. 2013;28(5):605–11. doi:10.1002/mds.25194.
6. van der Marck MA, Kalf JG, Sturkenboom IHWM, Nijkrake MJ, Munneke M, Bloem BR, et al. Multidisciplinary care for patients with Parkinson's disease. *Parkinsonism Related Disord*. 2009;15(3):S219–23. doi:10.1016/s1353-8020(09)70819-3.
7. Rijk MCD. Prevalence of parkinsonism and Parkinson's disease in Europe: the Europarkinson Collaborative Study. European Community Concerted Action on the Epidemiology of Parkinson's disease. *Neurosurg Psychiatr*. 1997;62(1):10–5.
8. Bezard E, Dovero S, Prunier C, Ravenscroft P, Chalon S, Guilloteau D, et al. Relationship between the Appearance of Symptoms and the Level of Nigrostriatal Degeneration in a Progressive 1-Methyl-4-Phenyl-1,2,3,6-Tetrahydropyridine-Lesioned Macaque Model of Parkinson's Disease. *J Neurosci*. 2001;21(17):6853–61. doi:10.1523/jneurosci.21-17-06853.2001.
9. Wirdefeldt K, Hans-Olov A, Cole P, Trichopoulos D, Mandel J. Epidemiology and etiology of Parkinson's disease: a review of the evidence. *Eur J Epidemiol*. 2011;26(S1):1–58. doi:10.1007/s10654-011-9581-6.
10. Hughes AJ, Daniel SE, Kilford L, Lees AJ. Accuracy of clinical diagnosis of idiopathic Parkinson's disease: a clinico-pathological study of 100 cases. *J Neurol, Neurosurg Psychiatr*. 1992;55(3):181–4. doi:10.1136/jnnp.55.3.181.
11. Brasil. Brasil. Portaria nº 228, de 10 de maio de 2010. Protocolo Clínico e Diretrizes Terapêuticas - Doença De Parkinson. Brasília, DF: Ministério da Saúde; 2010. Available from: http://bvsms.saude.gov.br/bvs/saudelegis/sas/2010/prt0228_10_05_2010.html.
12. Reichmann H. Clinical Criteria for the Diagnosis of Parkinson's Disease. *Neurodegener Dis*. 2010;7:284–90.
13. Maass A, Reichmann H. Sleep and non-motor symptoms in Parkinson's disease. *J Neural Transmission*. 2013;120(4):565–9. doi:10.1007/s00702-013-0966-4.
14. Breen KC, Drutyte G. Non-motor symptoms of Parkinson's disease: the patient's perspective. *J Neural Transmission*. 2013;120(4):531–5. doi:10.1007/s00702-012-0928-2.
15. Dorsey ER, Constantinescu R, Thompson JP, Biglan KM, Holloway RG, Kieburtz K, et al. Projected number of people with Parkinson disease in the most populous nations, 2005 through 2030. *Neurol*. 2007;68(5):384–6. doi:10.1212/01.wnl.0000247740.47667.03.
16. Lana RC, Álvares LMRS, Nasciutti-Prudente C, Goulart FRP, Teixeira-Salmela LF, Cardoso FE, et al. Percepção da qualidade de vida de indivíduos com doença de parkinson através do PDQ-39. *Rev Bras de Fisioterapia*. 2007;11(5):397–402. doi:10.1590/s1413-35552007000500011.
17. Silva JAMG, Filho AVD, Faganello FR. Mensuração da qualidade de vida de indivíduos com a doença de Parkinson por meio do questionário PDQ-39. *Fisioter Mov* . 2011;24(1):141–6. doi:10.1590/s0103-51502011000100016.
18. Navarro-Peternella FM, Marcon SS. Qualidade de vida de indivíduos com Parkinson e sua relação com tempo de evolução e gravidade da doença. *Rev Latinoam Enferm*. 2012;20(2):384–91.
19. Grimes D, Gordon J, Snelgrove B, Lim-Carter I, Fon E, Martin W, et al. Canadian Guidelines on Parkinson's disease Introduction. *Can J Neurol Sci*. 2012;39(4):1–30.
20. Stewart DA. NICE guideline for Parkinson's disease. *Age Ageing*. 2007;36(3):240–2. doi:10.1093/ageing/afm040.
21. Post B, van der Eijk M, Munneke M, Bloem BR. Multidisciplinary care for Parkinson's disease: not if, but how! *Pract Neurol*. 2011;11(2):58–61. doi:10.1136/jnnp.2011.241604.
22. van der Marck MA, Kalf JG, Sturkenboom IHWM, Nijkrake MJ, Munneke M, Bloem BR. Multidisciplinary care for patients with Parkinson's disease. *Parkinsonism Relat Disord*. 2009;15:S219–23. doi:10.1016/s1353-8020(09)70819-3.
23. de Swart BJM, Willemse SC, Maassen BAM, Horstink MWIM. Improvement of voicing in patients with Parkinson's disease by speech therapy. *Neurol*. 2003;60(3):498–500. doi:10.1212/01.wnl.0000044480.95458.56.
24. Ramig LO. Intensive voice treatment (LSVT(R)) for patients with Parkinson's disease: a 2 year follow up. *J Neurol, Neurosurg Psychiatry*. 2001;71(4):493–8. doi:10.1136/jnnp.71.4.493.

25. Prizer LP, Browner N. The Integrative Care of Parkinson's Disease: A Systematic Review. *J Parkinson's Dis*. 2012;2(2):79–86. doi:10.3233/jpd-2012-12075.
26. Johnston M, Chu E. Does attendance at a multidisciplinary outpatient rehabilitation program for people with Parkinson's disease produce quantitative short term or long term improvements? A systematic review. *Neuro Rehabil*. 2010;26(4):375–83. doi:10.3233/nre-2010-0575.
27. Lawton MP, Brody EM. Assessment of Older People: Self-Maintaining and Instrumental Activities of Daily Living. *Gerontologist*. 1969;9(3 Part 1):179–86. doi:10.1093/geront/9.3_part_1.179.
28. Fox SH, Katzenschlager R, Lim SY. The Movement Disorder Society Evidence-Based Medicine Review Update: Treatments for the motor symptoms of Parkinson's disease. *Mov Disord*. 1995;26:2–41.
29. Trend P, Kaye J, Gage H, Owen C, Wade D. Short-term effectiveness of intensive multidisciplinary rehabilitation for people with Parkinson's disease and their carers. *Clin Rehabil*. 2002;16(7):717–25. doi:10.1191/0269215502cr545oa.
30. Shulman LM, Pretzer-Aboff I, Anderson KE, Stevenson R, Vaughan CG, Gruber-Baldini AL, et al. Subjective report versus objective measurement of activities of daily living in Parkinson's disease. *Mov Disord*. 2006;21(6):794–9. doi:10.1002/mds.20803.
31. Ramig LO, Countryman S, Thompson LL, Horii Y. Comparison of two forms of intensive speech treatment for Parkinson's disease. *J Speech Hear Res*. 2011;38(6):1232–51.
32. Fox CM, Ramig LO, Ciucci MR, Sapir S, Mcfarland DH, Farley BG. The science and practice of SVT/LOUD: neural. 33.plasticity-principled approach to treating individuals with Parkinson's disease and other neurological disorders. *Semin Speech Lang*. 2006;27(4):283–99.
33. plasticity-principled approach to treating individuals with Parkinson's disease and other neurological disorders. *Semin Speech Lang*. 2006;27(4):283–299.
34. Young C, Abercrombie M, Beattie A. How a specialist nurse helps patients undergoing deep brain stimulation. *Prof Nurse*. 2003;18(6):318–21.
35. Crabb L. Sleep disorders in Parkinson's disease: the nursing role. *Br J Nurs*. 2001;10(1):42–7. doi:10.12968/bjon.2001.10.1.5401.
36. Deane KHO, Jones D, Playford ED. Physiotherapy versus placebo or no intervention in Parkinson's disease. *Cochrane Database Syst Rev*. 2001;3:2817.
37. Keus SH, Bloem BR, Hendriks EJ, Bredero-Cohen AB, Munneke M.
38. Evidence-based analysis of physical therapy in Parkinson's disease with recommendations for practice and research. *Mov Disord*. 2007;22(4):451–60.
39. Dibble LE, Addison O, Papa E. The Effects of Exercise on Balance in Persons with Parkinson′s Disease: A Systematic Review Across the Disability Spectrum. *J Neurol Phys Ther*. 2009;33(1):14–26. doi:10.1097/npt.0b013e3181990fcc.
40. Fahn S, Elton RL. Unified Parkinson's Disease Rating Scale. In: S F, CD M, M G, DB C, editors. Recent Dev Parkinson's Dis. vol. 2. Macmillan Healthcare Information; 1987. p. 153–163.
41. Sharkawi AE. Swallowing and voice effects of Lee Silverman Voice Treatment (LSVT(R)): a pilot study. *J Neurol, Neurosurg Psychiatry*. 2002;72(1):31–6. doi:10.1136/jnnp.72.1.31.
42. Baumgartner CA, Sapir S, Ramig LO. Voice Quality Changes Following Phonatory-Respiratory Effort Treatment (LSVT®) Versus Respiratory Effort Treatment for Individuals with Parkinson Disease. *J Voice*. 2001;15(1):105–14. doi:10.1016/s0892-1997(01)00010-8.
43. Lowit A, Dobinson C, Timmins C, Howell P, Kröger B. The effectiveness of traditional methods and altered auditory feedback in improving speech rate and intelligibility in speakers with Parkinson's disease. *Int J Speech-Language Pathol*. 2010;12(5):426–36. doi:10.3109/17549507.2010.497559.
44. de Dreu MJ, van der Wilk ASD, Poppe E, Kwakkel G, van Wegen EEH. Rehabilitation, exercise therapy and music in patients with Parkinson's disease: a meta-analysis of the effects of music-based movement therapy on walking ability, balance and quality of life. *Parkinsonism Relat Dis*. 2012;18:S114–9. doi:10.1016/s1353-8020(11)70036-0.
45. Goodwin VA, Richards SH, Taylor RS, Taylor AH, Campbell JL. The effectiveness of exercise interventions for people with Parkinson's disease: A systematic review and meta-analysis. *Mov Disord*. 2008;23(5):631–40. doi:10.1002/mds.21922.
46. Umphred DA, Neurológica. Reabilitação Neurológica. Rio de Janeiro: Elsevier; 2009.
47. Hirsch MA, van Wegen EEH, Newman MA, Heyn PC. Exercise-induced increase in brain-derived neurotrophic factor in human Parkinson's disease: a systematic review and meta-analysis. *Transl Neurodegener*. 2018;7(1). doi:10.1186/s40035-018-0112-1.
48. Barbalho M, Monteiro EP, Costa RR. EYects of low-volume resistance training on muscle strength and functionality of people with Parkinson's disease. *Int J Exerc Sci*. 2019;12(3):567–80.
49. Chung CLH, Thilarajah S, Tan D. EYectiveness of resistence training on muscle strength and physical function in people with Parkinson's disease: A systematic review and meta-analysis. *Clini Rehabil*. 2016;30(1):11–23.
50. Saltychev M, Bärlund E, Paltamaa J, Katajapuu N, Laimi K. Progressive resistance training in Parkinson's disease: a systematic review and meta-analysis. *BMJ Open*. 2016;6(1):1–9. doi:10.1136/bmjopen-2015-008756.
51. Ramazzina I, Bernazzoli B, Costantino C. Systematic review on strength training in Parkinson's disease: an unsolved question. *Clin Interv Aging*. 2017;12:619–28. doi:10.2147/cia.s131903.
52. Uygur M, Bellumori M, Knight CA. Effects of a low-resistance, interval bicycling intervention in Parkinson's Disease. *Physiother Theory Pract*. 2017;33:897–904. doi:10.1080/09593985.2017.1359868.
53. Silva FCD, Iop R, Oliveira LCD. EYects of physical exercise programs on cognitive function in Parkinson's disease patients: A systematic review of randomized controlled trials of the last 10 years. *PLoS One*. 2018;13(2).

Author biography

Mohammad Sheebakauser, Resident

Satish Vandanapu, Consultant Neurosurgeon

Ali Irani, Professor and HOD

Priyadarshini Kodurupaka, Assistant Professor

Mansi Bhartiya, Assistant Professor

V Sharmila Devi, Chief Physiotherapist

Cite this article: Sheebakauser M, Vandanapu S, Irani A, Kodurupaka P, Bhartiya M, Devi VS. Effect of exercise therapy in multi disiciplainary approach of parkinson disorder: A short review. *IP Indian J Clin Exp Dermatol* 2020;6(4):267-271.