# Promoting Mental Wellbeing in Elderly with Parkinson's Disease: A Holistic Approach

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#### **Abstract**

*Background:* Parkinson's disease is distinguished by ailments such as shaking hands, difficulties with walking, instability, depressive disorders, anxiety, and diarrhea. PD Patients belonging to the middle class and below exhibited the greatest prevalence of Parkinson's disease, accounting for 40% of the cases. It is likely to be more common among those in the middle socioeconomic class.

*Aim:* The objective is to gather the existing empirical data regarding the influence on mental wellness in older adults afflicted by Parkinson's disease.

*Methods and Materials:* Data was collected from additional resources such as search engines and databases, specifically Scopus, PubMed Central, Google Scholar, ProQuest, and JSTOR were consulted.

**Results and Conclusions:** Furthermore, the complexity and severe negative consequences may differ, although the impacted persons are able to adapt to both the physical and non-physical symptoms. In order to improve the health and well-being of senior individuals affected by Parkinson's disease, it is important for mental health specialists, neurologists, healthcare workers, caregivers, and family members to collaborate as a group.

Keyword: Parkinson's Disease, therapies, Elderly, Psychological wellbeing, mental health.

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#### INTRODUCTION

Parkinson's disease (PD) is a long-term degenerative ailment of the nervous system that occurs due to the breakdown of the dopaminergic system in the nigrostriatal pathway. (Dauer & Przedborski, 2003) This syndrome is neurologically destructive and is defined by symptoms that affect motor function, including Bradykinesia, stiffness, tremors, and difficulty with balance while walking. It also causes a variety of non-motor difficulties,

such as memory problems, psychological disorders, pain, and numerous sensory issues.

Typically, this condition primarily impacts older persons at a rate of 1.9% and the elderly at a rate of 2.6%. as per the statistics of the Indian Council of Medical Research, (2020). According to the 2019 data, Parkinson's disease has impacted over 8.5 million individuals globally. The global incidence of the condition has increased twice over the past 25 years, resulting in over five million lifetime years adjusted for disability. (World Health Organization, 2022).

The prevalence of neurological illnesses has increased two times from 1990 to 2019 accounting for 1.8% of the overall burden of illnesses related to the brain. (ICMR – Press release, 2021) In addition to the well-known motor indicators such as tremors and stiffness, it is often presented with a diverse array of non-motor symptoms, including cognitive decline, anxiousness, depressive disorders, and sleep disturbances. (Aarsland *et al.*, 2023) These signs can greatly diminish one's quality of life and necessitate extensive management strategies that address both mental and physical well-being. (Baumbach *et al.*, 2015)

#### **METHODOLOGY**

The purpose of this article is to collect recent empirical data on the relationship between wellness and aging, specifically in relation to treatments. The various platforms and databases used were Google Scholar, Jstor, ProQuest, PubMed Central, and Scopus. It focused on various aspects related to Parkinson's patients, including psychological well-being, quality of life, routine tasks, memory loss, interaction with others, and peer support. This study utilized an aggregate of 33 papers. Duplicates were eliminated and articles were chosen based on their whole text and content. Articles that lack relevancy are eliminated. The studies deliberately incorporated the aforementioned themes and characteristics.

#### Mental Health of Parkinson's Patients

Mental health issues significantly contribute to the occurrence of physical ailments in older adults. Additionally, it results in impairment in individuals with Parkinson's disease. (Gallagher *et al.*, 2010) A significant proportion of individuals aged 60 and above experience the impact of the disorder. People who are diagnosed with the illness are susceptible to signs of despair and

nervousness upon receiving their diagnosis. (Yazd et al., 2023) The emphasis of the mental well-being of these patients is crucial. There is a relative lack of research on mental health in comparison to physiological health and mobility issues. Ageism may result from the perpetuation of agerelated misconceptions and negative stereotypes. (Cavanaugh & Blanchard-Fields, 2002)

When examining mental health concerns among the elderly, it is crucial to take into account several aspects such as socio-cultural background, race, ethnic background, gender, socio-economic status, sexual orientation, handicap status, and whether they live in a rural or urban location.

## Quality of Life

Mental well-being is a vital component of a high quality of life in patients with Parkinson's disease. Anxiety, feeling depressed, apathy, and diminished quality of life usually occur simultaneously and possess a reciprocal effect on one another. (Kuhlman *et al.*, 2016) Prompt detection of illness and effective control of motor indications greatly improve the patient's quality of life. The management of symptoms is accompanied by involuntary motion, necessitates periodic modifications, and requires the expert administration of drugs.

(Kulisevsky, 2022) Movement complications, including slow movements, stiffness, shaking hands, and unstable posture, are fundamental features that can greatly impede mobility and independence, ultimately affecting one's overall quality of life. (Fereshtehnejad *et al.*, 2015) As the illness progresses, these signs tend to evolve into more prominent, leading to increased impairment and limitations in functionality. Motor impairments resulting from medication can significantly disrupt patients' everyday activities and quality of life. (Radder *et al.*, 2016)

Symptoms that are not related to movement, such as memory loss, autonomic dysfunction, and sleep disturbances, contribute to the overall impact of Parkinson's illness and negatively affect the individual's quality of life. (Martinez-Martin et al., 2015) These symptoms are frequently not acknowledged or addressed adequately, which worsens patients' distress and diminishes their quality of life. The effectiveness of treatment greatly impacts the quality of life in Parkinson's disease patients. Although drugs like levodopa and dopamine agonists might offer immediate relief and enhance functionality, they may lead to long-term issues such as motor fluctuations

and dyskinesias, reducing the effectiveness of treatment and quality of life. (Stocchi *et al.*, 2018) Moreover, surgical interventions such as deep brain stimulation (DBS) have demonstrated efficacy in addressing motor impairments in advanced Parkinson's disease, thereby enhancing degree of living. (Weaver *et al.*, 2020)

## **Activities of Daily Living**

The combination of virtual reality (VR) and motor imagery (MI) with conventional physical therapy (PT) resulted in substantial changes in movement coordination and tasks of everyday life, compared to physical therapy (PT) individually. (Kashif *et al.*, 2022) Research has demonstrated that individuals with Parkinson's disease (PD) observe enhanced motor symptoms, decreased reliance on medication, a higher standard of life, and increased autonomy in routine tasks when undergoing deep brain stimulation (DBS) treatment. (Malek, 2019)

Significant discrepancies were observed in activities pertaining to daily functioning and motor assessments, with the exception of intellectual capacities, behaviour, and emotional well-being. (De La Cruz, 2017) A Recent research suggests that the task-oriented Lee Silverman Voice Treatment-BIG (LSVT-BIG) program, which allows respondents to choose their tasks, may effectively improve hand functionality, performing everyday tasks, psychological health, and degree of living in individuals with Parkinson's disease. (Choi & Kim, 2022) Developing nutritional interventions for individuals with Parkinson's disease, using the Regulating Nutritional Condition score to boost their daily functioning. (Nagano et al., 2021)

## Cognitive Decline

Memory impairment is a prevalent non-motor manifestation in individuals with the neurological condition. Parkinson's disease dementia (PDD) may cause more difficulties for patients and their caregivers compared to the usual motor problems related to Parkinson's disease. (Lawson et al., 2016) Crucially, changes in thinking abilities were not limited to one specific area of cognition, and an earlier diagnosis suggests a progressive and varied deterioration in mental functioning in individuals with Parkinson's disease. The experiment conducted by Broeders and colleagues revealed that the linguistic and visual-spatial regions experienced the most notable impact over a period of five years. (Broeders et al., 2013) Involuntary articulation and naming difficulties have received scant study attention, but they have been linked to cognitive impairment. (Ash et al., 2017) Extensive research involving a large group of individuals and thorough assessments of cognitive abilities across each domain are necessary to enhance our understanding of the typical development of cognitive function. Reports should include both preliminary and subsequent information to enable researchers to evaluate the progression of cognitive abilities across time. (Roheger et al., 2018) Emphasizing particular symptoms during the initial phases of Parkinson's disease is of utmost importance, rather than relying on the patient to voluntarily report them. (Ding et al., 2015) Furthermore, within the context of neuropsychiatric symptoms, cognitive impairment, apathy, grief, nervousness, and difficulties in control of impulses are usually recognized as the most prevalent conditions in Parkinson's disease. (Weintraub et al., 2022) Recent research have reported that neuropsychiatric symptoms have an adverse effect on the thinking skills of individuals. (Jones et al., 2019)

### Social Interaction

Social engagement is crucial for improving and promoting the overall well-being of an individual. Effective communication plays a crucial role in social relationships, but individuals with Parkinson's disease may experience limited social interactions due to memory decline and speech impairments. (Sapir et al., 2011) However, social instability manifests in people who receive a diagnosis prior to the early onset of illness. (Porcelli et al., 2019). Research suggests that the condition has a significant influence on interpersonal functioning, leading to reduced overall enjoyment and quality of life. This includes negative effects on spouse interactions, friendship roles, and job roles. (Perepezko et al., 2019). The correlation between social role and the level of existence linked to health is evident. (Van Uem et al., 2016), Furthermore, it has been discovered that face masking is associated with social functioning difficulties such as social rejection. However, it should be noted that these associations and occurrences are diminished when taking depression into consideration. (Gunnery et al., 2016) Individuals with this illness report reduced social interaction and emphasize the importance of maintaining an active and meaningful life in order to achieve contentment. (Dauwerse et al., 2014). The Chronic inflammatory demyelinating polyneuropathy (CIDP) frequently impairs interpersonal relationships and disrupts nocturnal sleep, leading to a substantial decline in Wellness. (Englezou et al., 2023)

## Social Support

Seeking social assistance from loved ones, friends, and close relations is crucial for enhancing one's life and overall well-being. It is widely recognized that a decrease in social support might result in the development of depressed symptoms. (Northcott et al., 2016). It is essential to address the burden faced by care takers, as unofficial care givers play an important role in safeguarding the welfare of individuals with PD, which involves making significant sacrifices in terms of finances, social life, and personal well-being. Failing to acknowledge and address the strain experienced by caregivers may lead to exhaustion and the premature placement of individuals with Parkinson's disease into institutional care. (Mosley et al., 2017) Several data's indicate that PD patients who do not seek care and support from their families have a greater chance of experiencing anxiety and depressed symptoms. (Shao et al., 2020) there is also a positive impact among the Parkinson's disease affected elderly patients who seeks social supportbased on the age, the younger group seek more support than the older group. It might vary based on gender, severity of the disease, disease duration and intensity of the Parkinson's disease. (Saeedian et al., 2014)

## **RESULTS AND DISCUSSIONS**

The impact of Parkinson's disease on an individual's mental health and aging is significant and unavoidable. Parkinson's disease (PD) is a neurodegenerative condition that impacts both the motor and nonmotor processes of the brain. Parkinson's disease (PD) is more prevalent among elderly individuals, and advancing age is the primary determinant for the occurrence and advancement of PD. Ageing impacts numerous biological processes that make individuals more susceptible to neurodegeneration, including oxidative stress, mitochondrial failure, inflammation, and protein aggregation.

An important obstacle faced by individuals with Parkinson's disease (PD) is the significant influence of mental well-being on both the patients' and their caregivers' overall quality of life. Parkinson's disease (PD) can result in a range of neuropsychiatric symptoms, including sadness, anxiety, apathy, impulse control difficulties, and psychosis. These symptoms can manifest at any phase of the illness and frequently remain unnoticed and untreated. Additionally, PD medicines, sleep difficulties,

exhaustion, and various other circumstances might also exert an affect on them.

Psychological well-being is a crucial component of one's total well-being, and it is imperative to seek assistance if the cognitive and emotional symptoms disrupt typical functioning. Various approaches can be used to manage mental health problems in Parkinson's disease (PD), including counseling, making lifestyle modifications, altering PD drugs, or introducing additional treatments. Customized mental health care should be provided, taking into account the specific requirements and preferences of each individual. This care should involve the active participation of both the patient and their care partner.

## **CONCLUSIONS**

Therefore, mental health plays a vital role in the overall well-being of individuals with Parkinson's disease (PD), since they confront a range of nonmotor symptoms that impact their emotional state, drive, cognitive abilities, and actions. The symptoms might arise from the neurological progression of Parkinson's disease, the adverse effects of Parkinson's disease medication, or the psychological and social consequences of living with a chronic condition. Furthermore, the process of aging might intensify the susceptibility of the brain to Parkinson's disease pathology and deteriorate the clinical outcomes. Hence, it is crucial to evaluate and tackle the mental health requirements of individuals with PD and their caregivers, employing evidence-based therapies that can enhance their overall well-being and functionality. The relationship between mental health and Parkinson's disease is interconnected, necessitating a comprehensive and interdisciplinary approach to treatment.

#### REFERENCES

- Aarsland, D., Anderson, K., Larsen, J. P., & Wentzel-Larsen, T. (2023). Mental health disorders in Parkinson's disease. In H. Bloem, A. Schrag, F. Babb, & N. Beiser (Eds.), Movement disorders (6th ed., pp. 1294-1315). Springer International Publishing.
- Ash, S., Jester, C., York, C., Kofman, O., Langey, R., Halpin, A., Firn, K., Perez, S. D., Chahine, L. M., Spindler, M., Dahodwala, N., Irwin, D. J., McMillan, C. T., Weintraub, D., & Grossman, M. (2017). Longitudinal decline in speech production in Parkinson's disease spectrum disorders. *Brain and*

- Language, 171, 42-51. https://doi.org/10.1016/j.bandl.2017.05.001
- Baumbach, L. F., Deuschl, G., Krack, P., Volkmann, J., & Klein, J. C. (2015). Non-motor symptoms in Parkinson's disease: Management challenges and current treatment options. *Journal of Neurology*, *Neurosurgery & Psychiatry*, 86(8), 880-892
- Broeders, M., de Bie, R. M., Velseboer, D. C., Speelman, J. D., Muslimovic, D., & Schmand, B. (2013). Evolution of mild cognitive impairment in Parkinson disease. *Neurology*, 81(4), 346–352. https://doi.org/10.1212/ WNL.0b013e31829c5c86
- 5. Cavanaugh, J. C., & Blanchard-Fields, F. (2015). *Adult development and aging*. Cengage learning.
- Choi, Y., & Kim, D. (2022). Effects of Task-Based LSVT-BIG intervention on hand function, activity of daily living, psychological function, and quality of life in Parkinson's Disease: a randomized control trial. Occupational Therapy International, 2022, 1–13. https://doi.org/10.1155/2022/1700306
- De La Cruz, S. P. (2017). Effectiveness of aquatic therapy for the control of pain and increased functionality in people with Parkinson's disease: a randomized clinical trial. European Journal of Physical and Rehabilitation Medicine, 53(6). https:// doi.org/10.23736/s1973-9087.17.04647-0
- 8. Ding, W., Lj, D., Ff, L., Han, Y., & Mu, L. (2015). Neurodegeneration and cognition in Parkinson's disease: a review. *PubMed*, 19(12), 2275–2281. https://pubmed.ncbi.nlm.nih.gov/26166654
- 9. Dauer, W. T., & Przedborski, S. (2003). Parkinson's Disease. *Neuron (Cambridge, Mass.)*, 39(6), 889–909. https://doi.org/10.1016/s0896-6273(03)00568-3
- Dauwerse, L., Hendrikx, A., Schipper, K., Struiksma, C., & Abma, T. (2014). Quality-of-life of patients with Parkinson's disease. *Brain Injury*, 28(10), 1342–1352. https://doi.org/10.3109/026990 52.2014.916417
- Englezou, C., Nazeer, K. K., &Rajabally, Y. A. (2023). Impact of social-functioning and sleep on quality of life in chronic inflammatory demyelinating polyneuropathy. *Clinical Neurology and Neurosurgery*, 234, 108017. https://doi.org/10.1016/j.clineuro.2023.108017
- Fereshtehnejad, S. M., Shafieesabet, M., Farhadi, F., Hadizadeh, H., Rahmani, A., & Naderi, N. (2015). Quality of life in patients with Parkinson's disease: translation and psychometric evaluation of the Iranian version of PDQ-39. Journal of Research in Medical Sciences, 20(4), 374–381.
- 13. Gallagher, D. A., Lees, A. J., & Schrag, A. (2010). What are the most important nonmotor symptoms in patients with Parkinson's disease and are we missing them?. *Movement disorders: official journal of the Movement Disorder Society*, 25(15), 2493–2500. https://doi.org/10.1002/mds.23394

- Gunnery, S. D., Habermann, B., Saint-Hilaire, M., Thomas, C. A., & Tickle-Degnen, L. (2016). The Relationship between the Experience of Hypomimia and Social Wellbeing in People with Parkinson's Disease and their Care Partners. *Journal* of *Parkinson's Disease*, 6(3), 625–630. https://doi. org/10.3233/jpd-160782
- Jones, J. D., Kurniadi, N., Kuhn, T., Szymkowicz, S. M., Bunch, J., & Rahmani, E. (2019). Depressive symptoms precede cognitive impairment in de novo Parkinson's disease patients: Analysis of the PPMI cohort. *Neuropsychology (Journal)*, 33(8), 1111– 1120. https://doi.org/10.1037/neu0000583
- Kashif, M., Ahmad, A., Bandpei, M. a. M., Gilani, S. A., Hanif, A., & Iram, H. (2022). Combined effects of virtual reality techniques and motor imagery on balance, motor function and activities of daily living in patients with Parkinson's disease: a randomized controlled trial. *BMC Geriatrics*, 22(1). https://doi.org/10.1186/s12877-022-03035-1
- Kuhlman, G. M., Flanigan, J. L., Sperling, S. A., & Barrett, M. J. (2019). Predictors of health-related quality of life in Parkinson's disease. *Parkinsonism & Related Disorders*, 65, 86–90. https://doi.org/10.1016/j.parkreldis.2019.05.009
- 18. Kulisevsky J. (2022). Pharmacological management of Parkinson's disease motor symptoms: update and recommendations from an expert. Tratamientofarmacológico de lossíntomasmotores de la enfermedad de Parkinson: actualización y recomendaciones de un experto. *Revista de neurologia*, 75(s04), S1–S10. https://doi.org/10.33588/rn.75s04.2022217
- Lawson, R. A., Yarnall, A. J., Duncan, G. W., Breen, D. P., Khoo, T. K., Williams-Gray, C. H., Barker, R. A., Collerton, D., Taylor, J., & Burn, D. J. (2016). Cognitive decline and quality of life in incident Parkinson's disease: The role of attention. Parkinsonism & Related Disorders, 27, 47–53. https:// doi.org/10.1016/j.parkreldis.2016.04.009
- Malek, N. (2019). Deep brain stimulation in Parkinson's disease. Neurology India, 67(4), 968. https://doi.org/10.4103/0028-3886.266268
- 21. Martinez-Martin, P., Rodriguez-Blazquez, C., Kurtis, M. M., Chaudhuri, K. R., & Group, N. V. (2015). The impact of non-motor symptoms on health-related quality of life of patients with Parkinson's disease. Movement Disorders, 30(6), 738–746.
- Mosley, P., Moodie, R., & Dissanayaka, N. (2017). Caregiver burden in Parkinson Disease: A Critical review of Recent literature. *Journal of Geriatric Psychiatry and Neurology*, 30(5), 235–252. https://doi.org/10.1177/0891988717720302
- 23. Nagano, T., Kakuma, T., Umezu, Y., & Yanagawa, T. (2021). Nutritional status and activities of daily living in patients with Parkinson's disease. *PLOS ONE*, 16(2), e0246329. https://doi.org/10.1371/journal.pone.0246329

- Nojomi, M., Mostafavian, Z., Shahidi, G. A., & Jenkinson, C. (2010). Quality of life in patients with Parkinson's disease: Translation and psychometric evaluation of the Iranian version of PDQ-39. Journal of research in medical sciences: the official journal of Isfahan University of Medical Sciences, 15(2), 63–69.
- Northcott, S., Moss, B., Harrison, K., & Hilari, K. (2016). A systematic review of the impact of stroke on social support and social networks: associated factors and patterns of change. Clinical Rehabilitation, 30(8), 811–831. https://doi.org/10.1177/0269215515602136
- Perepezko, K., Hinkle, J. T., Shepard, M., Fischer, N., Broen, M. P. G., Leentjens, A. F., Gallo, J. J., & Pontone, G. M. (2019). Social role functioning in Parkinson's disease: A mixed-methods systematic review. *International Journal of Geriatric Psychiatry*, 34(8), 1128–1138. https://doi.org/10.1002/gps.5137
- Porcelli, S., Van Der Wee, N., Van Der Werff, S., Aghajani, M., Glennon, J., Van Heukelum, S., Mogavero, F., Lobo, A., Olivera, F. J. N., Lobo, E., Posadas, M., Dukart, J., Kozak, R., Arce, E., Ikram, M. A., Vorstman, J., Bilderbeck, A. C., Saris, I. M., Kas, M., &Serretti, A. (2019). Social brain, social dysfunction and social withdrawal. *Neuroscience* &Biobehavioral Reviews, 97, 10–33. https://doi. org/10.1016/j.neubiorev.2018.09.012
- Radder, D. L., Nonnekes, J., van Nimwegen, M., Eggers, C., Abbruzzese, G., Alves, G., & Bloem, B. R. (2016). Recommendations for the organization of multidisciplinary clinical care teams in Parkinson's disease. Journal of Parkinson's Disease, 6(4), 661– 667.
- 29. Roheger, M., Kalbe, E., & Liepelt-Scarfone, I. (2018b). Progression of cognitive decline in Parkinson's disease. *Journal of Parkinson's Disease*, 8(2), 183–193. https://doi.org/10.3233/jpd-181306
- Saeedian, R. G., Nagyová, I., Krokavcova, M., Škorvánek, M., Rosenberger, J., Gdovinová, Z., Groothoff, J. W., & Van Dijk, J. P. (2014). The role of social support in anxiety and depression among Parkinson's disease patients. *Disability and Rehabilitation*, 36(24), 2044–2049. https://doi.org/1 0.3109/09638288.2014.886727
- 31. Sapir, S., Ramig, L. O., & Fox, C. (2011). Intensive voice treatment in Parkinson's disease: Lee Silverman Voice Treatment. *Expert Review of Neurotherapeutics*, 11(6), 815–830. https://doi.org/10.1586/ern.11.43

- Shao, R., He, P., Ling, B., Tan, L., Xu, L., Hou, Y., Kong, L., & Yang, Y. (2020). Prevalence of depression and anxiety and correlations between depression, anxiety, family functioning, social support and coping styles among Chinese medical students. BMC Psychology, 8(1). https://doi.org/10.1186/s40359-020-00402-8
- Stocchi, F., Abbruzzese, G., Ceravolo, R., Cortelli, P., D'Amelio, M., De Pandis, M. F., & Pezzoli, G. (2018).
  Prevalence of fatigue in Parkinson disease and its clinical correlates. Neurology, 91(11), e1031–e1041.
- 34. https://main.icmr.nic.in/. (n.d.). Indian Council of Medical Research. https://main.icmr.nic.in/
- Van Uem, J. M., Marinus, J., Canning, C. G., Van Lummel, R., Dodel, R., Liepelt-Scarfone, I., Berg, D., Morris, M. E., &Maetzler, W. (2016). Health-Related Quality of Life in patients with Parkinson's disease A systematic review based on the ICF model. Neuroscience &Biobehavioral Reviews, 61, 26–34. https://doi.org/10.1016/j.neubiorev.2015.11.014
- 36. Weaver, F. M., Stroupe, K. T., Smith, B., Gonzalez, B., Huo, Z., Cao, L., ... & SoRelle, R. (2020). Impact of deep brain stimulation on health-related quality of life in early Parkinson's disease. Movement Disorders, 35(12), 2191–2198.
- 37. Weintraub, D., Aarsland, D., Chaudhuri, K. R., Dobkin, R. D., Leentjens, A. F., Rodríguez-Violante, M., & Schrag, A. (2022). The neuropsychiatry of Parkinson's disease: advances and challenges. *The Lancet Neurology*, 21(1), 89–102. https://doi.org/10.1016/s1474-4422(21)00330-6
- 38. World Health Organization: WHO. (2022, June 14). Launch of WHO's Parkinson disease technical brief. World Health Organization. https://www.who.int/news/item/14-06-2022-launch-of-who-s-parkinson-disease-technicalbrief#:~:text=Globally%2C%20the%20 prevalence%20of%20Parkinson,for%20any%20 other%20neurological%20disorder.
- Yazd, S. a. R., Gashtil, S., Moradpoor, M., Pishdar, S., Nabian, P., Kazemi, Z., & Naeim, M. (2023). Reducing depression and anxiety symptoms in patients with Parkinson's disease: The effectiveness of group cognitive behavioral therapy. *Parkinsonism & Related Disorders*, 112, 105456. https://doi.org/10.1016/j.parkreldis.2023.105456

