# Parkinson's Disease
# Current Awareness Bulletin
October 2021

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**Title: A French survey on the lockdown consequences of COVID-19 pandemic in Parkinson's disease. The ERCOPARK study.**

Author(s): Fabbri ; Leung, Clémence; Baille, Guillaume; Béreau, Matthieu; Brefel Courbon, Christine; Castelnovo, Giovanni; Carriere, Nicolas; Damier, Philippe; Defebvre, Luc; Doe de Maindreville, Anne; Fluchere, Frederique; Fuzzatti, Marie; Grabli, David; Maltete, David; Rousseau, Vanessa; Sommet A, Agnès; Thalamas, Claire; Thiriez, Claire; Rascol, Olivier; Ory-Magne, Fabienne

**Background:** In 2020 the coronavirus disease 19 (COVID-19) pandemic imposed a total and sudden lockdown. We aimed to investigate the consequences of the first COVID-19 lockdown (mid-March - mid-April 2020) on motor and non-motor symptoms (NMS) in a cohort of French people with Parkinson's disease (PwP).

**Methods:** PwP were enrolled either by an on-line survey sent from the national France Parkinson association (FP) to reach the French community of PwP or as part of outpatients' telemedicine visits followed by an hospital-based Parkinson Expert Center (PEC). All patients were evaluated using the same standardized questionnaire assessing motor and NMS (including a list of most disabling, new or worsened symptoms and Patient's Global Impression-Improvement scales [PGI-I]) psycho-social queries and quality of life.

**Results:** 2653 PwP were included: 441 (16.6%) in the PEC group and 2122 (83.4%) in the community-based group. Physiotherapy was interrupted among 88.6% of the patients. 40.9% referred a clinical modification of their symptoms. Based on the questionnaire, pain (9.3%), rigidity (9.1%) and tremor (8.5%) were the three most frequently new or worsened reported symptoms. Based on the PGI-I, the motor symptoms were the most affected domain, followed by pain and psychic state. PwP in community-based group tended to have more frequent worsening for motor symptoms, motor complications, pain and confusion than those of the PEC group.

**Conclusions:** The first COVID-19 lockdown had a negative impact on motor and NMS of PwP. Efforts should be allocated to avoid interruption of care, including physiotherapy and physical activities and implement telemedicine.

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**Title: Association of Sleepwalking and REM Sleep Behavior Disorder in Men with Parkinson's.**

**Abstract:** In this retrospective, cross-sectional study of men, both sleepwalking and rapid eye movement sleep behavior disorder were associated with the development of Parkinson's disease.

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**Title: Digital health technology for non-motor symptoms in people with Parkinson's disease: Futile or future?**

Author(s): van Wamelen ; Sringean, Jirada; Trivedi, Dhaval; Carroll, Camille B.; Schrag, Anette E.; Odin, Per; Antonini, Angelo; Bloem, Bastiaan R.; Bhidayasiri, Roongroj; Chaudhuri, K. Ray

**Introduction:** There is an ongoing digital revolution in the field of Parkinson's disease (PD) for the objective measurement of motor aspects, to be used in clinical trials and possibly support therapeutic choices. The focus of remote technologies is now also slowly shifting towards the broad but more "hidden" spectrum of non-motor symptoms (NMS).

**Methods:** A narrative review of digital health technologies for measuring NMS in people with PD was conducted. These digital technologies were defined as assessment tools for NMS offered remotely in the form of a wearable, downloadable as a mobile app, or any other objective measurement of NMS in PD that did not require a hospital visit and could be performed remotely. Searches were performed using peer-reviewed literature indexed databases (MEDLINE, Embase, PsycINFO, Cochrane Database of Systematic Reviews, Cochrane CENTRAL Register of Controlled Trials), as well as Google and Google Scholar.

**Results:** Eighteen studies deploying digital health technology in PD were identified, for example for the measurement of sleep disorders, cognitive dysfunction and orthostatic hypotension. In addition, we describe promising developments in other conditions that could be translated for use in PD.

**Conclusion:** Unlike motor symptoms, non-motor features of PD are difficult to measure directly using remote digital technologies. Nonetheless, it is currently possible to reliably measure several NMS and further digital technology developments are underway to offer further capture of often under-reported and under-recognised NMS.

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**Title: Does cybersickness affect virtual reality training using the Computer Assisted Rehabilitation Environment (CAREN)? Preliminary results from a case-control study in Parkinson's disease**

**Author(s):** Impellizzeri F.; Naro A.; Bramanti A.; Militi D.; Petralito F.; Calabro R.S.; Milardi D.; Basile G.; Gazia F.; Galletti F.

**Introduction and Objective:** This pilot study aimed to evaluate whether and to what extent cybersickness (CS) may affect a rehabilitation program using the Computer-assisted Rehabilitation Environment (CAREN), a virtual reality (VR) computer-assisted device for clinical rehabilitation.

**Method(s):** The study was carried out on 30 subjects, 15 patients with Parkinson's Disease (PD) and 15 healthy controls (HC), which underwent a set of four exergames programmed by our team for PD rehabilitation training.

**Result(s):** All participants completed the Motion Sickness Susceptibility Questionnaire Short-form (MSSQ) before the training and the Motion Symptoms Assessment Questionnaire (MSAQ) immediately after a single CAREN session. Overall, mean MSAQ scores remained low after the session, suggesting that the users did not experience severe discomfort. We found no significant difference in MSAQ scores between the two groups, while there was a statistically significant difference for the subsection of MSAQ regarding the peripheral symptoms (i.e. sweating, cold sweating, feeling warm), which were higher in HC. Moreover, the results highlighted some correlation between MSSQ and MSAQ. Gastrointestinal symptoms in PD, as well as MSSQ and sopite-related symptoms in HC, were also correlated with susceptibility to CS.

**Conclusion(s):** As CS is rarely reported after CAREN, this and similar devices may be considered comfortable and safe for patients' rehabilitation involving VR training, including PD persons. Copyright © 2021 Taylor & Francis Group, LLC.

**Title: Effect of Exercise on Motor Symptoms in Patients with Parkinson's Disease: A Network Meta-analysis**

**Author(s):** Alvarez-Bueno C.; Deeks J.J.; Cavero-Redondo I.; Jolly K.; Torres-Costoso A.I.; Price M.; Fernandez-Rodriguez R.; Martinez-Vizcaino V.

**Abstract:** Although the pharmacological approach may help with motor symptoms in Parkinson's disease (PD), they are clearly not the complete solution. Thus, for the treatment of PD motor symptoms, physical activity has been proposed as an effective intervention. Method(s): A systematic search in MEDLINE, Web of Science, Scopus, and Cochrane Central Register of Controlled Trials databases was conducted to identify randomized controlled trials testing the effectiveness of exercise interventions on motor symptoms of PD. Physical exercise interventions were divided into 9 categories: endurance, resistance, combined, balance, dance, alternative exercises, body weight supported, sensorimotor interventions including endurance exercise, and sensorimotor interventions not including endurance exercise. A pairwise meta-analysis for direct and indirect comparisons between intervention and control/nonintervention groups was carried out. Result(s): Fifty-six studies met the inclusion criteria, including 2740 participants, aged between 57.6 and 77.7 years. Results of our analyses showed that sensorimotor training including endurance (effect size [ES]-1.09; 95% confidence interval [CI], -1.68 to -0.50), resistance (ES-0.82; 95% CI, -1.23 to -0.41), and dance (ES-0.64; 95% CI, -1.24 to -0.05) were the most effective physical activity interventions for mitigating PD motor symptoms. Conclusion(s): Physical activity interventions are an effective strategy for the management of motor symptoms in patients with PD. Among the different exercise intervention programs, those including more complex and demanding activities (sensorimotor training including endurance, resistance, and dance) seem to be the most effective physical activity interventions. Copyright © 2021 Lippincott Williams and Wilkins. All rights reserved.

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**Title: Feeling controlled or being in control? Apps for self-management among older people with neurological disability.**

**Author(s):** Winberg ; Kylberg, M.; Pettersson, C.; Harnett, T.; Hedvall, P.-O.; Mattsson, T.; Månsson Lexell, E.

**Abstract:** The aim of this paper was to describe how people living with a neurological disability such as multiple sclerosis, Parkinson's disease and stroke reason regarding using apps to facilitate self-management in everyday life. A qualitative research approach with a focus group methodology was used. The sample comprised 16 participants, 11 men and 5 women, with an average age of 64 years (ranging from 51–80 years). Six participants were diagnosed with multiple sclerosis, six with Parkinson's disease and four with stroke. Data were analyzed using thematic analysis, which is a method for identifying, analyzing and reporting patterns. The results formed two themes. The first theme "using apps to have control of my health" comprises two subthemes; "monitor and take responsibility for a healthy lifestyle" and "compensate to facilitate everyday life". The second theme "using the app as a tool and means for communication" also comprised two subthemes; "dare to trust the app" and "feeling safe when sharing information with health care professionals". The use of apps put increased responsibility on the person and had the possibility to make them more involved in their own care. The use of an app can facilitate a healthy lifestyle and help

to monitor disease-specific symptoms. In order to be able to use apps for communication with the health care sector legislation and safety issues need to be considered. Apps can be used for self-management if they are safe and can be trusted. People with neurological disabilities want to be involved in their healthcare and needs to be addressed by health care professionals. The use of apps grasp over a wide variety of areas this is something that may be considered in health care and something that can be addressed by interdisciplinary approaches. Ordinary health-oriented apps and disease-specific apps were used differently and for different purposes.

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## Title: Impact of social and mobility restrictions in Parkinson's disease during COVID-19 lockdown.

**Author(s):** Luis-Martínez ; Di Marco, Roberto; Weis, Luca; Cianci, Valeria; Pistonesi, Francesca; Baba, Alfonc; Carecchio, Miryam; Biundo, Roberta; Tedesco, Chiara; Masiero, Stefano; Antonini, Angelo

**Background:** The consequences of strict COVID-19 mobility restrictions on motor/non-motor features in Parkinson's disease (PD) have not been systematically studied but worse mobility and quality of life have been reported. To elucidate this question, 12 mild to moderate PD patients were assessed in March 2020 before and after two months of isolation as part of a clinical study that had to be interrupted due to the pandemic and the implementation of COVID19 mobility restrictions.

**Methods:** Twelve patients were systematically evaluated before and after the lockdown period as part of a larger cohort that previously underwent thermal water rehabilitation. Clinical outcomes were the Body Mass index, the Mini-Balance Evaluation Systems Test, the MDS-Unified Parkinson's Disease Rating Scale part III, the 6 Minute Walking Test and the New Freezing of Gait Questionnaire. Global cognition was evaluated with the Montreal Cognitive Assessment scale. The impact of COVID-19 restrictions on quality of life and functional independence was evaluated with The Parkinson's disease Quality of life (PDQ-39), the Activities of Daily Living (ADL) and Instrumental Activities of Daily Living questionnaires (IADL) and the Parkinson's disease cognitive functional rating scales (PD-CFRS).

**Results:** After two months of isolation the Mini-BESTest score worsened (p=0.005), and four patients reported one or more falls during the lockdown. BMI increased (p=0.031) while the remaining clinical variables including quality of life did not change.

**Conclusion:** We observed moderate worsening at Mini-BESTest, greater risk of falls and increased body weight as consequence of prolonged immobility. We believe negative effects were partially softened since patients were in contact with our multidisciplinary team during the lockdown and had previously received training to respond to the needs of this emergency isolation. These findings highligh the importnace of patient-centered interventions in PD management.

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## Title: The magnitude of mood and behavioral symptoms in idiopathic Parkinson's disease: A caregiver perspective

**Author(s):** Klevor R.; Kissani N.; Chraa M.

**Background:** Neuropsychiatric symptoms cause considerable distress for patients and caregivers. Aim(s): To investigate the prevalence of mood and behavioral symptoms experienced by patients with idiopathic Parkinson's disease, and the level of distress due to symptoms for patients and their caregivers.

**Method(s):** A yearlong descriptive and analytical study was conducted using the Neuropsychiatric Inventory (NPI) in a group of 79 patients with idiopathic Parkinson's disease, in our specialized out-patient consultation. A corollary questionnaire was administered to characterize dopamine dysregulation syndrome.

**Result(s):** Ninety-five percent of caregivers reported at least one symptom among patients, with an average of four symptoms per patient. The most frequent symptoms were depression (77%), irritability (67%), and anxiety (57%). The least frequent were apathy (16%), delusions (14%), and hallucinations (14%). Dopamine dysregulation syndrome was present in 17.2% of our patients. Sleep problems were the most distressful to patients, while sleep disorders, aggressiveness and euphoria were particularly distressful for caregivers. A younger age of onset of the disease (P = 0.03) and a longer duration (P < 0.0001) were associated with depression.

**Conclusion(s):** Mood and behavioral symptoms are frequent in Parkinson's disease from caregivers' perspective. These symptoms cause considerable distress among patients and caregivers alike, and therefore warrant a systematic and thorough assessment as well as specific treatment.

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**Title: Impulse control disorders and related behaviors in Parkinson's disease: risk factors, clinical and genetic aspects, and management.**

**Author(s):** Faouzi ; Corvol, Jean-Christophe; Mariani, Louise-Laure

**Purpose Of Review:** To review recent findings and research directions on impulse control disorders and related behaviors (ICDRBs) in Parkinson's disease (PD).

**Recent Findings:** Longitudinal studies found that prevalence increases during PD progression, incident ICDRBs being around 10% per year in patients treated with dopaminergic therapies. Screening tools and severity scales already developed have been validated and are available in several countries and languages. The main clinical risk factors include young age, male gender, type, doses and duration of dopaminergic therapy, PD motor severity and dyskinesia, depression, anxiety, apathy, sleep disorders, and impulsivity traits. Genetic factors are suspected by a high estimated heritability, but individual genes and variants remain to be replicated. Management of ICDRBs is centered on dopamine agonist decrease, with the risk to develop withdrawal symptoms. Cognitive behavioral therapy and subthalamic nucleus deep brain stimulation also improve ICDRBs. In the perspective of precision medicine, new individual prediction models of these disorders have been proposed, but they need further independent replication.

**Summary:** Regular monitoring of ICDRB during the course of PD is needed, particularly in the subject at high risk of developing these complications. Precision medicine will require the appropriate use of machine learning to be reached in the clinical setting.

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**Title: Longitudinal Change in Quality of Life in Neurological Disorders Measures Over 3 Years in Patients With Early Parkinson's Disease.**

**Author(s):** Marras ; Mills, Kelly A.; Eberly, Shirley; Oakes, David; Chou, Kelvin L.; Halverson, Matthew; Parashos, Sotirios A.; Tarolli, Christopher G.; Lai, Jin-Shei; Nowinsky, Cindy J.; Suchowersky, Oksana; Farbman, Eric S.; Shulman, Lisa M.; Simuni, Tanya; Lai, Jin-Shei

**Background:** The Quality of Life in Neurological Disorders (Neuro-QoL) is a publicly available health-related quality-of-life measurement system.Objective: The aim of this study was to evaluate the utility of Neuro-QoL item banks as outcome measures for clinical trials in Parkinson's disease.

**Methods:** An analysis of Neuro-QoL responsiveness to change and construct validity was performed in a multicenter clinical trial cohort.

**Results:** Among 310 participants over 3 years, changes in five of eight Neuro-QoL domains were significant ($P < 0.05$) but very modest. The largest effect sizes were seen in the cognition and mobility domains (0.35-0.39). The largest effect size for change over the year in which levodopa was initiated was -0.19 for lower extremity function-mobility. For a similarly designed clinical trial, estimated sample size required to demonstrate a 50% reduction in worsening ranged from 420 to more than 1000 participants per group.

**Conclusions:** More sensitive tools will be required to serve as an outcome measure in early Parkinson's disease. © 2021 International Parkinson and Movement Disorder Society.

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**Title: Longitudinal observational study of boxing therapy in Parkinson's disease, including adverse impacts of the COVID-19 lockdown.**

**Author(s):** Horbinski ; Zumpf, Katelyn B.; McCortney, Kathleen; Eoannou, Dean

**Background:** Parkinson's Disease (PD) is a highly prevalent neurodegenerative disease whose incidence is increasing with an aging population. One of the most serious manifestations of PD is gait instability, leading to falls and subsequent complications that can be debilitating, even fatal. Boxing therapy (BT) uses gait and balance exercises to improve ambulation in people with PD, though its efficacy has not yet been fully proven.

**Methods:** In the current longitudinal observational study, 98 participants with idiopathic PD underwent twice-weekly BT sessions. Primary outcome was self-reported falls per month; secondary outcomes were quantitative and semi-quantitative gait and balance performance evaluations. Statistical methods included segmented generalized estimating equation with an independent correlation structure, binomial distribution, and log link.

**Results:** The average number of self-reported falls per month per participant decreased by 87%, from $0.86 \pm 3.58$ prior to BT, to $0.11 \pm 0.26$ during BT. During the lockdown imposed by COVID-19, this increased to $0.26 \pm 0.48$ falls per month. Females and those > 65 years old reported the greatest increase in falls during the lockdown period. Post-lockdown resumption of BT resulted in another decline in falls, to $0.14 \pm 0.33$. Quantitative performance metrics, including standing from a seated position and standing on one leg, largely mirrored the pattern of falls pre-and post-lockdown.

**Conclusions:** BT may be an effective option for many PD patients.

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**Title: Nursing and Parkinson's Disease: A Scoping Review of Worldwide Studies**

**Author(s):** Tosin M.H.S.; Oliveira E.F.M.; Oliveira B.C.; de Oliveira B.G.R.B.; Mecone C.A.C.; Tsui D.S.; Tan S.-B.; Irene S.

**Abstract:** This scoping review aims to evaluate the characteristics of worldwide studies evolving the scope of nursing practice in Parkinson's disease (PD). We conducted a three-step search strategy using 11 databases and reference lists. Of the 4,174 screened studies we included 324 (8%). Most were published during 1978 to 2020, with significant increasing in publications from 2002 onwards and a forecast to double in the next 10 years (total expected = 614, +/-62.2, R2 =.998). We identified studies involving nine contexts of nursing practice in PD, in four continents and 31 countries, most of them of observational design (47.2%), funded (52.2%), authored by nurses (70.1%), and related to Nursing care/Guidelines (32.1%), Educational/Research content (16.4%), Symptom management/Medication adherence (14.5%), and Family caregiving (11.1%). The worldwide studies evolving the scope of nursing practice in PD is growing in several health context. These results can guide future research and evidence-based practice involving the role of nurses in PD. Copyright © The Author(s) 2021.

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**Title: Nutrition in the palliative phase of Parkinson's disease: a scoping review of Parkinson's guidelines for medical and allied health professionals.**

**Author(s):** Breasail ; Goldsmith, S.E.; Henderson, E.J.; Lithander, F.E.

**Objective:** To summarise the extent to which nutrition in the palliative phase of Parkinson's disease is addressed in Parkinson's disease guidelines for medical and allied health professionals. Parkinson's disease is a heterogenous condition, people with Parkinson's (PwP) are susceptible to weight loss and malnutrition. This results from increased energy expenditure due to dyskinesia (involuntary movements) and the deleterious effects of disease symptoms and medication side-effects on nutrient intake and metabolism. Dysphagia is common in advanced disease. Increasing disease severity may indicate the need for clinically-assisted nutrition and hydration (CANH), though evidence of benefit is not established. Whether nutrition in the palliative phase of Parkinson's disease can prolong life and/or improve quality of life is an important consideration in the care of PwP. Guidelines for clinical practice, nutrition and palliative care can help to simplify and prioritise the management of complex needs.

**Methods:** A scoping review was performed using PUBMED, CINAHL, AMED, EMBASE, PsycINFO, Google Scholar, and Google Search between 22/02/21 and 16/03/21. Search terms were 'practice guidelines Parkinson's Disease', 'nutrition guidelines Parkinson's Disease', 'palliative care Parkinson's Disease guidelines'. Searches further specified "English language" and in "humans" where possible.

**Results:** Eighteen guidelines were identified as containing Parkinson's-specific guidance relating to food, diet, or nutrition aimed at medical, nursing, or allied health professionals. Sixteen of these were Parkinson's-specific; 1 focused on clinical nutrition in neurology contained extensive Parkinson's-specific guidance and another focused on CANH in adults without the capacity to consent contained limited Parkinson's-specific advice. Guidance relating to diet and nutrition was most frequently provided in the context of dysphagia (16/18) or in relation to the effects of dietary protein on levodopa metabolism (13/18). CANH was discussed in 6/18 guidelines. Nutrition in the palliative phase of Parkinson's was discussed in 3/18 publications. However, only 2 out of these 3 were Parkinson's-specific and were aimed at healthcare professionals and dieticians respectively: The Irish Palliative Care in Parkinson's Disease Group 2016 guidelines(1) and the British Dietetic Association/Parkinson's UK 2021 guidelines(2) . Both highlight the importance of early

planning for more advanced disease stages, in addition to specific guidance related to the withdrawal of CANH if it causes patient distress or reduces remaining quality of life.
**Conclusion:** PwP have complex individual healthcare needs and it may be difficult to give generalised recommendations for nutrition in the palliative phase of Parkinson's disease. Current guidelines for medical and allied health professionals focus mostly on the management of the specific symptoms of dysphagia and constipation. In relation to planning nutrition in the palliative stage of Parkinson's disease, the importance of early decision making in relation to CANH is emphasised whereby benefits and burdens can be weighed up to reach a decision that maximises an individual's quality of life.

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**Title: Parkinson's disease: Content analysis of patient online discussion forums. A prospective observational study using Netnography.**

**Author(s):** Bayen ; Carpentier, Cassandre; Baran, Jan; Cottencin, Olivier; Defebvre, Luc; Moreau, Caroline; Devos, David; Messaadi, Nassir

**Objectives:** To assess the users' characteristics, discussion contents, and the atmosphere of virtual peer communities.

**Methods:** A qualitative, prospective study was conducted using the Netnography method. The most popular, publicly accessible French discussion forums were investigated. The web users' quotes were collected from May to October 2018. Data analysis triangulation was performed by two researchers using the NVivo 12® software.

**Results:** The users discussed their experience with Parkinson's disease (PD) in a warm atmosphere. 23 discussion threads were analysed: 302 messages posted by 70 users (70% were females; the average illness duration was 6 years); 115 encoded nodes were created. Five user profiles appeared: leader, follower, expert, mixed, and undetermined. Common preoccupations were a lack of time and listening from the physicians' side. Three themes emerged: managing symptoms, living with PD, and sharing illness experiences. Users sought actively for a cure to limit or stop disease evolution, using alternative and complementary therapies to optimize their daily condition.

**Conclusions:** Online forums foster person's informal learnings about coping with PD. Healthcare professionals can use these learnings to optimize person-centred support. Practice Implications: During consultations, healthcare professionals should invite persons to discuss their online activity, informal learnings, beliefs and expectations towards therapeutic strategies.

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**Title: Parkinson's disease: is pharmacotherapy on the move?**

**Abstract:** Despite intensive research, there have been few important pharmacological innovations in Parkinson's disease (PD) in the last 30 years and treatment remains difficult. But earlier diagnosis and novel disease-modifying drugs in development may improve treatment outcomes in the future.

**Title: Perceptions and meanings of living with Parkinson's disease: an account of caregivers lived experiences**

**Citation:** International Journal of Qualitative Studies on Health and Well-being; 2021; vol. 16 (no. 1)

**Author(s):** Bhasin S.K.; Bharadwaj I.U.

**Purpose:** Current study looked into caregiving process of those dealing with family members suffering from Parkinson's disease, within the changing social milieu in India. It aimed to understand the experiential and existential impact on the lifeworld of caregivers.

**Method(s):** Narrative interviews of 10 female caregivers referred by neurologists were gathered. Employing Existential Phenomenological Analysis, the caregiver experiences were understood phenomenologically within an existential framework, six themes were generated.

**Result(s):** Themes were-Becoming a caregiver: Undertaking immeasurable and unrelenting responsibilities; Rising patient-hood of one's family member: pain of losing the person in the patient; Experience of altered temporality: living in pain with the uncertainty and duration of the disease; Encountering meaninglessness: dwindling faith in principles of life; Existing as a "Being For" and not "Being With": a caregiver's self-estrangement and blurring of Identity and lastly Self-Preservation through brief moments of respite: coping with caregiving.

**Conclusion(s):** The study illuminated how caregiving is experienced by an individual at a process and psychic level by shedding light on the conflicts, concerns and exhaustions endured by them. Adopting an existential approach in healthcare setups can aid in moving closer to felt experiences of these caregivers and in developing integrative and meaningful interventions for enhancing their well-being.

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**Title: Quality Improvement in Neurology 2020 Parkinson Disease Quality Measurement Set Update.**

**Citation:** Neurology; Aug 2021; vol. 97 (no. 5); p. 239-245

**Author(s):** Chou ; Martello, Justin; Atem, Juliana; Elrod, Matt; Foster, Erin R.; Freshwater, Karen; Gunzler, Steven A.; Kim, Hojoong; Mahajan, Abhimanyu; Sarva, Harini; Stebbins, Glenn T.; Lee, Erin; Yang, Laurice

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**Title: Rehabilitation training based on virtual reality for patients with Parkinson's disease in improving balance, quality of life, activities of daily living, and depressive symptoms: A systematic review and meta-regression analysis.**

**Citation:** Clinical Rehabilitation; Aug 2021; vol. 35 (no. 8); p. 1089-1102

**Author(s):** Li ; Zhang, Yanran; Jiang, Yunxia; Wang, Mengyao; Ang, Wei How Darryl; Lau, Ying

**Objective:** To examine the effectiveness of rehabilitation training based on virtual reality in improving balance, quality of life, activities of daily living, and depressive symptoms of patients with Parkinson's disease. Data sources: PubMed, EMBASE, CINAHL, Scopus, Cochrane Library, PsycINFO, ProQuest, Physiotherapy Evidence Database, IEEE Xplore, China National Knowledge Infrastructure, Wanfang, and VIP Information databases were

searched from their inception to October 15, 2020. Trial registries, gray literature, and target journals were also searched.

**Methods:** Eligible randomized controlled trials included studies with patients with Parkinson's disease in rehabilitation training based on virtual reality. Comprehensive Meta-Analysis 3.0 software was used. Physiotherapy Evidence Database Scale and the Grading of Recommendation, Assessment, Development, and Evaluation system were used to assess the methodological quality of individual trials and the overall quality of the evidence, respectively.

**Results:** A total of 22 randomized controlled trials with 836 patients were included. Meta-analysis revealed that training significantly improved balance ($g = 0.66$, $P < 0.001$), quality of life ($g = 0.28$, $P = 0.015$), activities of daily living ($g = 0.62$, $P < 0.001$), and depressive symptoms ($g = 0.67$, $P = 0.021$) compared to the control group. Subgroup analysis indicated that training should utilize video game consoles. Meta-regression analyses showed that age, sessions, and frequency of training had statistically significant impacts on balance scores. Quality of individual trials was high and overall evidence ranged from very low to low.

**Conclusion:** Virtual rehabilitation training could be adopted in healthcare institutions as supplementary training for patients with Parkinson's disease.

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## Title: REM sleep behaviour disorder in Parkinson's disease (Review).

**Author(s):** Diaconu, Ştefania; Falup-Pecurariu, Oana; Ţînţ, Diana; Falup-Pecurariu, Cristian

**Abstract:** Rapid eye movement (REM) sleep behavior disorder (RBD) is a parasomnia defined by simple or complex abnormal movements occurring in REM state, instead of the physiological muscular atonia. RBD may be idiopathic, or secondary as in the case of Parkinson's disease (PD). Several studies have confirmed that idiopathic RBD may precede with several years the onset of the specific motor characteristics of PD. The high prevalence of RBD in PD (19-70%) may be explained by several common pathophysiological pathways, mainly related to the dopaminergic cell loss. RBD is also associated with several comorbidities, including cognitive impairment, hallucinations, dysautonomia, or daytime sleepiness. The gold standard investigation for the diagnosis and assessment of RBD is video polysomnography, but in clinical practice, the use of clinical scales and questionnaires is reasonable for the screening of this complex parasomnia. Management options include ensuring a safe environment for the patient and pharmacological treatment, including clonazepam, melatonin or certain antiparkinsonian drugs.

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## Title: Systematic review and meta-analysis of randomised controlled trials on the effects of yoga in people with Parkinson's disease

**Author(s):** Suarez-Iglesias D.; Santos L.; Sanchez-Lastra M.A.; Ayan C.

**Purpose:** Yoga may be a beneficial treatment for people with Parkinson's disease (PD). However, no studies have critically reviewed and meta-analyzed the scientific evidence for yoga's benefits regarding motor and non-motor symptoms. The purpose of this study was to conduct a systematic review and meta-analysis on the effectiveness of yoga as a rehabilitation strategy for PD.

**Material(s) and Method(s):** Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines, a literature search was performed using MEDLINE/PubMed, PEDro, SPORTDiscus, and Scopus. Studies addressing any concepts on the impact of yoga intervention on physical and psychological outcomes in people with PD were included.

**Result(s):** Fourteen RCTs were selected, with heterogeneous protocols and outcomes measures. Yoga interventions were safe and well-accepted for patients with mild to moderate PD. The descriptive analysis indicated that its practice might provide both physical and psychological benefits. Preliminary evidence showed that yoga has comparable or superior efficacy to exercise. A subsequent meta-analysis on five RCTs detected that yoga was more effective than passive control in ameliorating motor symptoms.

**Conclusion(s):** Yoga appears to be a promising rehabilitative therapy for individuals with PD. Recommendations are proposed for future studies.

**Implications for Rehabilitation:** Yoga is a safe and feasible therapy for people with mild to moderate PD. Yoga practice positively impacts physical and mental health in this population. When compared to exercise, yoga showed to have similar or even greater effects.

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**Title: The Correlation Between Parkinson's Disease and Rapid Eye Movement Sleep Behavior Disorder: A Systematic Review.**

**Author(s):** Shrestha, Niki; Abe, Rose Anne M; Masroor, Anum; Khorochkov, Arseni; Prieto, Jose; Singh, Karan B; Nnadozie, Maduka C; Abdal, Muhammad; Mohammed, Lubna

**Abstract:** Parkinson's disease (PD) is a neurodegenerative disease caused due to the destruction of dopaminergic neurons and the deposition of α-synuclein proteins, known as Lewy bodies. Generally, the diagnosis of PD is centered around motor symptoms. However, the early recognition of non-motor symptoms such as autonomic dysfunction, sleep disturbances, and cognitive and psychiatric disturbances are gaining increased attention for the early diagnosis of PD. Rapid eye movement (REM) sleep behavior disorder or REM sleep behavior disorder (RBD) is described as parasomnia, which is a condition of loss of normal muscle atonia causing the person to act out vivid dreams and it has been seen to be associated with the misprocessing of intercellular α-synuclein leading to neurodegenerative diseases such as PD. This review's objective is to highlight the significance of RBD as a prodromal premotor marker for the early detection of PD. We used PubMed as our primary database to search for articles on May 2, 2021, and a total of 1849 articles were found in our initial search using keywords and medical subject heading (MeSH) keywords. Thereafter, we removed the duplicates, applied the inclusion/exclusion criteria, and did a quality appraisal to include 10 articles in this study. We concluded that the recognition and diagnosis of RBD are of paramount importance to detect early PD, and further longitudinal studies and clinical trials are of utmost importance to understand their correlation; also, treatment trials are needed to prevent the phenoconversion of RBD into PD.

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**Title: The frequency of atypical and extreme values for pharyngeal phase swallowing measures in mild parkinson disease compared to healthy aging**

**Author(s):** Gandhi P.; Mancopes R.; Sutton D.; Steele C.M.; Plowman E.K.

**Purpose:** Dysphagia is thought to be prevalent and a leading cause of morbidity and mortality in people with Parkinson disease (PwPD). The aim of this study was to compare the frequencies of atypical and extreme values for measures of swallowing physiology in PwPD and in an age-and sex-matched cohort of healthy adults. Atypical and extreme values were defined, respectively, as values falling in the 25% and 5% tails of the reference distribution for healthy adults under age 60 years.

**Method(s):** A standard videofluoroscopy (VF) protocol was performed in 17 adults with mild PD and 17 age-and sexmatched healthy adults using 20% w/v liquid barium ranging from thin to extremely thick consistency. Blinded VF analysis was performed according to the Analysis of Swallowing Physiology: Events, Kinematics and Timing Method. Frequencies for atypical and extreme values were tabulated by cohort and compared using odds ratios.

**Result(s):** Increased frequencies of atypical values (> 25%) were seen in the PwPD for prolonged swallow reaction time, prolonged time-to-laryngeal-vestibule-closure (LVC), and poor pharyngeal constriction. However, these findings were also observed in the healthy controls. The PwPD showed significantly higher odds of atypical values for narrow upper esophageal sphincter (UES) diameter on thin liquids, a short hyoid-burst-to-UES-opening interval on extremely thick liquids, and prolonged time-to-LVC, LVC duration, and UES opening duration on multiple consistencies. The frequencies of extreme values failed to show any significant cohort differences for any parameter.

**Conclusion(s):** In this study, a group of people with mild PD did not show clear evidence of swallowing impairments distinct from the changes seen in a healthy age-matched control group when odds ratios were used to compare the frequencies of atypical values between PwPD and the control group; only a few parameters showed significant differences. These were findings of significantly higher frequencies in PwPD of prolonged LVC and UES opening duration. Copyright © 2021 The Authors.

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**Title: The Influence of Coronavirus Disease-2019 (COVID-19) On Parkinson's Disease: An Updated Systematic Review.**

**Author(s):** Jaiswal ; Alquraish, Danah; Sarfraz, Zouina; Sarfraz, Azza; Nagpal, Shavy; Singh Shrestha, Prakriti; Mukherjee, Dattatreya; Guntipalli, Prathima; Sánchez Velazco, Diana F.; Bhatnagar, Arushee; Savani, Saloni; Halilaj, Elmjedina; Ruxmohan, Samir; Cueva, Wilson

**Background:** COVID-19 has affected global communities with multiple neurological complications in addition to other critical medical issues. COVID-19 binds to the host's angiotensin-converting enzyme 2 (ACE2) receptors, which are expressed in the neurons and glial cells, acting as an entry port to the central nervous system (CNS). ACE2 receptors are abundantly expressed on dopamine neurons, which may worsen the prognosis of motor symptoms in Parkinson's disease (PD). SARS-CoV-2 may lead to an indirect response via immune-mediated cytokine storms and propagate through the CNS leading to damage. In this systematic review, we aim to provide thorough analyses of associations between COVID-19 and neurological outcomes for patients with PD.

**Methods:** Using PRISMA statement 2020, a systematic review was conducted to isolate confirmed COVID-19 patients and analyze the PD-associated neurological outcomes using the following databases: PubMed, Science Direct, Google Scholar, and Cochrane databases. The following keywords were used "COVID19, SARS-CoV-2, Parkinson's disease, Pandemic, Mortality." A modified Delphi process was employed.

**Results:** Of the 355 studies located during the initial round of screening, 16 were included in the final synthesis. Of PD patients who tested positive for SARS-CoV-2, worsening motor symptoms and other viral-associated symptoms were reported. These symptoms included

bradykinesia, tremors, gait disturbances, delirium and dementia, and severe spasms of arms and legs. Encephalopathy was presented in 2 of the included studies. Increased mortality rates were identified for hospitalized patients due to COVID-19 and PD as compared to other patient groups.

**Conclusion:** Patients with PD may experience substantial worsening of symptoms due to COVID 19. Given the novelty of neurological-viral associations, clinical studies in the future ought to explore the disease severity and neurological outcomes in COVID-19 positive patients with PD as compared to non-PD patients, in addition to understanding the role of ACE2 in increased vulnerability to contracting the infection and as a treatment modality.

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**Title: The post-diagnosis sleep quality of patients with Parkinson's disease.**

**Author(s):** Fujii

**Background:** Addressing the complex factors associated with Parkinson's disease (PD) requires patient interventions to be implemented by nurses and caregivers that consider personality traits and their relationship to sleep quality.

**Aims:** To assess the sleep quality and personality traits of patients with PD pre- and post-diagnosis and determine how these factors affect patients' quality of life.

**Methods:** The authors mailed a self-reporting questionnaire survey to all 822 members of the Japanese PD Association of Tokyo in January 2017. The overall response rate was 48.4%, and the effective response rate was 34.3%. A total of 282 participants (136 men and 146 women) were enrolled. Each patient responded to questions regarding their sex, age and primary symptoms. Participants also provided responses to questions about the hours slept per night and hours spent napping, as well as the number of toilet visits during sleep and outcomes of Type A behavioural tests.

**Findings:** Patients with PD reported a post-diagnosis decrease in sleep time and an increase in napping time. The study subjects also reported becoming tense easily, but they did not report feeling irritated or angry. The subjective assessment indicated a post-diagnosis worsening of sleep quality in patients with PD.

**Conclusions:** Although the underlying mechanisms of PD are not yet fully understood, patients with PD require comprehensive strategies for care that should include actions such as encouragement of patients with PD to participate in society and to perform appropriate activities that enhance sleep quality.

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**Title: The state of telemedicine for persons with Parkinson's disease.**

**Author(s):** van den Bergh ; Bloem, Bastiaan R.; Meinders, Marjan J.; Evers, Luc J. W.

**Purpose of Review:** The COVID-pandemic has facilitated the implementation of telemedicine in both clinical practice and research. We highlight recent developments in three promising areas of telemedicine: teleconsultation, telemonitoring, and teletreatment. We illustrate this using Parkinson's disease as a model for other chronic neurological disorders.

**Recent Findings:** Teleconsultations can reliably administer parts of the neurological examination remotely, but are typically not useful for establishing a reliable diagnosis. For follow-ups, teleconsultations can provide enhanced comfort and convenience to patients,

and provide opportunities for blended and proactive care models. Barriers include technological challenges, limited clinician confidence, and a suboptimal clinician-patient relationship. Telemonitoring using wearable sensors and smartphone-based apps can support clinical decision-making, but we lack large-scale randomized controlled trials to prove effectiveness on clinical outcomes. Increasingly many trials are now incorporating telemonitoring as an exploratory outcome, but more work remains needed to demonstrate its clinical meaningfulness. Finding a balance between benefits and burdens for individual patients remains vital. Recent work emphasised the promise of various teletreatment solutions, such as remotely adjustable deep brain stimulation parameters, virtual reality enhanced exercise programs, and telephone-based cognitive behavioural therapy. Personal contact remains essential to ascertain adherence to teletreatment.

**Summary:** The availability of different telemedicine tools for remote consultation, monitoring, and treatment is increasing. Future research should establish whether telemedicine improves outcomes in routine clinical care, and further underpin its merits both as intervention and outcome in research settings.

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**Title: Validation of quantitative gait analysis systems for Parkinson's disease for use in supervised and unsupervised environments.**

**Author(s):** Alberto ; Cabral, Sílvia; Proença, João; Pona-Ferreira, Filipa; Leitão, Mariana; Bouça-Machado, Raquel; Kauppila, Linda Azevedo; Veloso, António P.; Costa, Rui M.; Ferreira, Joaquim J.; Matias, Ricardo

**Background:** Gait impairments are among the most common and impactful symptoms of Parkinson's disease (PD). Recent technological advances aim to quantify these impairments using low-cost wearable systems for use in either supervised clinical consultations or long-term unsupervised monitoring of gait in ecological environments. However, very few of these wearable systems have been validated comparatively to a criterion of established validity.

**Objective:** We developed two movement analysis solutions (3D full-body kinematics based on inertial sensors, and a smartphone application) in which validity was assessed versus the optoelectronic criterion in a population of PD patients.

**Methods:** Nineteen subjects with PD (7 female) participated in the study (age: $62 \pm 12.27$ years; disease duration: $6.39 \pm 3.70$ years; HY: $2 \pm 0.23$). Each participant underwent a gait analysis whilst barefoot, at a self-selected speed, for a distance of 3 times 10 m in a straight line, assessed simultaneously with all three systems.

**Results:** Our results show excellent agreement between either solution and the optoelectronic criterion. Both systems differentiate between PD patients and healthy controls, and between PD patients in ON or OFF medication states (normal difference distributions pooled from published research in PD patients in ON and OFF states that included an age-matched healthy control group). Fair to high waveform similarity and mean absolute errors below the mean relative orientation accuracy of the equipment were found when comparing the angular kinematics between the full-body inertial sensor-based system and the optoelectronic criterion.

**Conclusions:** We conclude that the presented solutions produce accurate results and can capture clinically relevant parameters using commodity wearable sensors or a simple smartphone. This validation will hopefully enable the adoption of these systems for supervised and unsupervised gait analysis in clinical practice and clinical trials.

**Title: Vigorous Aerobic Exercise in the Management of Parkinson Disease: A Systematic Review.**

**Author(s):** Rodríguez ; Albillos-Almaraz, Laura; López-Aguado, Ismael; Crespo, Irene; del Valle, Miguel; Olmedillas, Hugo

**Objective:** To summarize the findings from studies examining the effects of vigorous-intensity aerobic exercise in the management of Parkinson disease. TYPE: Systematic review.
**Literature survey:** PubMed/MEDLINE, EMBASE, Scopus, Web of Science, Cochrane Library, SPORTDiscus, and ScienceDirect databases were searched up to May 2020. Reference lists of the included articles were also searched for additional studies. Searches were restricted to English language.
**Methodology:** Seven papers, including six studies, five randomized controlled trials and one controlled trial, were identified. The studies examined the effects of vigorous-intensity aerobic exercise in participants with Parkinson disease. Studies in which the minimal intensity required was ≥77% of maximum heart rate, 60% of heart rate reserve or 64% of maximal oxygen uptake met the inclusion criteria. Method appraisal showed a mean score of 5.3 in the Physiotherapy Evidence Database (PEDro) scale.
**Synthesis:** No statistically significant differences were found between vigorous-intensity aerobic exercise and moderate/low-intensity aerobic exercise for the main outcomes (disease severity and motor function). Only one study concluded a significant higher aerobic fitness in favor of the group that exercised at vigorous intensity compared to the moderate intensity group.
**Conclusions:** Vigorous-intensity aerobic exercise has not shown statistically significant improvements in motor and nonmotor impairments in individuals with Parkinson disease as compared to moderate/low-intensity aerobic exercise. Hence, the current evidence is too limited to allow recommendations for clinical practice.

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**Title: Visual hallucinations.**

**Author(s):** Weil ; Lees, A. J.

**Abstract:** Visual hallucinations have intrigued neurologists and physicians for generations due to patients' vivid and fascinating descriptions. They are most commonly associated with Parkinson's disease and dementia with Lewy bodies, but also occur in people with visual loss, where they are known as Charles Bonnet syndrome. More rarely, they can develop in other neurological conditions, such as thalamic or midbrain lesions, when they are known as peduncular hallucinosis. This review considers the mechanisms underlying visual hallucinations across diagnoses, including visual loss, network dysfunction across the brain and changes in neurotransmitters. We propose a framework to explain why visual hallucinations occur most commonly in Parkinson's disease and dementia with Lewy bodies, and discuss treatment approaches to visual hallucinations in these conditions.

**Sources Used:**

The following databases are searched on a regular basis in the development of this bulletin: **EMCARE, British Nursing Index, CINAHL, Medline.**

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