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Review Article

Mapping of practices and approaches of occupational therapists in Parkinson's disease: a scoping review

Mapeamento das práticas e abordagens de terapeutas ocupacionais na doença de Parkinson: uma revisão de escopo

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Abstract

Introduction: Parkinson's disease (PD) ranks second among progressive chronic neurodegenerative diseases, with high prevalence and annual incidence. Therefore, it is necessary to update the current and developing occupational therapy options for this pathology. **Objective:** To map the practices and approaches of occupational therapists conducted through therapeutic interventions in PD. **Method:** Review conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist, based on the methodology of the Joanna Briggs Institute. The research question was formulated using the PCC (Patient, Concept, and Context) acronym, with primary and secondary terms consulted in the DeCS/MeSH multilingual thesaurus. Searches were conducted on five scientific databases between 2011 and 2020. Blind researchers were compared by the degree of agreement measured by Cohen's kappa coefficient. **Results:** The findings indicate that there are at least eight categories of practices and approaches performed by occupational therapists in PD. Most procedures are conducted at home. Research in outpatient environments is the primary setting for knowledge production in the field. Strategies focused on physical and functional behaviors are most in demand in PD, with measurable results, while occupation-based interventions show modest results. **Conclusion:** The actions of occupational therapists in PD are highly variable, occur in different contexts, and their outcomes suggest that not all mapped options

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present consistent results or are not sufficiently detailed to favor a better interpretation of the findings.

Keywords: Parkinson's Disease, Therapeutics, Rehabilitation, Occupational Therapy.

Resumo

Introdução: A doença de Parkinson (DP) é a segunda no grupo das doenças neurodegenerativas crônicas progressivas, com alta prevalência e incidência anual. Portanto, faz-se necessário atualizar as opções terapêutico-ocupacionais, vigentes ou em desenvolvimento, para essa patologia. **Objetivo:** Mapear as práticas e abordagens de terapeutas ocupacionais conduzidas por meio de intervenções terapêuticas na DP. **Método:** Revisão conduzida em atenção ao "*Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews* (PRISMA-ScR) *Checklist*", baseada na metodologia do *Joanna Briggs Institute*. A pergunta de pesquisa foi elaborada a partir do acrônimo PCC (Paciente, Conceito e Contexto), cujos termos principais e secundários foram consultados no DeCS/MeSH. As buscas foram realizadas em cinco plataformas científicas entre 2011 e 2020. Os pesquisadores cegos foram comparados pelo grau de concordância aferido pelo coeficiente kappa de Cohen. **Resultados:** Os achados indicam que há pelo menos oito categorias de práticas e abordagens realizadas por terapeutas ocupacionais na DP. A maioria dos procedimentos é executado no domicílio. A pesquisa em ambiente ambulatorial é o grande cenário de produção de conhecimento na área. As estratégias focadas em condutas físicas e funcionais são as mais demandadas na DP, com resultados aferíveis, ao passo que as intervenções baseadas em ocupações manifestam resultados discretos. **Conclusão:** As atuações do terapeuta ocupacional na DP têm ampla variabilidade, ocorrem em diferentes contextos e seus desfechos sugerem que nem todas as opções mapeadas apresentam resultados consistentes ou não são suficientemente detalhadas para favorecer uma melhor interpretação dos achados.

Palavras-chave: Doença de Parkinson, Procedimentos Terapêuticso, Reabilitação, Terapia Ocupacional.

Introduction

Parkinson's disease (PD) is a chronic progressive neurological condition characterized by the degeneration of cells in the ventral layer of the *substantia nigra* and the *locus coeruleus*. The main disorders are motor-related and include bradykinesia, muscle rigidity, resting tremor, and postural and gait changes (Monje et al., 2019). These and other signs and symptoms appear and worsen as the disease progresses. Therefore, monitoring the progression of the clinical condition is important. A reliable way to classify PD based on the level of disability of the person is through the Hoehn and Yahr Scale (Mello & Botelho, 2010). Originally, this scale classified the stages of PD from 1 to 5. In its modified version, two intermediate stages were included: 1.5 and 2.5 (Santos García et al., 2021). Stage 1 is related to minimal functional disability and stage 5 to the most severe situations. Another conceptual stratification for the Hoehn and Yahr Scale considers the levels of involvement in stages 1 to 3 as mild to moderate disabilities and in stages 4 and 5 as severe disabilities (Mello & Botelho, 2010; Silva et al., 2010).

In addition to motor symptoms, PD evolves with neuropsychiatric changes, sensory manifestations, and cognitive damage (Dhingra et al., 2021). Together, the progressive changes in PD impair functional performance, lead to varying degrees of dependence on activities of daily living, and affect quality of life (Marques et al., 2020). Therefore, the stage and progression of PD influence the choice of therapeutic option.

Currently, there is no treatment capable of halting the neurodegenerative process of PD. Although drug management assists in delaying the evolution of disease signs, side effects are significant limitations of this modality (Zhang et al., 2021). This is expressed in the pharmacological therapeutic window, which is not so extensive because of the sequence of dosage increases, approaching the risk of toxicity, thus reinforcing the need for the participation of a multidisciplinary team in specific area demands to fill gaps and seek the best results in interventions (Aye et al., 2020). In this sense, non-pharmacological interventions include physical, cognitive, psycho-emotional, functional, and occupational programs, primarily targeting the impact of disease on the quality of life of patients (Delgado-Alvarado et al., 2020). Thus, because of the complexity that PD presents in various areas of life, in the composition of the team, demands are usually met by nurses, physicians, psychologists, physiotherapists, speech-language pathologists, and occupational therapists (Aye et al., 2020; Radder et al., 2017).

The main objectives of PD treatment by occupational therapy relate to symptoms associated with sleep, fatigue, falls, autonomy in feeding, visual disturbances, mood changes, and sensory complaints (Welsby et al., 2019).

A survey conducted on the Joanna Briggs Institute (JBI) and Open Science Framework (OSF) platforms found no studies presenting the practices and approaches of occupational therapists conducted through interventions in the care of PD patients. However, this is a theme that needs to be addressed, as there is little and/or low evidence in the literature.

Thus, it is believed that the identification of studies on this theme can foster the sharing of specific therapeutic options found in the profession, generate reflections on the results obtained, and deepen the actions and performance of occupational therapists in PD.

Therefore, this scoping review aimed to map the practices and approaches of occupational therapists conducted through therapeutic interventions in PD.

Method

This study followed the requirements of the JBI methodology for scoping reviews, in line with the revised proposal by Arksey and O'Malley (Peters et al., 2020). As a requirement to support the search strategy, the research question was formulated based on the PCC acronym (Patient, Concept, and Context), defined as: How do occupational therapists work with people diagnosed with PD at different stages of the disease and in various practice contexts?

The steps adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist (Tricco et al., 2018). Briefly, the First Stage (Identification) encompasses the execution of the search strategy on scientific platforms to aggregate the studies found; the Second Stage (Selection) is carried out by reading titles and/or abstracts to filter texts relevant to the

research question; the Third Stage (Eligibility) involves applying the adopted inclusion and exclusion criteria for later finalization in the Fourth Stage (Inclusion), where the remaining studies have their (meta)data extracted for analysis. These stages are detailed below.

Search strategy

The searches were conducted between February and June 2021, always by two independent researchers, blind to each other, and followed the PRISMA-ScR Checklist (Tricco et al., 2018). The two researchers who executed the PRISMA-ScR stages were undergraduates with experience in undergraduate research programs and trained to execute these stages, whose autonomy in the study was defined for agreement values >0.7 (Kappa) with the Staff researcher – a doctor with expertise in the theme. The other researchers were also doctors and played roles in reviewing the conduct and analyzing the findings. Articles were retrieved from scientific databases: Cochrane Library (Cochrane), *Portal Regional da Biblioteca Virtual em Saúde*/BIREME (Portal BVS), MEDLINE via National Library of Medicine (PubMed), and Scopus Elsevier (Scopus). Another source consulted was the Occupational Therapy Systematic Evaluation of Evidence (OTseeker). Except for this last database, the others were searched using the CAFe access of *Periódicos CAPES*. To this end, the following descriptors were consulted at *DeCS*/MeSH: "Parkinson's Disease" and "Occupational Therapy". These descriptors were primarily filtered from titles, abstracts, and keywords, in Portuguese, Spanish, and English, published between 01 January 2011, and 31 December 2020. Table 1 summarizes the applied search strategy.

It is noteworthy that CAFe is a free platform for paid scientific publications; however, not all journals are in the subscription to the Brazilian Ministry of Education, which led to the removal of some articles because of difficulty accessing the full texts.

Table 1. Search strategy - Summary of the main procedures adopted.

DATABASE	SEARCH STRATEGY		
	FILTER	*SEARCHES/LANGUAGE/DESCRIPTORS*	*B1 + B2 + B3*
Cochrane	Title, abstract, and keywords	***Search in Portuguese (B1):*** (Terapia Ocupacional **OR** Curso de Terapia Ocupacional) **AND** (Parkinson Primário **OR** Mal de Parkinson **OR** Doença de Parkinson com Corpos de Lewy **OR** Doença de Parkinson **OR** Doença de Parkinson Idiopática)	63
Scopus			294
PubMed	Title and abstract		20
		Search in English (B2):(Occupational Therapy) **AND** (Parkinson's Disease)	
OTseeker			5
		Search in Spanish (B3): (Terapia Ocupacional) **AND** (Enfermedad de Parkinson)	
Portal BVS	Title, abstract, and subject		926

Source: From research.

The search procedures were equally conducted across all selected databases, differing only in the filters used (Table 1), and were later uploaded in a compatible extension for analysis in the Rayyan online software.

Selection and eligibility of studies

The identified studies were exported to Rayyan (Ouzzani et al., 2016). In this online software, first, studies in duplicate were removed, and then the independent researchers proceeded to the blind selection stage according to the defined research question and objective of this review. The analyzed text was maintained between the stages following the favorable opinion of both researchers. Blind disagreements between them were kept for a more detailed analysis of eligibility.

Once the selection stage was completed, the process moved on to eligibility, still in a blind manner. The main selection criteria were previously inserted into the Rayyan software, namely, inclusion criteria: original studies, whether primary or not; experimental, observational, clinical or semi-clinical studies, study protocols, and surveys of information/data/interviews, conducted with adults (aged ≥18 years), at any stage of PD; practices and approaches of occupational therapists through interventions conducted at home, in outpatient clinic, or hospital settings; presence of an occupational therapist in the technical and/or research team; reference text containing the practices and approaches conducted through occupational therapy interventions; reference text in Portuguese or English. Exclusion criteria: gray literature; parkinsonian manifestations; articles published in any review format; full texts not available; publications in which the description of the practices and approaches of occupational therapy interventions does not minimally allow for reproducibility, without clarifying frequency, duration, and number of sessions, or minimum resources used, whether or not there was adjunctive treatment.

Only from this point, disagreements in the opinions of the blind researchers were sent for open discussion among them. If no consensus was reached among the non-blind reviewers, the decision was made by a third independent researcher. This set of procedures resulted in the articles included for the extraction of metadata and subsequent inference of outcomes.

Extraction of metadata

Information that would help achieve the main objective of this scoping review was extracted from the included articles, as listed in Table 2.

Table 2. Presentation of metadata - Definition and delimitation of the extraction of information.

Metadata	Definition and delimitation
Author/Year	First author or research group and year of publication
Objective	Draft of the object or problem or hypothesis of the study
Study design	Methodological design of the original study
Sample and groups	Number of study participants/groups
Interventions	Brief description of the main procedures, practices and/or approaches of occupational therapists conducted through therapeutic interventions in PD
Main results	Summary of the main findings or conclusions of the study

Source: From research.

Tabulation, analysis and presentation of outcomes

The analysis was established by individually categorized metadata tabulated in an Excel® spreadsheet, as well as the generation of inferences about the outcomes. To this end, initially, the metadata supported the development of domains of the categories and mapped strategies, in which, after analysis, each study was allocated to only one of the identified categories – the one most representative of the inferred strategy. The naming of the categories was based on the interpretation of the objectives, metadata, and practices and approaches presented in the included studies.

Thus, the conducted practices and approaches analyzed were aggregated as strategies, and compose the primary outcomes. Concurrently, the results in each included study were interpreted and grouped to characterize the secondary outcomes. To facilitate this interpretation and the visualization of the impact of these outcomes on the included studies, an arbitrary scoring code was originally assembled and defined as follows: Positive (**+**), coded to studies whose conclusion indicated gains, at least, in the main indicators adopted (score: 1.00) – this coding was only granted to outcomes that were favorable to the participants of the analyzed studies. Middling (**+/–**), established for studies that suggested gains in some variables and/or maintenance in others, without priorities (score: 0.25) – this coding was given to outcomes in which at least one of the assessment instruments did not indicate benefits to participants with significant differences between the established controls. None/Empty/Absent (**Ø**), indicated for studies that did not show gains in all the evaluation instruments used or whose outcomes did not demonstrate significant differences between the established controls in the included studies (score: 0.00). Finally, studies whose design did not allow for analysis of the outcomes in favor of interventions were marked without any score, as Not Applicable (**NA**).

The coding adhered to the conventional scoring was used in studies approved by the inclusion criteria and not removed by the exclusion criteria, both to obtain an absolute numerical orientation – by the sum of the outcomes, and relative – established by the ratio of the achieved sum divided by the number of scored studies.

Analysis of agreement

The degree of agreement between the independent blind researchers for the selection of articles was analyzed using Cohen's Kappa coefficient (k) and interrater reliability was graded as: no agreement (0); none to slight (0–0.20); fair (0.21–0.40); moderate (0.41–0.60); substantial (0.61–0.80); almost perfect agreement (≥0.81) (Higgins et al., 2019). The data were processed using the SPSS 20.0 software (IBM®) and statistical significance was established for values of $p<0.05$. The results are presented as mean ± standard deviation.

Results

The searches in the electronic databases identified 1308 studies, of which 131 were selected. The eligibility criteria filtered 71 studies for the complete analysis of the texts. Of these, 28 were included for the extraction of metadata (Figure 1). During each stage,

where studies were being removed, it is noteworthy the small number of gray literature texts identified, totaling only six examples, among books, book chapters, theses, and dissertations. Contradictorily, from the total of elected studies, a significant number (n=13) were removed for not containing minimal information that could guarantee the understanding of what was exactly done, which makes a possible replication of the studies unfeasible.

Through the execution of the search strategy, the coefficient of agreement (*k*) between the independent researchers was in the order of 0.715 ±0.036, *p*=0.007. This result evidences a "substantial" degree of interrater reliability and demonstrates homogeneity in the procedures.

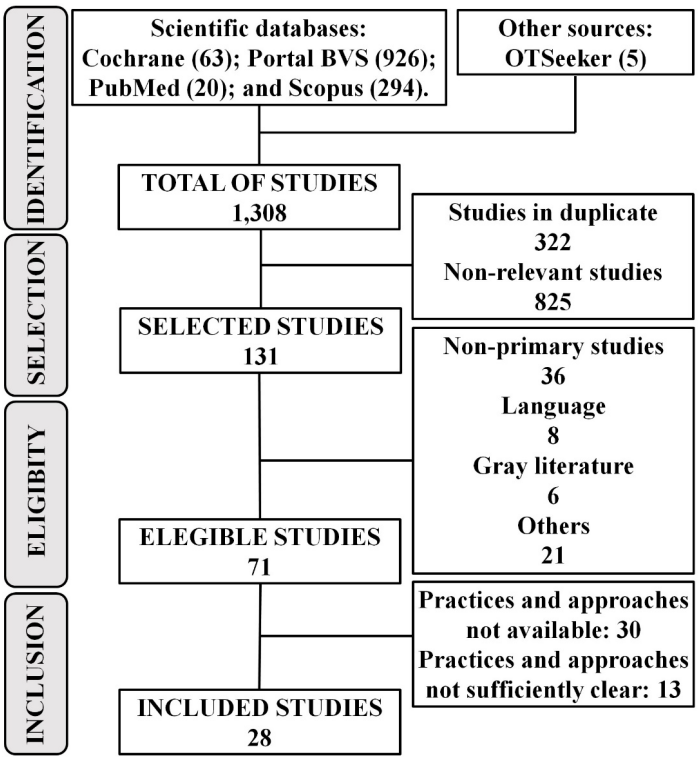

Figure 1. PRISMA-ScR Checklist. **Source:** From research.

Regarding the analyzed data, the practices and approaches conducted by occupational therapists through interventions in attention and care for people with PD showed variability among the mapped productions (Table 3). This finding enabled grouping into at least eight categories, composed of different strategies conducted in the included studies. All strategies from the categories received coding to assist in the interpretation of the results (Table 3). Only the last two categories, as they consist of studies with designs that do not enable interpretation of outcomes, did not receive score notations and were used for the collection of data and information or the prior dissemination of research procedure systematization with PD patients, such as study protocols (Table 3).

Table 3. Mapping of categories, practices, and approaches conducted through interventions in PD - Study outcomes.

SCORED CATEGORIES			
NUMBER **CATEGORY**	**DESCRIPTION OF PRACTICES AND APPROACHES**	**AUTHORSHIP / OUTCOME**	**ANALYSIS**
n = 6	Priorities: ADLs, IADLs, transfers/mobility, and sleep/fatigue; priority definition agreed with the patient; occupational therapy program in PD using significant activities feasible in time and context following the client-centered approach in promoting occupation and participation	(**+**) Chapman & Nelson (2014); (**Ø**) Clarke et al. (2016); (**+**) Sturkenboom et al. (2014); (**Ø**) Sturkenboom et al., 2015; (**+/–**) Sturkenboom et al. (2016); and (**Ø**) Sturkenboom et al. (2020)	**Absolute number**: 2.(+) + 1.(+/–) + 3.(Ø) = 2.25
Significant activity x occupation x client-centered			**Relative number**: 2.25/6 = 0.37.
n = 5	Manual activities linked to cognitive training; training of motor, functional, and cognitive skills; fine motor functional training; training of skills, adaptations, and use of equipment/resources (ADLs); reconciling motor training with daily tasks/activities.	(**+**) Díez-Cirarda et al. (2017); (**+**) Franciotta et al. (2019); (**+**) Mateos-Toset et al. (2016); (**Ø**) Monticone et al. (2015); and (**+/–**) Schaeffer et al. (2019)	**Absolute number**: 3.(+) + 1.(+/–) + 1.(Ø) = 3.25.
Activities x components and/or task-oriented practice			**Relative number**: 3.25/5 = 0.65.
n = 4	Autonomy in ADLs and IADLs; autonomy in IADLs/driving and work; training of independence in ADLs, training in ADLs and recreational activities	(**+**) Frazzitta et al. (2012); (**+**) Lee et al. (2012); (**+**) Monzeli et al. (2016); and (**Ø**) Olivares et al. (2019)	**Absolute number**: 3.(+) + 1.(Ø) = 3.00.
ADLs x IADLs x work x recreation			**Relative number**: 3/4 = 0.75.
n = 3	Non-immersive virtual reality in the stimulation of functional (motor and sensory) components and quality of life	(+) Sanguinetti et al. (2016); (+) Santana et al. (2015); and (+) Silva et al. (2019)	**Absolute number**: 3.(+) = 3.00.
Virtual reality			**Relative number**: 3/3 = 1.00.
n = 2	Community yoga program adapted alongside fall risk management	(Ø) Swink et al. (2020a); and (Ø) Swink et al. (2020b).	**Absolute number**: 2.(Ø) = 0.00.
Alternative			**Relative number**: 0/2 = 0.00.
n = 1	Use of Assistive Technology principles for the adaptation of a household utensil for fun ctio nal training of feeding	(**+**) Cavalcanti et al. (2020)	**Absolute number**: 1.(+) = 1.00.
Adaptation			**Relative number**: 1/1 = 1.00.

Captions: (**+**) – Positive: the study indicates gains (1.00 point); (**+/–**) – Middling: the study suggests gains in some variables and maintenance in others (0.25 points); (**Ø**) – None/Empty/Absent: the study found no gains or no differences between the groups (0.00 points); (**NA**) – Not applicable: the study design does not allow for inferences of results (no score). **Source:** From research.

Table 3. Continued…

UNSCORED CATEGORIES			
NUMBER CATEGORY	STRATEGY DESCRIPTION	AUTHORSHIP	ANALYSIS
n = 5 Interview	Data collection: health problems and satisfaction in occupations; data collection: physical, psychological, social, and spiritual; data collection: Canadian Occupational Performance Measure (COPM); data collection: effects of the disease on daily life; data collection: remote cognition screening	(**NA**) Hultqvist et al. (2020); (**NA**) Murdock et al. (2015); (**NA**) Silva & Carvalho (2019). (**NA**) Sperens et al. (2018) and (**NA**) Stillerova et al. (2016)	5(NA)
n = 2 Study protocol	OTiP protocol: diagnoses, goals, and intervention options – based on daily functional demands (COPM) client-centered in function of occupation and participation	(**NA**) Sturkenboom et al. (2013a); and (**NA**) Sturkenboom et al. (2013b)	2(NA)

Captions: (**+**) – Positive: the study indicates gains (1.00 point); (**+/–**) – Middling: the study suggests gains in some variables and maintenance in others (0.25 points); (**Ø**) – None/Empty/Absent: the study found no gains or no differences between the groups (0.00 points); (**NA**) – Not applicable: the study design does not allow for inferences of results (no score). **Source:** From research.

On the other hand, the coding with the arbitrary scoring explored in the first six categories favored the quantification of practices and approaches conducted by occupational therapists through therapeutic interventions in PD (Table 3). Among the four most frequent, the strategies involving the application of Client-centered Practices through the use of Occupations and Participation stand out as the most used category (n=6), with a significant absolute outcome (2.25 points) (Table 3). Regarding the number and absolute score of the results, the strategies of the Activities and Components category stand out, showing the highest overall outcome (n=5; 3.25 points) (Table 3). In the same vein, the strategies associated with the ADL/IADL Training category showed a comparatively moderate outcome (n=4; 3.00 points) (Table 3).

However, it is worth highlighting the practices and approaches conducted through interventions that use technological resources, particularly Virtual Reality (Table 3). As for the number, this category ranks fourth (n=3) in the studies that used it (Table 3), but for favorable outcomes, it exhibits the best proportion (1.00) and thus assumes the first place (Table 3).

Thus, reordering the categories by their respective calculated proportions, the second-best outcome was the ADL/IADL Training category (0.75), followed by the Activities and Components / Task-Oriented Practices category (0.65), and, in the fourth place, the Occupation and Participation category (0.37) (Table 3). Collectively, this suggests that professional practices guided by sensorimotor task-oriented choices and ADL/IADL training might better fit the immediate demands of PD and, conversely, the proposals categorized in Occupation and Participation.

The mapping of practices and approaches conducted by occupational therapists through therapeutic interventions in PD led to the identification of home-based interventions as the predominant practice context (46.4%), followed by services in outpatient clinics (35.7%), and hospitals (17.9%) contexts (Figure 2). This observation is reinforced by the number of patients treated in these practice contexts, respectively, 1040, 978, and 606 (Figure 2).

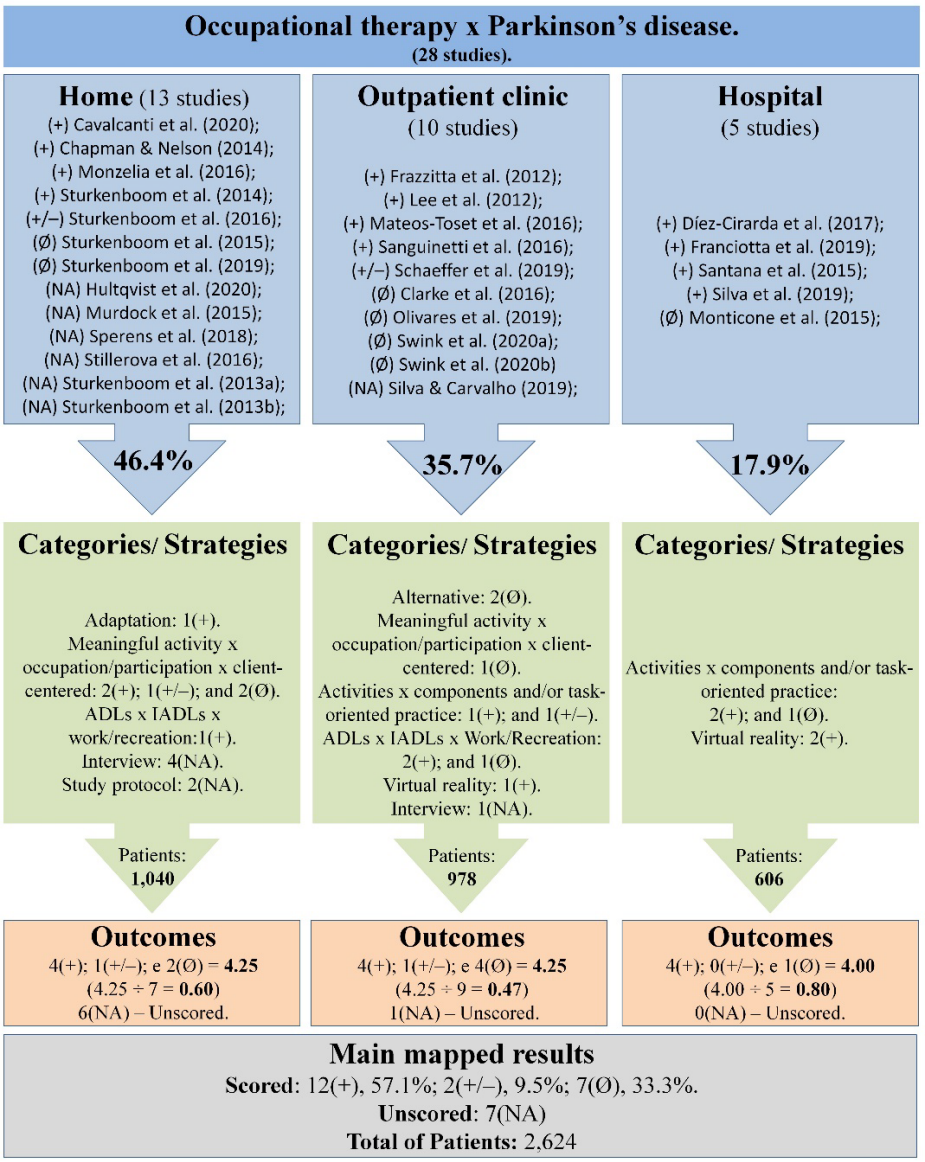

Figure 2. Contexts x Categories / Practices and Approaches x Outcomes x Results. Summary of number and outcomes. **Captions:** (**+**) – Positive: the study indicates gains (1.00 point); (**+/–**) – Middling: the study suggests gains in some variables and maintenance in others (0.25 points); (**Ø**) – None/Empty/Absent: the study found no gains or no differences between the groups (0.00 points); (**NA**) – Not applicable: the study design does not allow for inferences of results (no score). **Source:** From research.

The categories of strategies mapped in Table 1 were regrouped in Figure 2 based on Home, Outpatient Clinic, and Hospital contexts. The cross-sectional analysis of these contexts did not identify any of the categories as common among them (Figure 2). Individually, in the Home context, there is a noted predominance of productions linked to strategies that use Occupation and Participation (n=5) (Figure 2). In the other contexts, there is no evident predominance among the regrouped categories, demonstrating the diversity of options in Outpatient Clinic and Hospital contexts (Figure 2). This observation is complemented by the note that more productions and strategies are being conducted in the Outpatient Clinic context than in the others (Figure 2).

In a preliminary overview, the analysis of the outcomes ordered in the contexts of the practices and approaches conducted through interventions demonstrates consistency between the absolute number of findings and the proportion calculated for each of them (Figure 2). From the relative values raised, Hospital outcomes show clinical rigor in the search for successful results to provide patient discharge, achieving 80% (Figure 2). This result, therefore, seems to highlight the pragmatism of the Hospital in the face of Home (0.60) and Outpatient Clinic (0.47) outcomes (Figure 2). These notably lower yields in the Home and Outpatient Clinic contexts suggest the need for greater technical-scientific control in practices and productions outside the hospital environment.

The general analysis of the mapping of these data showed good results, with favorable outcomes in most publications (57.1%) compared to all scored categories (Figure 2). This finding is contrasted with the indifferent outcomes, which represent 33.3% of the quantity scored (Figure 2). Although it can be interpreted that the interventions adopted in PD are broadly successful, there is, on the other hand, a significant number of studies that did not show differentiated gains for the participants, that is, it seems that receiving or not the proposed treatments did not influence the participants' progress in the studies. Collectively, these findings show that this gap may be related to the need for detailed methods in the intervention protocol.

Discussion

Analysis of the productions mapped in the past decade shows that occupational therapists have produced significant therapies in PD, here grouped into eight categories. Most participants were treated at Home. However, it is in the Outpatient Clinic environment that more opportunities for knowledge production in the field seem to emerge, demonstrated by the larger number of practices and approaches mapped and conducted through interventions in PD. Moreover, it is noted that the occupational-therapeutic repertoire in PD based on the category of Significant Activities and Occupation was the most frequently used, but with outcomes that did not present good results or failed to detail them. This suggests that the main finding reflects that strategies based on physical and functional conduct are more demanded in PD because of the evolutionary condition of the participants, with more palpable results. This interpretation corroborates the literature, which highlights the performance of restorative and/or functional maintenance rehabilitation in PD (Rafferty et al., 2021).

Concerning the highlighted findings, the literature points to heterogeneous procedures in the treatment of PD associated or not with specific approaches related to mobility (Abbruzzese et al., 2016). Thus, in this scoping review, the options found suggest important variability – this corroborates the publication of Abbruzzese et al. (2016). In other studies, the same variability or heterogeneity of the identified treatments was also grouped to facilitate the inference of the data (Abbruzzese et al., 2016; Foster et al., 2014). In yet other studies, this approach was concise and direct, where three major categories of intervention appear: physical nature activities, environmental cues and cognitive-behavioral, and self-management (Foster et al., 2014).

The findings of this review differ from those of previous studies by categorizing the strategies identified in the treatment of PD, adopting classification through practices exclusive to occupational therapists or in development by professionals in the field. Thus, it is considered a complementation of the literature concerning occupational therapy in PD, by reporting similarities of procedures with other chronic and acute neurological diseases (for example, multiple sclerosis and stroke, respectively), and by bringing to light that the outcomes of the profession's interventions are essentially focused on physical and functional practices (De-Bernardi-Ojuel et al., 2021; McGlinchey et al., 2020). Part of this decision may be based on the target of the therapies adopted in PD: the resuming and/or maintenance of ADLs and independence and/or quality of life (Doucet et al., 2021), which can be easily identified in the objectives and methods of the included studies.

Perhaps for this reason, ADLs and IADLs emerged as the most frequent category – Significant Activities and Occupation. What differentiates them are the worked objectives. In this category, the focus was on favoring participation in meaningful occupations to the participants, whereas in the other categories, the interest was in achieving or maintaining competencies, skills, and independence from therapeutic practices based on activities and tasks. In any case, PD leads to functional decline and limitations in other areas of occupational performance, not just in ADLs. This allows drawing a parallel with a recent study that portrays potential impairments caused by aging to participation in meaningful occupations and, therefore, should be in the monitoring field of occupational therapists (Tuntland et al., 2020), as well as in conditions like PD.

As for the outcomes in the category of Significant Activities and Occupation, the number of indifferent and null results weighs negatively on the choice of strategies. Perhaps, compared with other mapped categories, this category interacts the most with the Client-centered Practice category, focusing on meaningful engagement with less interest in aspects of Occupational Performance (Du Toit et al., 2019). The adoption of these procedures requires, in addition to the professional's experience, a considerable investment of time for the proper conduct of this approach (Anaby et al., 2020; Kessler et al., 2019). In this sense, it is believed that this last factor may have hindered the proposal of the studies that selected it as a therapeutic approach in PD. A similar interpretation has already been raised as an argument by other authors since more time is needed for assessments than in traditional parallels, and consequently, this may be reflected in the outcomes (Eyssen et al., 2013, 2014).

Another issue to consider is the demands of PD. Here, the findings point to consistent benefits when associated with physical and functional strategies. Unlike therapeutic options linked to Occupational Participation and Engagement and the Client-centered approach, the literature highlights the benefits achieved in other areas (social interaction and communication) that are not functional (Eyssen et al., 2014).

The outcomes of Eyssen et al. (2014) help clarify the low yield of this category found in the present scope review, without excluding the possibility of also being related to the need, in these cases, for detailed methods in the intervention protocols.

Thus, in addition to the Significant Activity x Occupation category, the present survey highlighted three others – Activities/Components, ADLs/IADLs, and Virtual Reality – produced by occupational therapists through interventions in PD that demonstrate a closer proximity to therapeutic interventions based on activities and tasks. This classification was based on a recent study that highlights these productions as interventions focused on Performance Component impairments that seek to reduce disabilities, gain skills, and foster independence in occupations (Pontes & Polatajko, 2016). This does not rule out the possibility of them still being worked with the Client-centered approach (Preissner, 2010). This approach also seems to complement the Task-oriented Practice, and as identified here, this category highlights the training of motor skills as an option to solve functional problems (Hakim et al., 2017; Preissner, 2010).

Among the functional problems, it was common for the therapeutic proposal to involve ADLs/IADLs. Therefore, this category is composed of studies focused on training and independence in these areas of Occupational Performance in PD. Recently, it was confirmed that maintaining functional skills in older people with moderate and mild cognitive deficits benefits participation in meaningful occupations conducted by IADLs (Lahav & Katz, 2020). These results seem to be consistently aligned with the findings on this category described in this scoping review. Similarly, focusing on ADLs, another study suggests the efficacy of both occupation- and deficiency-centered approaches to improve the overall health and physical functions of participants (Tomori et al., 2015).

Delving into the efficiency of the results, the category that performed best-used strategies related to Virtual Reality. Here, as described in the literature, the benefits of Virtual Reality prove to be more efficient when complemented by functional motor therapeutics (Peng et al., 2021). This result emphasizes the interpretation evidenced in this scoping review, which considers this category as the closest to interventions based on physical and functional procedures in the restoration and gains of Performance Components.

Although PD presents extensive motor behavioral manifestations, in advanced stages, non-motor symptoms emerge, particularly among those with cognitive impairments. On this note, studies that used therapy based on Virtual Reality resources also show good results in the cognitive domain (Tieri et al., 2018). This assertion is another argument that can help clarify the good performance of Virtual Reality found in this scoping review in the construct of PD treatment by occupational therapists.

On this aspect, current studies conducted with participants with multiple sclerosis and stroke survivors, which relate classical occupational therapy interventions complemented with Virtual Reality, show satisfactory results concerning the precision of movements and functional tasks that reflect in everyday life (Silva et al., 2019; Waliño-Paniagua et al., 2019).

The use of games as a resource for environmental enrichment based on interventions with stimulation in multiple domains is relatively recent. Mainly video games or Virtual Reality resources are known for being intrinsically fun and can stimulate cognitive and social aspects, in addition to neuroplasticity (Cabral et al., 2016).

Furthermore, a study states that virtual games have shown greater adherence by older adults, who prefer these games to their paper versions (Doniger et al., 2018). Digital technologies provide innovation and motivation to this population, aiding treatment adherence.

The literature describes a classic direction of potential objectives of occupational therapists in PD focused on maintaining habitual activities, including self-care, work, and leisure, and environmental, physical, and social adaptations, accompanied by the valorization of roles (Dixon et al., 2007). These points can be inferred from the objectives and results of the studies included and distributed in the three contexts of practices and approaches mapped and conducted through interventions of occupational therapists in this scoping review: Home, Outpatient Clinic, and Hospital.

Of these contexts, for at least 20 years, home treatment has been recognized for being conducive to the training of functional skills according to the participant's reality, performed in the initial phases of PD, necessary for possible disabilities in everyday life acquired with the worsening of the disease and, in more advanced stages, this context is indicated to host rehabilitation procedures and receive environmental adaptations in an attempt to prolong the independence of PD patients (Pélissier & Pérennou, 2000).

Concurrently, the Outpatient Clinic context is suitable for mediating rehabilitation solutions due to the deficiencies and disabilities that arise during the clinical evolution of PD (Pélissier & Pérennou, 2000). This last statement supports the importance of the Outpatient Clinic context by the number of categories and strategies mapped here.

Thus, the two definitions cited, because of the contributions of the Home and Outpatient Clinic contexts in PD, summarize the findings of this study and reinforce the relevance of these environments in the therapeutic context, which can be extended to other clinical conditions.

It was not the object of this scoping review to synthesize the results of the included studies, but the general analysis of the outcomes showed that they present good performance in response to the therapy adopted in PD. Not all proposals were conducted exclusively by occupational therapists, some procedures were shared with physical therapists, and others carried out by a multidisciplinary team. The fact is that these findings corroborate those of previous publications and reinforce the success of occupational therapy practices in PD, both those conducted solely by the professional (Meek et al., 2010; Welsby et al., 2019) and those carried out in established team partnerships (Radder et al., 2017; Skelly et al., 2012).

Limitations

This scoping review presents some limitations. Among them, it can be recognized that among the chosen search platforms, OTseeker is probably the one with the least research coverage, because of its characteristic of being a specialized data platform, which made it stand out for the smaller number of studies identified, while it was expected that this platform would be the largest provider of studies in the field, which was not confirmed.

Another limitation may lie in the descriptors. In an attempt to seek objectivity in the selection of studies, a limited number of alternative terms were used in the search strategies. This decision was made by applying the search terms in three languages for identification: English, Portuguese, and Spanish. By the same logic, for the eligibility criteria, it was opted to admit only in English or Portuguese, despite the probable risk of hindering the replication and international sharing of the findings.

In a scoping review, unlike a systematic review, it is possible to conduct an expanded search for various types of texts, including gray literature (books, theses, dissertations, etc.) and secondary sources (reviews). It was decided not to include this type of literature in this study, believing that part of it would already be converted into articles (theses and dissertations) or from articles (books and reviews). This methodological decision prioritized the efficiency of the searches, but the possibility of loss of detail should be recognized because of the textual limitation of more objective articles; not so present in theses, dissertations, and books, where the freedom of textual editing is greater.

Although the CAFe access of *Periódicos CAPES* is an important platform for Brazilian researchers to have free access to paid scientific publications, not all journals are in the subscription of the Brazilian Ministry of Education. Therefore, studies had to be removed because of the difficulty in accessing the full texts. As the number of these studies unavailable for analysis for inclusion was significant, access to them could modify the inferences presented here to some degree.

Finally, the analyses carried out here encountered certain difficulties for authors to express how they performed the procedures, especially those related to treatment strategies, without clarifying the frequency, duration, number of sessions, or minimum resources used, and whether or not adjunctive therapy was used. This is an issue to be observed in the scientific technique of occupational therapy researchers. This superficial way of explaining the method weighed in the analysis of the possibility of replication or not of the proposed trial. Thus, the presentation of interventions conducted with PD patients was not always entirely clear or guaranteed the complete reproducibility of the excluded studies. Those admitted, although with methodological gaps, but acceptable, may have contributed to the interpretation of classification of the categories and therapeutic strategies conceptualized here, as well as to the contextualization of the adopted therapeutic environment.

Conclusion

All findings were categorized according to practices inherent to the profession, with a predominance of interventions with a physical-functional objective. The variability of practices and approaches conducted through interventions by the occupational therapist in Parkinson's Disease (PD) is applicable in different therapeutic contexts, and the mapped outcomes did not demonstrate good results or did not detail the procedures.

Further studies should be conducted to ascertain how much the chosen therapeutic modality has its results influenced by the stage of PD. Concurrently, the need to detail the protocols/outcomes in therapeutic interventions that use Occupation and Participation in PD is emphasized.

References

Abbruzzese, G., Marchese, R., Avanzino, L., & Pelosin, E. (2016). Rehabilitation for Parkinson's disease: current outlook and future challenges. *Parkinsonism & Related Disorders*, *22*(Suppl 1), S60-S64.

Anaby, D., Vrotsou, K., Kroksmark, U., & Ellegård, K. (2020). Changes in participation patterns of youth with physical disabilities following the Pathways and Resources for Engagement and Participation intervention: a time-geography approach. *Scandinavian Journal of Occupational Therapy*, *27*(5), 364-372.

Aye, Y. M., Liew, S., Neo, S. X., Li, W., Ng, H. L., Chua, S. T., Zhou, W. T., Au, W. L., Tan, E. K., Tay, K. Y., Tan, L. C., & Xu, Z. (2020). Patient-centric care for parkinson's disease: from hospital to the community. *Frontiers in Neurology*, *11*(502), 1-6.

Cabral, V. H. G., Albuquerque, B. L., Milanesi, C. V., Oliveira, A. P., & Rocha, A. N. D. C. (2016). Jogos interativos para o incentivo cognitivo. In *Simpósio Brasileiro De Games e Entretenimento Digital* (pp. 222–225). São Paulo: SBC – Proceedings of SBGames.

Cavalcanti, A., Amaral, M. F., Silva, E., Dutra, F. C. M., Santos, A. V. F., Licursi, L. A., & Silveira, Z. C. (2020). Adaptive eating device: performance and satisfaction of a person with parkinson's disease. *Canadian Journal of Occupational Therapy*, *87*(3), 211-220.

Chapman, L., & Nelson, D. (2014). Person-centered, community-based occupational therapy for a man with parkinson's disease: a case study. *Activities, Adaptation and Aging*, *38*(2), 94-112.

Clarke, C. E., Patel, S., Ives, N., Rick, C. E., Dowling, F., Woolley, R., Wheatley, K., Walker, M. F., Sackley, C. M. (2016). Physiotherapy and occupational therapy vs no therapy in mild to moderate parkinson disease: a randomized clinical trial. *JAMA Neurology*, *73*(3), 291-299.

De-Bernardi-Ojuel, L., Torres-Collado, L., & García-de-la-Hera, M. (2021). Occupational therapy interventions in adults with multiple sclerosis or amyotrophic lateral sclerosis: a scoping review. *International Journal of Environmental Research and Public Health*, *18*(4), 1-25.

Delgado-Alvarado, M., Marano, M., Santurtún, A., Urtiaga-Gallano, A., Tordesillas-Gutierrez, D., & Infante, J. (2020). Nonpharmacological, nonsurgical treatments for freezing of gait in Parkinson's disease: a systematic review. *Movement Disorders*, *35*(2), 204-214.

Dhingra, A., Janjua, A. U., Hack, L., Waserstein, G., Palanci, J., & Hermida, A. P. (2021). Exploring nonmotor neuropsychiatric manifestations of parkinson disease in a comprehensive care setting. *Journal of Geriatric Psychiatry and Neurology*, *34*(3), 181-195.

Díez-Cirarda, M., Ojeda, N., Peña, J., Cabrera-Zubizarreta, A., Lucas-Jiménez, O., Gómez-Esteban, J. C., Gómez-Beldarrain, M. Á., & Ibarretxe-Bilbao, N. (2017). Increased brain connectivity and activation after cognitive rehabilitation in Parkinson's disease: a randomized controlled trial. *Brain Imaging and Behavior*, *11*(6), 1640-1651.

Dixon, L., Duncan, D., Johnson, P., Kirkby, L., O'Connell, H., Taylor, H., & Deane, K. H. (2007). Occupational therapy for patients with Parkinson's disease. *Cochrane Database of Systematic Reviews*, *2007*(3), 1-20.

Doniger, G. M., Beeri, M. S., Bahar-Fuchs, A., Gottlieb, A., Tkachov, A., Kenan, H., Livny, A., Bahat, Y., Sharon, H., Ben-Gal, O., Cohen, M., Zeilig, G., & Plotnik, M. (2018). Virtual reality-based cognitive-motor training for middle-aged adults at high Alzheimer's disease risk: a randomized controlled trial. *Alzheimer's & Dementia*, *4*, 118-129.

Doucet, B. M., Franc, I., & Hunter, E. G. (2021). Interventions within the scope of occupational therapy to improve activities of daily living, rest, and sleep in people with parkinson's disease: a systematic review. *The American Journal of Occupational Therapy*, *75*(3)

Du Toit, S. H. J., Shen, X., & McGrath, M. (2019). Meaningful engagement and person-centered residential dementia care: A critical interpretive synthesis. *Scandinavian Journal of Occupational Therapy*, *26*(5), 343-355.

Eyssen, I. C., Dekker, J., de Groot, V., Steultjens, E. M., Knol, D. L., Polman, C. H., & Steultjens, M. P. (2014). Client-centred therapy in multiple sclerosis: more intensive diagnostic evaluation and less intensive treatment. *Journal of Rehabilitation Medicine*, *46*(6), 527-531.

Eyssen, I. C., Steultjens, M. P., de Groot, V., Steultjens, E. M., Knol, D. L., Polman, C. H., & Dekker, J. (2013). A cluster randomised controlled trial on the efficacy of client-centred occupational therapy in multiple sclerosis: good process, poor outcome. *Disability and Rehabilitation*, *35*(19), 1636-1646.

Foster, E. R., Bedekar, M., & Tickle-Degnen, L. (2014). Systematic review of the effectiveness of occupational therapy-related interventions for people with Parkinson's disease. *The American Journal of Occupational Therapy*, *68*(1), 39-49.

Franciotta, M., Maestri, R., Ortelli, P., Ferrazzoli, D., Mastalli, F., & Frazzitta, G. (2019). Occupational therapy for parkinsonian patients: a retrospective study. *Parkinson's Disease*, *2019*, 1-7.

Frazzitta, G., Bertotti, G., Morelli, M., Riboldazzi, G., Pelosin, E., Balbi, P., Boveri, N., Comi, C., Turla, M., Leva, S., Felicetti, G., & Maestri, R. (2012). Rehabilitation improves dyskinesias in Parkinsonian patients: a pilot study comparing two different rehabilitative treatments. *NeuroRehabilitation*, *30*(4), 295-301.

Hakim, R. M., Tunis, B. G., & Ross, M. D. (2017). Rehabilitation robotics for the upper extremity: review with new directions for orthopaedic disorders. *Disability and Rehabilitation. Assistive Technology*, *12*(8), 765-771.

Higgins, S. D., Erdogan, M., Coles, S. J., & Green, R. S. (2019). Early mobilization of trauma patients admitted to intensive care units: a systematic review and meta-analyses. *Injury*, *50*(11), 1809-1815.

Hultqvist, J., Sahlström, T., Timpka, J., Henriksen, T., Nyholm, D., Odin, P., & Eklund, M. (2020). Everyday occupations and other factors in relation to mental well-being among persons with advanced parkinson's disease. *Occupational Therapy in Health Care*, *34*(1), 1-18.

Kessler, D., Walker, I., Sauvé-Schenk, K., & Egan, M. (2019). Goal setting dynamics that facilitate or impede a client-centered approach. *Scandinavian Journal of Occupational Therapy*, *26*(5), 315-324.

Lahav, O., & Katz, N. (2020). Independent older adult's IADL and executive function according to cognitive performance. *OTJR (Thorofare, N.J.)*, *40*(3), 183-189.

Lee, H. C., Yanting Chee, D., Selander, H., & Falkmer, T. (2012). Is it reliable to assess visual attention of drivers affected by Parkinson's disease from the backseat?-a simulator study. *Emerging Health Threats Journal*, *5*, 1-8.

Marques, N. G. S., Oliveira, M. I. da S., Alves, M. N., Leão, S. S., Souza, S. D. B., & Lopes, G. S. (2020). Doença de Parkinson: os principais danos provocados no indivíduo. *Research Social Development*, *9*(11), e37491110023.

Mateos-Toset, S., Cabrera-Martos, I., Torres-Sánchez, I., Ortiz-Rubio, A., González-Jiménez, E., & Valenza, M. C. (2016). Effects of a single hand-exercise session on manual dexterity and strength in persons with parkinson disease: a randomized controlled trial. *PM & R*, *8*(2), 115-122.

McGlinchey, M. P., James, J., McKevitt, C., Douiri, A., & Sackley, C. (2020). The effect of rehabilitation interventions on physical function and immobility-related complications in severe stroke: a systematic review. *BMJ Open*, *10*(2), 1-10.

Meek, C., Morgan, E., Walker, M. F., Furmston, A., Aragon, A., Birleson, A., Kelly, V., Clarke, C. E., & Sackley, C. M. (2010). Occupational therapy to optimise independence in parkinson's disease: the designing and recording of a randomised controlled trial intervention. *British Journal of Occupational Therapy*, *73*(4), 178-185.

Mello, M. P. B., & Botelho, A. C. G. (2010). Correlação das escalas de avaliação utilizadas na doença de Parkinson com aplicabilidade na fisioterapia. *Fisioterapia em Movimento*, *23*(1), 121-127.

Monje, M. H. G., Foffani, G., Obeso, J., & Sánchez-Ferro, Á. (2019). New sensor and wearable technologies to aid in the diagnosis and treatment monitoring of parkinson's disease. *Annual Review of Biomedical Engineering*, *21*, 111-143.

Monticone, M., Ambrosini, E., Laurini, A., Rocca, B., & Foti, C. (2015). In-patient multidisciplinary rehabilitation for Parkinson's disease: A randomized controlled trial. *Movement Disorders*, *30*(8), 1050-1058.

Monzeli, G. A., Toniolo, A. C., & Cruz, D. M. C. (2016). Intervenção em terapia ocupacional com um sujeito com doença de Parkinson/Occupational therapy intervention in a subject with Parkinson disease. *Cadernos Brasileiros de Terapia Ocupacional*, *24*(2), 387-395.

Murdock, C., Cousins, W., & Kernohan, W. G. (2015). "Running Water Won't Freeze": how people with advanced Parkinson's disease experience occupation. *Palliative & Supportive Care*, *13*(5), 1363-1372.

Olivares, A., Comini, L., Orfano, J., Froldi, M., & Vezzadini, G. (2019). Occupational therapy with Nordic walking and therapeutic touch: a pilot study for multidisciplinary rehabilitation in Parkinson's disease. *NeuroRehabilitation*, *45*(1), 125-134.

Ouzzani, M., Hammady, H., Fedorowicz, Z., & Elmagarmid, A. (2016). Rayyan: a web and mobile app for systematic reviews. *Systematic Reviews*, *5*(210), 1-10.

Pélissier, J., & Pérennou, D. (2000). Exercices program and rehabilitation of motor disorders in Parkinson's disease. *Revue Neurologique*, *156*(Suppl. 2), 190-200.

Peng, Q. C., Yin, L., & Cao, Y. (2021). Effectiveness of virtual reality in the rehabilitation of motor function of patients with subacute stroke: a meta-analysis. *Frontiers in Neurology*, *12*(639535), 1-20.

Peters, M. D. J., Marnie, C., Tricco, A. C., Pollock, D., Munn, Z., Alexander, L., McInerney, P., Godfrey, C. M., & Khalil, H. (2020). Updated methodological guidance for the conduct of scoping reviews. *JBI Evidence Synthesis*, *18*(10), 2119-2126.

Pontes, T., & Polatajko, H. (2016). Habilitando ocupações: prática baseada na ocupação e centrada no cliente na Terapia Ocupacional/Enabling occupation: occupation-based and client centred practice in Occupational Therapy. *Cadernos Brasileiros de Terapia Ocupacional*, *24*(2), 403-412.

Preissner, K. (2010). Use of the Occupational Therapy Task-Oriented Approach to optimize the motor performance of a client with cognitive limitations. *The American Journal of Occupational Therapy*, *64*(5), 727-734.

Radder, D. L. M., Sturkenboom, I. H., van Nimwegen, M., Keus, S. H., Bloem, B. R., & de Vries, N. M. (2017). Physical therapy and occupational therapy in Parkinson's disease. *The International Journal of Neuroscience*, *127*(10), 930-943.

Rafferty, M. R., Nettnin, E., Goldman, J. G., & MacDonald, J. (2021). Frameworks for parkinson's disease rehabilitation addressing when, what, and how. *Current Neurology and Neuroscience Reports*, *21*(3), 1-16.

Sanguinetti, D. C. de M., Coriolano, M. G. W. S., Santana, C. M. F., Ângelo, T. D. A., Silva, J. P. A., Câmara, S. B., Asano, A. G., & Lins, O. G. (2016). Quality of life of people with Parkinson's disease after treatment with non-immersive virtual reality. *Acta Fisiátrica*, *23*(2), 85-88.

Santana, C. M. F., Lins, O. G., Sanguinetti, D. C. M., Silva, F. P., Angelo, T. D. A., Coriolano, M. G. W. S., Câmara, S. B., & Silva, J. P. A. (2015). Efeitos do tratamento com realidade virtual não imersiva na qualidade de vida de indivíduos com Parkinson. *Revista Brasileira de Geriatria e Gerontologia*, *18*(1), 49-58.

Santos García, D., De Deus Fonticoba, T., Paz González, J. M., Cores Bartolomé, C., Valdés Aymerich, L., Muñoz Enríquez, J. G., Suárez, E., Jesús, S., Aguilar, M., Pastor, P., Planellas, L. L., Cosgaya, M., García Caldentey, J., Caballol, N., Legarda, I., Hernández Vara, J., Cabo, I., López Manzanares, L., González Aramburu, I., Ávila Rivera, M. A., Catalán, M. J., Nogueira, V., Puente, V., García Moreno, J. M., Borrué, C., Solano Vila, B., Álvarez Sauco, M., Vela, L., Escalante, S., Cubo, E., Carrillo Padilla, F., Martínez Castrillo, J. C., Sánchez Alonso, P., Alonso Losada, M. G., López Ariztegui, N., Gastón, I., Kulisevsky, J., Blázquez Estrada, M., Seijo, M., Rúiz Martínez, J., Valero, C., Kurtis, M., de Fábregues, O., González Ardura, J., Ordás, C., López Díaz, L., Mir, P., & Martinez-Martin, P., & Coppadis Study Group. (2021). Staging parkinson's disease combining motor and nonmotor symptoms correlates with disability and quality of life. *Parkinson's Disease*, *2021*:8871549.

Schaeffer, E., Streich, S., Wurster, I., Schubert, R., Reilmann, R., Wolfram, S., & Berg, D. (2019). How to evaluate effects of occupational therapy - lessons learned from an exploratory randomized controlled trial. *Parkinsonism & Related Disorders*, *67*, 42-47.

Silva, F. S., Pabis, J. V. P. C., De Alencar, A. G., Da Silva, K. B., & Peternella, F. M. N. (2010). Evolução da doença de Parkinson e comprometimento da qualidade de vida. *Revista Neurociências*, *18*(4), 463-468.

Silva, G. L. O., Ceron, B. M., Borba, K. M., Amaral, D. S., Marcelino, J. F. de Q., Coriolano, M. D. G. W. S., & Sanguinetti, D. C. M. (2019). Repercussões do treinamento com realidade virtual não imersiva nas habilidades motoras manuais de pessoas com doença de Parkinson. *Acta Fisiátrica*, *26*(1), 43-48.

Silva, T. P., & Carvalho, C. R. A. (2019). Doença de Parkinson: o tratamento terapêutico ocupacional na perspectiva dos profissionais e dos idosos. *Cadernos Brasileiros de Terapia Ocupacional*, *27*(2), 331-344.

Skelly, R., Lindop, F., & Johnson, C. (2012). Multidisciplinary care of patients with Parkinson's disease. *Progress in Neurology and Psychiatry*, *16*(2), 10-14.

Sperens, M., Hamberg, K., & Hariz, G. M. (2018). Challenges and strategies among women and men with Parkinson's disease: striving toward joie de vivre in daily life. *British Journal of Occupational Therapy*, *81*(12), 700-708.

Stillerova, T., Liddle, J., Gustafsson, L., Lamont, R., & Silburn, P. (2016). Could everyday technology improve access to assessments? A pilot study on the feasibility of screening cognition in people with Parkinson's disease using the Montreal Cognitive Assessment via Internet videoconferencing. *Australian Occupational Therapy Journal*, *63*(6), 373-380.

Sturkenboom, I. H. W. M., Graff, M. J., Borm, G. F., Adang, E. M. M., Nijhuis-van der Sanden, M. W. G., Bloem, B. R., & Munneke, M. (2013a). Effectiveness of occupational therapy in Parkinson's disease: study protocol for a randomized controlled trial. *Trials*, *14*(34), 1-8.

Sturkenboom, I. H., Graff, M. J., Borm, G. F., Veenhuizen, Y., Bloem, B. R., Munneke, M., & Nijhuis-van der Sanden, M. W. (2013b). The impact of occupational therapy in Parkinson's disease: a randomized controlled feasibility study. *Clinical Rehabilitation*, *27*(2), 99-112.

Sturkenboom, I. H. W. M., Nott, M. T., Bloem, B. R., Chapparo, C., & Steultjens, E. M. J. (2020). Applied cognitive strategy behaviours in people with parkinson's disease during daily activities: A cross-sectional study. *Journal of Rehabilitation Medicine*, *52*(1), 1-9.

Sturkenboom, I. H., Graff, M. J., Hendriks, J. C., Veenhuizen, Y., Munneke, M., Bloem, B. R., Nijhuis-van der Sanden, M. W. (2014). Efficacy of occupational therapy for patients with Parkinson's disease: a randomised controlled trial. *Lancet Neurology*, *13*(6), 557-566.

Sturkenboom, I. H., Hendriks, J. C., Graff, M. J., Adang, E. M., Munneke, M., Nijhuis-van der Sanden, M. W., & Bloem, B. R. (2015). Economic evaluation of occupational therapy in Parkinson's disease: A randomized controlled trial. *Movement Disorders*, *30*(8), 1059-1067.

Sturkenboom, I. H., Nijhuis-van der Sanden, M. W., & Graff, M. J. (2016). A process evaluation of a home-based occupational therapy intervention for Parkinson's patients and their caregivers performed alongside a randomized controlled trial. *Clinical Rehabilitation*, *30*(12), 1186-1199.

Swink, L. A., Fling, B. W., Sharp, J. L., Fruhauf, C. A., Atler, K. E., & Schmid, A. A. (2020a). Merging yoga and occupational therapy for parkinson's disease: a feasibility and pilot program. *Occupational Therapy in Health Care*, *34*(4), 351-372.

Swink, L. A., Fruhauf, C. A., Atler, K. E., Fling, B. W., Klinedinst, T. C., & Schmid, A. A. (2020b). Health-related quality of life changes after the merging yoga and occupational therapy for Parkinson's disease program: a mixed-methods study. *Complementary Therapies in Clinical Practice*, *39*, 101156.

Tieri, G., Morone, G., Paolucci, S., & Iosa, M. (2018). Virtual reality in cognitive and motor rehabilitation: facts, fiction and fallacies. *Expert Review of Medical Devices*, *15*(2), 107-117.

Tomori, K., Nagayama, H., Ohno, K., Nagatani, R., Saito, Y., Takahashi, K., Sawada, T., & Higashi, T. (2015). Comparison of occupation-based and impairment-based occupational therapy for subacute stroke: a randomized controlled feasibility study. *Clinical Rehabilitation*, *29*(8), 752-762.

Tricco, A. C., Lillie, E., Zarin, W., O'Brien, K. K., Colquhoun, H., Levac, D., Moher, D., Peters, M. D. J., Horsley, T., Weeks, L., Hempel, S., Akl, E. A., Chang, C., McGowan, J., Stewart, L., Hartling, L., Aldcroft, A., Wilson, M. G., Garritty, C., Lewin, S., Godfrey, C. M., Macdonald, M. T., Langlois, E. V., Soares-Weiser, K., Moriarty, J., Clifford, T., Tunçalp, Ö., & Straus, S. E. (2018). PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. *Annals of Internal Medicine*, *169*(7), 467-473.

Tuntland, H., Kjeken, I., Folkestad, B., Førland, O., & Langeland, E. (2020). Everyday occupations prioritised by older adults participating in reablement. A cross-sectional study. *Scandinavian Journal of Occupational Therapy*, *27*(4), 248-258.

Waliño-Paniagua, C. N., Gómez-Calero, C., Jiménez-Trujillo, M. I., Aguirre-Tejedor, L., Bermejo-Franco, A., Ortiz-Gutiérrez, R. M., & Cano-de-la-Cuerda, R. (2019). Effects of a game-based virtual reality video capture training program plus occupational therapy on manual dexterity in patients with multiple sclerosis: a randomized controlled trial. *Journal of Healthcare Engineering*, *2019,* 9780587.

Welsby, E., Berrigan, S., & Laver, K. (2019). Effectiveness of occupational therapy intervention for people with Parkinson's disease: systematic review. *Australian Occupational Therapy Journal*, *66*(6), 731-738.

Zhang, R., Li, J., Wu, Y., Liang, S., & Xu, L. (2021). Association of multiple dopamine D3 receptor gene 3'UTR polymorphisms with susceptibility to parkinson's disease and clinical efficacy of piribedil therapy. *Genetic Testing and Molecular Biomarkers*, *25*(1), 20-30.

Author's Contributions

Gabriela do Monte Oliveira and Sarah Almeida Rodrigues Basílio: organization of sources and writing of the manuscript; Kátia Maki Omura: analysis and guidance; Mark Kovic and Anette Enemark Larsen: critical reading and contributions to the text; Marcelo Marques Cardoso and Victor Augusto Cavaleiro Corrêa: analysis and guidance. All authors approved the final version of the text.

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