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Review

The Integrative Care of Parkinson's Disease: A Systematic Review

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Abstract. Parkinson's disease (PD) is the second most common neurodegenerative disorder after Alzheimer's disease, and it is characterized by a complex variety of both motor and neuropsychiatric issues. Effective treatment of PD symptoms requires a combination of pharmacotherapy and allied health therapies; however, treatment is generally monodisciplinary, with the neurologist referring out to varied therapists as needed. In order to more effectively manage PD as it progresses over time, clinics are beginning to implement and advocate the use of more integrative models of care for PD. In order to understand the effectiveness of these models, a comprehensive literature review was conducted through electronic searches of PubMed, Academic Search Premier, PsycINFO, Health Source: Nursing/Academic Edition, AgeLine, AMED (Alternative Medicine), Health and Psychosocial Instruments, Health Source - Consumer Edition, and Social Work Abstracts databases. The review identified only two published studies, both of which only evaluated the effectiveness of multidisciplinary care in outpatient settings. The results of the studies indicated that multidisciplinary treatment led to marked improvement in patient outcomes; however, these results are limited as they measured short term outcomes only. The limited available evidence on the efficacy of integrative healthcare delivery models in PD should serve as a call-to-action for clinicians to work to improve the care, and subsequently the quality of life, of PD patients through streamlining PD-specialized care with multiple complementary clinicians and incorporating patient preferences and goals into treatment.

Keywords: Parkinson's disease, integrative care, multidisciplinary, interdisciplinary, chronic care model, allied health

INTRODUCTION

Parkinson's disease (PD) is a chronic and progressive neurodegenerative disorder, which usually presents in patients over the age of 60. It currently affects about 1 million individuals in the United States, and this number is expected to increase as the baby boomer generation enters the over-60 age bracket. PD is characterized by a diverse combination of motor symptoms, neuropsychiatric complaints, autonomic dysfunctions, sleep problems, and dementia, and the complexity of PD symptoms increases with the continuous progression of the disease [1–3]. Most motor symptoms respond well to dopaminergic therapy during early stages of the disease; however, as the disease progresses, motor symptoms worsen and non-L-Dopa-responsive problems, such as psychiatric and cognitive disorders, often become the dominating features of the disease [4–9]. The primary emphasis in PD patient care is currently placed on quality of life and on reduction in patient disability; however, conventional therapies – both drug treatments and stereotactic deep brain stimulation surgery – offer only partial and temporary relief [7–9]. Because of the chronic and progressive nature

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of PD, as well as the fact that medication management cannot fully address all symptoms as the disease progresses, research has advocated the incorporation of complementary clinicians in order to provide the best care for PD patients [10–12].

COMPLEMENTARY CLINICIANS IN PD CARE

Evidence is growing to support the effectiveness of various allied health disciplines in the care of PD. Physical therapy (PT), PT-guided exercise, and sensory cueing have been shown to improve overall motor functioning, balance, gait, performance of activities of daily living, and quality of life for individuals with PD [13–18]. PT intervention studies, including those on the LSVT® Big program, have shown such positive effects for individuals with PD that the Movement Disorder Society's evidence-based medicine review suggests that PT is useful as a symptomatic adjunct therapy to levodopa [9, 14, 18–21]. Symptoms such as hypophonia and dysphagia have been shown to be improved through the implementation of speech therapy (ST), swallowing therapy, and/or cognitive training [22–25]. In particular, the Lee Silverman Voice Treatment® (LSVT) has been shown after a 4-week intensive therapy to significantly improve orofacial functions, respiratory and laryngeal functions, and vocal intensity. Studies have also indicated that these positive results can be sustained up to 6 months [26–28]. Although some studies have included occupational therapy (OT) in conjunction with PT, very few studies have evaluated OT alone in treating PD. Still, there is some evidence to suggest that OT is beneficial in promoting patient participation in roles at home and work, to enhance independence in activities of daily living, and to improve quality of life [29–31].

The incorporation of nurse practitioners and social workers into integrative care teams for PD has also been promoted, as they can help coordinate team assessments and referrals and provide psychosocial support and disease education to patients and families [32–35]. Psychiatry is another important component of PD patient care in treating the many non-motor symptoms that are often reported as the most distressful for patients and their families [36–39]. An integrative model of treatment, involving a variety of specialties, allows clinicians to interact and treat arising PD symptoms in a more fluid manner than on a strictly-referral basis. While a core team of specialists is ideal, additional clinicians can be brought in as needed to address more specific, and perhaps rarer, symptoms that emerge throughout the course of the disease.

MODELS OF CARE

Although several models of care currently exist, most practitioners operate from a *monodisciplinary* or a consultative standpoint. Patients may be referred out to other clinicians, but one practitioner retains central responsibility. Communication between clinicians is often limited. More integrative models of care, incorporating the perspectives of a multitude of specialists, include multidisciplinary and interdisciplinary

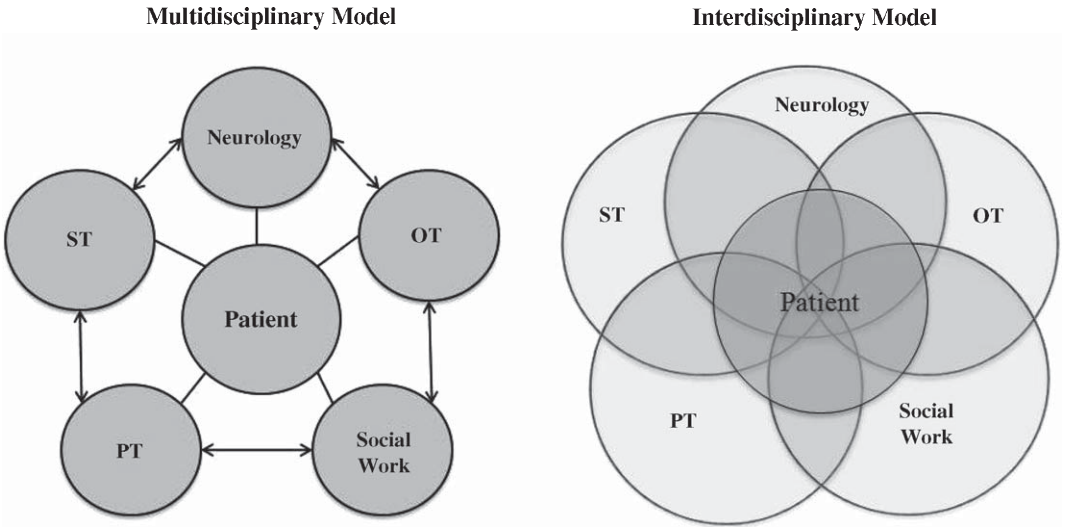

Fig. 1. Multidisciplinary vs. Interdisciplinary models of care.

approaches. These terms are often used interchangeably, but there are distinct differences between the models [see Fig. 1]. The *multidisciplinary* care approach involves various health care professionals working independently – not collaboratively – and in parallel, each responsible for a different patient care need. The *interdisciplinary* care approach utilizes a patient-centered perspective where assessments, as well as short- and long-term disease management goals, are conducted and developed by a team of healthcare professionals together with the patient [40, 41]. Some, but not all, multidisciplinary models facilitate communication between practitioners, but an interdisciplinary model promotes open and continuing communication between the patient and all involved practitioners [40, 41].

Integrative models of patient care have been advocated and successfully implemented with positive outcomes for patients with chronic conditions such as cancer, chronic pain, and diabetes, leading to higher survival rates as well as significant reductions in pain intensity and disability [42–48]. The multifaceted nature of PD, as well as the evolution of treatment goals from disease stage to stage, demands the attention of multiple professionals for the optimal treatment of symptoms [49, 50]. The successful application of an integrative care approach in the treatment of other chronic conditions, suggest that it is an ideal approach to apply to PD as well.

MATERIALS AND METHODS

The primary objective of this review is to evaluate the effectiveness of current and available studies of integrative team models used to manage PD. This review also aims to highlight gaps in research and to determine potential next steps in developing and researching best care practices for PD. Relevant studies were identified through electronic searches of Academic Search Premier, PubMED, PsycINFO, Health Source: Nursing/Academic Edition, AgeLine, AMED (Alternative Medicine), Health and Psychosocial Instruments, Health Source – Consumer Edition, and Social Work Abstracts databases, using the following search terms: (1) *multidisciplinary* or *interdisciplinary*; (2) *parkinson's, parkinsons* or *parkinson's disease*; (3) *allied health care* or *therapy*; (4) *team*; and (5) *management* or *care.* No studies on interdisciplinary care for PD patients were identified, and only two comparable studies utilizing an outpatient short-term multidisciplinary team approach to the management of PD were found [51, 52].

RESULTS

Currently, there is no recommended standard as to the makeup, setting, treatments, outcome measures, or duration of multidisciplinary teams, so very few programs that have been studied are directly comparable in a review. Table 1 shows the study designs, measures, and efficacy results for the two studies being reviewed.

In a single-blind randomized trial, with a pretest/posttest quasi-experimental design, Guo et al. compared the effects of an eight-week multidisciplinary treatment to the outcomes of a wait-listed control group [52]. The intervention program included three group lectures on health education specific to PD as well as individualized rehabilitation from a team consisting of movement disorders neurologists, occupational and physical therapists, a dietician, a psychologist, and a nurse. Most of the patients in both groups were at stage H & Y II with mean disease duration of 5 years. After the four weeks of intervention, only the bodily discomfort subscale of the health related quality of life (HRQoL) measure improved significantly ($p < 0.001$); however, the intervention group improved in Parts 2 and 3 of the UPDRS after eight weeks of treatment, and their PDQ-39 scores also significantly improved by 37% compared to the control group. Caregivers' moods also improved in the intervention group versus the control group [52]. The study initially recruited 44 patients who were randomized into an intervention and a control group. At the end of the eight weeks, the program reported that they lost two individuals in the control group as well as two individuals in the intervention group, leaving a total of 40 patients who completed the study [52].

Also evaluating the short-term effectiveness of a multidisciplinary treatment program for individuals with PD, Trend et al. found results comparable to the Guo et al. study [51]. In this study, 118 patients and their caregivers were treated in weekly multidisciplinary units for six weeks. In this cohort, approximately 52% of patients presented in H & Y stage III with 37% of patients in stage II. Fifty percent of patients had disease duration of less than 6 years, and an additional 33% of patients had disease duration of 6–10 years. The program included group activities with educational components as well as individual multidisciplinary care, conducted by a team consisting of a PD neurologist, nurse, physical and occupational therapists, dietician, and psychologist. At the end of the six-week intervention, participants showed significant improvements on the timed walk test, gait, voice articulation, depression scores, and HRQoL. Caregiver

Table 1
Intervention studies evaluating the effectiveness of multidisciplinary care for individuals with Parkinson's disease

Author	Methodology	Study Design		Follow-Up Duration	Results
		Intervention	Team Effectiveness Variables		
Guo et al. (2009)	Single-blind, randomized trial, with a pre-test/post-test quasi-experimental design, measuring the short term effects of multidisciplinary team treatment for 44 non-demented Parkinson's patients	The intervention group received three group lectures on Parkinson's health education, covering the topics: nutrition, movement, and mood. Relevant information was posted to a website. Participants then received individualized physical and occupational therapy comprised of 24 half-hour sessions over eight weeks	-Hoehn and Yahr stages -HR-QOL -UPDRS -Schwab and England Activities of Daily Living (SEADL) -Zung Self-Rating Depression Scale (SDS) -Global patient's mood status (PMS) -Caregiver's mood status (CMS)	Assessments at time zero, after four weeks of intervention, and the end of the eight-week intervention	On the HR-QOL, the intervention group showed a 37% improvement on PDQ-39 scores. On the UPDRS, the intervention group improved in ADLs and movement. Intervention participant scores showed significant improvement on the global patient's mood status measure.
Trend et al. (2002)	Exploratory, one group, pretest/posttest design 118 patients participated in 24 groups of six with their carers. Studied the short term effects of team treatment	Six, 5.5 hour session multidisciplinary (nurse, physical therapist, occupational therapist, and a speech therapist) treatment program involving both individual and group treatment for patients as well as their carers	-Hoehn and Yahr stages -Barthel ADL Index -Hospital Anxiety and Depression Scale (HADs) -Euroqol-5d -Emerson and Enderby measures of voice and articulation -Timed walk	Assessments at time zero and at the sixth week	Participants showed significant improvements in health-related quality of life, depression, mobility and gait, voice articulation and speech

outcomes did not significantly change throughout the intervention period. Out of 137 patients recruited over three years, only 118 proceeded to treatment with their caregivers, and the drop-out rate occurred solely in patients who were allocated for treatment after a six-month delay, when, during the wait, those patients became ill, died, lost interest, or moved away [51]. The outpatient models of Guo et al. and Trend et al. provide examples of multidisciplinary care that may be more feasible for clinics to implement and for patients to attend regularly; however any model of multidisciplinary care will depend on organizational cooperation.

DISCUSSION

Only two directly comparable studies on integrative care for PD were identified in a literature search, and a review of these studies primarily reveals large gaps in the research. Although both studies found statistically significant improvements overall for treated patients from baseline to follow-up periods, the follow-up assessments were performed immediately after the conclusion of treatment, leaving no opportunity to measure the duration of the effects of treatment [51, 52]. One long-term study by Wade et al. not included in this review followed up on the Trend et al. study and found consistent deterioration in all patient measures up to six months after the conclusion of the six-week treatment [53]. The authors pointed out that the crossover design of the study may have led to some bias against treatment for the patients in the treated group; previously satisfactory disease management could leave little room for improvement; and a lack of sufficient intervention by the psychologist or neurologist could potentially explain the short lived therapeutic improvements [53]. The Wade et al. study results also reflect the progressive neurodegenerative nature of PD and may point to a need for booster therapy sessions or more ongoing integrative treatment. Overall, the inconsistent long-term outcomes of the study again highlight the need for additional research on the subject.

Thus, from the limited available examples of multidisciplinary treatment of PD, it is clear that future research on the topic calls for well-designed studies utilizing randomization of treatment and inclusion of control groups. Studies would also benefit from an expansion of subject recruitment efforts – possibly to primary care practices, PD outreach events, and senior recreational centers – to attempt to avoid selection bias in sampling. Lastly, the effects of different variations of team models need to be studied and compared to determine which style might be most effective in addressing and managing PD symptoms throughout the continuum of the disease.

KEY CONCEPTS IN TEAM FORMATION

Several factors must be considered in creating an integrative care team for PD patients. First, clinics and clinicians should offer specialized care and services for individuals with PD and their caregivers, as evidence has shown that neurologist-treated PD patients are less likely to be placed in skilled nursing facilities, have a lower risk of hip fractures, and have a lower adjusted likelihood of death [54–56]. Neurologists and other clinicians who specialize in PD are better able to provide advice and care for specific symptoms at an individual level, and as a result of their training, they are likely to have greater adherence to evidence-based standards of care for PD as well [10, 57].

Also, as patients' perceptions of troublesome symptoms have been shown to vary widely from person to person, care needs to be tailored to patients' individual preferences, and their expectations of treatment success should be discussed and considered in developing goals of care [50, 58, 59]. This point reflects the need for patient-centered care in the treatment of PD. A patient-centered approach, the key concept in an interdisciplinary care model, involves the patient intimately in any discussions regarding his or her condition or prognosis as well as in planning for future care. A common understanding and holistic view of all aspects of the patient's care ensues, with the patient empowered to form part of the decision-making process [40, 41]. Patients are more likely to report higher satisfaction and to comply with treatment recommendations when they perceive that their physicians are highly involved in their care, and a patient-centered, integrative model of treatment better enables a patient to work collaboratively with his or her physician in developing and meeting goals of care [58, 59].

EXAMPLES OF SUCCESSFUL INTEGRATIVE CARE

Despite growing worldwide recognition of the potential benefits of integrative care in PD, only a few such teams are operative to date [55, 60, 61]. In the Netherlands, the 'ParkinsonNet' concept of healthcare was created to optimize the delivery of interdisciplinary care in every day clinical practice. The ParkinsonNet program developed a series of regional professional networks throughout the nation to provide PD patients with specially-trained clinicians. In evaluating the concept with regard to PT in a cluster randomized trial, the program resulted in reduced healthcare costs, increased adherence to evidence-based standards, and increased patient volume per professional; however, health outcomes did not change [10, 57]. This lack of efficacy was likely due to the design of the trial, which focused on implementation. The IMPACT study is a larger cluster randomized trial aiming to evaluate the effectiveness and cost of integrated interdisciplinary care in PD compared with usual monodisciplinary care [60]. This model of integrative care includes a tailored 3-day assessment by and recommendations from a multidisciplinary team consisting of specifically trained health professionals. Although the Nijmegen group called the concept of the IMPACT study "multidisciplinary," the patient-tailored approach as well as the patient-centeredness of the project suggests its "interdisciplinary" nature. The results of the study should be available later this year.

Other overlooked examples of integrative patient care, receiving more recognition in PD treatment, are palliative care and hospice. These models of care utilize an interdisciplinary approach, including both patient and family goals in the discussion of patient care plans, and patient quality of life often improves as a result [62, 63]. One study indicated that nursing home residents on hospice care had fewer acute care admissions, spent fewer days in the acute care setting, and had greater satisfaction in the quality of their care [63]. Interestingly, the National Home and Hospice Care Survey has shown that patients who were discharged alive from hospice care were more likely to have non-cancer diagnoses, such as neurodegenerative disorders [64]. These results may be due in part to improved health services delivery through an interdisciplinary approach and to a patient-centered focus in care. In fact, the American Academy of Neurology Ethics and Humanities Subcommittee recognized in 1996 that "because many neurologic

illnesses are progressive and incurable, the optimal care of such patients requires that neurologists understand and apply the principles of palliative medicine" [12, 65–69]. Mayasaki et al. currently implements interdisciplinary hospice and palliative team assessments for PD patients, and the comprehensive, coordinated services provided have already proven to relieve both caregiver burden and patient distress, providing further evidence to support the promotion of integrative care for PD patients [70].

IMPLICATIONS FOR FUTURE RESEARCH

Overall, there are some inherent difficulties in implementing future studies of integrative care for PD. As the fields of PT, OT, and ST incorporate a variety of strategies and therapeutic techniques to compensate for functional issues, standardization of individual treatment throughout the disciplines is very difficult to implement. Thus, comparisons of the effectiveness of varying interdisciplinary teams for PD could be inherently flawed. Also, the variation in symptoms and disease duration from patient to patient leads to potential issues in determining inclusion/exclusion criteria for such studies and in matching baseline study groups on randomization. Because PD may progress over the course of 15–20 years and symptoms may vary greatly from stage to stage, it would be advisable for future studies to consider the effectiveness of interdisciplinary team intervention based on disease stage in order to determine if there is an optimal point in the disease for intervention to be implemented.

Future studies need to explore various approaches to team implementation in order to develop recommendations on best practices of integrative care for PD. Different models of care (i.e., interdisciplinary vs. multidisciplinary) and different settings (i.e., inpatient vs. outpatient) need to be evaluated and compared, and the cost-effectiveness and implementation of such models need to be considered as well. The limited research available on the use of integrative care teams for PD indicates that there is still much work to be done in developing and studying the effectiveness of varying models of care for these individuals.

CONCLUSION

The studies included in this review, as well as additional research on the effectiveness of allied health therapies for PD, emphasize the need for the further development and research of integrative models of care, both multidisciplinary and interdisciplinary, in the treatment of PD. The primary result of this review is that it highlights both the inconsistency in integrative care model implementation for PD as well as the large gaps in researching the effectiveness of these team models of care. The available evidence on the potential contributions of allied health clinicians as well as of integrative healthcare delivery models in PD should serve as a call-to-action for clinicians to work to improve the care, and subsequently the quality of life, of PD patients through streamlining PD-specialized care with multiple complementary clinicians and incorporating patient preferences and goals into treatment.

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