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The Effect of Cognitive Impairments in Parkinson's Disease on Caregiver Burden

Parkinson Hastalığında Bilişsel Bozukluğun Bakım Veren Yükü Üzerindeki Etkisi

Sena Kıcıklar 1*

ABSTRACT

Parkinson's disease (PD) has motor symptoms such as tremor, rigidity, bradykinesia/akinesis, postural instability and nonmotor symptoms including cognitive impairment. Many PD patients struggle in a variety of cognitive domains, including as language, executive functioning, memory, attention, and visuospatial abilities. These deficits may be at a level that causes difficulty in performing activities of daily living and occasionally self-care. For this reason, PD patients may need caregivers. As has been demonstrated in all other chronic diseases, caregiving is a demanding process, both mentally and physically. Most of the studies based on the prevalence of nonmotor symptoms in the Turkish sample show that these symptoms are frequent and negatively affect the lives of both patients and their caregivers. Additionally, as the cognitive deficit deepens, the burden on caregivers increases. The aim of this study was to examine cognitive impairment in PD and its effect on caregiver burden by using the literature review method. In addition, although there are many studies on PD and caregivers in the literature, studies on cognitive abilities as a factor that increases caregiver burden are very limited. This study aims to fill this gap by focusing on factors that contribute to caregiver burden, especially cognitive functions. As studies have shown, cognitive decline impairs the ability of the patient to participate in activities of daily living and self-care and thus makes them dependent on the caregiver. This leads to the caregiver taking on more duties and consequently increasing their burden. The experience of disease is shaped socially as well as individually, thus factors such as the burden faced by the caregiver play a critical role in understanding the social effects of the disease. Therefore, factors that negatively affect caregivers must be considered more.

Keywords: Parkinson's Disease, Cognitive Impairment, Caregiver Burden

ÖZ

Parkinson hastalığı (PH) tremor, rijidite, bradikinezi/akinezi, postural instabilite gibi motor semptomların yanı sıra bilişsel bozukluğu da içeren motor olmayan semptomlara sahiptir. Birçok hasta dil, yürütücü işlevler, bellek, dikkat ve görsel-uzamsal yetenekler gibi çeşitli bilişsel alanlarda zorluk çekmektedir. Bu eksiklikler günlük yaşam aktivitelerini yerine getirmede ve zaman zaman öz bakımda zorluğa neden olacak düzeyde olabilir. Bu nedenle hasta bir bakım verene ihtiyaç duyabilir. Diğer tüm kronik hastalıklarda gösterildiği gibi, bakım verme hem zihinsel hem de fiziksel olarak zorlu bir süreçtir. Türk örnekleminde nonmotor semptomların yaygınlığına dayanan çalışmaların çoğu, bu semptomların sık olduğunu ve hem hastaların hem de bakım verenlerin yaşamlarını olumsuz etkilediğini göstermektedir. Ayrıca bilişsel eksiklik derinleştikçe bakım verenler üzerindeki yük de artmaktadır. Bu çalışmanın amacı, PH'nda bilişsel bozukluğu ve bunun bakım veren yükü üzerindeki etkisini literatür taraması yöntemiyle incelemektir. Ayrıca, literatürde PH ve bakım verenler üzerine birçok çalışma olmasına rağmen, bakım veren yükünü artıran bir faktör olarak bilişsel beceriler üzerine yapılan çalışmalar oldukça sınırlıdır. Bu çalışma, bilişsel işlevler başta olmak üzere bakım veren yüküne katkıda bulunan faktörlere odaklanarak bu boşluğu doldurmayı amaçlamaktadır. Çalışmaların gösterdiği gibi, bilişsel düşüş hastanın günlük yaşam aktivitelerine katılma ve öz bakım becerilerini bozmakta ve dolayısıyla hastayı bakım verene bağımlı hale getirmektedir. Bu da bakım verenin daha fazla görev üstlenmesine ve dolayısıyla yükünün artmasına neden olur. Hastalık deneyimi bireysel olduğu kadar sosyal olarak da şekillenir, bu nedenle bakım veren kişinin karşılaştığı yük gibi faktörler hastalığın sosyal etkilerini anlamada kritik bir rol oynar. Dolayısıyla, bakım verenleri olumsuz etkileyen faktörler daha fazla dikkate alınmalıdır.

Anahtar kelimeler: Parkinson Hastalığı, Bilişsel Bozukluk, Bakım Veren Yükü

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INTRODUCTION

As a worldwide public health concern, the burden of impairment brought on by neurological illnesses is becoming more widely acknowledged, and it is expected to increase over the next decades (Feigin et al., 2020). Among neurological disorders, Parkinson's disease (PD) has shown the greatest rise in frequency and impairment in recent years, thus becoming one of the main causes of disability globally (Ou et al., 2021). PD which affects 2–3% of people aged 65 and above, is the second most prevalent neurodegenerative disease and characterized by progressively deteriorating motor symptoms (Poewe et al., 2017). Over the last 26 years, the estimated total number of individuals with Parkinson's disease has more than quadrupled, rising from 2.5 million in 1990 to 6.1 million in 2016 (Rocca, 2018). Based on this rate of increase, the number of patients would relatively double over the next 30 years, reaching more than 12 million patients worldwide by around 2050 (Dorsey et al., 2018). In this respect, it is important to know the etiology of the disease, its symptoms and the factors that contribute to the burden of disease.

The etiology of the disease is complex. Different genetic causes have been identified in approximately 5-10% of cases (Balestrino et al., 2020), but many non-genetic environmental factors have also been associated with PD (Chade et al., 2006). Pathological hallmarks of the disease include a buildup of misfolded a-synuclein, which is shown in intracytoplasmic inclusions called Lewy bodies (LBs), and loss of dopaminergic neurons in the substantia nigra (SN) pars compacta (SNpc) (Balestrino et al., 2020). However, the pathophysiology of PD involves several mechanisms and pathway dysfunctions, such as oxidative stress, mitochondrial dysfunction, cellular calcium imbalance, neuroinflammation, and other deficiencies in the neurotransmitter system (Zaman et al., 2021). The main motor symptoms of the disease are caused by a reduction in dopaminergic neurons (Xia & Mao 2012).

While the presence of tremor, rigidity, bradykinesia/akinesis, postural instability, and other fundamental motor features are necessary for a clinical diagnosis, it is also linked to other non-motor symptoms that contribute to overall disabilities (Poewe et al., 2017). Non-motor symptoms are also observed on initial presentation in about 2% of patients (O'Sullivan, et al., 2008). They range from dysphagia to autonomic, gastrointestinal, sleep, sensory, cognitive and neuropsychiatric disturbances, but are underreported by patients (Balestrino et al., 2020). A study examining the prevalence of nonmotor symptoms in PD patients in a Turkish sample reported that 25.2% of patients had severe and 25.2% had very severe nonmotor symptoms (Onder & Comoglu 2024). It was emphasized that sleep/fatigue, mood/cognition and urinary-related symptoms were the most common. They have a major impact on health-related quality of life (QoL) and disability (Schapira et al.,2017; Balestrino& Martinez- Martin, 2017).

One of the most observed non-motor symptoms is cognitive impairment, which can potentially occur at any disease stage (Aarsland et al., 2021). It has been demonstrated to negatively impact QoL and function beyond motor symptoms, even in the early stages of PD (Chandler et al, 2021). One of the reasons for this is that the deterioration in cognitive abilities leads to progressive limitations in the functioning of their daily lives. It is suggested that cognitive impairment associated with PD enhances the possibility that individuals with PD may be institutionalized, adding to the financial strain on healthcare systems (Rissardo et al., 2023). The institutionalization of PD patients is accompanied by a decline in cognitive functions, a decrease in decision-making capacity, and deterioration in patient-caregiver interaction (Rissardo et al., 2023).

As PD progresses over time, with the addition of non-motor symptoms to motor symptoms, individuals require more support, which is seldom provided by an informal caregiver, usually a spouse or family member (Martinez-Martin et al., 2007). Informal caregiving, whether as a friend or family member, is often considered a chronic stressor in life and consequently caregivers often experience negative symptoms in behavioral, psychological and physiological aspects (Hiseman & Fackrell, 2017). Therefore, the fact that cognitive impairment causes limitations in the life of the patient may significantly contribute to caregiver burden by increasing the need for caregivers.

From a theoretical perspective, the biopsychosocial model offers a multidimensional approach to understanding the effects of cognitive impairment in PD on caregivers. According to this model, the experience of caregivers is not only limited to the biological symptoms of the patient, but also the psychological state and social environment of the caregiver are integral parts of this process (Engel, 1977). While cognitive impairments reduce the patient's functionality, the responsibilities of the caregiver increase and this leads to difficulties in biological (e.g. fatigue, sleep disorders), psychological (anxiety, depression) and social (isolation, lack of social support) areas (Pinquart & Sörensen, 2003). Chronic stress of the caregiver may even cause impairment in immune system functions and general health problems (Schulz & Beach, 1999).

Based on the dramatic effect of the decline in cognitive functions on the patient, it may be predicted that it maintains a similar negative effect on the caregiver. One of the recent studies, based on data obtained in a Turkish sample, found that 70.2% of PD patients reported very high nonmotor symptom severity levels, while 33.7% of these people were semi dependent or dependent in terms of performing their activities of daily living (Yilmaz et al., 2023). In Turkey, many caregivers are informal carers such as spouses, children or relatives and non-motor symptoms are important for both patients and caregivers. This review aimed to highlight the importance of cognitive impairment in PD in both patient and informal caregiver perspectives and to synthesise the evidence on its contribution to caregiver burden. Among the non-motor symptoms of the disease, cognitive impairments are one of the most likely to limit the daily life of individuals. Therefore, they have the potential to increase the need for caregivers. Although there are many studies on PD and caregivers in the literature, studies on cognitive abilities as a factor that increases caregiver burden are very limited. This study focuses on factors contributing to caregiver burden, particularly cognitive functioning, and provides an update on cognitive dysfunctions observed in individuals with PD.

METHOD

This study was prepared as a traditional non-systematic review, and it analysed the worldwide literature on the topic. Such reviews provide an informative review of the literature on each topic by adopting a non-systematic approach (Huelin, Iheanacho, Payne & Sandman, 2015). Within the scope of the review, studies in Science Direct, Psychinfo, Prequest and Google Scholar databases were analysed. Studies between 2000 and 2025 were evaluated. Although mainly after 2020 publications were examined, studies after 2000 were also included in the review to show when the effect of cognitive deficit in the patient on the caregiver received attention in the literature and to give the theoretical background. The selection criteria for the studies were that they were published in a national/international peer-reviewed journal. In peer reviewed journals, studies written in Turkish and English were included. In the literature search, the keywords "Parkinson's disease", "caregiver", "cognitive impairment" and "quality of life" were searched.

COGNITIVE IMPAIRMENT AS A NON-MOTOR SYMPTOM

Among the most prevalent non-motor symptoms is cognitive impairment. People with PD are up to six times more likely than the general healthy population to have cognitive impairment

(Aarslandet al., 2021). Age, low educational level, severe motor symptoms, depression and psychosis are risk factors responsible for cognitive impairment in PD (Kummer& Teixeira, 2009). The level of cognitive decline may vary in each patient, therefore the cognitive profile of people with PD varies. These significant differences in clinical severity, affected cognitive domains and the rate of onset of cognitive decline may occur before or during the PD diagnosis, or several years after the diagnosis (Aarsland et al., 2021). They experience the whole range of cognitive impairment, from dementia (PD-D) to mild cognitive impairment and subjective cognitive decline (Aarslandet al., 2021).

Some patients may score just as well as healthy individuals on standardized neuropsychological assessment tests and still report cognitive deficits, in other words, they may complain of subjective cognitive impairment. It is implicated that subjective cognitive decline may be a sign of further cognitive deterioration in PD patients (Aarsland et al., 2017). It has been the focus of studies whether people who report subjective cognitive decline will develop MCI-PD. In a longitudinal study examining patients with subjective memory complaints, 30.3% of patients followed up for 2 years were at high risk of developing MCI (Erro et al., 2014).

On the other hand, PD-MCI is a gradual decline in cognitive function reported by an informant or a clinician in a patient with PD (Litvan et al., 2012). It is linked to cognitive deficits on formal neuropsychological tests. MCI, which is on the spectrum between normal cognition and dementia, refers to a moderate level of cognitive decline (Galtier et al., 2016). Symptoms are not severe enough to significantly impair the patient's capacity to perform normal functions (Martinez-Horta& Kulisevsky et al, 2019). The prevalence of PD-MCI is reported to range from 20% to 70% (Baiano et al., 2020). Although MCI in PD patients is typically linked to deficiencies in a specific domain, such as verbal fluency, executive/attention, and visuospatial skills, memory loss is also possible (Aarsland et al., 2011).

More than 80% of people develop PD-D within 20 years after they are diagnosed (Hely et al., 2008). It is characterized by a deterioration from pre-disease levels in several cognitive domains, is progressive, and has deficiencies severe enough to interfere with daily activities (Emre et al., 2007). In cognitive aspects, PD-D patients are observed in attention, memory, executive and visuospatial functions (Emre et al., 2007).

Attention and Executive Function

It is asserted that patients with PD frequently have difficulties initiating specific activities, a lack of cognitive flexibility, attentional shift failures, and trouble adjusting to novelty (McKeith& Burn 2000). Attention and executive function are important for PD because the involvement of these processes also related to maintaining postural control (Woollacott& Shumway-Cook, 2002; Lord et al., 2010), therefore there are lots of study focusing on attention and executive function (Cameron et al., 2010).

The primary cause of attention and executive function deficiencies is frequently thought to be dopamine depletion, which disrupts the associative and limbic circuits that connect the striatum to the frontal and prefrontal lobes (Dujardin et al., 2013). The studies asserted that multiple components of attention are affected in PD, including focused (Machado et al., 2009), sustained (Koerts et al., 2010) and divided attention (Malapani et al., 1994). In addition, impairments in the voluntary control of attention have also been demonstrated by studies (Cameron et al., 2010).

Memory

One of the cognitive domains particularly affected in PD is memory. In PD, different materials such as story recall and word lists were used to assess memory, focusing mainly on both declarative and non-declarative memory (Watson et al., 2010). Assessments of verbal declarative memory, such as the story recall task, have shown deficits in both immediate and delayed recall in PD patients (Fama et al., 2000).

Besides verbal memory, impairments have also been reported in tasks used to assess non-verbal memory, such as face recognition, shape copying and visual retention (Watson et al., 2010). Some types of implicit memory have declined, as has explicit memory (Watson et al., 2010).

Visuospatial Skills

Cognitive abilities that involve processing visual information are referred to as visual-spatial abilities. Impaired visuospatial ability affects simple but important daily activities such as reading, writing and walking. Therefore, impairments in this set of skills affect a person's daily life and QoL (Nieto-Escamez et al., 2023).

Although some studies on mental rotation skills in PD suggest otherwise, it has been reported that mental rotation and three-dimensional and visual transformation processes are also impaired in PD (Crucian et al., 2003). Moreover, several recent studies assessing visuospatial skills suggest that PD patients may have difficulty integrating visual and kinesthetic elements of motor imagery (Bek et al., 2022).

Language

Speech and language impairments are particularly prevalent and often precede motor dysfunctions in PD (Cao et al., 2025). In addition to problems in motor aspects of language, they also show lower performance in neurocognitive aspects such as phonemic verbal fluency (Uc et al., 2006), semantic verbal fluency (Aarsland et al., 2009) and visual confrontational naming (Compta et al., 2009).

According to previous findings, verbal fluency in PD patients worsens as disease progresses and is directly connected with the disease stage (Obeso et al., 2012). Verbal fluency is also affected by depression and impairments in cognitive abilities (Obeso et al., 2012). Besides verbal fluency, semantic fluency is also important for PD and has been suggested to be a predictor of cognitive decline in the disease (Williams-Gray et al., 2009).

THE EFFECT OF COGNITIVE IMPAIRMENT ON PD PATIENTS

One of the most common and troublesome non-motor symptoms often experienced by people with PD is cognitive impairment. Although its severity, level of advancement, and type of influenced cognitive domains vary considerably (Koros, 2022), little is known about its structural and molecular causes (Jellinger, 2023). Cognitive deficits seriously affect QoL, may prolong hospitalization and thus increase caregiver burden and medical costs (Yang et al., 2016).

An important component of clinical practice for the diagnosis of cognitive impairment is the assessment of the individual's ability to live independently in the community (Bode et al., 2024). Independent living skills can include self-care such as bathing, dressing or eating, and more complex tasks such as medication management, grocery shopping or financial management (Lawton et al., 1969). They are of skills are considerably important for cognitive status.

Moreover, impairment in independent living skills deteriorates with cognitive impairment, according to comparisons between PD's cognitive subgroups (Bode et al., 2024). PD-D patients exhibit the most severe impairment in activities of daily living when compared to PD patients who are not demented, followed by PD-MCI patients when compared to cognitively normal PD patients (Holden et al., 2018; Fellows& Schmitter-Edgecombe, 2019; Becker et al., 2020). Deficits in such skills in daily life are also seen in PD-MCI (Bode et al., 2024), and the presence of these deficits increases the risk of PD-D conversion within three years (Becker et al. 2022). There are studies showing that poor performance in cognitive skills such as attention, executive functions and memory is associated with poor performance in activities of daily living (Foster et al, 2021; Fernández-Baizán et al. 2022). In the light of all these findings, it is suggested that self-directed functioning of PD patients is associated with cognitive impairment and may make their daily lives more difficult.

As is well known, cognitive impairment can reduce life expectancy and affect QoL (Foltynie et al., 2004). Many studies have been conducted especially on its impact on QoL. As the study by He et al. (2021) demonstrated, PD severity and cognitive function reduce activities of daily living. Consequently, depression increases and QoL decreases. Therefore, it is concluded that a decrease in cognitive functioning leads to a worsening of activities of daily living and ultimately causes deterioration of mood. Particularly in PD-D, poor QoL and reduced wellbeing are prevalent (Leroi et al., 2012). The reason for this might be that they are the PD group with the most impaired cognitive abilities.

Early examples of health related QoL studies in PD have focused on motor severity and dyskinesias and associated them with low QoL (Dodel et al., 2001; Keränen et al., 2003). However, more recent studies indicate that non-motor symptom frequency and severity have an even stronger influence on health-related QoL in PD than motor symptoms (Prakash et al., 2016). In support of these findings, a study evaluating how the presence of MCI affects health-related QoL in PD patients found that patients with MCI had worse health-related QoL, with a larger size effect than motor disability (Lawson et al., 2014).

THE EFFECT OF COGNITIVE IMPAIRMENT ON CAREGIVER BURDEN

Since PD is a progressive neurodegenerative disease, most patients are cared for by family members or friends, called informal carers, and these individuals experience distress and problems that affect the physical, mental and socioeconomic aspects of their lives (Martinez-Martin et al., 2015). In several European countries the number of informal caregivers is considerable, ranging from 20% to 44% of the total population (Choi et al., 2024). They are an essential source of emotional and physical support for those suffering with PD (Lawson et al., 2017). In addition, as caregivers spend most of their time with the patient, they have the possibility to observe many of the difficulties that the patient experiences in daily life. It is usual for caregivers to detect and report cognitive decline that would not have been detected in an initial consultation with a professional. Therefore, information from caregivers in the assessment of non-motor symptoms must be considered (Naismith et al., 2011). In contrast to the positive aspects for the patient, challenges for the caregiver cannot be ignored due to the demanding nature of this process.

Psychosocial Consequences for Caregivers

In the early stages of the PD, caring for patients is relatively undemanding. However, as the disease progresses and the person with PD need more assistance with everyday tasks, the carer's burden begins to increase (Greenwell et al., 2015). The caregivers often report negative lifestyle changes (including restricted work and social activities), worsening financial status, and deterioration in emotional and physical health (Eriksson & Svedlund, 2006). It is not surprising that this leads to poor psychosocial outcomes such as poor QoL, emotional strain (Martinez-Martin et al., 2008), frustration (Carter et al., 1998), impaired sleep quality, social withdrawal and thus isolation (O'Reilly, et al., 1996).

As is well known, informal caregiving is frequently viewed as a chronic stressor in life (Hiseman et al., 2017). The influence of these stressors on daily living and generally health is inevitable.

They encounter negative consequences such as sleep disturbance, chronic stress and decreased life satisfaction due to their caregiving responsibilities (Wang et al., 2022). It might affect their ability to operate emotionally, socially, financially, or physically. Additionally, it is apparent that an increase in caregiver burden may cause negative effects such as anxiety (Martinez- Martin et al., 2008). The studies suggest that such negative effects may even affect the cognitive functions of the caregiver (Evans et al., 2019). Caregivers were found to have lower scores in executive function and working memory compared to non-caregivers (García-Castro et al., 2022).

Most of the early studies focused on the caregiver burden of motor symptoms of PD and showed that motor symptoms of PD have the greatest impact because they cause high dependency (Lau et al., 2011). However, it is now widely accepted that neuropsychiatric symptoms including cognitive impairment have a negative impact on the QoL of both the patient and the caregiver (Hiseman et al., 2017). It is suggested that cognitive functioning of patients modulates the psychosocial burden of the caregiver (Thommessen et al., 2002). In support of the findings, distress and caregiver burden increase in parallel with the intensity of neuropsychiatric symptoms (Hiseman et al., 2017).

The Impact of Impairment in Activities of Daily Living on the Caregiver

A decrease in QoL is not the only negative outcome, as studies have shown that an increase in neuropsychiatric symptoms, including cognitive impairment, is also associated with increased mortality and admission to institutional care settings (Stella et al., 2009). Predictably, impairment in cognitive functioning is a factor that can directly affect a person's ability to carry out daily life. Therefore, the caregivers become aware of any decline in cognitive skills and may increase the level of support provided to the patient. Indeed, Hiseman et al. (2017) characterised deficits in cognitive skills as the most important non-motor symptom because they affect patients' autonomy and increase caregiver burden.

According to the findings of the studies, executive dysfunction is one of the earliest cognitive deficits that can be recognized by PD caregivers (Muslimovic et al., 2005). Since executive functions include a set of mental processes such as cognitive flexibility, set-shifting, planning, attention, and so on, a deterioration in this skill may result in the patient gradually having problems with more complex skills such as financial management or detailed planning and, consequently, becoming dependent on the caregiver. When such a situation occurs with informal caregivers, the circumstances may cause caregivers to spend more time but, more importantly, to feel that they have lost the character or personality of their loved one, which may increase their distress (Hiseman et al., 2017). Therefore, it may serve as an example that there is a psychological dimension beyond a physical or financial caregiver burden.

However, executive functions are not the only cognitive functions affected. Deficits in other cognitive functions can also lead to problems in people's daily functioning. For example, a study examining the impact of non-motor symptoms such as depression and cognitive skills on caregiver burden reported that a memory task such as delayed recall was associated with caregiver burden. The deficits in delayed recall are also important for daily life. Spontaneous, automatic retrieval processes are also associated with prospective memory tasks that allow us to plan future actions (Einstein & McDaniel, 2005). Accordingly, an individual can both carefully monitor an action that he/she needs to perform in the future (e.g., remembering an appointment) and automatically recall it when a cue is recognised. Likewise, studies show that PD patients have reduced prospective memory that they have difficulties in planning the future (e.g. Costa et al., 2008). On the one hand, prospective memory tasks, which we can also associate with executive functions, are very important for maintaining daily life. A deficit in this capability may lead to a patient in need of planning by the caregiver.

Several studies addressing how impairment in visuospatial skills affects the daily functioning of individuals with PD have reported that individuals have problems with many tasks. Several studies addressing how impairment in visuospatial skills affects the daily functioning of individuals with PD have reported that individuals have problems with many tasks. It has been observed that freezing of gait in relation to movement is associated with visual hallucinations, double vision and contrast sensitivity deficits, and visual strategies are often used to overcome these problems (Davidsdottir et al., 2005). Problems with visual spatial skills are likely to be compensated for by support from carers.

The language impairments in Parkinson's disease include multifaceted difficulties such as reduced information content, grammatical impairment, impaired fluency and reduced syntactic complexity. As an outcome of these, it has been reported that caregivers increasingly assume the role of the "voice" of PD patients, and that patients have fewer opportunities to participate in discussions on complex issues (Altmann& Troche, 2011), which can lead to social withdrawal. Since language is the most basic element of communication, such a change may be highly problematic for both the patient and the carer.

DISCUSSION and CONCLUSION

Since sound cognitive function is important for individuals to maintain their daily lives, in diseases with profound cognitive deficits, QoL decreases and the burden on caregivers increases. It has begun to appear in the literature as an integral part of PD. Impairment in cognitive functions is also associated with the loss of skills that enable the patient to self-manage daily life. At this point, the psychological impact on both the patient and the caregiver is not to be underestimated. Most of the studies on PD caregivers have not sufficiently considered the impact of patients' cognitive decline on caregiver burden. However, PD is a progressive disease with frequent cognitive deterioration and has the potential to cause a negative impact on caregivers.

When evaluated within the framework of biopsychosocial theory, it is seen that cognitive impairments seen in patients with PD affect not only the individual functionality of the patient but also the holistic well-being of the caregiver. Deficits in cognitive abilities in the patient increase the complexity of the caregiving process and cause the caregiver to experience multidimensional burdens in biological, psychological and social areas. Increased physical care needs and decision-making responsibilities may negatively affect the physiological health of the caregiver (e.g. sleep disorders, fatigue, weakened immune system). At the same time, this burden may lead to increased levels of psychological burnout, depression and anxiety; socially, it may lead to isolation, decreased social interaction and weakening of support resources.

In this respect, the effects of cognitive impairment in PD should not only be addressed at the neurological level, but also the holistic health status of individuals involved in the care process should be considered. The needs of caregivers should be assessed based on biopsychosocial dynamics and multifaceted support programmes should be developed, including not only psychoeducation, but also interventions to strengthen social support mechanisms and maintain their physiological well-being. In this way, both the sustainability of the quality of care can be ensured and the long-term health and quality of life of caregivers can be protected.

One of the limitations of the study is that it is a non-systematic literature review. However, only sources published in peer-reviewed journals with high scientific quality were included in the study. In addition, in order to reach the current literature, studies published in recent years were prioritised. Another limitation is the limited number of studies on the burden of caregivers of individuals with PD in Turkey. Since the number of studies on this issue is quite rare, it was difficult to include examples from the Turkish sample in this literature review.

This study has several implications for healthcare professionals and researchers. One of the important implications for health professionals working with PD is that the cognitive impairments observed in PD are as important as the motor symptoms, which are seen as the main symptoms of the disease and greatly affect both the patient and the caregiver. For this reason, it appears to be important to approach the process from a biopsychosocial perspective when addressing PD from both patient and carer perspectives. It is especially important for professionals working with caregivers to recognise that PD is a progressive process with not only physical but also cognitive decline. Therefore, specialists working with caregivers need to pay attention not only to the physical burden of care, but also to the effects of the patient's cognitive impairments on the care process. Mental health professionals and social workers may design supportive programmes, recognising that cognitive deficits may increase the emotional burden on the caregiver.

The study also has implications for researchers. Firstly, the effect of nonmotor symptoms on caregivers in PD has been studied very rarely, therefore, cognitive deficits need to be considered in future studies, evaluated with detailed neuropsychological tests and the effect of these deficits on caregivers should be examined. Secondly, in future research, it is important to use innovative qualitative methods to better understand the experiences faced by carers of people with PD. Online Photovoice (OPV), which allows participants to express their own experiences in visual and narrative form, can provide a more enriched and authentic portrayal of the feelings, challenges and needs of carers. In future studies, the use of not only qualitative methods but also mixed methods will allow the experiences of Parkinson's caregivers to be addressed in a multidimensional way. Researchers' preference for these innovative methods will enrich the knowledge in the field and contribute to improving patient service quality.

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