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Psychological Distress Among Caregivers of Patients with Parkinson's Disease Assessed with SCL-90-R Self-reported Questionnaire

Parkinson Hastalığı Olan Hastalara Bakım Verenlerin Yaşadığı Psikolojik Stresin SCL-90-R Değerlendirme Ölçeği Kullanılarak Değerlendirilmesi

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Abstract

Objective: Caregivers of patients with Parkinson's disease (PD) experience increased levels of psychological distress. This study investigated the impact of caring for patients with PD on the psychiatric health status of the caregivers by using Symptom Checklist 90 Revised (SCL-90-R) and described the relationship between various socio-demographic and clinical characteristics and psychological distress of caregivers.

Materials and Methods: The SCL-90-R self-reported questionnaire was administered to 60 caregivers of PD patients and 50 healthy controls. Sixty patients underwent different scales including unified PD rating scale, Hoehn & Yahr scale, the Schwab-England activities of daily living scale and mini-mental state examination for the assessment of their motor and non-motor symptoms. Sleep disturbances in patients were assessed using the PD sleep scale and Epworth sleepiness scale.

Results: All caregivers were family members. They got higher scores from the anxiety (ANX) of the SCL-90-R than the control group. Of the caregivers, 13 (22%) had a pathological score in the global severity index. Age and sleep scales scores significantly predicted psychological distress in interpersonal sensitivity, phobic ANX, psychoticism and obsessive - compulsive symptoms, ANX, depression and additional items dimensions in caregivers. Disease severity and other clinical findings did not affect psychological distress in caregivers.

Conclusion: Our findings suggest that caregivers of patients with PD who are family members have higher ANX level as psychological distress. Sleep symptoms of patients with PD affect distress level of caregivers of patients with PD.

Keywords: Parkinson's disease, caregivers, psychological distress, SCL-90-R

Öz

Amaç: Parkinson hastalığı (PH) olan hastalara bakım verenler yoğun psikolojik stres yaşarlar. Bu çalışmada Belirti Tarama Ölçeği 90 (SCL-90-R) formu kullanılarak, PH'li hastalara bakmanın, bakım verenlerin psikiyatrik durumları üzerindeki etkisi araştırılmış ve değişik sosyo-demografik ve klinik özellikler ile bakım verenin yaşadığı psikolojik stres arasındaki ilişki açıklanmaya çalışılmıştır.

Gereç ve Yöntem: SCL-90-R anketi PH'li hastaya bakım veren 60 kişiye ve 50 sağlıklı kontrole uygulanmıştır. Hastaların motor ve motor olmayan bulguları; birleşik PH değerlendirme ölçeği, Hoehn & Yahr ölçeği, Schwab-İngiltere günlük yaşam aktiviteleri ölçeği ve mini-mental test gibi farklı testler kullanılarak değerlendirilmiştir. Hastalardaki uyku bozuklukları ise PH uyku skalası ve Epworth uykululuk skalası kullanılarak değerlendirildi.

Bulgular: Bakım vericilerin tümü aile üyeleriydi. Bakım vericiler SCL-90-R'nin anksiyete bölümünden kontrol grubuna göre daha yüksek puan almıştır. On üç (%22) bakım vericide genel semptom indeks puanı patolojik bulunmuştur. Hastaların yaşı ve uyku ölçek skorları, bakım vericinin kişiler arası duyarlılık, fobik anksiyete, psikoz, obsesyon-kompülsiyon, anksiyete, depresyon ve ek madde bölümlerinde artmış psikolojik stresi anlamlı şekilde öngörebilmiştir. Hastalığın şiddeti ve diğer PH bulguları bakım vericideki psikolojik strese anlamlı etkide bulunmamıştır.

Sonuç: Bu çalışma, PH'li hastaların aile üyesi olan bakım vericilerinin psikolojik stres olarak daha yüksek anksiyete düzeyine sahip olduğunu göstermektedir. PH'li hastaların uyku ile ilgili semptomları bakım vericilerin psikolojik stres seviyelerini etkilemektedir.

Anahtar Kelimeler: Parkinson hastalığı, bakım vericiler, psikolojik stres, SCL-90-R

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Introduction

Parkinson's disease (PD) is a chronic and progressive neurodegenerative movement disorder which is characterized by resting tremor, rigidity, bradykinesia and postural instability. In addition to these motor symptoms, non-motor symptoms such as cognitive impairment, psychiatric symptoms, autonomic dysfunction and sleep problems are observed frequently (1). Because of the progressive debilitating nature of the disease and treatment complications, patients with PD need caregiving. It is estimated that 40-90% of patients with PD are in close contact or reside with informal caregivers (2). In Turkey, the vast majority of patients suffering from PD and related disorders live with their families. However, provision of support by family members and/or living together with PD patients constitute a considerable burden on primary caregivers (3,4,5). Primary caregivers experience increased psychological distress due to financial, psychological, and social demands of chronically ill patients. Psychological distress is conceptually defined as a "unique, discomforting, emotional state experienced by an individual, in response to a specific stressor or demand, that results in harm, either temporary or permanent to the person" (6).

The main purpose of the present study was to investigate psychopathological distress levels of primary caregivers of patients with PD. Therefore, we screened a caregiver population of patients with PD by using Symptom Check List 90 Revised (SCL-90-R). Secondary purpose of the study was to investigate the relationship between socio-demographic features, motor and non-motor symptoms of patients with PD and psychological distress of caregivers and to identify the putative factors for their psychopathological distress levels.

Materials and Methods

Caregivers

All caregivers of patients with PD, who underwent a follow-up at our outpatient clinic, were invited to participate in the study. Inclusion criteria for caregivers were (1) aged older than 18 years (2) no history of a mental disorder or use of a psychotropic drug (3) living together with the patient or having frequent contacts with the patient (at least 3 times a week), and (4) availability for assessment. Sixty caregivers fulfilling the study criteria agreed to participate in the study. For each caregiver a socio-demographic form was recorded including the following data; age, gender, educational level, marital status, religion, presence of chronic illness, working status, monthly family income, kinship, and their living status (whether he or she resided with the patient), duration of caregiving (months) and daily hours of caregiving.

Healthy Controls

Fifty healthy, unrelated individuals were recruited from spouses, friends and relatives of the hospital personnel. They were age- and sex-matched with 60 caregivers. Controls were not providing care for anyone in need of social support.

Scales Performed in the Caregivers and Healthy Controls

Psychological distress in caregivers was assessed by using the SCL-90-R. The SCL-90-R is a 90-item self-report symptom inventory broadly used as a screening instrument for psychological distress and psychopathology (7). Each item is scored on a scale from 0 (not at all) to 4 (extreme) based on how much an individual was bothered by each item in the last week. The combined answers on the checklist provide scores for 9 primary symptom dimensions: Somatization dimension [(SOM), 12 items] reflecting distress arising from bodily perceptions; obsessive-compulsive dimension [(O-C), 10 items] reflecting symptoms typical of O-C disorder; interpersonal sensitivity dimension [(I-S), 9 items] focusing on feelings of personal inadequacy and inferiority in comparison with others; depression dimension [(DEP), 13 items] reflecting most of the typical symptoms of depressive disorders; anxiety dimension [(ANX), 10 items] reflecting symptoms that are associated with manifest ANX; hostility dimension [(HOS), 6 items] focusing on thoughts, feelings or actions characteristic of negative affect and state of anger; phobic ANX (PHOB, 7 items) reflecting manifestations of agoraphobia; paranoid ideation dimension [(PAR), 6 items] representing PAR as a disordered mode of thinking; psychoticism dimension [(PSY), 10 items] reflecting a continuum from mild interpersonal alienation to dramatic evidence of psychosis; and the additional item [(AI), 7 items] for eating and sleep disorders. For the purposes of this study, only global severity index (GSI) was used from the global indices. The scores on the 10-symptom dimensions are expressed as a profile of symptoms, and scores >1 are suggestive of possible psychopathology. In the present study, the Turkish standardized version of the SCL-90-R was used (8). The results of the tests were evaluated by a qualified psychiatrist.

The Characteristics of the Patients and Clinical Scales

Sixty eligible patients with PD attending an outpatient clinic with their caregivers were enrolled in the study. The diagnosis of PD was made in accordance with the United Kingdom PD Society Brain Bank criteria. Patients had been diagnosed for at least 2 years and continued PD treatment regularly during this period. The patients had to be clinically stable for a minimum period of 3 months before the initiation of the study. Detailed medical records were available for each patient. Patients' demographic and clinical data including age, gender, religion, years of education, marital status and number of children, employment, presence of chronic illness, age at onset, disease duration, treatment duration, Levodopa equivalent dose (LEDD), complications of dopaminergic treatment, past history of depression, any behaviors related to impulse control disorder (ICD) during the course of PD, history of current or previous antidepressant treatment, history of heavy alcohol use (>14 drinks weekly), family history of depression or other mental disorders and family history of suicide (9). The presence or absence of motor fluctuations, dyskinesia, hallucinations, delusions, sialorrhea, urinary and bowel incontinence, and sleep disturbances was recorded. Inclusion criteria were: (1) Patients aged 45-90 years and having at least 5 years of education, (2) patients in Hoehn & Yahr (HY) scale stages 2, 3, 4, or 5, (3) patients with a mini-mental state examination (MMSE) score greater than 24, (4) patients contacting with a responsible caregiver at least 3 h per day for at least the past 6 months, (5) patients who were receiving antiparkinsonian therapy regularly for 6 months, and (6) patients who were accompanied by their primary caregivers for more than 3 consecutive follow-up visits (10,11).

The same neurologist interviewed all patients, their caregivers and healthy controls. Patients underwent a complete neurological examination in their on-phase, which included all sections of the

Unified Parkinson's Disease Rating scale (UPDRS), HY scale, Schwab-England activities of daily living scale (SE-ADL) and MMSE (12,13). The clinical type of PD onset was classified as tremor-dominant or bradykinesia-dominant; and dyskinesia status, motor fluctuations, and postural instability were determined as present or absent. UPDRS is a tool comprising 4 sections that assess severity of non-motor symptoms (UPDRS I section), impact on ADL (UPDRS II), motor signs (UPDRS III), and complications of disease and treatment. Complications include dyskinesia (UPDRS IVA) and motor fluctuations (UPDRS IVB). HY scale objectively evaluates PD stages and SE-ADL is used to assess disability in ADL. Patients with dementia based on the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition criteria and patients who had lower scores in MMSE were excluded from the study. Sleep disturbances in patients with PD were assessed using the PD sleep scale and Epworth sleepiness (ES) scale (14,15). Beck depression inventory and SCL-90-R, which are self-report scales, were also administered for assessing psychiatric symptoms.

All questionnaires and scales for caregivers, patients and healthy controls are developed through qualitative research and their validation studies are in accordance with Turkish cultural characteristics. The study is in accordance with the protocol approved by the university institutional review board. Following a complete description of the study, written informed consent was obtained from all participants.

Statistical Analysis

All analyses were carried out using SPSS software version 21.0. We calculated the mean and standard deviation for each of the 10 dimension scores and GSI. We created dichotomous variables for each dimension considering scores >1 as suggestive of possible psychopathology. To evaluate the relation between the various psychopathological dimensions, we performed correlation analysis between the dimensions scores, followed by principal component analysis with varimax rotation. Correlation analysis (using two-tailed Pearson correlation coefficients) was then performed between SCL-90-R variables and demographic and disease related variables. T-test was used to compare means. The level of statistical significance was set at 0.05.

Results

The socio-demographic features of patients with PD, their caregivers and healthy controls and clinical characteristics of the patients with PD are listed in Table 1. All caregivers were family members and most were women (n=47). Three groups of caregivers were identified according to their relationship with the patients: Spouses (n=44; 73%), children (n=13; 22% daughter, n=9; son, n=4), and siblings (n=3; 5%). Patients were most frequently cared for by a spouse or daughter at the patient's home. The average caregiving duration was 27.6±22.4 months (range, 6-120) and the average amount of time spent in daily caregiving was 10.3±8.9 h (range, 3-24).

Fifty-one (85%) PD patients had tremor-dominant form and 9 (15%) patients had a familial history of PD. The distribution of patients according to HY stage was as follows: 20 patients in stage 2, 18 in stage 3, 15 in stage 4, and 7 in stage 5. Of all the patients, 25 (42%) had lucid dreams, 8 (13%) had mild to moderate hallucinations, 40 (67%) had sialorrhea, 24 (40%) had dyskinesia, 40 (67%) had motor fluctuations, and 25 (42%) had motor blocks, 10 (17%) had objective orthostatic hypotension, and 10 patients had urinary or bowel incontinence. All patients were receiving antiparkinsonian drugs, 15 (25%) patients were on antidepressants, 10 (17%) patients were on antipsychotic agents, and 15 (25%) patients were using more than one type of psychotropic drugs. Eighty-five percent of the patients, were receiving dopamine agonists. None of the subjects had undergone surgical treatment for PD. Fourteen patients had a history of ICD behaviors. The ES scale showed that 10 (17%) patients had pathological sleepiness. According to the PD sleep scale, 45 patients reported that they were satisfied with their sleep.

Caregiver's Psychological Distress

The mean scores and standard deviations of the caregivers and healthy controls on the 9 dimensions and the AI of the SCL-90-R and the GSI) are presented in Table 2. Significantly higher scores among caregivers of patients with PD than healthy controls were found in the level of ANX. Fifteen (25%) caregivers had no pathological scores in any SCL-90-R dimensions. Figure 1 shows the prevalence of pathological scores for each SCL-90-R dimension. The scores of GSI and the dimensions were not correlated within the caregivers group (Table 3).

The GSI scores were not significantly correlated with the patients' demographic and disease-related features. The scores of I-S, PHOB and PSY dimensions were significantly correlated with patient age. Patient PD sleep scale and ES scale scores were correlated with the scores of O-C, ANX, DEP and AI dimensions in caregivers. The scores of the dimensions of SCL-90-R were not correlated with the tremor-dominant or akinetic-rigid form PD,

Table 1. Socio-demographic characteristics of patients, their caregivers and healthy controls and clinical features of patients

	Patients with PD (n=60) Mean ± SD	Caregivers (n=60) Mean ± SD	Controls (n=50) Mean ± SD
Age (years)	62.64±8.32	57.50±11.24	52.86±8.89
Male/female	39/21	13/47	17/33
Education (years)	8.72±4.64	9.38±4.60	8.34±3.48
Disease duration (years)	9.70±3.48	-	-
HY stage	3.30±1.01	-	-
SE-ADL (%)	55.00±10.00	-	-
LEDD (mg/day)	843±479	-	-
UPDRS-I	4.62±2.47	-	-
UPDRS-II	20.50±10.46	-	-
UPDRS-III	25.16±11.84	-	-
UPDRS-IV	3.14±2.28	-	-
UPDRS-total	57.60±26.90	-	-
MMSE	26.7±1.9	-	-

HY: Hoehn & Yahr scale, SE-ADL: Schwab-England activities of daily living scale; LEDD: Levodopa equivalent dose, UPDRS: Unified Parkinson's Disease Rating scale, MMSE: Mini-mental state examination, SD: Standard deviation

HY scale stage, SE ADL scale scores, UPDRS total and subscale scores and LEDD. There was not any association between SCL-90-R scores and behavioral and psychiatric clinical disorders of patients with PD. There were significant correlations between GSI scores and caregivers' age, but GSI scores were not correlated with gender. No relation was found between the caregiving duration (months) and daily hours of caregiving. Table 4 shows correlation level between ten dimensions of SCL-90-R with socio-demographic and disease characteristics of patients and caregivers.

Discussion

Caregivers play an essential role in supporting patients with PD, but caregiver burden often leads to deterioration of the caregivers' psychological and physical health. In this study, we focused on the impact of caring for patients with PD on the caregiver's psychological distress among the caregivers of stable outpatients with PD and investigated the relationship between various socio-demographic and clinical characteristics, and caregiver's psychological distress. As far as we know, SCL-90-R scale was not used in any study to assess psychological distress of the caregivers of patients with PD.

Table 2. Mean scores of the SCL-90-R dimensions of caregivers of patients with PD and healthy controls

SCL-90-R dimensions	CG	Healthy controls	p value
GSI	0.772±0.614	0.627±0.521	0.20
SOM	0.971±0.816	0.815±0.736	0.30
O-C	0.940±0.806	0.826±0.617	0.42
I-S	0.685±0.697	0.679±0.648	0.94
DEP	0.943±0.807	0.732±0.641	0.14
ANX	0.806±0.649	0.418±0.335	**0.04***
HOS	0.750±0.740	0.516±0.588	0.11
PHOB	0.522±0.674	0.313±0.426	0.06
PAR	0.800±0.755	0.599±0.575	0.13
PSY	0.420±0.485	0.352±0.484	0.48
AI	0.851±0.633	0.809±0.682	0.74

Student t-test, *p<0.05. SCL-90-R: The Symptom Check List 90 Revised, PD: Parkinson's disease, CG: Caregivers, GSI: Global severity index, SOM: Somatization, O-C: Obsessive-compulsive, I-S: Interpersonal sensitivity, DEP: Depression, ANX: Anxiety, HOS: Hostility, PHOB: Phobic anxiety, PAR: Paranoid ideation, PSY: Psychoticism, AI: Additional items

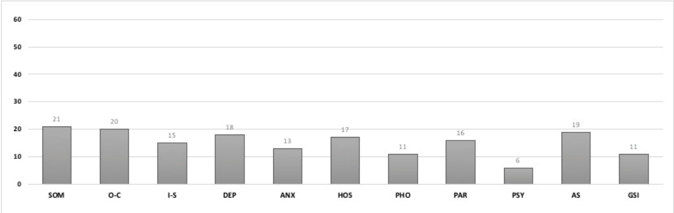

Figure 1. Prevalence of pathologic scores in SCL-90-R. Bars represent number of caregivers with pathological scores in each of SCL-90-R categories (from a total of 60)

SCL-90-R: The Symptom Check List 90 Revised, SOM: Somatization, O-C: Obsessive-compulsive, I-S: Interpersonal sensitivity, DEP: Depression, ANX: Anxiety, HOS: Hostility, PHOB: Phobic anxiety, PAR: Paranoid ideation, PSY: Psychoticism

All of the caregivers in our study were spouses, children, or siblings of the patients with PD. We did not intend to include only caregivers who were family members, but we found that the caregivers of patients who were eligible for our study were all family members, indicating that, in Turkish society, caregiving is primarily imposed on family members.

In this study, we found that family caregivers of PD patients experienced high levels of ANX. We also observed high scores in the obsessive-compulsive symptoms with similar frequency to depressive and ANX symptoms, indicating a trend to repetitive thoughts. We know that patients with PD also have high levels of obsessive thought contents (16). Perseverant obsessive thinking may be a consequence of the PD-related dysfunction of the frontal-striatal pathways that may induce a perseverant way of thinking (17). This finding may be a consequence of living together with the patient and a typical example of social learning and psychosocial adaptation. We did not find significant differences between family caregiver and healthy control groups with respect to the level of SOM, I-S, depression, phobic ANX, HOS, O-C symptoms, psychoticism, PAR and AI. However, overall assessment of SCL-90-R scale scores revealed that caring for patients with PD has an increasing effect on ANX levels.

The study further explored the effects of numerous socio-demographic variables. Our findings suggest that only the age of patients and caregivers may be possible influencing factors for caregiver psychological distress. Contrary to our expectations, neither the type of family member (parent, sibling, or spouse) nor the living status (residing together or apart) was significantly related to caregivers' distress. In fact, caregiver burden and psychological distress, often reflecting the level of dependency of the care-receiver, differed between those with mild ANX and depressive symptoms and those with very severe symptoms, suggesting that they were positively related to the severity of the disease. PD severity may not reflect caregiver burden and it may not be the best indicator of the amount of dependency of the care recipient in the home environment (18,19). These findings highlight the importance of including all caregivers when designing treatment programs for PD caregivers.

Another noteworthy finding in this study was that family caregivers' psychological distress was not predicted by duration and severity of PD and other clinical characteristics of patients with PD. Only daily sleepiness of the patients was found to be positively related to increased SCL-90-R scores on O-C, ANX, DEP and AI dimensions. Because sleep disturbance was a prominent symptom and a common disability factor for ADL of patients with PD, increased scores on O-C, ANX and depressive symptoms might be expected in the relatively old caregivers (most of whom were spouses).

Study Limitations

There are some limitations of the present study. Firstly, this study was limited by its cross-sectional study design in terms of explanation of causal relationship between level of psychosocial functionality and the caregiver role. Other variables which were not measured in the present study could contribute to caregiver psychological distress among primary caregivers of patients with PD. Secondly, the sample size was relatively small considering

Table 3. The mean scores of SCL-90-R dimensions of the caregiver group

	Spouses (n=44)	Children		Siblings (n=3)	p value*
		Daughter (n=9)	Son (n=4)		
GSI	0.767±0.622	0.856±0.539	0.525±0.628	0.977±1.272	0.820
SOM	1.006±0.854	1.177±0.636	0.166±0.220	0.791±1.001	0.105
O-C	0.905±0.747	1.100±0.871	0.766±1.327	1.200±1.555	0.667
I-S	0.702±0.708	0.666±0.537	0.296±0.513	1.111±1.571	0.671
DEP	0.904±0.802	1.038±0.749	1.076±1.008	1.192±1.577	0.866
ANX	0.727±0.670	0.712±0.473	0.200±0.173	1.050±1.343	0.431
HOS	0.648±0.624	1.083±0.806	0.666±1.013	1.416±1.553	0.509
PHOB	0.532±0.720	0.446±0.583	0.523±0.577	0.620±0.707	0.951
PAR	0.756±0.732	0.979±0.768	0.555±0.509	1.250±1.767	0.791
PSY	0.462±0.524	0.300±0.316	0.266±0.461	0.350±0.494	0.851
AI	0.790±0.533	0.853±0.677	0.942±0.745	1.011±1.231	0.834

*p value shows the results of Kruskal-Wallis variance analysis. SCL-90-R: The Symptom Check List 90 Revised, PD: Parkinson's disease, SOM: Somatization, O-C: Obsessive-compulsive, I-S: Interpersonal sensitivity, DEP: Depression, ANX: Anxiety, HOS: Hostility, PHOB: Phobic anxiety, PAR: Paranoid ideation, PSY: Psychoticism, AI: Additional items

Table 4. Correlation between SCL-90-R dimensions scores and demographics, clinical variables of PD patients

	GSI	SOM	O–C	I–S	DEP	ANX	HOS	PHOB	PAR	PSY	AI
Patient's age	-0.182	-0.008	-0.104	-0.283*	-0.183	-0.125	-0.145	-0.299*	-0.184	-0.291*	-0.112
Patient's gender	-0.092	-0.208	-0.110	-0.028	-0.095	-0.046	-0.029	0.013	0.031	-0.198	0.036
Disease duration	-0.041	-0.117	0.001	-0.050	-0.052	0.026	0.024	-0.052	0.005	-0.067	-0.010
HYs	0.062	0.109	0.020	0.045	0.054	0.146	-0.111	-0.034	0.248	-0.095	0.093
SEs	-0.075	-0.108	-0.059	-0.028	-0.094	-0.104	-0.072	0.032	-0.184	0.092	-0.199
UPDRS total	-0.018	0.093	-0.041	-0.047	-0.008	-0.007	-0.079	-0.115	0.068	-0.177	0.060
PDSs	-0.209	-0.195	-0.165	-0.066	-0.278	-0.342*	-0.117	-0.176	-0.006	-0.018	-0.300*
ESs	0.195	0.008	**0.368****	0.102	**0.281***	0.093	0.160	0.045	0.067	0.024	0.479**
CG age	**-0.371***	-0.201	**-0.354***	**-0.321***	**-0.373***	-0.268	-0.533**	-0.325*	-0.324*	-0.369**	-0.231
CG gender	0.172	0.337*	0.099	0.087	0.178	0.185	0.137	-0.008	0.148	0.133	-0.005

Pearson correlation coefficients (r). *p<0.05, **p<0.01. SCL-90-R: The Symptom Check List 90 Revised, PD: Parkinson's disease, SOM: Somatization, O-C: Obsessive-compulsive, I-S: Interpersonal sensitivity, DEP: Depression, ANX: Anxiety, HOS: Hostility, PHOB: Phobic anxiety, PAR: Paranoid ideation, PSY: Psychoticism, AI: Additional items, HYs: Hoehn &Yahr scale score, SEs: Schwab-England scale score, UPDRS total: Unified Parkinson's disease Rating scale total score, PDSs: Parkinson's disease sleep scale score; ESs: Epworth sleepiness scale score, CG: Caregiver

the large number of patients with PD. Thirdly, our hospital is a regional public university hospital appealing to a wide public. So, majority of patients with PD admitted to our center might be more severe patients. Furthermore, this study concentrated on socio-demographic and clinical variables. It is possible that caregivers' distress stems from various other factors not measured in this study, such as the extent of caregivers' social network, support, and coping strategies. Thus, the results cannot be generalized for the entire population of caregivers. Despite these study limitations, this study makes several contributions to the PD literature. First, this is the first study examining different types of caregiver psychopathological distress in PD by comparing caregivers with a healthy control group. Secondly, findings of this study suggest that it is important to identify and screen psychological symptoms of caregivers before they reach "burnout" in order to provide optimal quality of care to patients with PD, and to prevent poor health outcomes of family caregivers.

Conclusion

In conclusion, our findings suggest that health care providers should assess ANX and depressive symptoms or burden related to caregiving role regularly to prevent negative health outcomes in both patients with PD and their caregivers. The psychological distress that occurs among caregivers may have deleterious effects, especially if primary caregivers are alone and fully responsible for the care. Further large-scale studies are needed to examine whether improvement of psychopathological symptoms in caregivers will have a positive impact on the disease course of patients and caregiver burden.

Ethics

Ethics Committee Approval: Marmara University Faculty of Medicine Ethics Committee approval was obtained (protocol code: MAR-YÇ-2008-0163).

Informed Consent: Written informed consent was obtained from all participants.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: B.Ö., D.G., Design: B.Ö., D.G., Data Collection or Processing: B.Ö., Analysis or Interpretation: B.Ö., S.B., Literature Search: B.Ö., S.B., Writing: B.Ö.

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