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ASSESSING THE BURDEN OF DEMENTIA IN PARKINSON'S DISEASE PATIENTS

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Abstract

Dementia is a common but often overlooked complication in Parkinson's disease (PD), significantly impacting patients' quality of life and daily functioning. ***The objective of this study was to determine frequency of dementia in patients with Parkinson Disease.*** *This cross-sectional study, conducted over six months at the Neurology OPD and Ward of CMC Hospital Larkana, aimed to determine the frequency and associated risk factors of dementia among 196 patients aged 40–60 years with PD. Using standard cognitive assessments, the study found that 50.5% of patients exhibited signs of dementia. The condition was significantly more prevalent among males (60%), individuals aged ≥45 years (64.8%), and those with a disease duration of 10 months or more (59.4%). These findings highlight older age, male gender, and longer disease duration as key risk factors. Given the high prevalence, early detection and intervention strategies are essential to manage cognitive decline in PD patients, particularly in settings like Pakistan where such data has been scarce.*

INTRODUCTION

Parkinson's disease is one of the most common neurological disorders.[1]The symptoms of the disease include depression, Sleep disturbances bradykinesia, hypokinesia, resting tremor, rigidity and postural reflexes. It effects about 1-2% of the population.[2]

Prevalence studies of dementia in Parkinson's disease have focused on point prevalence, and wide variations have been reported.[3] Because survival time is shorter in patients who have Parkinson's disease with dementia compared with those without dementia, and development of dementia is associated with longer disease duration,[2] longitudinal studies are needed to explore the frequency of dementia in Parkinson's disease.[4]

Although longitudinal studies of dementia in Parkinson's disease are few and have usually reported

an incidence of new cases, little is known regarding the proportion of patients with Parkinson's disease who will eventually develop dementia.[5] The prevalence of dementia in Parkinson disease ranges from 20-40%, with the disease conferring a 2- to 6-fold increased risk compared with control populations. Many patients with Parkinson disease have some executive function impairment, even early in the disease. Substantial cognitive impairment and dementia typically occur 8 years or more after the onset of motor features.[6 40] Recently, the cumulative proportion of patients who developed dementia after a mean observation period of 5.5 years was found to be 0.38.[7]The longitudinal Sydney study revealed that 15 years after the diagnosis 85% of the patients had cognitive impairment, with 50% fulfilling criteria for dementia.[8] The risk factors for dementia in patients with Parkinson's disease are as follows: Age 70 years or older, Score greater than 25 on the Parkinson's disease rating scale (Parkinson's disease). This is a test that doctors use to check for progression of the disease, Depression, agitation, disorientation, or psychotic behavior when treated with the Parkinson's disease drug levodopa, Exposure to severe psychological stress, Cardiovascular disease, Low socioeconomic status and Low education level.[9] Hoops et al found that in Parkinson disease, the Montreal Cognitive Assessment (MoCA) is superior to the Mini-Mental State Examination (MMSE) for screening for mild cognitive impairment or dementia. MoCA and MMSE demonstrated similar overall discriminant validity for detection of any cognitive disorder, but as a screening instrument, MoCA was better than MMSE (64% vs 54% correct diagnoses).[10]

Information about which patients will eventually develop dementia may be useful for the patient, caregiver, and physician to plan future treatment.[11-12] Parkinson disease is one of the main causes of disability in the elderly population. Dementia after Parkinson is further worsening quality of life of patients as well as other people and relatives living with them. The data regarding this problem is not available from Pakistan. Moreover, the prevalence varies widely in different studies so the aim of this study is to determine the burden of dementia in patients of Parkinson disease in our elderly population so intervention can be made to help peoples with Dementia after Parkinson to cope with daily life.

MATERIAL AND METHODS

Study design: Cross sectional study

Place of study: Neurology OPD and Ward CMC hospital Larkana

Duration of the study: Six months after approval of synopsis

Sample Size:

Sample size was calculated using software package WHO for determination of sample size. The frequency of dementia in patients of Parkinson disease was 50%.[7]196 patients were required to achieve 5% level of significance and 7% bond on error of estimation.

$$n = \frac{z^2_{1-\alpha/s} P(1-P)}{d^2}$$

Sampling technique: Non-probability consecutive sampling.

Sample selection

Inclusion criteria:

Following patients were included:

All patients 40-60 years of age, of either gender with Parkinson disease of 6 months duration were included in this study.

Exclusion criteria:

Following patients were excluded:

1. Stroke
2. Known case of chronic liver disease, chronic lung disease and chronic kidney disease
3. Patients on steroids, immunosuppression or chemotherapy
4. Terminal cancers
5. Known cases of CNS tumors
6. Known cases of endocrinopathy

This study was approved from ethical review committee of the institute. Patients fulfilling inclusion criteria were enrolled in this study after taking written informed consent. All patients were labeled is having dementia as per operational

definition. The data was recorded in predesigned proforma by principal researcher.

Data Analysis:

Data entry and analysis was done using SPSS version 19. Frequency and percentage were computed for categorical variable like sex and dementia. Mean and standard deviations was computed for continuous variables like age& duration of disease.

Effect modifiers like age, sex and duration of disease were controlled through stratification by applying chi squared test and p-value <0.05 was considered significant.

RESULTS

A total of 196 patients were enrolled in this study during study period. The mean age of enrolled participants was 50.9±6.4 years and mean disease duration was 7.7±0.78 months. Majority of enrolled participants were male 105 (53.6%) and female patients were 91 (46.4.5%) as shown in Fig No I.

Table 1 presents a stratified analysis of the frequency of dementia among patients with Parkinson's disease based on age, gender, and duration of illness. The findings reveal that dementia was significantly more common in patients aged 45 years and older, with 64.8% affected compared to 38.1% in those under 45 years ($p < 0.001$). A notable gender difference was also observed, as 60% of male patients had dementia compared to 39.6% of female patients ($p = 0.006$). Additionally, the duration of Parkinson's disease was associated with dementia frequency; 59.4% of patients with a disease duration of 10 months or more had dementia, whereas only 41.1% of those with a shorter duration were affected ($p = 0.015$). These results suggest that older age, male gender, and longer duration of Parkinson's disease are linked to a higher prevalence of dementia in this patient population.

Fig I: Distribution of Gender of Enrolled Participants (N=196).

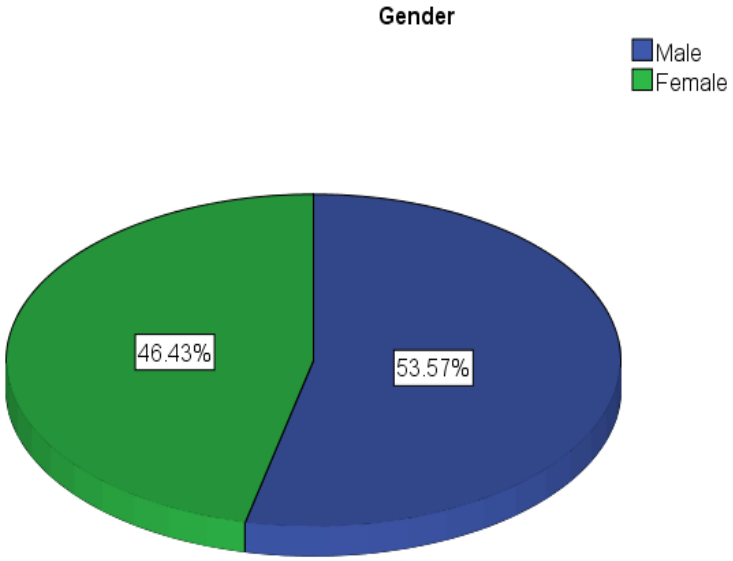

Table No I: Stratified Analysis of Frequency of Dementia in Patients with Parkinson's Disease by Age, Gender, and Duration of Disease (n=196).

Variable	Category	Total (n)	Dementia Yes n (%)	Dementia No n (%)	p-value
Gender	Male	105	63 (60.0%)	42 (40.0%)	0.006
	Female	91	36 (39.6%)	55 (60.4%)	
Age	<45 years	105	40 (38.1%)	65 (61.9%)	<0.001
	≥45 years	91	59 (64.8%)	32 (35.2%)	
Duration of Parkinson's	<10 months	95	39 (41.1%)	56 (58.9%)	0.015

Disease	≥10 months	101	60 (59.4%)	41 (40.6%)	

Discussion

Dementia affects about 40% of patients with Parkinson's disease; the incidence of dementia in these patients is up to six times that in healthy people. Clinically, the prototype of dementia in PD is a dysexecutive syndrome. Loss of cholinergic, dopaminergic, and noradrenergic innervation has been suggested to be the underlying neurochemical deficits. Nigral pathology alone is probably not sufficient for the development of dementia. Although there is some controversy with regard to the site and type of pathology involved, dementia is likely to be associated with the spread of pathology to other subcortical nuclei, the limbic system, and the cerebral cortex. On the basis of more recent studies, the main pathology seems to be Lewy-body-type degeneration with associated cellular and synaptic loss in cortical and limbic structures. Alzheimer's disease-type pathology is commonly associated with dementia but less predictive. Recent evidence from small studies suggests that cholinesterase inhibitors may be effective in the treatment of dementia associated with PD.[13]

Three types of pathological substrates have been suggested to underlie dementia in PD. These include: cellular loss in discrete subcortical nuclei, notably dopaminergic cell loss in medial substantia nigra and nuclei of the other ascending pathways; co-incident Alzheimer-type pathology; and Lewy body (LB) type pathology in limbic and cortical areas. There have been a number of clinical–pathological correlation studies supporting one or the other view.[14]

Substantial variation in the prevalence of dementia in Parkinson's disease (PDD) has been reported. In this study we found that the frequency of dementia in patients with Parkinson's disease was 50.5%. Compared to our study, a longitudinal Sydney study revealed that 15 years after the diagnosis 85% of the patients had cognitive impairment, with 50% fulfilling criteria for dementia.[8]

In an study, the reported cumulative proportion of PD patients with dementia was 38% (95% CI 20 to 55%), or 42.6 cases per 10 years of observation.[7] The finding of this study is in contrast to the finding of this study. The difference among study is due to different methodology and use of scoring tools.

In a systematic review, Due to significant methodological variations between studies, the rate of dementi in patients with Parkinson's disease was 31.1% (95% CI 20.1-42.1%) which is lower compared to the findings of this study.[15]

We also found that the frequency of dementia was high in patients with old age (64.9%), longer duration of disease (59.4%) and male (60%). All these variables are statistically significant. Similarly, in a study, the incident dementia in patients with PD was associated with older age, longer duration of PD, greater disability, and male sex.[7]

Findings of systematic review concluded that, older age is the predictor of dementia in Parkinson's disease. This find is consistent with the findings of this study. In another study reported that patients with dementia were older at the time of the study and at onset of PD and had had PD longer than the patients without dementia.[16]

Conclusion

It was concluded from this study that, the frequency of dementia in patients with Parkinson's disease was high and presented in 50.5% cases. Old age, longer duration of disease and male sex are effect modifiers in this study.

Limitations and recommendation:

This study's cross-sectional design limits causal conclusions, and being conducted at a single center may reduce generalizability. The sample size and reliance on clinical diagnosis without advanced tests may affect accuracy. Future studies should use larger, diverse populations with longitudinal designs and include more precise diagnostic methods to better understand and manage dementia in Parkinson's disease.

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