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Investigation into Treatment Patterns for Neurodegenerative Diseases within the Pakistani Setting

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ABSTRACT

BACKGROUND: This study examines the treatment patterns of neurodegenerative diseases, focusing on Alzheimer's disease and Parkinson's disease, within the Pakistani healthcare context. The objective is to provide valuable insights for neurophysicians practicing in the region.

METHODS: Conducted over a six-month period from December 14, 2020, to June 18, 2021, this study was carried out in a private hospital located in a well-off area of Karachi. Convenient sampling methods were employed, with patients initially screened in the general outpatient department or emergency room, followed by referrals to consultant physicians and subsequently to neurologists for confirmation, treatment, and management. A total of 146 patients were diagnosed with Alzheimer's disease, while 46 were diagnosed with Parkinson's disease.

RESULTS: In Alzheimer's disease, females exhibited a higher prevalence, often presenting with comorbidities. The 50-59 age group was most affected by mild-grade Alzheimer's, whereas severe cases were more prevalent in individuals aged 80 years and above. Severity correlated positively with associated diseases, gender, age, concurrent drug therapies, supportive treatments, and physiotherapy.

CONCLUSION: Parkinson's disease demonstrated a male predominance, with onset typically occurring after the age of 50. A significant proportion of patients used multiple medications and received physiotherapy. Compared to Alzheimer's disease, Parkinson's disease showed milder associations with various independent variables, including disease duration, motor symptoms, comorbidities, age at first symptom onset, and gender.

KEYWORDS: SPECT (Single Photon Emission Computed Tomography), UPDRS (Unified Parkinson's Disease Rating Scale).

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Introduction

Neurodegenerative disease is a multi-factorial disease which is attributed to the constant degeneration of the function and structure of central and peripheral nervous system. Alzeihmer and Parkinson's diseases are common degenerative diseases all over the world including Pakistan. The neurodegenerative disease is the neurological disorder that eventually influences different bodily activities like walking, speaking, listening, movement, cardiac functions, breathing, balancing, dementia symptoms like difficulty in thinking and etc. [1].

The studies show that there is a high relationship between age and neurological disease. Almost all over the world, the neurodegenerative disease affect aging population. However, due to accidents or severe injuries, medicinal action leads to eradicate the symptoms of neurodegenerative disease before aging or at early times [2]. The dementia symptoms also progresses into neurodegenerative disease. Primarily, dementia is a psychological disease and many researchers confuse this terms as neurodegenerative disease [3]. Dementia has different types. Dementia is common in Pakistan and when left untreated gets converted into neurodegenerative disease like Parkinson and Alzheimer. This disease can be partially to fully cured depending on the age, causes, brain condition and treatment duration. Treatment is usually prolonged in older patients [4]. However, due to different metabolic diseases like diabetes, hyperlipidemia, overweight and etc. Life challenges that cause to feel the individual deeply traumatic inside due to stress; depression, insomnia, anxiety etc. affect the prognosis of the disease [5].

The global prevalence is about 6.5%. 4-5% are contributed by the low income countries inclusive of Pakistan. However, the global burden contributing percentage is high in high income countries like Unites States, United Kingdom, Australia, New Zealand etc. The 11 to 12% people of first world countries or high income countries are suffering with the nerve cells degenerative disease [6].

In Pakistan about 219 people in 100,000 individuals are suffering from Parkinson's disease and the trend is rising. The contributing factors are gender and age, depressive illnesses, exposure to drugs like pesticides, smoke, occupation, sedentary life style like consuming health deleterious diets, consuming alcohol etc. [7]. Furthermore, the demographic, geographic and socioeconomic conditions are also the main causes of disease advancement.

In today's era, the older adults are also experiencing Parkinson symptoms frequently than previous decades. The studies show that older adults of both genders are significantly reported for neurodegenerative diseases all over the world. Some of the Pakistan based research proposed that Karachi and Peshawar have high occurrence rate of Parkinson disease [8]. In rural areas, male population is more affected while in urban areas, females population are affected more with Parkinson disease [9].

Alzheimer disease is the common type of dementia disease that is growing very fast. In countries like China, Pakistan, India and other Asian countries have been reporting increasing number of cases. In China, nearly nine million people are living with the neurodegenerative disease. In Pakistan, 75% neurological cases are Alzheimer and more common in older age group followed by traumatic brain injury. The dementia patients worsened into Alzheimer disease [10]. According to the report of WHO (World

Health Organization) in the year 2018, Pakistan ranked 114 in Alzheimer and dementia mortalities accounting 1.39% of yearly deaths. The current statistics proposed that nearly two million people are living with Alzheimer disease and dementia is the common cause behind this condition with common causes is thinking, memory and behavioral changes [11].

Another rare neurodegenerative disease in Pakistan is Amytrophic lateral disease in which the nerve cells of brain and spinal cord are affected. This disease is the main type of motor neuron disorder and is developed under the age of 50 years. The damage in nerve cell and spine ultimately influences muscle movement that control movement and breathing. For this disease, the exact cause in still under investigation however, it is believed that this condition can be inherited, or may be associated with particular environmental factors that cause the incorrect manufacturing of nerve proteins or by chemical imbalance etc. The prevalence is more in men than women [12].

Another rare inherited neurodegenerative disease is the Huntington Disease in which the nerve cells rapidly breakdown leading functional disabilities including both physical and physiological. The common disabilities are eye movement, body movement inclusive of legs and body, difficulty in speaking etc. This disease is very rare in Pakistan but its occurrence is high in western countries and rare in Asian countries [13].

Literature Review:

In Pakistan, the major reasons behind the neurodegenerative disease are insomnia, worries, loneliness, overthinking, stress, depression, dealing with socioeconomic challenges, family issues, lack of self-care, lack of physical activity, metabolic diseases, overuse of digital technology, improper sleep-awake pattern, job issues etc. These challenges affect people of all ages. But, those who take these challenges with less stress or in a positive manner can deal with or suppress the symptoms of emergence of neurodegenerative disease before time [14].

Literature Review

Alzheimer Disease

Alzheimer Disease is manifested by dementia which is characterized by the rapid loss of cognitive abilities over normal aging. The symptoms can be generally noticed by the change in mood and behavior. Physiologically, cerebral cortex and hippocampus are damaged in Alzheimer disease. Pathologically, neurofibrillary tangles, senile plaques or neuritic plaques are aggregated in affected tissues. This disease has two main features. In blood vessels of brain, neuritic plaques are formed due to the aggregation of amyloid beta peptides. The second common pathological change is neurofibrillary tangles which occurs to hyper-phosphorylation of tau protein in the cytoplasm of neurons [15]. Under normal condition, the tau protein functions as nutrition transport. However, in pathological condition, the tau proteins in hyper-phosphorylated form develop tangles and are deposited leading to disturbances in normal cascade mechanism. The associated damages are nutritional deficiency in brain, micro vascular damage, oxidative stress leading to inflammation, abnormal mitochondrial function etc. Alzheimer disease can be hereditary, the familial Alzheimer disease usually have the autosomal dominant inherent pattern [16]. To date, the three mutations in genes encoding genes associated to form amyloid precursor proteins have been identified. The presenilin-1 gene, presenilin-2 gene and amyloid precursor protein gene are the causal genes

for early on-set of Alzheimer disease. Usually, the non-hereditary disease occurs after the age of 65 years in which the amyloid deposition takes place. The non-hereditary Alzheimer disease women suffer more than men [17].

Traumatic brain injury leading to Alzheimer disease is more noticed in older adults and the changes are 2.3 times higher. The common sign and symptoms are memory loss, bad decisions due to poor judgment, taking relatively long time to finish the task, wandering and getting lost, loss things or misplacing things at odd places, mood and behavior changes, hallucination, paranoia, difficulty in learning new things, too high in out-bursting of anger, using vulgar language, repetitive statements, frequent muscle twitching and blockage are the common symptoms [18]. These symptoms can be controlled by medicinal therapy; the commonly prescribed medicines in mild to moderate conditions is cholinesterase Inhibitor which assists in managing behavioral changes [19]. Donepezil, galanitamine, memantine-donepezil, rivastigmine are the common medicines given to Alzheimer patients to recover memory loss, ability to perform tasks, improvement in speech, attention and judgment. At advanced stages, the aducanumab is given which is a monoclonal antibody and is administrated through intraperitoneal injections. This drug causes the removal of amyloid aggregates in brain [20].

Parkinson's Disease

Parkinson's disease is fundamentally a movement disorder. It may be idiopathic or of unknown origin. It is a progressive neurodegenerative disease affecting millions of people around the globe. This disease is caused by the loss of nerve cells in the substantia nigra which produces dopamine. The pathogenesis includes defective protein deposition and deficiency in their clearance. The aggregates are the alpha-synuclein in lewy bodies which deposited in intra-cells eventually causing less dopamine formation and release [21].

Dopamine regulates some of the brain functions and nervous system to assist in controlling and co-coordinating body movements. Lack of dopamine is a disease condition, the brain doesn't perform normal to control movement leading to rigidity, slow movement, tremors, instability in body posture etc. The disease onset is usually after 50 years. There is a different hereditary condition that eventually leads to the development of Parkinson disease. The mutation in SNCA gene encodes the protein called alpha-synuclein and performs the function of repairing DNA damage repairing signaling kinase [22].

There are some genes that are associated with the lysosome function. The lysosome function is to digest waste products of cells. But in Parkinson disease, the lysosomal function is disturbed leading to decrease in the ability of catabolism activity of cells to breakdown alpha-synuclein. Current researches revealed the association between smoking and Parkinson disease. High caffeine intake is also more prone to develop Parkinson disease at older age. The smoking reduces the monoamine oxidase enzyme activity in the brain. In the consequence, the dopamine catabolism gets reduced [23]. In addition to this, there are five major pathways in brain coordinating and connecting other areas of brain with basal ganglia. They are motor, oculo-motor, associative, limbic and orbitofrontal circuits. These regions are involved in learning, movement and attention. In Parkinson disease, all these five brain regions get

affected which physically explains the symptom of disease like difficulty in walking, imbalance body posture, difficulty in learning, speaking, thinking etc. [24].

To date, there is no particular treatment for Parkinson's disease; the medicines are available just to improve symptoms. Dopamine agonists, monoamine oxidase inhibitors, levodopa are usually recommended therapies. The counseling therapy and physiotherapy help to improve muscle movement, following strict dietary regimen to further manage the deteriorating conditions. However, at advanced stage where medicinal therapy failed to improve symptoms, surgical intervention is recommended and microelectrodes are installed in substantia nigra for providing deep brain stimulation (DBS). This therapy is quite helpful in resolving motor dysfunctions [25].

Methodology

There are a number of neurodegenerative diseases: These are Alzheimer's disease, Parkinson's disease, Huntington's disease, Motor neuron disease and Amyotrophic disease. Among all these five Alzheimer's disease and Parkinson's disease are more prevalent. Therefore we have focused our study on these two diseases.

Study setting and period of study: This was a six months study from December 14, 2020 to June 18, 2021 (both days included). The study setting was a private hospital of a posh locality of Karachi having almost 200 indoor patient capacity. There are a number of consultant physicians and one neurologist in the hospital. The OPD and ER are taken care of well qualified junior doctors.

Sampling procedure: The sampling was based on convenient sampling method. The screening was done at two stages. At first the patients were screened at general OPD or ER. The attending physician then referred the cases to consultant physicians available in the hospital. After confirmation at his level he referred the cases to the neurologist for further confirmation, treatment and control. Since this study is limited to the diagnosis, the follow up of treatment and control aspects have not been discussed in detail.

During the said six months period a total of 4682 patients reported to the OPD and ER. Out of these patients, during the first screening (by junior doctors) 273 patients were referred to the consultant physicians. In the second screening (by the consultant physician) a total of 192 patients were finally diagnosed for both the diseases. At neurologist level all of the 192 patients were confirmed of their diagnoses. Out of this total 192, 146 patients were diagnosed for Alzheimer disease while 46 were diagnosed for Parkinson's disease.

Alzheimer's disease:

The following signs and symptoms were considered while diagnosing Alzheimer's disease: memory loss, misplacing things, difficulty in remembering events that just occurred, confusion with place and time, losing track of dates, seasons and time, difficulty in completing routine functions, difficulty with conversations, trouble understanding visual images and spatial relationships, challenges in planning or solving problems, problems with in speaking, problems with in writing, change in mood and personality, poor decision-making.

Inclusions criteria:

All patients above 40 who reported or experienced the signs and symptoms of the disease.

Exclusions criteria:

Patients who did not report or experienced the signs and symptoms of the disease.
Reference: National Institute of Ageing, Symptoms and Diagnosis of Alzheimer's Disease, What Are the Signs of Alzheimer's Disease? May 16, 2017, https://www.nia.nih.gov/health/what-are-signs-alzheimers-disease

Parkinson's disease:
The following signs and symptoms were considered for diagnosis of Parkinson's disease: tremor, loss of automatic movements, rigid muscles, slowed movement (bradykinesia), impaired posture and balance, speech changes, writing changes.

Inclusions criteria: All patients above 40 who reported or experienced the following signs and symptoms of the disease: slowness of movement, speech changes, tremor, flatulence, hyposmia, dyskinesia

Exclusions criteria:
Patients suffering from a) dementia, b) motor fluctuations at the first visit, co physical disabilities as a result of any other disease having the possibility of interfering with the diagnosis and rating of Parkinson's disease and d) Patients who were on non PD medications having the possibility of interfering the diagnosis of PD (e. g. extrapyramidal motor function).

History of repeated strokes with stepwise progression of parkinsonian features, History of repeated head injury, History of definite encephalitis, Oculogyric crises, Neuroleptic treatment at onset of symptoms, More than one affected relative, Sustained remission, Strictly unilateral features after 3 years, Supra-nuclear gaze palsy, Cerebellar signs, Early severe autonomic involvement, Early severe dementia with disturbances of memory, language and praxis, Babinski sign, Presence of cerebral tumor or communicating hydrocephalus on CT scan, Negative response to large doses of levodopa (if malabsorption excluded), MPTP exposure.

Result

Alzheimer's disease
Gender wise females were more affected than males. Age wise, 50 - 59 YEARS old patients were affected most (29.45%) followed by 80 years and above (28.08%). Among the major comorbid conditions hypertension (72.60%) was followed by diabetes (62.33%). Psychiatric illnesses (depression, agitation etc.) in totality were found to be 76.71%. As high as 77.40% patients were taking 1-3 drugs on a routine regular basis. 43.15% patients were taking physiotherapy at different intervals during a month. Patients (50%) were getting mental and social stimulation from within the family and friends. 45.89% patients were also getting counseling as well.

50 - 59 years patients were higher for mild (34.14%) of the disease. 80 years and above years patients were higher for moderate (37.10%) and severe (38.30%) grades of the disease. For mild grade the following major diagnostic measures were observed more frequently: Loss of spontaneity and sense of initiative (72.97%), Taking longer to complete normal daily tasks (64.86%), Trouble handling money and paying bills (62.16%). For moderate grade the following major diagnostic measures were observed more frequently: Difficulty carrying out multistep tasks, such as getting dressed (83.87%), Repetitive statements or movement (83.87%), occasional muscle twitches Problems coping with new situations (79.03%) and Shortened attention span (69.35%). For severe grade the

TABLE 1: ALZHEIMER'S DISEASE BASIC DATA

		NO: 146	PERCENT
GENDER	MALE	55	37.67
	FEMALE	91	62.33
AGE	40 - 49 YEARS	17	11.64
	50 - 59 YEARS	43	29.45
	60 - 69 YEARS	26	17.81
	70 -79 YEARS	19	13.01
	80 YEARS AND ABOVE	41	28.08
COMORBIDITY	HYPERTENSION	106	72.60
	CARDIAC AILMENTS	79	54.11
	DIABETES	91	62.33
	ARTHRITIC PROBLEMS	86	58.90
	PEPTIC ULCER	55	37.67
	PSYCHIATRIC ILLNESSES (**DEPRESSION**, AGITATION ETC.)	112	76.71
DRUG THERAPY	1 to 3	113	77.40
	4 to 6	27	18.49
	More than 6	6	4.11
PHYSIOTHERPAY	1-2 IN A MONTH	32	21.92
	3-4 IN A MONTH	17	11.64
	MORE THAN 4 IN A MONTH	14	9.59
	NONE	83	56.85
OTHER SUPPORTIVE TREATMENT	COUNSELING	67	45.89
	MEMORY TRAINING	54	36.99
	MENTAL AND SOCIAL STIMULATION	73	50.00
	PHYSICAL EXERCISE PROGRAMS	47	32.19

Me

TABLE 2: ALZHEIMER'S DISEASE (n=146): DURATION OF SUFFERINGS

		2-4 YRS (MILD)		3-9 YRS (MODERATE)		10 YRS OR MORE (SEVERE)		TOTAL	
		NO	PERCENT	NO	PERCENT	NO	PERCENT	NO	PERCENT

TABLE 2: ALZHEIMER'S DISEASE (n=146): DURATION OF SUFFERINGS									
		2-4 YRS (MILD)		3-9 YRS (MODERATE)		10 YRS OR MORE (SEVERE)		TOTAL	
		NO	PERCENT	NO	PERCENT	NO	PERCENT	NO	PERCENT
GENDER	MALE	14	37.84	16	25.81	9	19.15	55	37.67
	FEMALE	23	62.16	29	46.77	38	80.85	91	62.33
AGE	40 - 49 YEARS	7	18.92	8	12.90	2	4.26	17	11.64
	50 - 59 YEARS	13	35.14	14	22.58	16	34.04	43	29.45
	60 - 69 YEARS	9	24.32	9	14.52	8	17.02	26	17.81
	70 -79 YEARS	8	21.62	8	12.90	3	6.38	19	13.01
	80 YEARS AND ABOVE		0.00	23	37.10	18	38.30	41	28.08
	AGE TOTAL	37	100.00	62	100	47	100	146	100

following major diagnostic measures were observed more frequently: Increased sleeping (91.49%), Difficulty swallowing (89.36%), Groaning, moaning, or grunting (82.98%).

In regression analysis the values of R (0.939), R2 (0.882) and adjusted R2 (0.876) indicate that the independent variables supports the dependent variable at 93.9%, 88.2% and 87.6% respectively. The Durbin-Watson value of 0.320 indicates that there is a strong positive relationship between the dependent variable and independent variables. The Sig (P) value of zero indicates that the result is significant and the model is a good fit.

Parkinson's disease

Gender wise males were higher (60.87%) than the females (39.13%). Age wise the onset of the disease started at 50 - 59 years (41.30%) and 60 – 69 years 32.61%. Other major comorbid conditions were: hypertension 58.70%, cardiac ailments 50% and psychiatric illnesses 50%. More than half of the patients (56.52%) were taking 3-4 drugs at a time in their daily routine. 30.43% patients were given deep brain stimulation (DBT) as their treatment. 63.04% patients were getting physiotherapy 1-2 times a month. Among other supportive treatments mental and social stimulation were given to 69.57% patients.

The major signs and symptoms were as follows: muscular rigidity or stiffness (93.48%), 4–6 hz rest tremor (93.48%), bradykinesia (73.91%), tiredness (100%), pain (84.78%), morning akinesia (71.74%), all patients had a day time sleep pattern of different duration (from less than 3 hours to more than 5 hours). Unified Parkinson's Disease Rating Scale (UPDRS) was used to

TABLE 3: ALZHEIMER'S DISEASE: DIAGNOSTIC MEASURES		
Mild Alzheimer's Disease		
	NO: 37	PERCENT
Mild memory loss	14	37.84
Poor judgment leading to bad decisions	7	18.92
Loss of spontaneity and sense of initiative	27	72.97
Taking longer to complete normal daily tasks	24	64.86
Repeating questions	21	56.76
Trouble handling money and paying bills	23	62.16
Wandering and getting lost	3	8.11
Losing things or misplacing them in odd places	9	24.32
Mood and personality changes	16	43.24
Increased anxiety and/or aggression	19	51.35
Moderate Alzheimer's Disease		
	NO: 62	PERCENT
Increased memory loss and confusion	32	51.61
Inability to learn new things	24	38.71
Difficulty with language and problems with reading, writing, and working with numbers	25	40.32
Difficulty organizing thoughts and thinking logically	27	43.55
Shortened attention span	43	69.35
Problems coping with new situations	49	79.03
Difficulty carrying out multistep tasks, such as getting dressed	52	83.87
Problems recognizing family and friends	23	37.10
Hallucinations, delusions, and paranoia	16	25.81
Impulsive behavior such as undressing at inappropriate times or places or using vulgar language	7	11.29
Inappropriate outbursts of anger	11	17.74
Restlessness, agitation, anxiety, tearfulness, wandering—especially in the late afternoon or evening	27	43.55
Repetitive statements or movement, occasional muscle twitches	52	83.87
Severe Alzheimer's Disease		
	NO: 47	PERCENT
Inability to communicate	36	76.60
Weight loss	33	70.21
Seizures	21	44.68
Skin infections	29	61.70
Difficulty swallowing	42	89.36
Groaning, moaning, or grunting	39	82.98
Increased sleeping	43	91.49
Loss of bowel and bladder control	37	78.72

TABLE 4: ALZHEIMER'S DISEASE REGRESSION ANALYSIS: Model Summaryb

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				Sig. F Change	Durbin-Watson	Sig (P) value
					R Square Change	F Change	df1	df2			
1	.939a	0.882	0.876	0.26646	0.882	172.404	6	139	0	0.320	0

a Predictors: (Constant), COMORBIDITY , GENDER, DRUG THERAPY, OTHER SUPPORTIVE TREATMENT , PHYSIOTHERAPY, AGE

b Dependent Variable: GRADE (DURATION OF SUFFERING)

TABLE 5: PARKINSON'S DISEASE: BASIC INFORMATION			
		NO: 46	PERCENT
GENDER	MALE	28	60.87
	FEMALE	18	39.13
AGE OF ONSET OF PD	30 - 39 YEARS	3	6.52
	40 - 49 YEARS	6	13.04
	50 - 59 YEARS	19	41.30
	60 - 69 YEARS	15	32.61
	70 YEARS AND ABOVE	3	6.52
COMORBIDITY	HYPERTENSION	27	58.70
	CARDIAC AILMENTS	23	50.00
	DIABETES	21	45.65
	ARTHRITIC PROBLEMS	16	34.78
	PEPTIC ULCER	18	39.13
	PSYCHIATRIC ILLNESSES (DEPRESSION, AGITATION ETC.	23	50.00
NO OF DRUGS TAKING	1 TO 2	13	28.26
	3 TO 4	26	56.52
	5 TO 6	7	15.22
	MORE THAN 6	0	
DEEP BRAIN STIMULATION	INSERTION AT ONE SIDE	14	30.43
	NONE	32	69.57
PHYSIOTHERAPY	1-2 IN A MONTH	29	63.04
	3-4 IN A MONTH	14	30.43
	MORE THAN 4 IN A MONTH	3	6.52
OTHER SUPPORTIVE TREATMENT	COUNSELING	24	52.17
	MEMORY TRAINING	18	39.13
	MENTAL AND SOCIAL STIMULATION,	32	69.57
	PHYSICAL EXERCISE PROGRAMS	27	58.70

assess the degree of involvement of Parkinson's disease. It was found that motor involvement (71.74%) was the most prominent one according to the measurement scale. 73.981% patients had their first onset during 50 to 69 years of age. At the time of first SPECT (Single Photon Emission Computed Tomography) 93.48% patients were 50 – 69 years old. Disease duration at the time of first UPDRS was 5-7 years for 23.91% patients and less than 2 years for 15.22% patients.

In regression analysis the value of R (0.955), R2 (0.912) and adjusted R2 (0.880) indicate that the independent variables support the dependent variable at 95.5%, 91.2% and 88.0% respectively. The Durbin-Watson value of 1.484 indicates that there is a mild relationship between the independent variables and the dependent variable. The zero sig (P) value indicates that the result is significant and the model is a good fit.

Conclusions

Alzheimer's disease:

The disease was found more prevalent in females than males. Almost all the patients were also suffering from one or more other disease. Most affected (29.45%) age group for mild grade of *Alzheimer's disease* was people of 50-59 years, for moderate and severe grade 80 years and above were more frequent, Psychiatric illnesses were the most prevalent illness (76.71) among all. As high as 77.40% patients were taking 1-3 drugs. Mental and social stimulation from within the family and friend circle were received by 50%

TABLE 6: PARKINSON'S DISEASE. SIGNS AND SYMPTOMS			
		NO= 46	PERCENT
MOTOR SYMPTOMS	BRADYKINESIA	34	73.91
	MUSCULAR RIGIDITY OR STIFFNESS	43	93.48
	4–6 HZ REST TREMOR	43	93.48
	POSTURAL IMBALANCE	24	52.17
NON-MOTOR SYMPTOMS	TIREDNESS	46	100.00
	DEPRESSION	33	71.74
	PAIN	39	84.78
WORST TIME OF SYMPTOMS	MORNING AKINESIA	33	71.74
	OTHER TIMINGS	13	28.26
DAY TIME SLEEP	LESS THAN 3 HOURS	23	50.00
	3-5 HOURS	17	36.96
	MORE THAN 5 HOURS	6	13.04
UPDRS	PART I: Mentation, Behavior, Mood	23	50.00
	PART II: Activities of Daily Living (good or bad day)	21	45.65
	PART III: Motor Examination	33	71.74
	PART IV: Complications of Therapy (in the past week)	7	15.22
AGE AT THE TIME OF FIRST ONSET OF UPDRS	30 - 39 YEARS	3	6.52
	40 - 49 YEARS	6	13.04
	50 - 59 YEARS	19	41.30
	60 - 69 YEARS	15	32.61
	70 YEARS AND ABOVE	3	6.52
AGE AT THE TIME OF FIRST SPECT	50 - 59 YEARS	22	47.83
	60 - 69 YEARS	21	45.65
	70 YEARS AND ABOVE	3	6.52
DISEASE DURATION AT THE TIME OF FIRST UPDRS	LESS THAN 2 YEARS	7	15.22
	2-4 YEARS	23	6.52
	5-7 YEARS	11	23.91
	8-10 YEARS	5	10.87

TABLE 7: PARKINSON'S DISEASE REGRESSION ANALYSIS: Model Summary[b]											
Model	R		Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson	
		R Square			R Square Change	F Change	df1	df2	Sig. F Change		Sig (P) value
1	.955[a]	0.912	0.880	0.20282	0.912	28.474	12	33	0.000	1.484	0

a. Predictors: (Constant), DISEASE DURATION AT THE TIME OF FIRST UPDRS, DEEP BRAIN STIMULATION, MOTOR SYMPTOMS, COMORBIDITY, AGE AT THE TIME OF FIRST SPECT, NO OF DRUGS TAKING , PHYSIOTHERAPY, AGE AT THE TIME OF FIRST ONSET OF UPDRS, DAY TIME SLEEP, WORST TIME OF SYMPTOMS, OTHER SUPPORTIVE TREATMENT, GENDER

b. Dependent Variable: UPDRS

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8. Tufail M. Clinical features

of the patients. The result concludes that the grade of suffering (mild, moderate, severe) in Alzheimer's disease has a positive relationship with associated disease, gender, age, drug therapy the patients are taking for other disease, other supportive treatments and physiotherapy.

Parkinson's disease: The disease is more prevalent on males were higher (60.87%) than the females (39.13%). The disease onset started for most of the patients (73.91%) after 50 years. This indicates that for elderly people proper preventive measures should be taken to stop the onset. More than half of the patients (56.52%) were taking 3-4 drugs on their routine. They were also getting physiotherapy as well. In comparison to Alzheimer's disease, Parkinson's disease had a mild relationship with the independent variables *(*disease duration at the time of first UPDRS, deep brain stimulation, motor symptoms, comorbidity, age at the time of first SPECT, no of drugs taking, physiotherapy, age at the time of first onset of UPDRS , day time sleep, worst time of symptoms, other supportive treatment, gender. Both the diseases are major diseases of the old age and are progressive in nature with age. In a Pakistani society where joint family is a norm rather than exception, with the help of family members the disease symptoms and their progression can be either slowed down or stopped altogether. However, poverty and financial constraints are major causes of worry and tension which are considered the basic reasons for onset. This constraints can be overcome through love, affection and tender care by the family members.

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