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RESEARCH ARTICLE

LOWER URINARY TRACT SYMPTOMS IN NIGERIANS WITH PARKINSON'S DISEASE

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Abstract

Introduction: Parkinson's disease (PD) is the commonest age related motoric neurodegenerative disease. It results from the destruction of dopaminergic cell in the substantial nigra in the midbrain. In addition to the typical motor 'Parkinsonism' symptoms, non -motor manifestations affect multiple organs including the lower urinary tract and contribute to worsening the overall quality of life. The objective of this study is to highlight the bother from lower urinary tract symptoms in patients with PD and determine the relationship between the lower urinary symptoms and severity of PD.

Materials and Methods: This is a descriptive cross-sectional study in patients with clinically diagnosed PD that were managed by the Neurology Unit, Department of Medicine University of Port Harcourt Teaching Hospital, Port Harcourt, Rivers State, Nigeria. They all filled the International Prostate Symptom Score and Quality of Life form. The severity of PD in each patient was assessed using Unified Parkinson's Disease Rating Scale (UPDRS). The data obtained was analyzed using SPSS Version 20.

Results: There were 22 patients ages between 25-87years with a mean age of 59.36 ±15.58years. Nocturia (90.90%), frequency (59.10%) and urgency (59.10%) were the commonest LUTS, while straining was the least frequent (22.70 %). Majority had mild (59.09%) and moderate (27.27%) symptoms. There was a strong association between total IPSS and QoL scores that was statistically significant (p<0.0001; r= +0.859). The degree of bother from LUTS, evaluated with the IPSS questionnaire was associated with worsening of PD symptoms assessed with UPDRS (p=0.012). There was a moderate positive correlation between the severity of PD and the degree of bother from LUTS in PD patients (r=+0.527)

Conclusions: Irritative symptoms are very common in Parkinson's disease, with nocturia the commonest. There was a moderate positive correlation between the severity of PD and the degree of bother from LUTS. The IPSS questionnaire could be used in evaluating urinary dysfunction in PD patients in both genders.

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Introduction:-

Parkinson's disease is one of the commonest age-related motoric neurodegenerative diseases.^{1,2} It results from the destruction of dopaminergic cells in the substantial nigra in the midbrain. In addition to the typical motor 'Parkinsonism' symptoms, non-motor manifestations affect multiple organs including the lower urinary tract.^{3,4} These contribute to worsening the overall quality of life in patients with PD.

The severity of LUTS can be assessed with the International Prostate Symptom Score, a validated symptoms scoring system that has become the international standard for evaluating LUTS resulting from benign prostate enlargement. It comprises eight questions, seven symptoms, and a question assessing the impact of the urinary symptoms on the patient's quality of life.⁵ While the IPSS score was designed primarily for patients with prostate enlargement, it has been used to evaluate LUTS in PD patients also.⁶

There are many PD rating scales in use for staging the disease severity. The Unified Parkinson's Disease Rating Scale (UPDRS) is a standardized tool used to evaluate the severity of PD and assess the impact on their quality of life.⁷ This study highlights the bother from lower urinary tract symptoms in PD patients and determines the relationship between the lower urinary symptoms and severity of PD.

Materials And Methods:-

This is a descriptive cross-sectional study on patients with clinically diagnosed PD who presented to the Neurology Out-Patient Department, University of Port Harcourt Teaching Hospital, Port Harcourt, Rivers State, Nigeria. They had all been clinically diagnosed with PD by a Consultant Neurologist. The patients were consecutively selected and all of them filled the International Prostate Symptom Score (IPSS) and Quality of Life (QoL) forms. Patients' demographic information such as their age, sex, etc. were obtained. The Unified Parkinson's Disease Rating Scale (UPDRS) was also administered to them to assess the severity of the PD Symptoms.

IPSS Questionnaire

The IPSS questionnaire comprises seven questions on LUTS (incomplete emptying, frequent urination within 2 hours, intermittency, urgency, weak stream, straining to start, and nocturia) and an additional question on Quality of life. Nocturia was scored from 0 to 5 (five or more times per night) as the actual voiding frequency per night. Other symptoms were scored on a frequency scale from 0 to 5: 0 (not at all); 1 (less than once every five times); 2 (less than half the time); 3 (about half the time); 4 (more than half the time); and 5 (almost always). The scores were aggregated to form a symptom index from 0 to 35. The overall subjective satisfaction on urinary conditions was assessed using the Quality-of-Life section and scored from 0 (delighted) to 6 (terrible).

Unified Parkinson's Disease Rating Scale

The UPDRS has four parts. These are Part 1: Intellectual function, mood, and behavior; Part 2: Activities of daily living; Part 3: Motor examination; and Part 4: Motor complications. Each part has multiple points that are individually scored; 0 for normal or no problems, 1 for minimal problems, 2 for mild problems, 3 for moderate problems, and 4 for severe problems. These scores were tallied to indicate the severity of the disease, with 199 points being the worst total disability and 0 meaning no disability.³

The data that was obtained from the IPSS questionnaire and UPDRS of the patients was analyzed using SPSS version 20.

Results:-

There were 22 patients with clinically diagnosed Parkinson's disease who participated in the study, with 18 males and 4 females. The mean age, IPSS, QoL score and UPDRS was 59.36±15.58 years, 8.95±6.87, 2.20±2.09, and 35.64±19.83 respectively.

Table 1:- Means of Parkinson's disease patients Age, IPSS, QoL and UPDRS.

Variable	Mean ± SD	Range
AGE	59.36±15.58	25.00–87.00
IPSS	8.95±6.87	0–21.00
QoL score	2.20±2.09	0–6.00
UPDRS	35.64±19.83	8.00–67.00

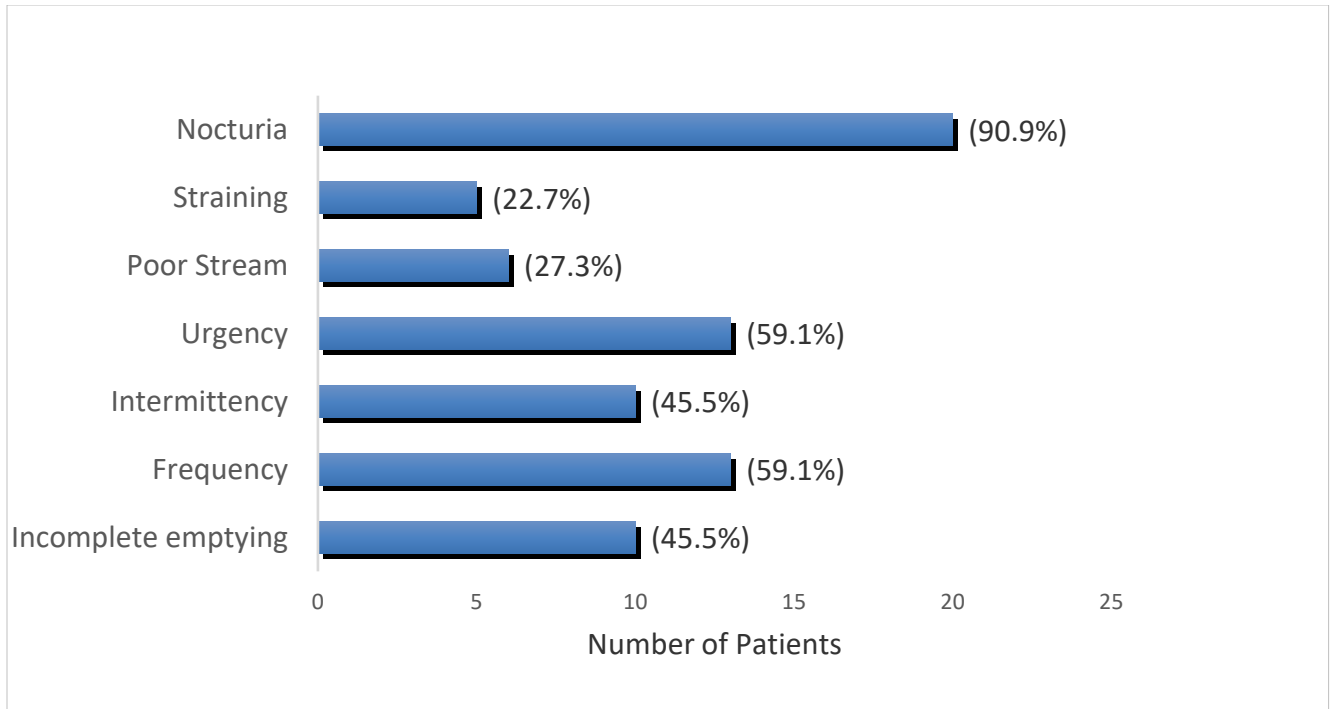


Figure 1:- Distribution of Lower Urinary Symptoms in Parkinson's Disease patients.

Table 2:- Relationship between severity LUTS symptoms (IPSS) with age, sex, QoL, and severity of Parkinson's disease (UPDRS).

Variables		IPSS
Age	R	0.359
	p-value	0.101
	N	22
Sex	R	-0.295
	p-value	0.182
	N	22
QoL score	R	0.859
	p-value	<0.0001*
	N	22
UPDRS	R	0.527
	p-value	0.012*
	N	22

Table 3:- Relationships between severity of symptoms (IPSS) with Age, Sex, QoL and severity of Parkinson's disease (UPDRS).

Variables	IPSS			p-value	
	MILD (0-7)	MODERATE (8-19)	SEVERE (20-35)		
	Mean±SD	Mean±SD	Mean±SD		
Age	54.69±18.40	67.33±4.23	63.67±10.60	0.235	
QoL score	0.92±1.04	3.83±1.94	5.00±.00	<0.0001*	
UPDRS score	27.23±18.48	42.50±16.51	58.33±4.93	0.021*	
Sex					
	Male	10(76.9%)	5(83.3%)	3(100.0%)	0.642
	Female	3(23.1%)	1(16.7%)	0(0.0%)	

Table 4:- Multiple linear regression coefficients of IPSS scores with UPDRS, QoL, Age and Sex.

	Unstandardized Coefficients		P-value	95.0% Confidence Interval for B	
	B	S E		Lower Bound	Upper Bound
(Constant)	-3.10	5.71	0.594	-15.20	8.99
UPDRS	-0.05	0.08	0.576	-0.24	0.13
QoL score	2.91	0.56	<0.0001	1.70	4.11
Age	0.07	0.06	0.218	-0.05	0.20
Sex	0.03	2.40	0.991	-5.07	5.12

Discussion:-

Parkinson's disease (PD) is classically described as a 'motor' neurodegenerative disorder resulting from dopaminergic neurotransmitter imbalance in the basal ganglia.^{1,2,3} The most overt symptoms are the motor parkinsonism signs and symptoms such as bradykinesia/akinesia, rigidity, tremor, and postural instability. Covert symptoms from associated autonomic dysfunction such as distressing lower urinary symptoms often go unnoticed. In some studies, the reported prevalence of this non-motor manifestation ranged from 37% to 70%.^{1,10,11}

There are many rating scales for evaluating voiding and storage dysfunctions in men with LUTS. Most are primary urological scales that have been well validated in urological settings, but none specifically in PD patients. The IPSS questionnaire, comprising questions on LUTS was originally designed for use in obtaining some "quantification" of the subjective voiding and storage symptoms that patients with prostate enlargement manifest. This is useful for evaluation, diagnosis, management, and follow-up during treatment. We utilized this questionnaire to evaluate bladder dysfunction in both male and female patients with PD. Other researchers have also utilized the IPSS questionnaire to evaluate LUTS in Parkinson's disease patients and found it useful irrespective of the patient's gender.^{6,12,13}

There are many PD rating scales in use for staging the Parkinson's disease severity. We utilized the Unified Parkinson's Disease Rating Scale (UPDRS), which is a validated and standardized questionnaire for the holistic assessment of the severity and impact of PD on the patient. The higher the total score, the greater the impact of the "parkinsonian" symptom on the quality of life of the patient.^{7,8}

In our study, the irritative symptoms of nocturia, frequency, and urgency were the commonest. This is corroborated by several studies showing a similar pattern.^{10,11,14,15} The basal ganglia, including the substantia nigra, have been demonstrated to be involved in the micturition reflex.¹ Therefore, it is not surprising that the degenerative changes in the dopaminergic neurons of the substantia nigra could manifest with irritative symptoms in Parkinson's disease.¹⁶⁻¹⁸

Nocturia is defined as waking up more than twice at night to void. The high prevalence of nocturia, which was the commonest symptom in our study (90.9%), had also been reported as the most frequent PD symptom in other studies; nocturia interferes with sleep and further worsens the patient's quality of life.¹⁹⁻²¹ Frequency is the inability to hold urine for up to two hours, while the PD patient with urgency is unable to defer voiding. Both of these symptoms were the next common symptoms observed in our study (59.1% each) and can be causes of embarrassment to a patient already struggling with motor dysfunctions associated with PD. Araki I. and Sadako K., in their study⁶ applied the IPSS questionnaire to 203 patients and observed that among Parkinson patients with urinary symptoms, pure irritative LUTS was the commonest. Gupta, A et al. observed that eighteen and sixteen of the twenty-two patients in their study had nocturia and urgency with or without urge incontinence respectively.¹⁹ Other researchers have also observed the preponderance of bothersome irritative symptoms in PD patients.^{3,6,20}

Obstructive symptoms were also observed in our study and include poor stream, hesitancy, intermittency, and incomplete bladder emptying. Intermittency (45.5%) and incomplete bladder emptying (45.5%) were the most frequently observed. The obstructive symptoms in patients with Parkinson's disease might result from the observed micturition hyporeflexia due to impairment in the autonomic nervous system.⁸

None of the female patients in our study had obstructive symptoms. This may indicate that lower urinary symptoms from prostate enlargement may be a contributing factor to the PD symptom in males. This is not unlikely, considering that the mean age of the patients was 59.36±15.58 years as indicated in Table 1, and it is known that the prevalence of symptomatic prostate enlargement increases with age. This observation was also reported in other studies.^{1,2,10}

Other known factors that could contribute to obstructive symptoms include Parkinson's disease medication like levodopa, dopamine agonist, and other anticholinergic medication.^{7, 8,19} Our study did not exclude the effects of the various medications used by the PD patients in attendance at the clinic.

LUTS are generally stratified using the IPSS into mild (1-7), moderate (8-19), and severe (19-35). (Tables 2) This categorization was applied to the patient with PD in our study and it was observed that most of the patients had mild to moderate symptoms. We found no relationship between age ($p=0.101$, $r=0.359$) and sex ($p=0.183$, $r=-0.295$) with the severity of LUTS symptoms in PD patients as shown in Tables 2.

The QoL of the patients was found to be very positively correlated with the IPSS ($p<0.0001$, $r=0.859$). Multivariate linear regression analysis (Tables 3&4) indicated that age and sex are unlikely to influence the relationship observed between QoL and IPSS; suggesting that a case could be made for applying the IPSS questionnaire irrespective of age and gender. It is also indicative that it can be applied for evaluating the degree of bother from the autonomic dysfunction that is responsible for urinary tract symptoms in patients with PD. These findings and the non-gender-specific usefulness of the IPSS in PD patients, also observed by Araki I and Sadako K. in their study⁶ will require further validation.

Finally, we found a statistically significant association, with a moderately positive linear relationship between the severity of urinary symptoms assessed with IPSS and the severity of PD symptoms graded with UPDRS. ($p=0.012$, $r=+0.527$) This implies that patients with severe PD were more likely to have worse urinary symptoms. Isao Araki in their study in Japan also found that the IPSS correlated with the severity of PD symptoms using the Hoehn and Yahr staging of PD and concluded that the IPSS questionnaire could be applied for evaluating voiding dysfunction in PD patients.⁶ Larger studies are required to evaluate the seldom emphasize, often underplayed but troublesome voiding and storage urinary symptoms in PD patients.

Conclusions:-

Irritative symptoms are very common among patients with Parkinson's diseases with nocturia the commonest. There is a moderate positive correlation between the severity of PD and the degree of bother from LUTS. The IPSS questionnaire could be used in evaluating urinary dysfunction in PD patients irrespective of gender. The greater the severity of LUTS in PD patients, the more the negative impact on the quality of life from the urinary symptoms.

Limitations:-

This is a descriptive cross-sectional study with small sample size. Larger studies are needed to validate our observations.

The effects of Parkinson's medications such as such and neurotropic medications that the patients may be taking were not excluded.

The impact and contributions of the individual lower urinary tract symptoms to the quality of life of the patient were also not explored.

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