

Evaluation of Corneal Sensitivity in Patients with Multiple Sclerosis and Parkinson's Disease

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DOI: <https://doi.org/10.70670/sra.v4i1.2621>

Abstract

Multiple Sclerosis (MS) and Parkinson's Disease (PD) are neurodegenerative disorders that may affect corneal innervation and sensory function. Corneal sensitivity assessment provides a simple, non-invasive method for evaluating neurological involvement in these conditions. To evaluate corneal sensitivity in patients with Multiple Sclerosis and Parkinson's Disease, and to determine the relationship between disease duration and corneal sensitivity in patients with Multiple Sclerosis and Parkinson's Disease. This cross-sectional observational study was conducted at the Department of Ophthalmology, Services Hospital Lahore, and Social Security Teaching Hospital Lahore in collaboration with the Department of Neurology. A total of 58 participants were enrolled, including 29 patients with MS and 29 patients with PD. Corneal sensitivity was measured using the Cochet-Bonnet esthesiometer in both eyes, and the mean value was used for analysis. Normality was assessed using the Shapiro-Wilk test. One-way ANOVA with Bonferroni post-hoc test, Kruskal-Wallis test, Spearman correlation, and Mann-Whitney U test were applied as appropriate. A p-value < 0.05 was considered significant. A total of 58 participants were included, comprising 29 patients with Multiple Sclerosis (MS) and 29 patients with Parkinson's Disease (PD). Mean corneal sensitivity was 54.01 ± 3.23 mm in the Multiple Sclerosis group and 52.96 ± 3.85 mm in the Parkinson's disease group. Corneal sensitivity decreased significantly with increasing disease duration in Multiple Sclerosis patients ($p = 0.010$; $\rho = -0.373$, $p = 0.047$), whereas no significant association was observed in Parkinson's disease patients ($p = 0.218$; $\rho = -0.195$, $p = 0.310$). Corneal sensitivity decreased significantly with disease duration in Multiple Sclerosis but not in Parkinson's disease. Corneal sensitivity assessment may serve as a useful non-invasive marker of disease progression in Multiple Sclerosis.

Keywords: Multiple Sclerosis, Parkinson's Disease, Corneal Sensitivity, Cochet-Bonnet Esthesiometer, Neurodegeneration, Disease Duration.

Introduction

Corneal sensitivity refers to the ability of the cornea to detect mechanical, chemical, and thermal stimuli through its rich sensory innervation. The cornea is among the most densely innervated tissues in the human body and receives its sensory supply from the ophthalmic branch of the trigeminal nerve. Corneal nerves play a critical role in maintaining ocular surface health by regulating protective reflexes such as blinking and tear secretion. These mechanisms help preserve

epithelial integrity and protect the eye from environmental insults. A reduction in corneal sensitivity can impair these protective functions, leading to decreased tear production, epithelial defects, delayed wound healing, increased susceptibility to infection, and visual disturbances ^{1,2}. Corneal innervation consists primarily of A-delta and C nerve fibers, which mediate mechanical, thermal, and chemical sensations. These fibres form a highly organized network comprising stromal nerves, the sub-basal nerve plexus, and epithelial nerve terminals. Among these structures, the sub-basal nerve plexus is particularly important because of its high nerve density and accessibility for clinical assessment ^{3,5}. Advances in ocular imaging have enabled detailed visualization of corneal nerves, highlighting their value as indicators of neural integrity and function.

The eye and the central nervous system (CNS) are closely interconnected both anatomically and functionally. The retina and optic nerve are direct extensions of the CNS, while the cornea reflects changes occurring in peripheral and central neural pathways ⁶. Because of this close relationship, ocular tissues have gained attention as potential sites for detecting neurodegenerative changes. Corneal nerve alterations have been reported in several neurological and systemic disorders, suggesting that the cornea may serve as a readily accessible biomarker for neuronal dysfunction ^{7,8}. Neurodegenerative diseases are characterized by progressive neuronal loss, neuroinflammation, oxidative stress, and synaptic dysfunction ⁹. Among these conditions, Parkinson's disease (PD) and Multiple Sclerosis (MS) are associated with significant neurological impairment and often exhibit ocular manifestations. Parkinson's disease is a progressive neurodegenerative disorder primarily affecting dopaminergic neurons in the substantia nigra. Clinically, it presents with tremor, rigidity, bradykinesia, and postural instability. In addition to these motor symptoms, patients frequently experience non-motor manifestations, including autonomic dysfunction and ocular surface abnormalities. Reduced blink rate, tear film instability, and dry eye symptoms are common findings in PD. Furthermore, peripheral small-fiber neuropathy and abnormal alpha-synuclein deposition may contribute to degeneration of the corneal sub-basal nerve plexus. Previous studies using corneal confocal microscopy have demonstrated reductions in corneal nerve fiber density, nerve fiber length, and branch density in patients with PD, findings that correlate with disease severity and reduced corneal sensitivity ¹⁰⁻¹². Multiple Sclerosis is a chronic immune-mediated demyelinating disease of the CNS characterized by inflammation, demyelination, and axonal degeneration. Visual symptoms are often among the earliest manifestations of the disease, particularly in patients with optic neuritis. Demyelination affecting trigeminal sensory pathways may impair corneal sensory function, while chronic neuroinflammation can lead to degeneration of peripheral small nerve fibers, including those within the cornea. Studies have reported significant reductions in corneal nerve parameters and corneal sensitivity in patients with MS compared with healthy individuals. Moreover, alterations in corneal nerve morphology have been shown to correlate with disease severity, highlighting the potential role of corneal assessment as an indicator of neurological damage ^{10,13-15}.

The identification of reliable, non-invasive biomarkers is essential for improving diagnosis and monitoring disease progression in neurodegenerative disorders. Traditional approaches such as neuroimaging and cerebrospinal fluid analysis can be expensive, invasive, or difficult to repeat regularly. Consequently, there is increasing interest in accessible biomarkers that reflect underlying neural degeneration. Due to its dense innervation and ease of examination, the cornea represents a promising target for such assessments ¹⁶⁻²⁰. Corneal sensitivity can be quantitatively evaluated using aesthesiometry. Among the available instruments, the Cochet-Bonnet aesthesiometer remains the most widely used and is considered the clinical gold standard for measuring mechanical corneal sensitivity. By varying the length of a nylon filament, the device

determines the corneal touch threshold and provides a simple, reproducible assessment of corneal nerve function ^{21,25}. Changes in corneal sensitivity may reflect underlying alterations in nerve structure and function, making this technique useful for detecting and monitoring neurological disorders. Therefore, the present study aims to evaluate corneal sensitivity in patients with Parkinson's disease and Multiple Sclerosis using quantitative aesthesiometry and to explore its potential as a non-invasive biomarker of neuronal degeneration.

Methodology

This cross-sectional observational study was conducted in the Department of Ophthalmology, Services Hospital Lahore, and Social Security Teaching Hospital Lahore, in collaboration with the Department of Neurology, over a period of four months following approval of the research synopsis. A total of 58 participants were enrolled using a non-probability convenience sampling technique, including 29 patients with Multiple Sclerosis (MS) and 29 patients with Parkinson's Disease (PD). Sample size was calculated using G*Power version 3.1 for the comparison of two independent means. Patients aged 18–60 years with a confirmed diagnosis of MS or PD documented by a consultant neurologist and a disease duration of at least six months were included. Both male and female patients who provided informed consent were recruited. Exclusion criteria included history of ocular surgery within the previous six months, contact lens wear, ocular trauma, active ocular infection or inflammation, corneal surface diseases (e.g., keratoconus), diabetes mellitus, autoimmune disorders affecting tear secretion, use of topical ocular medications, and inability to cooperate during examination. Eligible participants were identified from the Neurology Department and screened according to the inclusion and exclusion criteria. After obtaining written informed consent, demographic information, disease type and duration, ocular history, and systemic history were recorded using a structured proforma. All participants underwent a comprehensive slit-lamp examination to exclude corneal and ocular surface pathology. Corneal sensitivity was assessed using a Cochet–Bonnet esthesiometer. Measurements were performed under standardized room lighting and environmental conditions. The nylon filament was initially set at its maximum length of 60 mm and gradually shortened until the patient perceived the stimulus or a blink response was elicited. The longest filament length producing a positive response was recorded in millimetres. Measurements were obtained from both eyes, and the mean value was used for statistical analysis. The independent variable was the type of neurodegenerative disease (MS or PD), while the dependent variable was corneal sensitivity measured in millimetres using the Cochet–Bonnet esthesiometer. The primary outcome measure was corneal sensitivity in patients with MS and PD. Data were entered and analysed using IBM SPSS Statistics version 26. A p-value <0.05 was considered statistically significant.

Results:

A total of 58 participants were included in the study, comprising 29 (50.0%) patients with Multiple Sclerosis and 29 (50.0%) patients with Parkinson's disease. Among the participants, 31 (53.4%) were females and 27 (46.6%) were males (Table 4.1).

5.1: Demographic and Clinical Characteristics of Participants by Disease Group (N = 58)

Variable	Multiple Sclerosis (n=29)	Parkinson's Disease (n=29)	Total (N=58)
Gender, n (%)			
Male	13 (44.8)	14 (48.3)	27 (46.6)

Female	16 (55.2)	15 (51.7)	31 (53.4)
Age Group, n (%)			
18–30 years	9 (31.0)	0 (0.0)	9 (15.5)
31–45 years	4 (13.8)	0 (0.0)	4 (6.9)
46–60 years	16 (55.2)	19 (65.5)	35 (60.3)
≥61 years	0 (0.0)	10 (34.5)	10 (17.2)
Disease Duration Category, n (%)			
Short (<3 years)	15 (51.7)	14 (48.3)	29 (50.0)
Medium (3–6 years)	8 (27.6)	8 (27.6)	16 (27.6)
Long (>6 years)	6 (20.7)	7 (24.1)	13 (22.4)

Table 5.1: Demographic and clinical characteristics of participants

Table 5.1 showed that the demographic and clinical characteristics of the 58 study participants, equally distributed between the Multiple Sclerosis (MS) and Parkinson's Disease (PD) groups (29 participants each). Females constituted a slightly higher proportion of the study population (53.4%) than males (46.6%). A significant difference in age distribution was observed between the two disease groups with younger participants predominantly represented in the MS group, whereas older participants were more common in the PD group.

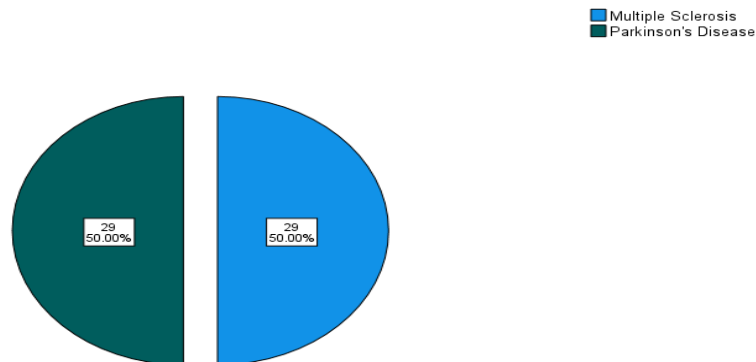


Figure # 5.1: Distribution of Disease Groups Among Study Participants

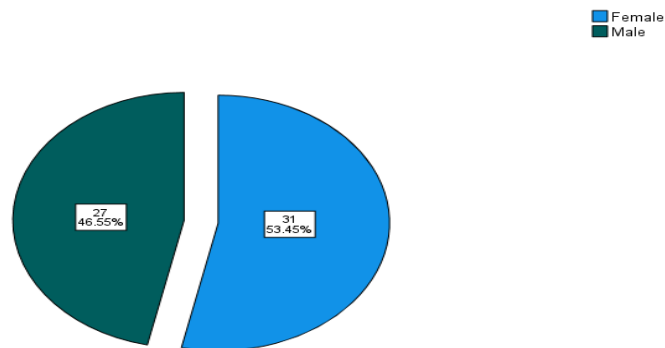


Figure # 5.2: Gender Distribution of Study Participants.

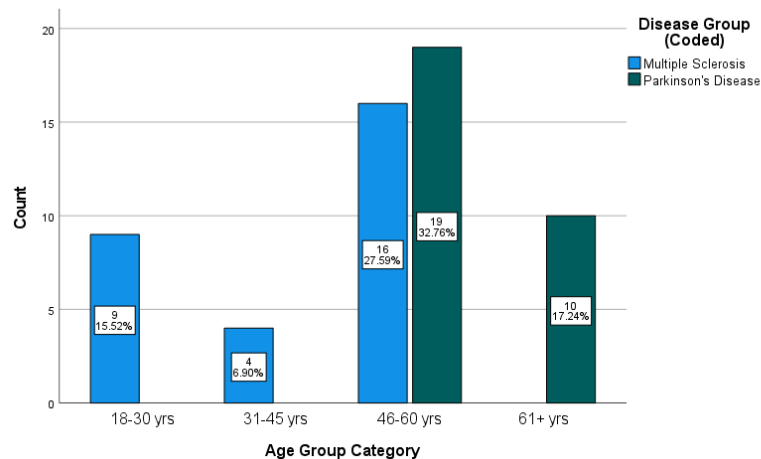


Figure # 5.3: Distribution of Age Groups According to Disease Category (Multiple Sclerosis and Parkinson's Disease).

Descriptive Statistics of Study Variables (N = 58)

Variable	Mean $\pm$ SD	Minimum	Maximum
Right Eye Corneal Sensitivity (mm)	53.58 $\pm$ 3.76	45.3	60.4
Left Eye Corneal Sensitivity (mm)	53.39 $\pm$ 3.65	45.3	60.1
Mean Corneal Sensitivity (mm)	53.48 $\pm$ 3.56	45.6	59.4
Inter-Eye Asymmetry (mm)	1.60 $\pm$ 1.17	0.1	5.2

Table 5.2: Descriptive Statistics of Study Variables (N = 58)

The above table shows that the mean age of participants was 50.50 ± 14.25 years. The mean right eye corneal sensitivity was 53.58 ± 3.76 mm, while the mean left eye corneal sensitivity was 53.39 ± 3.65 mm. The overall mean corneal sensitivity was 53.48 ± 3.56 mm. The mean inter-eye asymmetry was 1.60 ± 1.17 mm, indicating relatively small differences between eyes among participants.

5.3.1: To evaluate mean corneal sensitivity according to disease duration categories in Multiple Sclerosis

Duration Category	n	Mean CS $\pm$ SD (mm)
Short (<3 yrs)	15	55.23 $\pm$ 3.30
Medium (3–6 yrs)	8	54.18 $\pm$ 2.65

Duration Category	n	Mean CS $\pm$ SD (mm)
Long (>6 yrs)	6	50.73 $\pm$ 0.87

Table 5.3.1: Evaluation of mean corneal sensitivity according to disease duration categories in Multiple Sclerosis

The above table showed that Mean corneal sensitivity showed a progressive decline with increasing disease duration among patients with Multiple Sclerosis. The highest mean corneal sensitivity was observed in the **short-duration group (<3 years)** (55.23 $\pm$ 3.30 mm), which slightly decreased in the **medium-duration group (3–6 years)** (54.18 $\pm$ 2.65 mm). The **long-duration group (>6 years)** exhibited the lowest mean corneal sensitivity (50.73 $\pm$ 0.87 mm). These findings suggest that corneal sensitivity is most adversely affected in patients with a longer duration of Multiple Sclerosis, indicating a greater degree of corneal nerve impairment as the disease progresses.

5.3.2: To evaluate mean corneal sensitivity according to disease duration categories in Parkinson's disease.

Duration Category	n	Mean CS $\pm$ SD (mm)
Short (<3 yrs)	14	54.12 $\pm$ 4.02
Medium (3–6 yrs)	8	51.70 $\pm$ 3.45
Long (>6 yrs)	7	52.06 $\pm$ 3.74

Table 5.3.2: Evaluation of mean corneal sensitivity according to disease duration categories in Parkinson's disease.

The above table 5.3.2 showed that mean corneal sensitivity was highest in the **short-duration group (<3 years)** (54.12 $\pm$ 4.02 mm) and decreased in the **medium-duration group (3–6 years)** (51.70 $\pm$ 3.45 mm). A slight increase was observed in the **long-duration group (>6 years)** (52.06 $\pm$ 3.74 mm); however, corneal sensitivity remained lower than that of the short-duration group.

5.4.1: Normality Assessment of Mean Corneal Sensitivity in Multiple Sclerosis disease:

Disease Group	Shapiro-Wilk Statistic	p-value	Interpretation
Multiple Sclerosis	0.935	0.075	Normal Distribution

Table.5.4.1: Normality Assessment of Mean Corneal Sensitivity in Multiple Sclerosis disease Shapiro-Wilk Statistic = 0.935

Table.5.4.2: Normality Assessment of Mean Corneal Sensitivity in Parkinson's disease:

Disease Group	Shapiro-Wilk Statistic	p-value	Interpretation
Parkinson's Disease	0.926	0.044	Non-Normal Distribution

**Table.5.4.2: Normality Assessment of Mean Corneal Sensitivity in Parkinson's disease
Shapiro-Wilk Statistic=0.926**

The above tables 5.4.1 and 5.4.2 indicate that the normality of mean corneal sensitivity was assessed using the **Shapiro–Wilk test**. In the Parkinson's disease group, the Shapiro–Wilk statistic was 0.926 with a p-value of 0.044, indicating that the data significantly deviated from normality ($p < 0.05$). Therefore, the distribution of corneal sensitivity in Parkinson's disease patients was considered non-normal. In contrast, the Multiple Sclerosis group showed a Shapiro–Wilk statistic of 0.935 with a p-value of 0.075, suggesting that the data were approximately normally distributed ($p > 0.05$). Because the normality assumption was not satisfied in all study groups, **non-parametric statistical tests** were used for inferential analyses.

5.5.1 To evaluate corneal sensitivity in patients with Multiple Sclerosis

Disease Group	n	Mean Corneal Sensitivity (mm) Mean $\pm$ SD	Median
Multiple Sclerosis	29	54.01 $\pm$ 3.23	53.30

Table 5.5.1 To evaluate corneal sensitivity in patients with Multiple Sclerosis

The above table shows that the corneal sensitivity measurements among patients with Multiple Sclerosis. A total of 29 patients were included in this group. The mean corneal sensitivity was **54.01 $\pm$ 3.23 mm**, while the median value was **53.30 mm**. These findings indicate that corneal sensitivity was generally preserved in the studied MS population, with relatively low variability among participants as reflected by the standard deviation.

5.5.2. To evaluate corneal sensitivity in patients with Parkinson's Disease.

Disease Group	n	Mean Corneal Sensitivity (mm) Mean $\pm$ SD	Median
Parkinson's Disease	29	52.96 $\pm$ 3.85	53.90

Table 5.5.2. To evaluate corneal sensitivity in patients with Parkinson's Disease

Table 5.5.2 summarizes corneal sensitivity measurements in 29 patients with Parkinson's disease. The mean corneal sensitivity was **52.96 $\pm$ 3.85 mm**, with a median value of **53.90 mm**. The slightly lower mean value compared to the MS group suggests reduced corneal sensitivity among

Parkinson's disease patients. However, inferential testing would be required to determine whether this difference is statistically significant.

5.6. One-way ANOVA for Mean Corneal Sensitivity Across Disease Duration Categories in Multiple Sclerosis Patients

Duration Category	n	Mean Corneal Sensitivity (mm) $\pm$ SD	F-value	p-value
Short (6 month to <3 years)	15	55.23 $\pm$ 3.30	5.51	0.010*
Medium (3–6 years)	8	54.18 $\pm$ 2.65		
Long (>6 years)	6	50.73 $\pm$ 0.87		

Table 5.6. One-way ANOVA for Mean Corneal Sensitivity Across Disease Duration Categories in Multiple Sclerosis Patients

One-way ANOVA, significant at $p < 0.05$

The above table showed that a statistically significant difference in mean corneal sensitivity was observed among the disease duration categories of Multiple Sclerosis patients ($F = 5.51$, $p = 0.010$). Mean corneal sensitivity progressively decreased with increasing disease duration, with the highest value recorded in the short-duration group (55.23 $\pm$ 3.30 mm) and the lowest in the long-duration group (50.73 $\pm$ 0.87 mm). Bonferroni post-hoc analysis revealed a significant difference between the short-duration and long-duration groups (mean difference = 4.50 mm, $p = 0.008$), indicating that patients with disease duration greater than six years had significantly reduced corneal sensitivity.

Post-hoc analysis revealed a significant reduction in corneal sensitivity between the short- and long-duration groups ($p = 0.008$). No significant difference was observed between the medium- and long-duration groups ($p = 0.020$), also short- and medium-duration groups ($p = 0.272$). These findings indicate that the significant Kruskal-Wallis result was primarily driven by the markedly lower corneal sensitivity observed in patients with disease duration greater than six years

5.7: Bonferroni correction table

$$0.05 \div 3 = \mathbf{0.0167}$$

Comparison	p-value	Bonferroni Result
Short vs Medium	0.272	Not Significant
Short vs Long	0.008	Significant
Medium vs Long	0.020	Not Significant

Table 5.7: Bonferroni correction table

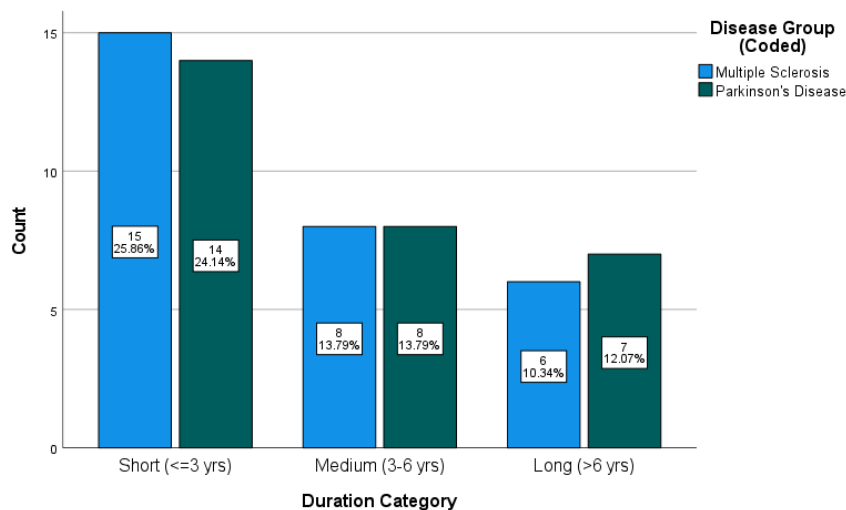


Figure # 5.4: Distribution of Disease Duration Categories Among Multiple Sclerosis and Parkinson's Disease Patients.

5.8. To determine the relationship between disease duration and corneal sensitivity in Parkinson's disease

Duration Category	n	Mean Rank	p-value
<3 years	14	17.82	0.218
3–6 years	8	11.81	
>6 years	7	13.00	

Table 5.8. To determine the relationship between disease duration and corneal sensitivity in Parkinson's disease

The above table showed that the relationship between disease duration and corneal sensitivity in patients with Parkinson's disease was assessed using the Kruskal–Wallis test because the patients were divided into three duration groups and the data were not normally distributed. The mean ranks of corneal sensitivity were 17.82 for patients with a disease duration of ≤ 3 years, 11.81 for those with a disease duration of 3–6 years, and 13.00 for those with a disease duration of more than 6 years. The Kruskal–Wallis test showed no statistically significant difference among the groups ($H = 3.047$, $p = 0.218$). Since the p-value was greater than 0.05, it indicates that there is no significant relationship between disease duration and corneal sensitivity in Parkinson's disease patients. Although the mean ranks varied slightly between the duration groups, the differences were not large enough to suggest that disease duration affects corneal sensitivity in this group.

5.9.1: To check the correlation of corneal sensitivity with disease duration in Multiple Sclerosis Groups.

Disease Group	Spearman's rho	p-value
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Multiple Sclerosis	-0.373	0.047
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Table 5.9.1: To check the correlation of corneal sensitivity with disease duration in Multiple Sclerosis Groups.

Spearman's rho test = -0.373

A significant weak-to-moderate negative correlation was observed between disease duration and corneal sensitivity in Multiple Sclerosis patients ($\rho = -0.373$, $p = 0.047$), indicating that corneal sensitivity decreased as disease duration increased. Since the p-value was less than 0.05, the null hypothesis was rejected, and the alternative hypothesis was accepted. This indicates a statistically significant relationship between disease duration and corneal sensitivity in patients with Multiple Sclerosis.

5.9.2: To check the correlation of corneal sensitivity with disease duration in Parkinson's disease.

Disease Group	Spearman's rho	p-value
Parkinson's Disease	-0.195	0.310

Table 5.9.2: To check the correlation of corneal sensitivity with disease duration in Parkinson's disease

Spearman's rho test = -0.195

A weak negative correlation was observed between disease duration and corneal sensitivity in Parkinson's disease patients; however, the association was not statistically significant ($\rho = -0.195$, $p = 0.310$). Since the p-value was greater than 0.05, the null hypothesis was accepted, and the alternative hypothesis was rejected. This indicates there was no statistically significant relationship between disease duration and corneal sensitivity in patients with Parkinson's disease.

Comparison of Clinical Characteristics Between Disease Groups

Variable	MS Mean Rank	PD Mean Rank	Mann-Whitney U	p-value
Age Group	20.24	38.76	152.0	<0.001
Disease Duration	29.76	29.24	413.0	0.907
Duration Category	28.86	30.14	402.0	0.754
Hypertension	30.50	28.50	391.5	0.597

Table 5.10: Comparison of Clinical Characteristics Between Disease Groups

The above table showed that the Mann–Whitney **U test** was used to compare clinical characteristics between Multiple Sclerosis and Parkinson's disease patients. This non-parametric test was selected because the study data did not fully meet the assumptions of normality and involved comparisons between two independent groups. A statistically significant difference was observed for **age group**, with mean ranks of **20.24** for the MS group and **38.76** for the Parkinson's disease group ($U = 152.0$, $p < 0.001$). This finding indicates that the age distribution differed significantly between the two disease groups, with Parkinson's disease patients generally belonging to older age categories. No significant differences were observed for **disease duration** ($U = 413.0$, $p = 0.907$), **disease duration category** ($U = 402.0$, $p = 0.754$), or **hypertension status** ($U = 391.5$, $p = 0.597$).

Discussion:

The present study evaluated corneal sensitivity in patients with Multiple Sclerosis (MS) and Parkinson's disease (PD) and examined its association with disease duration. The results demonstrated that mean corneal sensitivity was slightly higher in MS patients (54.01 ± 3.23 mm) than in PD patients (52.96 ± 3.85 mm). A significant decline in corneal sensitivity with increasing disease duration was observed in MS patients, whereas no significant association was found in the PD group. Corneal nerves are essential for maintaining ocular surface homeostasis through regulation of tear secretion, blink reflexes, and epithelial repair. Neurodegenerative disorders are increasingly recognized to affect corneal nerve structure and function, making corneal assessment a potential biomarker of neurological disease. In the present study, MS patients with longer disease duration exhibited significantly lower corneal sensitivity, and a significant negative correlation was identified between disease duration and corneal sensitivity. These findings suggest progressive corneal nerve dysfunction with advancing disease duration.

The present findings are consistent with those of Petropoulos et al. (2021), who demonstrated significant corneal nerve fiber loss in MS patients using corneal confocal microscopy and suggested that corneal alterations reflect ongoing neurodegeneration¹⁹. Similarly, Mikolajczak et al. reported that corneal nerve parameters were associated with disease severity in MS, supporting the concept that corneal changes may serve as markers of neurological involvement. The significant reduction in corneal sensitivity observed in long-duration MS patients in the present study further supports the utility of corneal assessment as a non-invasive indicator of disease progression²¹. However, our findings contrast with those of Sukkarieh et al. (2021), who reported no significant association between corneal sensitivity and disease duration in MS patients. Differences in sample size, disease characteristics, duration categories, and patient demographics may explain this discrepancy. Furthermore, variations in disease severity and treatment status among study populations could influence corneal sensory measurements¹³.

In patients with Parkinson's disease, corneal sensitivity was slightly lower than in MS patients; however, disease duration was not significantly associated with corneal sensitivity. Although a weak negative correlation was observed, it failed to reach statistical significance. This finding suggests that disease duration alone may not adequately reflect corneal nerve dysfunction in PD and that other factors, such as disease severity, autonomic dysfunction, or medication status, may have a greater influence on corneal sensory changes. The present findings partially agree with those of Mirsa et al. (2017), who reported significant reductions in corneal nerve density in PD patients but found no significant reduction in corneal sensitivity compared with controls. Their findings suggest that structural corneal nerve abnormalities may occur before measurable functional impairment, which may explain the absence of a significant relationship between disease duration and corneal sensitivity in our PD cohort¹⁰. Conversely, Gundogan et al. (2025) reported significantly reduced corneal sensitivity in newly diagnosed PD patients compared with healthy controls, indicating that corneal sensory dysfunction may develop early in the disease process¹². Likewise, Camacho-Ordonez et al. (2024) demonstrated a progressive decline in corneal sensitivity with increasing Parkinson's disease severity. The discrepancy between these studies and the present findings may be attributable to methodological differences, including the use of disease duration rather than validated clinical severity scales. Disease duration may not accurately reflect neurological impairment because progression rates vary considerably among individuals²². A major strength of the present study is the use of a simple, clinically applicable technique for evaluating corneal sensitivity in two important neurodegenerative disorders. However, the relatively small sample size and absence of a healthy control group may limit the

generalizability of the findings. Future studies incorporating larger populations, longitudinal follow-up, clinical severity scales, and corneal confocal microscopy are recommended. Overall, the findings indicate that corneal sensitivity decreases with increasing disease duration in Multiple Sclerosis and may serve as a useful non-invasive biomarker of disease progression. In contrast, no significant relationship was observed between disease duration and corneal sensitivity in Parkinson's disease, suggesting that additional factors may influence corneal nerve function in this population.

Conclusion:

Corneal sensitivity decreased significantly with increasing disease duration in patients with Multiple Sclerosis and showed a significant negative correlation with disease duration. In contrast, no significant association was observed between disease duration and corneal sensitivity in Parkinson's disease. These findings suggest that corneal sensitivity assessment may serve as a simple, non-invasive biomarker for monitoring disease progression in Multiple Sclerosis.

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