

Neurologists' Perspectives on Parkinson's Disease: Perceived Prevalence, Age at Onset, and Diagnostic Patterns

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وجهات نظر أطباء الأعصاب حول مرض باركنسون: الانتشار المُتصوّر، والعمر عند بدء ظهور الأعراض، والأنماط التشخيصية

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Abstract:

Background: Parkinson's disease (PD) is a progressive neurodegenerative disorder with a growing global burden and substantial impact on healthcare systems. Early diagnosis and effective management are essential to improve patient outcomes. Neurologists' perspectives provide valuable insights into disease prevalence, diagnostic trends, and healthcare challenges, particularly in settings where epidemiological data are limited.

Objective: To explore neurologists' perceptions regarding the prevalence of Parkinson's disease, age at onset, diagnostic patterns, and management challenges.

Methods: A cross-sectional survey was conducted among 303 neurologists practicing in different countries. The questionnaire collected data on demographic characteristics, perceived prevalence of PD, age at diagnosis, trends in early-onset PD, diagnostic practices, and management challenges. Descriptive statistics were calculated, and chi-square (χ^2) tests were used to assess associations between demographic variables and neurologists' perceptions. A p-value <0.05 was considered statistically significant.

Results: Most respondents perceived Parkinson's disease as common (47.9%) or very common (24.1%), while 65.3% reported an increase in PD cases over time. The most frequently reported age at diagnosis was 60–75 years (57.8%), although 31.0% of neurologists observed an increase in early-onset Parkinson's disease (<50 years). Most patients were diagnosed at the moderate stage of disease (53.1%). Patient delay (42.2%) and limited awareness (28.7%) were identified as the primary causes of delayed diagnosis. Approximately 66.3% of respondents reported improvements in diagnostic accuracy in recent years. Significant associations were found between years of clinical experience and perceived prevalence of PD ($\chi^2(6, N = 303) = 12.67, p = 0.048$), between practice setting and observed increases in early-onset PD ($\chi^2(3, N = 303) = 9.85, p = 0.020$), and between stage at diagnosis and perceived improvement in diagnostic accuracy ($\chi^2(2, N = 303) = 10.32, p = 0.006$).

Conclusion: Neurologists perceive an increasing burden of Parkinson's disease, including a growing recognition of early-onset cases. Diagnostic delays and limited access to care remain major challenges. These findings highlight the need for improved awareness, earlier diagnostic strategies, strengthened healthcare resources, and enhanced surveillance systems to optimize Parkinson's disease management.

Keywords: Parkinson's disease; neurologists; prevalence; early-onset Parkinson's disease; diagnosis; management challenges.

المخلص:

الخلفية: يُعد مرض باركنسون (PD) اضطرابًا تنكسيًا عصبيًا تدريجيًا يتزايد عبؤه عالميًا، ويُشكل تحديًا كبيرًا لأنظمة الرعاية الصحية. ويُعد التشخيص المبكر والإدارة العلاجية الفعالة أمرين أساسيين لتحسين نتائج المرضى. كما توفر آراء

أطباء الأعصاب رؤى قيمة حول انتشار المرض، والاتجاهات التشخيصية، والتحديات التي تواجه الرعاية الصحية، لا سيما في البيئات التي تفتقر إلى بيانات وبائية كافية.

الهدف: استكشاف تصورات أطباء الأعصاب بشأن انتشار مرض باركنسون، وعمر بداية المرض، والأنماط التشخيصية، والتحديات المرتبطة بإدارته.

المنهجية: أجريت دراسة مقطعية باستخدام استبيان شمل 303 من أطباء الأعصاب العاملين في دول مختلفة. وُجمعت البيانات المتعلقة بالخصائص الديموغرافية، والتصورات حول انتشار مرض باركنسون، والعمر عند التشخيص، واتجاهات زيادة حالات باركنسون المبكر، والممارسات التشخيصية، والتحديات التي تواجه إدارة المرض. وتم استخدام الإحصاءات الوصفية لتحليل البيانات، كما استخدم اختبار مربع كاي (χ^2) لتقييم العلاقة بين المتغيرات الديموغرافية وتصورات أطباء الأعصاب، مع اعتبار قيمة $p < 0.05$ ذات دلالة إحصائية.

النتائج: رأى معظم المشاركين أن مرض باركنسون شائع (47.9%) أو شائع جدًا (24.1%)، بينما أفاد 65.3% منهم بوجود زيادة في عدد الحالات مع مرور الوقت. وكان العمر الأكثر شيوعًا عند التشخيص بين 60 و75 عامًا (57.8%)، في حين لاحظ 31.0% من أطباء الأعصاب زيادة في حالات باركنسون المبكر (أقل من 50 عامًا). كما أشار معظم المشاركين إلى أن المرضى يُشخصون غالبًا في المرحلة المتوسطة من المرض (53.1%). واعتُبر تأخر المريض في طلب الرعاية الصحية (42.2%) وضعف الوعي بالمرض (28.7%) من أبرز أسباب تأخر التشخيص. وأفاد نحو 66.3% من المشاركين بوجود تحسن في دقة تشخيص المرض خلال السنوات الأخيرة. وأظهرت النتائج وجود علاقة ذات دلالة إحصائية بين سنوات الخبرة السريرية والتصورات المتعلقة بانتشار مرض باركنسون ($\chi^2(6, N = 303) = 12.67$ ، $p = 0.048$) وبين بيئة الممارسة الطبية وزيادة ملاحظة حالات باركنسون المبكر ($\chi^2(3, N = 303) = 9.85$ ، $p = 0.020$) وكذلك بين مرحلة المرض عند التشخيص والتصورات المتعلقة بتحسين دقة التشخيص ($\chi^2(2, N = 303) = 10.32$ ، $p = 0.006$).

الاستنتاج: يرى أطباء الأعصاب أن عبء مرض باركنسون أخذ في الازدياد، مع تزايد التعرف على حالات المرض المبكر. ولا تزال تأخرات التشخيص ومحدودية الوصول إلى خدمات الرعاية الصحية من أبرز التحديات. وتؤكد هذه النتائج أهمية تعزيز الوعي بالمرض، وتطوير استراتيجيات التشخيص المبكر، وتقوية موارد الرعاية الصحية، وتحسين أنظمة الترصد الوبائي بما يساهم في الارتقاء بإدارة مرض باركنسون.

الكلمات المفتاحية: مرض باركنسون؛ أطباء الأعصاب؛ انتشار المرض؛ مرض باركنسون المبكر؛ التشخيص؛ تحديات إدارة المرض.

Introduction

Parkinson's disease (PD) is one of the most common neurodegenerative disorders, with progressive motor symptoms such as bradykinesia, resting tremor, rigidity, and postural instability, as well as a variety of non-motor manifestations such as cognitive impairment, mood disorders, sleep disturbances, and autonomic dysfunction [1, 2]. The illness is largely caused by the loss of dopaminergic neurons in the substantia nigra pars compacta, which leads to dopamine deficit in the basal ganglia [3].

Parkinson's disease is a major public health problem worldwide as populations age and life expectancy rises [4]. Recent epidemiological statistics show a continuous growth in both frequency and incidence worldwide, particularly in low- and middle-income countries where health-care systems may be underprepared to address chronic neurological disorders [5,6]. Despite this growth, reported prevalence rates vary significantly among regions, reflecting variations in demography, environmental exposures, genetic predisposition, and availability to neurological care [7].

Age is the most significant risk factor for Parkinson's disease, with the majority of cases occurring beyond the age of 60; nevertheless, early-onset Parkinson's disease is becoming more recognized and presents distinct diagnostic and treatment issues [8]. Understanding trends of age at onset is critical for improving early diagnosis, planning long-term care, and properly allocating healthcare resources (9).

Accurate diagnosis of Parkinson's disease remains essentially clinical, relying on medical history and neurological examination, especially in the early stages when symptoms may overlap with other movement disorders [10]. Advances in diagnostic knowledge, imaging methods, and clinical criteria have increased detection rates; nonetheless, delayed or missing diagnoses are still prevalent, particularly in impoverished areas [11].

Neurologists are critical to the diagnosis, treatment, and epidemiological knowledge of Parkinson's disease. Their clinical expertise offers useful insights on illness incidence, diagnostic trends, and changing patterns of presentation across communities [12]. Capturing neurologists' opinions is especially crucial in areas where population-based epidemiological statistics are few or unavailable.

As a result, the purpose of this study is to investigate neurologists' perceptions on the Parkinson's disease burden, with an emphasis on perceived community prevalence, age of start, and diagnostic trends in various practice settings and nations. Understanding these viewpoints may aid in the identification of diagnostic gaps, informing health policy, and guiding future epidemiological and clinical research [13].

2. Materials and Methods

2.1 Study Design and Setting

This study was conducted as a **cross-sectional survey** coordinated by the **University of Sirte, Sirte, Libya**. Although the study was based in Sirte, data were collected internationally from **neurologists practicing in different countries** through an online questionnaire .

2.2 Study Duration

Data collection was carried out over a **ten-month period**, from April 2025 to January 2026

2.3 Study Population

The target population included **licensed neurologists** who are actively involved in the diagnosis and management of Parkinson's disease in clinical practice.

2.4 Sample Size and Data Cleaning

The sample size was estimated using an online sample size calculator (e.g., Raosoft), assuming a **95% confidence level**, **5% margin of error**, and **50% response distribution**. The minimum required sample size was approximately **350 participants**.

A total of **350 responses** were initially collected. Following data cleaning procedures, which included the removal of incomplete, duplicate, and ineligible responses, **303 responses** met the inclusion criteria and were included in the final analysis.

2.5 Data Collection Tool

Data were collected using a **structured, self-administered questionnaire**, developed based on relevant literature and expert opinion. The questionnaire was created in English and arabic and distributed electronically using **Google Forms**.

The questionnaire included sections on:

- Demographic and professional characteristics of participants
- Neurologists' perspectives on the community prevalence of Parkinson's disease
- Age of onset patterns
- Diagnostic trends and challenges in Parkinson's disease

The survey link was disseminated through professional networks, email invitations, and medical social media platforms.

Inclusion Criteria

- Qualified and licensed neurologists
- Actively involved in the diagnosis or management of Parkinson's disease
- Practicing in any country
- Provided informed consent electronically
- Completed the questionnaire

Exclusion Criteria

- Non-neurologist healthcare professionals
- Medical students or trainees
- Duplicate responses
- Incomplete or inconsistent questionnaires

2.6 Statistical Analysis

Data were entered and analyzed using **Statistical Package for the Social Sciences (SPSS) version 28** (IBM Corp., Armonk, NY, USA).

- **Descriptive statistics** were used to summarize the data.
 - Categorical variables were presented as **frequencies and percentages**
 - Continuous variables were expressed as **means $\pm$ standard deviations**, where applicable
- Associations between variables were assessed using the **Chi-square test** or **Fisher's exact test**, as appropriate.
- A **p-value < 0.05** was considered statistically significant.

2.7 Ethical Considerations

Participation in this study was entirely voluntary. **Electronic informed consent** was obtained from all participants prior to completion of the questionnaire. Participants' responses were collected anonymously, and **confidentiality of all data was strictly maintained** throughout the study.

3. Results

3.1. Demographic Features of Respondents

Of the 303 neurologists polled, 42.9% ($n = 130$) had more than ten years of clinical experience, 33.3% ($n = 101$) had five to ten years, and 23.8% ($n = 72$) had less than five. In terms of practice environments, 37.0% ($n=112$) worked in government hospitals, 25.7% ($n=78$) in private clinics, 22.4% ($n=68$) in university hospitals, and 14.9% ($n=45$) in mixed practice settings. This distribution represents a broad spectrum of clinical experience from various healthcare settings.

Table 1. Demographic Characteristics of Respondents (N = 303)

Variable	Category	n	%
Years of clinical experience	<5 years	72	23.8
	5–10 years	101	33.3
	>10 years	130	42.9
Practice setting	Government hospital	112	37.0
	Private clinic	78	25.7
	University hospital	68	22.4
	Mixed	45	14.9

3.2. Perceived prevalence of Parkinson's disease.

According to neurologists' opinions of Parkinson's disease prevalence, 47.9% ($n = 145$) regarded it "common," 24.1% ($n = 73$) "very common," 21.1% ($n = 64$) "moderate," and 6.9% ($n = 21$) "rare." When asked about long-term trends, 65.3% ($n = 198$) felt the number of Parkinson's disease cases was growing, 28.7% ($n = 87$) reported constant numbers, and 6.0% ($n = 18$) saw a decline.

Table 2. Perceived Prevalence and Trends of Parkinson's Disease

Question	Response	n	%
How common is PD in your community?	Rare	21	6.9
	Moderate	64	21.1
	Common	145	47.9
	Very common	73	24.1
Trend over time	Increasing	198	65.3
	Stable	87	28.7
	Decreasing	18	6.0

3.3. Age of Onset

The most commonly observed age group at diagnosis was **60–75 years (57.8%, n = 175)**, followed by **40–59 years (25.1%, n = 76)**, **>75 years (11.2%, n = 34)**, and **<40 years (5.9%, n = 18)**. Regarding early-onset PD (<50 years), **31.0% (n = 94)** of neurologists had observed an increase, **56.4% (n = 171)** had not, and **12.6% (n = 38)** were unsure.

Table 3. Age of Onset of Parkinson's Disease

Question	Response	n	%
Most common age group at diagnosis	<40 years	18	5.9
	40–59 years	76	25.1
	60–75 years	175	57.8
	>75 years	34	11.2
Observed increase in early-onset (<50 years)	Yes	94	31.0
	No	171	56.4
	Not sure	38	12.6

3.4. Diagnostic Trends

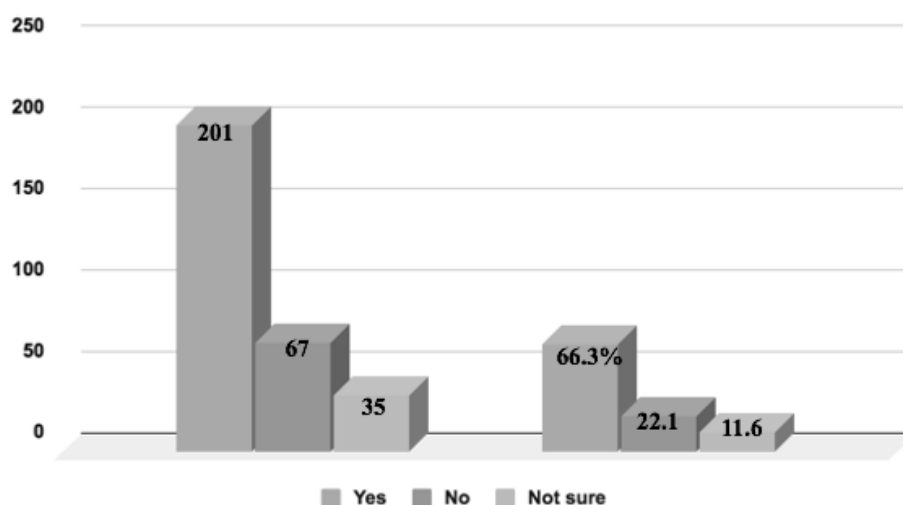
Most patients were diagnosed at the **moderate stage (53.1%, n = 161)**, with **early-stage (27.1%, n = 82)** and **advanced-stage (19.8%, n = 60)** diagnoses less frequent. Factors delaying diagnosis included **patient delay (42.2%, n = 128)**, **limited awareness (28.7%, n = 87)**, **overlap with other conditions (17.2%, n = 52)**, and **limited diagnostic resources (11.9%, n = 36)**. Furthermore, **66.3% (n = 201)** of neurologists believed diagnostic accuracy has improved in recent years, **22.1% (n = 67)** disagreed, and **11.6% (n = 35)** were unsure.

Table 4, Figure.1

Table 4. Diagnostic Trends in Parkinson's Disease

Question	Response	n	%
Most common stage at diagnosis	Early	82	27.1
	Moderate	161	53.1
	Advanced	60	19.8
Factor delaying diagnosis	Patient delay	128	42.2
	Limited awareness	87	28.7
	Overlap with other conditions	52	17.2
	Limited diagnostic resources	36	11.9

Figure.1 Perceived Improvement in Diagnostic Accuracy Among Participants



3.5. Challenges in Parkinson's Disease Management

Neurologists identified **late diagnosis** (43.6%, $n = 132$) as the primary challenge in managing PD, followed by **limited access to treatment** (29.4%, $n = 89$), **lack of rehabilitation services** (16.5%, $n = 50$), and **patient non-compliance** (10.6%, $n = 32$). **Figure. 2**

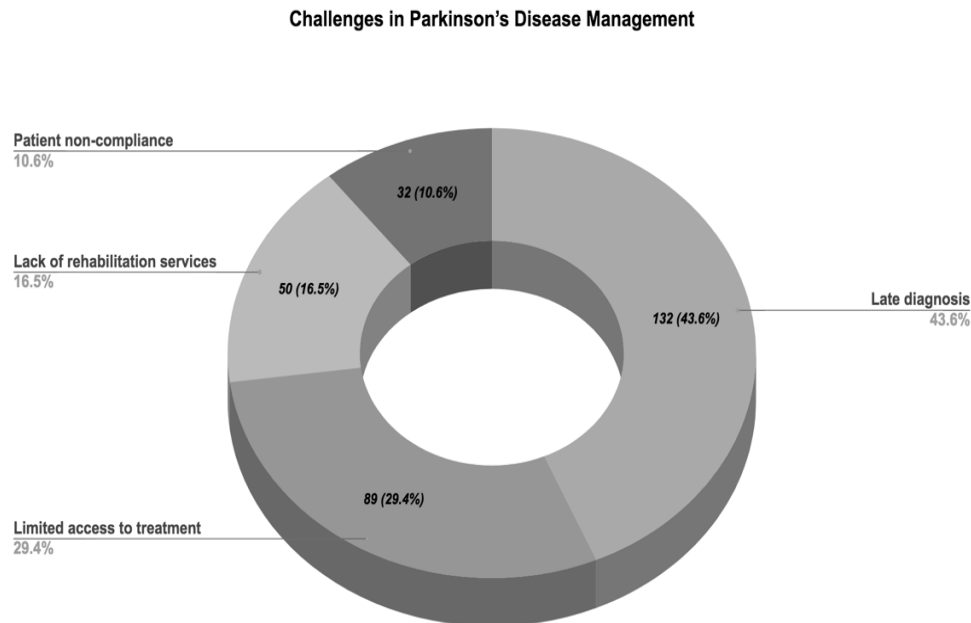


Figure 2. Challenges in Parkinson's Disease Management

3.6 Inferential Statistical Analysis

Chi-square analyses were conducted to assess associations between demographic characteristics and neurologists' perceptions of Parkinson's disease.

A statistically significant association was found between years of clinical experience and perceived prevalence of Parkinson's disease ($\chi^2(6, N = 303) = 12.67, p = 0.048$). Neurologists with more than 10 years of clinical experience were more likely to perceive Parkinson's disease as common or very common compared with less experienced neurologists.

Similarly, a significant association was observed between practice setting and reported increases in early-onset Parkinson's disease cases ($\chi^2(3, N = 303) = 9.85, p = 0.020$). Neurologists practicing in university hospitals were more likely to report an increase in early-onset cases than those working in private or government settings.

In addition, a statistically significant association was identified between stage at diagnosis and perceived improvement in diagnostic accuracy ($\chi^2(2, N = 303) = 10.32, p = 0.006$). Respondents who reported improved diagnostic accuracy were significantly more likely to diagnose patients at earlier stages of disease.

Overall, these findings suggest that clinical experience and practice environment influence neurologists' perceptions of Parkinson's disease prevalence, diagnostic trends, and disease recognition patterns.

4. Discussion

The present study explored neurologists' perceptions regarding the prevalence, age at onset, diagnostic patterns, and management challenges of Parkinson's disease (PD). The findings indicate that most neurologists perceive PD as a common or very common neurological disorder, with approximately two-thirds reporting an increasing number of PD cases over time. These observations are consistent with previous epidemiological studies demonstrating that Parkinson's disease represents one of the fastest-growing neurological disorders

worldwide, with substantial increases in prevalence, incidence, and disability burden over recent decades (13,14). Furthermore, the concept of a "Parkinson pandemic" has been increasingly recognized, largely driven by population aging, increased life expectancy, and improved disease recognition (15,16).

Regarding age at diagnosis, most respondents indicated that Parkinson's disease is commonly diagnosed between 60 and 75 years of age. This finding is consistent with established epidemiological evidence identifying increasing age as the most important risk factor for PD development (17,18). However, approximately one-third of neurologists reported observing an increase in early-onset Parkinson's disease (EOPD), suggesting growing recognition of this clinical entity. Recent studies have highlighted increasing awareness of EOPD, with genetic susceptibility, environmental exposures, and improvements in diagnostic recognition potentially contributing to this observed trend (19,20,21). These findings emphasize the importance of considering Parkinson's disease among younger individuals presenting with motor and non-motor symptoms (22).

An important finding of the current study is that most patients were reported to be diagnosed during the moderate stage of disease. Diagnostic delay remains a significant challenge in Parkinson's disease management because early manifestations may be subtle and frequently overlap with other neurological conditions (23,24). In this study, patient delay and limited awareness were identified as the principal factors contributing to delayed diagnosis. These findings are consistent with previous reports demonstrating that delayed healthcare-seeking behavior and difficulties in recognizing early symptoms remain important barriers to timely diagnosis and intervention (25,26).

Despite these challenges, approximately two-thirds of respondents reported that diagnostic accuracy has improved in recent years. Moreover, the current study demonstrated a statistically significant association between stage at diagnosis and perceived improvement in diagnostic accuracy ($\chi^2(2, N = 303) = 10.32, p = 0.006$). This finding suggests that improvements in diagnostic awareness, clinical expertise, and available diagnostic approaches may contribute to earlier recognition of Parkinson's disease and reduce the proportion of patients diagnosed at advanced stages. Continued efforts to improve physician education and access to diagnostic resources may further enhance early disease detection.

The present study also identified late diagnosis and limited access to treatment as the most important challenges affecting Parkinson's disease management. Similar disparities in access to neurological services, medications, rehabilitation programs, and multidisciplinary care have been widely reported, particularly in low- and middle-income countries (27,28,29). These healthcare limitations may contribute to increased disability, reduced quality of life, and poorer long-term outcomes among patients with Parkinson's disease.

The inferential analysis revealed statistically significant associations between years of clinical experience and perceived prevalence of Parkinson's disease ($\chi^2(6, N = 303) = 12.67, p = 0.048$), as well as between practice setting and observed increases in early-onset Parkinson's disease ($\chi^2(3, N = 303) = 9.85, p = 0.020$). These findings suggest that neurologists' clinical exposure and practice environment may influence their perceptions regarding disease burden and epidemiological trends. Differences in patient populations, referral patterns, and access to specialized care may partially explain these observed associations.

4.1 Limitations

This study has several limitations. First, the findings are based on neurologists' perceptions rather than objective epidemiological or registry-based data, which may introduce recall and reporting bias. Second, the cross-sectional design limits the ability to establish causal relationships or confirm temporal changes in disease patterns. Third, participation was voluntary, which may have introduced selection bias. Finally, the lack of detailed regional

analyses limits the generalizability of the findings across different healthcare settings and populations.

4.2 Implications

Despite these limitations, the study provides valuable insights into neurologists' perceptions of Parkinson's disease burden and clinical practice patterns. The findings highlight the importance of strengthening surveillance systems, improving awareness among healthcare professionals and the public, promoting earlier diagnosis, and expanding access to specialized neurological care and rehabilitation services. Further population-based studies are warranted to confirm these observations and to investigate the factors contributing to the increasing recognition of early-onset Parkinson's disease.

5. Conclusion

This survey highlights neurologists' perceptions of a rising PD burden, increasing recognition of early-onset disease, ongoing diagnostic delays, and persistent barriers to care. These observations closely reflect global epidemiological evidence identifying PD as a growing public health challenge. Addressing these issues will require coordinated efforts in surveillance, education, health system strengthening, and policy integration. As global PD prevalence continues to rise, such measures are essential to mitigate disability and improve outcomes worldwide (20,21).

6. Acknowledgments

We thank all neurologists who participated in the survey for their time and valuable insights. Their contributions were essential in highlighting real-world perceptions of Parkinson's disease burden and management challenges.

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