

KNOWLEDGE AND ATTITUDE AMONG NURSING STUDENTS REGARDING PARKINSON'S DISEASE

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DOI: <http://doi.org/10.5281/zenodo.23238349>

Received
25 January 2026

Accepted
10 March 2026

Published
24 March 2026

ABSTRACT

Background: Parkinson's disease is a progressive neurological disorder that represents a growing global health challenge due to increasing prevalence, disability, and the need for comprehensive long-term care. Nurses play a vital role in managing patients with Parkinson's disease through assessment, education, symptom monitoring, and supportive care. Adequate knowledge and positive attitudes among nursing students are essential for preparing competent future healthcare professionals; however, gaps in neurological education may affect their readiness to provide effective care.

Aim: The study aimed to assess the level of knowledge and attitudes among undergraduate nursing students regarding Parkinson's disease.

Methods: A descriptive cross-sectional study design was used among 218 undergraduate nursing students at the College of Nursing, Superior University, Lahore, Pakistan. Participants were selected through a probability simple random sampling technique. Data were collected using a structured questionnaire consisting of demographic characteristics, knowledge-related items, and attitude assessment items. Data were analyzed using SPSS version 27. Descriptive statistics and Chi-square tests were applied, with statistical significance set at $p < 0.05$.

Results: The findings revealed that 54.6% of students had moderate knowledge, 24.8% had poor knowledge, and 20.6% demonstrated good knowledge regarding Parkinson's disease. Regarding attitudes, 51.4% showed a neutral attitude, 30.7% showed a positive attitude, and 17.9% demonstrated a negative attitude. A significant association was found between knowledge level and attitude toward Parkinson's disease ($p < .001$).

Conclusion: Undergraduate nursing students demonstrated moderate knowledge and predominantly neutral attitudes toward Parkinson's disease. Strengthening neurological nursing education and increasing clinical exposure are recommended to improve students' competency and preparedness for Parkinson's disease care.

Keywords: Parkinson's disease; Nursing students; Knowledge; Attitude; Neurological nursing; Undergraduate nursing education; Patient care.

INTRODUCTION

Parkinson's disease (PD) is a progressive neurodegenerative disorder characterized by the gradual loss of dopaminergic neurons in the substantia nigra, resulting in a wide range of motor symptoms including tremor, bradykinesia, rigidity, and postural instability, along with non-motor manifestations such as cognitive impairment, depression, sleep disturbances, and autonomic dysfunction. It represents the second most common neurodegenerative disorder worldwide after Alzheimer's disease and has become a major public health concern due to increasing life expectancy, population ageing, and the growing prevalence of chronic neurological conditions. Unlike acute diseases, Parkinson's disease requires lifelong management involving pharmacological therapy, rehabilitation, psychological support, and multidisciplinary healthcare interventions. The increasing complexity of care associated with PD has created a significant demand for healthcare professionals, particularly nurses, who play a central role in symptom monitoring, patient education, medication management, and improving quality of life among affected individuals (Dorsey et al., 2022; GBD 2021 Diseases and Injuries Collaborators, 2024).

Parkinson's disease is one of the fastest growing neurological diseases in the world and its prevalence and burden has grown significantly over the past few decades. Epidemiological data suggest that millions of people have PD now and that prevalence, mortality and DALYs are increasing over time. The Global Burden of Disease study was able to identify a marked rise in the number of people with Parkinson's disease throughout the world, mostly attributable to demographic ageing, longer life expectancy, and improved disease recognition. Parkinson's disease is an emerging neurological priority identified by the World Health Organization due to the significant burden imposed by the disease in terms of disability and health care needs. This has been especially worrisome in low and middle-income countries, where healthcare systems are also under-resourced to address the needs of those impacted, including a lack of specialists and neurological

services (World Health Organization [WHO], 2023; Luo et al., 2025).

Parkinson's disease poses a special challenge because of the many facets of physical, psychological, social and functional impairment it causes. Patients often struggle with mobility, communication, independence, work and social functioning, which is a challenge for patients and caregivers. To manage effectively, healthcare workers need to have sufficient knowledge about the disease, how to handle symptoms, any problems with the medications, and supportive care strategies. Nurses are amongst the most common health care providers along the disease course and their knowledge and attitudes are believed to have a significant impact on the quality of care provision. Low levels of knowledge of PD by nurses could lead to delayed symptom identification, poor patient education, poor management of complications, and low patient satisfaction (Bloem et al., 2021; Armstrong & Okun, 2022).

Knowledge about Parkinson's disease is the extent to which a person understands the process, etiology, risk factors, clinical presentation, testing, treatment, and management of Parkinson's disease. Disease-specific knowledge is a nucleus of the clinical competence at nursing education, which affects decision making, assessment skills, or implementation of evidence-based interventions. Nursing students are future health care providers that will be seeing more patients with neurological disorders as a result of demographic changes and rising chronic disease prevalence. Despite this, neurological education is still relatively restricted in many nursing educational programs as compared to other healthcare priorities, which could lead to poor preparation of graduates for neurological care of patients. Lacking knowledge about the disease can have a negative impact on the confidence of nurses, clinical performance, and the delivery of comprehensive care to people with Parkinson's disease (PD) (Miyasaki et al., 2021; Alshammari et al., 2025).

Attitude towards Parkinson's disease is the beliefs, perceptions, feelings and behavioural patterns an individual forms about people with the disorder.

Attitudes are very important in nursing practice as it affects communication, empathy, willingness of providing care and understanding the patients' psychological and social needs. This can include stigma, as well as restricted understanding and/or negative attitudes regarding neurological disabilities, which can impact the quality of patient centred care. Staff nurses' positive attitudes are correlated with high levels of compassion, positive therapeutic relationships, and motivation to assist those with long-term neurological illness. Considering the Knowledge - Attitude - Practice framework, knowledge improvement can influence an attitude and eventually enhance the professional practice; thus, knowledge and attitude assessment can provide a comprehensive knowledge of nursing students preparedness for PD care (Rosenstock, 2020; Alshammari et al., 2025).

Theoretical perspectives on nursing education focus on the need to integrate theory and practice for knowledge development. Professional competence is the product of making experiences meaningful to learners, as Kolb does with experiential learning theory, and education and clinical experiences are essential in developing nursing competence, as Benner does with his Novice-to-Expert model. When used to evaluate the needs of nursing students for providing education for patients with PD, the information suggests that they need exposure to structured learning and clinical exposure in order to build confidence in caring for neurological patients and to have reflective experiences. But, there are not many undergraduate nursing programs available that offer specialized training in the field of neurology, which means the demand for neurological care and the skills that registered nurses possess may not always match. In this light, enhancing the education of neurological nursing might be critical to prepare future nurses for the growing load of Parkinson's disease (PD) (Benner, 2020; Miyasaki et al., 2021).

The burden of neurological disorders is rising in South Asia as a result of epidemiological transition, urbanization, life expectancy and population ageing. Traditionally, Parkinson's Disease has not received as much attention as

other diseases such as infectious and cardiovascular diseases in South Asian countries, yet emerging evidence suggests there is a significant and underestimated burden of PD in South Asia. Under-recognition of PD is due to limited disease registers, insufficient neurological surveillance, delayed diagnosis and limited access to specialized health care. South Asia is plagued by further problems like the lack of neurologists, lack of rehabilitation facilities and lack of awareness among healthcare providers and communities. The challenges underscore the need to enhance healthcare education systems, especially those for healthcare workers and nurses, providing them with the necessary education for the management of neurological diseases (GBD 2021 Diseases and Injuries Collaborators, 2024; Ray et al., 2022).

Likewise for neurological care, Pakistan is also struggling with data scarcity, inequitable access to health services as well as access to specialist neurological services. While national prevalence estimates for Parkinson's disease are still lacking, existing evidence indicates that the burden of the disease is likely to be growing as a result of demographic changes and the growing prevalence of non-communicable diseases. Unfortunately, many people with Parkinson's are not diagnosed early, as the initial symptoms often are not understood, noted, or blamed on aging. Cultural beliefs, lack of awareness and accessibility of healthcare add to the complexity of disease management. In such a context, nurses frequently play an important role as providers of health care services, assessing the patient, educating him/her, supporting with medication and providing guidance to caregivers. Thus the knowledge and attitude formation of the nursing students regarding Parkinson disease is of great relevance in the context of the changing healthcare needs in Pakistan (Khan et al., 2022; WHO, 2023).

The approach to the management of contemporary Parkinson's disease has moved from a disease-centred to a multidisciplinary and patient-centred approach that includes neurologists, nurses, physiotherapists, occupational therapists, psychologists and caregivers. Although treatment and rehabilitation have improved, there is still a huge disparity

between countries with high and low incomes in terms of access to diagnosis, advanced treatments and supportive services. One of the big issues in health care education is that the educational framework is not meeting the demands for neurologic diseases. Given the significant burden of neurological conditions for disability, they are rarely a focus of education compared to other chronic conditions. This lack of knowledge could lead new graduates to be inadequately prepared to provide good care for patients with Parkinson's disease when they are in clinical practice (Armstrong & Okun, 2022; Dorsey et al., 2022). Most previous studies have concentrated on either patient, caregiver or general health professionals' awareness of Parkinson's disease, with little attention given to undergraduate nursing students. The literature available suggests nursing students might have rudimentary knowledge about common motor symptoms, but lack knowledge about non-motor symptoms, the course of PD, side effects of medications, and the social and psychological dimensions of PD. The curriculum as well as the clinical experience and teaching resources are somewhat different across nursing programs, which will result in differences in student knowledge and attitudes. The preparedness of nursing students is limitedly known and is an important research gap, especially in developing countries where neurological healthcare resources are already scarce (Alshammari et al., 2025; Parveen et al., 2026). Knowledge and attitudes of nursing students towards PD are important to measure in order to detect weaknesses of educational needs and to design suitable plans for enhancing the skills of neurological nursing. Nursing students are the future healthcare professionals who will be tasked with caring for an ageing population with increased neurological healthcare demands. Knowing the knowledge and conception of these patients can benefit curriculum modifications, designing interventions for specific educational needs, and implementing neurological material into undergraduate nursing curricula. Such studies can offer important data to enhance the quality of nursing education and preparation in Pakistan, where the current context of research on

nursing students' readiness for care provision for individuals with Parkinson's disease is not well documented.

Although Parkinson's disease is a growing problem in the world, little has been done to prepare undergraduate nursing students to manage this complex neurological disorder. Lack of knowledge and attitudes of future nurses can have adverse effects on early detection, patient education, communication and quality of care. To close the gaps in existing education and guide evidence-based nursing practice, it is therefore necessary to investigate the knowledge and attitudes of the nursing students about the Parkinson's disease. The findings of this study will support neurological nursing research by providing context-specific evidence which can help guide education providers, health policy makers, and healthcare institutions in creating effective nursing education initiatives for improving the care competency of the future nursing workforce.

Methods

This paper describes the cross-sectional research design used to analyze the knowledge and attitudes of undergraduate nursing students related to Parkinson's disease. The research was conducted at the College of Nursing, Superior University, Lahore, Pakistan. The research study population included undergraduate nursing students during the study period, with an approximate population of 500 students. Using the Raosoft sample size calculator, a sample size of 218 participants was determined with a 95% confidence interval, a 5% margin of error, and a 50% response distribution. Participants were selected by a probability simple random sampling technique. The study included undergraduate nursing students who were enrolled, present, and consented, and voluntarily participated in the research. Absent students, students who refused to participate, and students who submitted incomplete review questionnaires were excluded. The study estimated the knowledge of and attitude toward Parkinson's disease, and background variables were demographic data including age, gender, academic year, prior contact with Parkinson's disease patients, neurological nursing education, and clinical practice.

Data Collection Procedure

Data collection began after the approval of both ethical and administrative permits from the College of Nursing, Superior University, Lahore. After this approval, researcher approached the participants who fit the inclusion criteria and explained the purpose and aspects of the study to all of them. After the explanation, all participants provided written informed consent. Data regarding demographic information, knowledge, and attitudes toward Parkinson's disease for the selected participants was collected through a pre-validated, researcher made, structured questionnaire. Participants were informed that they can refuse to participate at any time without consequences. Time was provided for completion of the questionnaires, and the researcher stood by to answer any procedural questions. Questionnaires were collected after completion, reviewed for completeness, and coded for analysis.

Process of Data Analysis

Data were analyzed using SPSS version 27. The demographic data and the study variables were summarized using descriptive statistics. Calculated measures were means, standard deviations, and percentages for the study variables. Knowledge and attitude scores were compiled in workbook tables and then summarized. Knowledge and attitude scores were designated using the scoring criteria of the questionnaire. The association between the demographic data and the participants' knowledge and attitude toward Parkinson's disease was analyzed using the Chi-square test. The test of significance was demonstrated using a p-value less than 0.05. The analyzed data were published in this report as tables and figures to support the findings and conclusions.

Results

Demographic Analysis

Table 1

Demographic Characteristics of Undergraduate Nursing Students

Variables	Categories	n	%
Age (years)	18-20	64	29.4
	21-23	118	54.1
	≥24	36	16.5
Gender	Male	74	33.9
	Female	144	66.1
Academic Year	1st Year	52	23.9
	2nd Year	56	25.7
	3rd Year	58	26.6
	4th Year	52	23.9
Previous Exposure to Parkinson's Disease Patient	Yes	62	28.4
	No	156	71.6
Received Neurological Nursing Education/Training	Yes	84	38.5
	No	134	61.5

Table 1 presents the demographic characteristics of undergraduate nursing students participating in the study. The majority of participants were aged between 21-23 years (54.1%), followed by students aged 18-20 years (29.4%), while 16.5% were aged 24 years or above. Regarding gender distribution, female students represented the majority of the sample (66.1%), whereas male

students accounted for 33.9%. In terms of academic year, the highest proportion of participants were from the third year (26.6%), followed by second-year students (25.7%), while first-year and fourth-year students each represented 23.9% of the sample. Most students had no previous exposure to Parkinson's disease patients (71.6%), while only 28.4% reported

previous exposure. Furthermore, the majority of participants had not received specific neurological nursing education or training (61.5%), whereas

38.5% had received some form of neurological-related education.

Figure 1 Distribution of Nursing Students According to Knowledge Regarding Parkinson's Disease

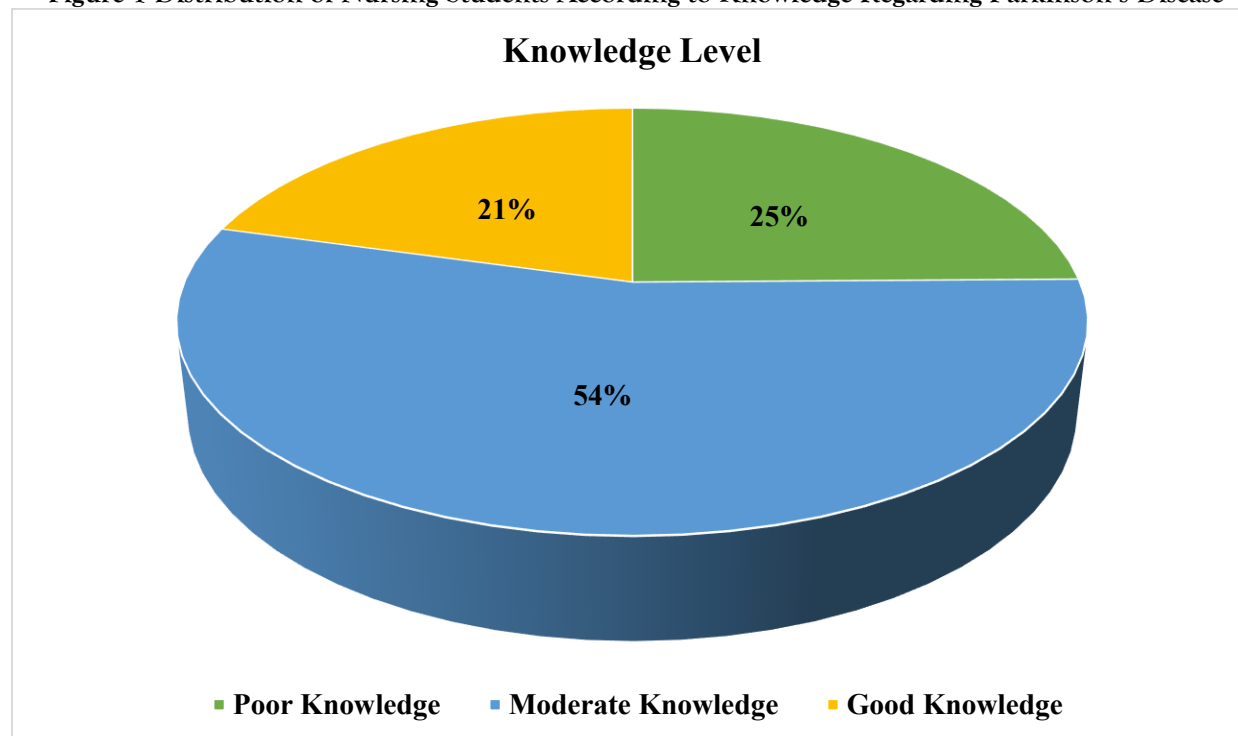


Figure 1 demonstrates the overall knowledge level of undergraduate nursing students regarding Parkinson's disease. The findings revealed that more than half of the participants had a moderate level of knowledge (54.6%), indicating that students possessed basic awareness regarding Parkinson's disease but may have limitations in understanding advanced concepts related to disease progression, management, and nursing care. Approximately one-fourth of the students demonstrated poor knowledge (24.8%), suggesting inadequate understanding of important aspects of

Parkinson's disease, including symptoms, treatment approaches, and patient management. Only 20.6% of participants achieved a good knowledge level, reflecting that a relatively small proportion of students had comprehensive understanding of the disease. These findings suggest the need for strengthening neurological nursing education and incorporating more focused Parkinson's disease content within undergraduate nursing curricula to improve students' preparedness for caring for affected patients.

Table 2
Item-Wise Responses Regarding Knowledge of Parkinson's Disease Among Nursing Students

Knowledge Items	Correct Response n (%)	Incorrect Response n (%)
Parkinson's disease is a progressive neurological disorder	176 (80.7)	42 (19.3)
Dopamine deficiency is associated with Parkinson's disease	152 (69.7)	66 (30.3)

Tremor is a common motor symptom of Parkinson's disease	184 (84.4)	34 (15.6)
Bradykinesia is associated with Parkinson's disease	137 (62.8)	81 (37.2)
Parkinson's disease can involve cognitive impairment	128 (58.7)	90 (41.3)
Depression can occur as a non-motor symptom	121 (55.5)	97 (44.5)
Medication therapy helps manage symptoms	166 (76.1)	52 (23.9)
Physiotherapy contributes to disease management	143 (65.6)	75 (34.4)
Nurses play an important role in patient education	190 (87.2)	28 (12.8)
Parkinson's disease has no impact on quality of life	48 (22.0)	170 (78.0)

Table 2 presents the item-wise distribution of students' knowledge regarding Parkinson's disease. The majority of participants correctly identified Parkinson's disease as a progressive neurological disorder (80.7%) and recognized tremor as a common motor symptom (84.4%), demonstrating good awareness of basic disease concepts. However, knowledge gaps were observed regarding dopamine deficiency, with 69.7% providing correct responses, and bradykinesia, where only 62.8% correctly identified its association with Parkinson's disease. Understanding of non-motor symptoms was comparatively lower, as only 58.7% recognized cognitive impairment and 55.5% identified depression as a possible symptom. Knowledge

regarding supportive management strategies was moderate, with 65.6% recognizing the importance of physiotherapy and 76.1% understanding the role of medication therapy. Most students (87.2%) acknowledged the importance of nurses in patient education, indicating positive awareness of nursing responsibilities. However, misconceptions regarding disease impact were present, as 22% incorrectly believed that Parkinson's disease does not affect quality of life. Overall, the findings demonstrate that students have better knowledge of common clinical features but require further education regarding disease complexity, non-motor symptoms, and holistic management approaches.

Figure 2 Distribution of Nursing Students According to Attitude Toward Parkinson's Disease

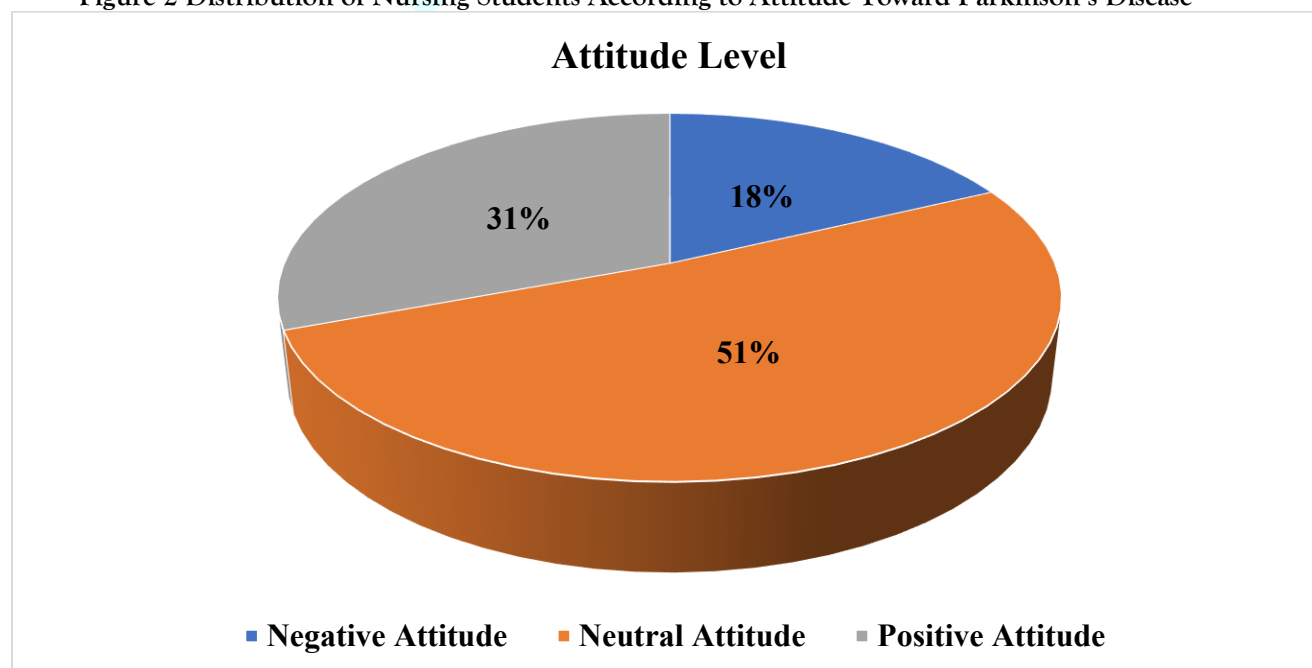


Figure 2 illustrates the attitude levels of undergraduate nursing students toward Parkinson's disease. The findings revealed that more than half of the participants demonstrated a neutral attitude (51.4%), suggesting that many students had neither strongly positive nor negative perceptions toward caring for individuals with Parkinson's disease. Approximately 30.7% of students showed a positive attitude, indicating willingness, empathy, and acceptance toward providing care for patients with Parkinson's disease. However, 17.9% of participants demonstrated negative attitudes, which may

reflect uncertainty, limited confidence, or inadequate understanding of the challenges associated with neurological patient care. The predominance of neutral attitudes may be related to limited clinical exposure and insufficient specialized education regarding Parkinson's disease. These findings highlight the importance of educational interventions, clinical experiences, and simulation-based learning approaches to promote positive attitudes and improve nursing students' confidence in caring for patients with Parkinson's disease.

Table 3
Association Between Demographic Characteristics and Knowledge Level Regarding Parkinson's Disease

Variables	Categories	Poor n (%)	Moderate n (%)	Good n (%)	χ^2	p-value
Gender	Male	22 (29.7)	39 (52.7)	13 (17.6)	2.14	.343
	Female	32 (22.2)	80 (55.6)	32 (22.2)		
Academic Year	1st-2nd Year	39 (36.1)	59 (54.6)	10 (9.3)	14.82	.005*
	3rd-4th Year	15 (13.6)	60 (54.5)	35 (31.8)		
Previous PD Exposure	Yes	8 (12.9)	34 (54.8)	20 (32.3)	8.96	.011*
	No	46 (29.5)	85 (54.5)	25 (16.0)		

Table 3 presents the association between selected demographic characteristics and knowledge levels regarding Parkinson's disease among undergraduate nursing students. The findings showed that gender was not significantly associated with knowledge level ($p = .343$), indicating that male and female students demonstrated comparable levels of understanding regarding Parkinson's disease. However, academic year showed a statistically significant association with knowledge level ($p = .005$), where students in higher academic years demonstrated better knowledge compared with junior students. This

finding suggests that increased educational exposure and clinical experience contribute to improved understanding of neurological disorders. Similarly, previous exposure to Parkinson's disease patients was significantly associated with knowledge level ($p = .011$), indicating that students who had encountered Parkinson's disease patients were more likely to demonstrate better knowledge. These findings emphasize the importance of clinical exposure and progressive integration of neurological content throughout nursing education programs.

Table 4
Association Between Knowledge Level and Attitude Toward Parkinson's Disease Among Nursing Students (N = 218)

Knowledge Level	Negative Attitude n (%)	Neutral Attitude n (%)	Positive Attitude n (%)	χ^2	p-value
Poor Knowledge	19 (35.2)	30 (55.6)	5 (9.2)	18.76	<.001*
Moderate Knowledge	18 (15.1)	68 (57.1)	33 (27.8)		
Good Knowledge	2 (4.4)	14 (31.1)	29 (64.5)		

Table 4 demonstrates the association between students' knowledge levels and attitudes toward Parkinson's disease. The findings revealed a statistically significant relationship between knowledge and attitude levels ($p < .001$). Students with poor knowledge predominantly demonstrated negative or neutral attitudes, with only 9.2% showing positive attitudes. In contrast, students with good knowledge showed considerably more positive attitudes, as 64.5% demonstrated positive perceptions toward Parkinson's disease care. These findings indicate that improved knowledge regarding Parkinson's disease may contribute to the development of more positive attitudes among nursing students. The results support the importance of educational interventions aimed at increasing disease-specific knowledge as a strategy for improving students' confidence, reducing misconceptions, and promoting compassionate, patient-centred nursing care for individuals living with Parkinson's disease.

Discussion

The present study was aimed at evaluating the knowledge and attitudes of the undergraduate nursing students about Parkinson's disease and showed that majority of the respondents had moderate level of knowledge followed by poor level of knowledge and good level of knowledge. The results show that nursing students have a basic understanding of Parkinson's disease but lack in-depth knowledge about the disease, its non-motor symptoms, and treatment. This was confirmed by Kareem (2025) who reported that despite their role in the care of patients, nurses showed inadequate knowledge about Parkinson's disease. The findings of the current study corroborate with previous evidence that neurological disorders could continue to be underrepresented in educational focus of nursing programs and ongoing professional development activities. The findings of the present study, however, do not match the findings of Alshammari et al. (2025), which showed relatively high knowledge among those in healthcare-related fields, which may be attributed to variation in educational exposure,

study population and neurological training programs availability.

The demographic results of the present study revealed that over half (66.1%) of the participants were female students, and that majorities of them were age group 21-23 (54.1%). The higher percentage of female participants may be due to the general pattern of more females in nursing education than males in many settings. The academic year was significantly correlated with the level of knowledge, with the senior students having higher knowledge than junior students. The results indicate that more theoretical content and more clinical learning experiences leads to greater understanding of neurological conditions. There is also evidence that the same pattern exists in education in the healthcare sector, whereby senior students have greater knowledge about diseases as a result of greater clinical exposure and professional training. The discovery highlights the need for the progressive integration of neurological nursing concepts throughout the curriculum during the undergraduate studies.

The present study revealed that the majority of students (71.6%) had no previous experience with a patient of Parkinson's disease; 28.4% had clinical exposure to Parkinson's patients. Students that had previously had exposure had significantly more knowledge than those who had not had exposure. Students get the chance to see clinical manifestation, the patient's difficulties, and relate the theory to actual care through clinical experience. This coincided with the results of Qasim et al. (2023), who showed that factors affecting awareness of PD included previous exposures and educational background. The knowledge gaps observed may be attributed to a lack of exposure amongst the nursing students, especially knowledge about non-motor symptoms, psychosocial issues and long term management of PD.

The results for specific knowledge items showed that there was greater knowledge of visible than of complex clinical aspects of PD. The great majority of participants were able to identify Parkinson's disease as a progressive neurological disorder (80.7%) and the recognition of tremor as a frequent symptom (84.4%). The recognition of

dopamine deficiency, bradykinesia, cognitive dysfunction and depression was lower compared to other features. This pattern is in line with the results of earlier studies indicating that people often notice their observable symptoms (tremor, movement difficulties) but not so much their non-motor symptoms. A similar pattern of increasing awareness of motor symptoms and limited awareness of more subtle symptoms, including fatigue and cognitive changes, was reported by Crooks et al. (2025). The results suggest that nursing education should include more than just motor symptoms in educating students about Parkinson's disease.

The present study revealed that 30.7% of the nursing students had positive attitudes, 51.4% had neutral attitude, and 17.9% had negative attitudes towards individuals with Parkinson's disease. The high rate of neutral attitudes might be due to low confidence and not so many clinical experiences with Parkinson's patients. Students may identify the need for nursing care but have doubt about their capacity to care for a patient with complex neurological care needs. Findings by Parveen et al. (2026) revealed that there were positive attitudes among university students towards Parkinson's disease and there was gap in knowledge about the symptoms and disease management. Attitude differences between studies could be due to different levels of education, exposure to health care environment or cultural differences in understanding neurological disability.

The present study showed a significant association between knowledge level and attitude towards PD ($p < .001$). Those who had a good knowledge of the subject were more likely to show positive attitudes than those with poor knowledge. This discovery aligns with the theoretical postulate that increased knowledge leads to better perceptions, fewer misconceptions and more confidence in patient care. Familiar relationships have been found in studies on healthcare education, where knowledge about a disease has a positive impact on the attitudes of health professionals towards managing chronic diseases. New insights into Parkinson's disease could enable students to better understand the disease, lessen fears of

neurological disorders, and increase their readiness to provide supportive care.

This study showed that only 38.5% of the respondents had undergone neurological nursing education or training, but 61.5% had not undergone neurological training. The low level of knowledge among the participants may be attributed to this educational constraint. Nursing curricula may include a wide range of health conditions, but may need extra detailed teaching due to the complexity and chronicity of progressive neurological disorders. Bloem et al. (2021) highlighted the need for a multidisciplinary knowledge of symptom control, rehabilitation, psychosocial and patient education for the management of Parkinson's disease. The results of the present study reinforced the necessity of reinforcing the content of neurological nursing in undergraduate nursing education to enhance students' competence in managing PD.

The results of this study have significant implications for nursing education in Pakistan, where there is limited availability of neurological healthcare resources and specialized training programs. Some of the students' exposure to patients with Parkinson's disease was minimal and their neurological training inadequate, which can impact future nurses' knowledge in recognition and/or education of patients and caregivers with Parkinson's disease. Dorsey et al. (2022) pointed out that Parkinson's disease is one of the fastest-growing neurological health problems in the world and that health care systems must have a properly trained workforce. Based on the current findings, it is recommended that possibly structured Parkinson's disease modules, simulation learning and opportunities for clinical exposure be inculcated in undergraduate nursing programs to ensure better preparedness.

The current results also highlight the importance of developing educational interventions aimed at improving both knowledge and attitudes among nursing students. Traditional classroom teaching alone may not be sufficient to address gaps related to chronic neurological disease management. Interactive teaching strategies, case-based learning, clinical demonstrations, and patient-centered experiences may enhance understanding and

promote positive attitudes. Evidence from neurological nursing education indicates that active learning approaches improve students' confidence and clinical reasoning abilities. Implementation of such strategies may contribute to producing nurses who are better prepared to provide holistic care for individuals living with Parkinson's disease.

The present study contributes important evidence regarding the knowledge and attitudes of undergraduate nursing students toward Parkinson's disease; however, some limitations should be considered. The cross-sectional design limits the ability to establish causal relationships between educational exposure and knowledge or attitudes. The study was conducted at a single nursing institution, which may limit generalizability to nursing students from other regions and institutions. Self-reported questionnaire responses may also introduce response bias. Despite these limitations, the findings provide valuable insight into existing educational gaps and highlight the need for strengthening neurological nursing education. Future research should include multiple institutions, larger samples, and intervention-based designs to evaluate the effectiveness of educational programs in improving Parkinson's disease knowledge and attitudes among nursing students.

CONCLUSION:

The present study concluded that undergraduate nursing students possessed a moderate level of knowledge regarding Parkinson's disease, while significant gaps remained in understanding disease progression, non-motor symptoms, and comprehensive management approaches. Although students demonstrated awareness of common symptoms and the importance of nursing care, a considerable proportion lacked adequate knowledge and specialized exposure to Parkinson's disease. The findings also revealed that attitudes toward individuals with Parkinson's disease were mainly neutral, indicating limited confidence and preparedness among students for managing patients with complex neurological conditions. A significant association was identified

between knowledge level and attitude, demonstrating that improved understanding of Parkinson's disease contributes to more positive perceptions and willingness to provide care. Academic year and previous exposure to Parkinson's disease patients were associated with better knowledge outcomes, highlighting the importance of clinical experience and educational exposure. The study emphasizes the need for strengthening neurological nursing education through structured teaching, clinical experiences, and evidence-based learning strategies. Improving nursing students' knowledge and attitudes regarding Parkinson's disease is essential for preparing competent future nurses capable of delivering effective, compassionate, and patient-centred neurological care.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations are proposed:

1. **Integration of Parkinson's disease content into nursing curriculum:**

Nursing education programs should include structured modules focusing specifically on Parkinson's disease, including its pathophysiology, clinical manifestations, treatment approaches, and nursing management.

2. **Increase clinical exposure opportunities:**

Nursing students should be provided with opportunities to interact with patients suffering from neurological disorders, including Parkinson's disease, to improve practical understanding and confidence.

3. **Implementation of specialized educational programs:**

Workshops, seminars, and continuing education sessions related to neurological disorders should be organized to enhance students' knowledge and develop positive attitudes.

4. **Use of innovative teaching strategies:**

Case-based learning, simulation-based training, clinical scenarios, and patient-centred learning approaches should be incorporated to improve neurological nursing competencies.

5. **Strengthening neurological nursing education:**

Nursing institutions should review existing curricula and ensure adequate emphasis on progressive neurological conditions due to their increasing global burden.

6. Encourage further research:

Future studies should be conducted among nursing students from multiple institutions and different regions to generate broader evidence regarding Parkinson's disease knowledge and attitudes.

7. Development of awareness programs:

Healthcare institutions and nursing schools should collaborate to develop awareness initiatives aimed at reducing misconceptions and improving understanding of Parkinson's disease among healthcare students.

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