

PREVALENCE OF NEUROPHOBIA AND ITS ASSOCIATED RISK FACTOR AMONG PHYSICAL THERAPY STUDENTS IN PESHAWAR: A CROSS-SECTIONAL STUDY

Original Research

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ABSTRACT

Background: Neurology is widely regarded as a challenging field due to the intricate structure of the nervous system and the diversity of neurological disorders and symptoms. Neurophobia, defined as the fear or anxiety surrounding neurology, often arises from its perceived complexity and the challenges of diagnosing and managing neurological conditions. This phenomenon is frequently reported among medical and allied health students, potentially impacting their academic confidence and clinical performance.

Objective: To assess the prevalence of neurophobia and its associated risk factors among physical therapy students in Peshawar.

Methods: A cross-sectional survey was conducted using a validated neurophobia questionnaire developed by Schon et al., along with demographic information. The study included 324 physical therapy students, both male and female, selected conveniently from rehabilitation institutes in Peshawar. Data collection spanned six months, and responses were documented via face-to-face interviews. Statistical analysis was performed using SPSS version 23, with descriptive and inferential tests applied to determine associations between neurophobia and its risk factors.

Results: Out of 324 participants, 91.4% (n=296) reported experiencing neurophobia. Among them, 88.1% (n=261) were undergraduate students, with fourth-year students showing the highest prevalence, followed by fifth, third, and second-year students. Females were more commonly affected than males. A majority identified key factors contributing to neurophobia, including lack of exposure (70.4%, n=228), limited faculty support (54.7%, n=162), and fear of making mistakes (67.3%, n=218). However, no statistically significant associations were found between these factors and neurophobia (p>0.05). A significant association was observed between neurophobia and undergraduate students as well as rehabilitation institutes (p<0.05).

Conclusion: The study revealed a high prevalence of neurophobia among physical therapy students in Peshawar, particularly among undergraduates. The findings emphasize the need for targeted educational interventions to address this issue and improve student confidence in neurology.

Keywords: Anxiety, Clinical Competence, Fear, Neurology, Neurophobia, Physical Therapy, Students.

INTRODUCTION

Neurophobia, a term first coined in 1994, refers to the fear or anxiety experienced by medical personnel when interacting with patients suffering from neurological disorders. This phenomenon is particularly concerning among physical therapy students, who are expected to develop the competencies necessary to treat a wide array of conditions, including neurological illnesses (1, 2). Neurophobia not only hampers their confidence but also poses significant challenges in evaluating and managing patients, potentially leading to suboptimal clinical performance and compromised patient care. Given the critical role of physical therapists in the rehabilitation of neurological conditions, the prevalence and underlying causes of neurophobia warrant careful investigation (3).

The complexity of neurology is widely recognized as one of the primary contributors to this phenomenon. Medical students and professionals alike often perceive neurology as a daunting discipline due to its intricate subject matter and the high level of cognitive demand required to master it (4). This perception is exacerbated by inadequate exposure to practical, experiential learning opportunities and insufficient training during both preclinical and clinical education. Neurological disorders, with their multifaceted presentations, further compound this sense of complexity, leaving students uncertain about their ability to provide competent care. Such apprehension not only affects neurology but also extends to related fields such as psychiatry, which is similarly stigmatized and undervalued among medical disciplines (5, 6).

The global burden of neurological disorders underscores the importance of addressing neurophobia (7). Neurological illnesses account for a significant percentage of the overall health burden worldwide, making it imperative for healthcare professionals to possess adequate knowledge and skills in this area. However, studies across various regions, including Asia, Europe, Africa, and the Americas, consistently highlight the high prevalence of neurophobia among medical students (8-10). This issue persists even during the early stages of their training, suggesting that systemic factors within medical education contribute to its development. While some recent evidence suggests that alternative learning modalities, such as online education, may help mitigate neurophobia by enhancing clinical neuroscience knowledge, traditional gaps in hands-on training and curriculum design remain unaddressed (11, 12).

The reluctance of students to engage with neurological disciplines reflects broader challenges within medical education, where neurology and psychiatry are often perceived as less approachable or rewarding compared to other specialties (13). Such attitudes not only discourage career interest in these fields but also diminish the quality of care provided to patients with neurological and psychiatric conditions. Recognizing the multifactorial nature of neurophobia is critical to designing effective interventions. By addressing the perceived complexity of neurology, improving experiential learning opportunities, and fostering a more supportive educational environment, the barriers posed by neurophobia can be significantly reduced (14, 15).

The objective of this study is to evaluate the prevalence of neurophobia and its associated risk factors among physical therapy students in Peshawar. By identifying the underlying causes and contributing elements, this research aims to inform targeted strategies for mitigating neurophobia, ultimately enhancing clinical education and improving patient outcomes.

METHODS

A cross-sectional survey was conducted to determine the prevalence of neurophobia and its associated risk factors among physical therapy students in Peshawar between May 2023 and October 2023. The study targeted both undergraduate and postgraduate students enrolled in physical therapy programs at rehabilitation institutions. Participants were selected based on inclusion criteria that required them to be male or female students aged 18 to 35, actively enrolled in their respective programs. Students enrolled in other rehabilitation disciplines such as speech-language pathology, occupational therapy, prosthetics and orthotics, and audiology were excluded. Additionally, individuals with pre-existing neurological or systemic conditions were also excluded to ensure the study focused specifically on neurophobia as experienced by otherwise healthy students.

Data collection utilized a reliable and validated questionnaire adapted from previously established tools to gather demographic details and assess neurophobia and its risk factors. Before data collection, participants were provided with an information sheet explaining the

study, and any questions they had were addressed. Informed consent was obtained from all participants prior to their inclusion. The investigator administered the questionnaire verbally to ensure clarity and consistency, and responses were recorded directly.

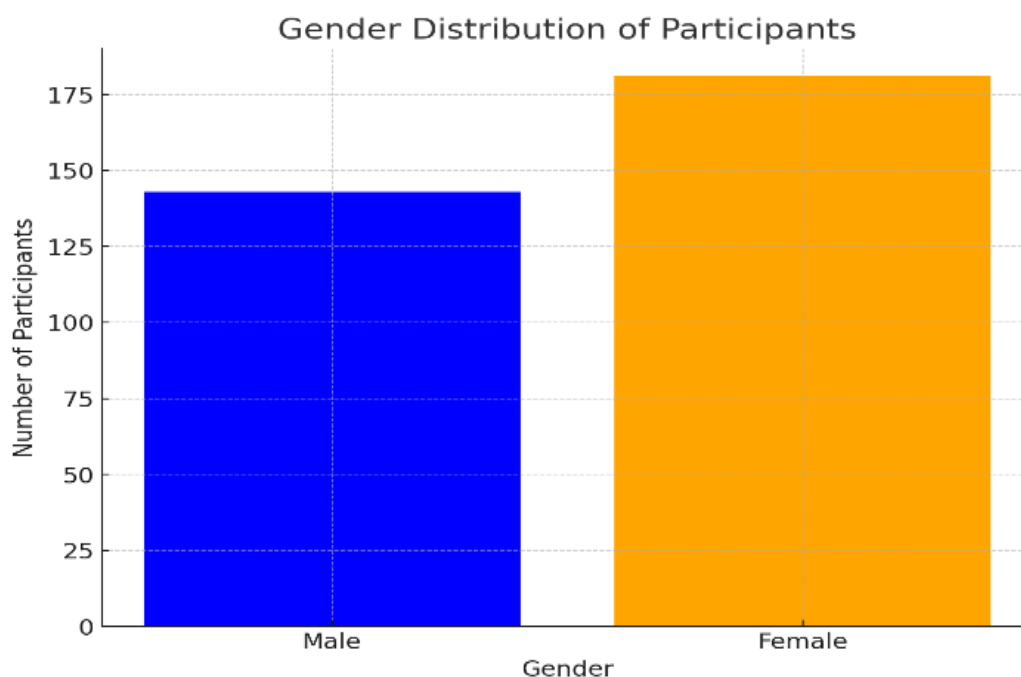
For data analysis, the Statistical Package for Social Sciences (SPSS) version 23 was employed. Continuous variables such as age were analyzed using mean and standard deviation, while categorical variables such as gender, education level, and rehabilitation institutes were summarized using frequencies and percentages. The data followed a normal distribution, as confirmed by the Shapiro-Wilk test. The chi-square test was utilized to explore associations between variables such as gender, rehabilitation centers, neurophobia prevalence, and related risk factors. Cross-tabulation was used to present frequency counts and percentages for each variable, and the results were summarized in tabular format for clarity.

RESULTS

The study included 324 participants, with an average age of 22.83 years (± 1.8), ranging from 19 to 33 years. Among them, 44.1% were male ($n=143$) and 55.9% were female ($n=181$). The participants were selected from various professional years, with 14.2% from the second year ($n=46$), 17.9% from the third year ($n=58$), 34.3% from the fourth year ($n=111$), and 21.3% from the fifth year ($n=69$). Postgraduate students constituted 40 participants, equally distributed between musculoskeletal physical therapy (50%, $n=20$) and neurological physical therapy (50%, $n=20$).

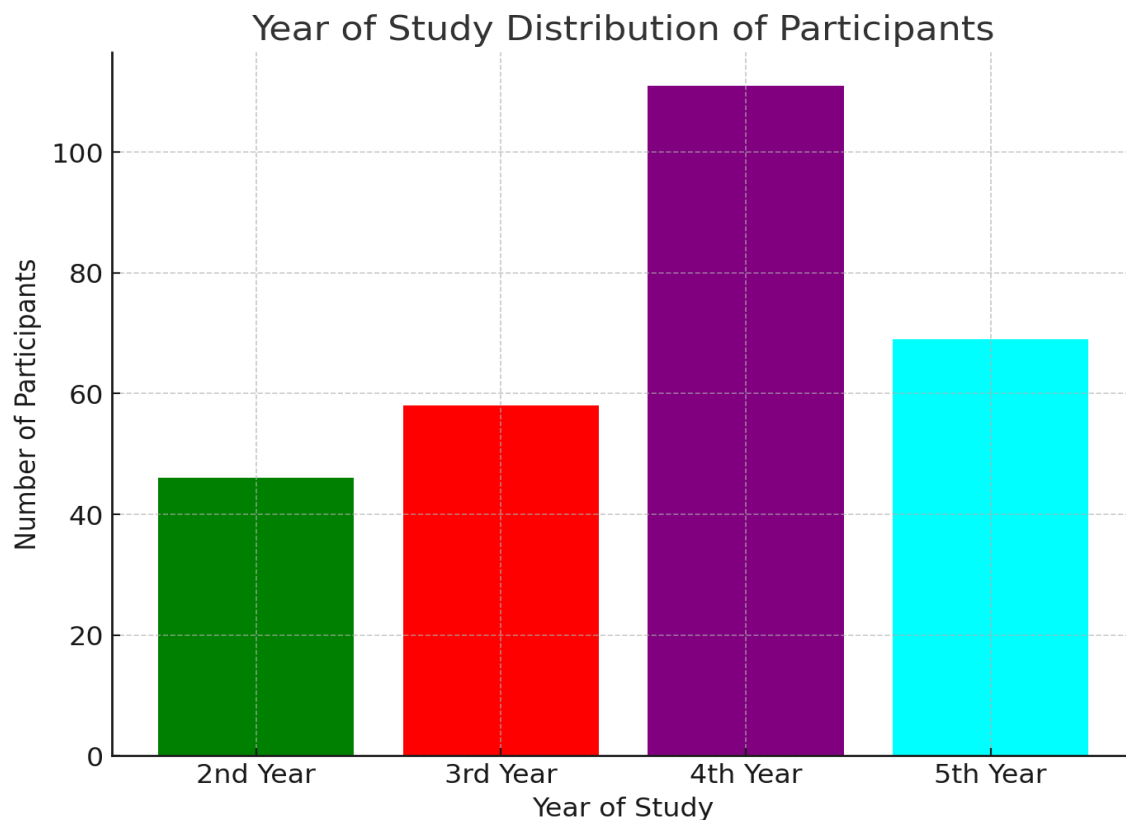
A significant majority of the participants, 91.4% ($n=296$), reported experiencing neurophobia, while only 8.6% ($n=28$) did not. Among the identified risk factors, 70.4% ($n=228$) of the participants reported limited exposure to neurological patients during clinical placements, 50% ($n=162$) highlighted insufficient faculty support, and 42.9% ($n=139$) cited restricted access to educational resources in neurology. Furthermore, 67.3% ($n=218$) expressed a fear of making mistakes or causing harm to patients with neurological conditions, and 52.5% ($n=170$) reported a lack of confidence in their neurological assessment skills. Additionally, 64.8% ($n=210$) perceived neurology as a particularly complex and difficult field compared to other areas of practice.

Chi-square tests revealed no statistically significant associations ($p>0.05$) between neurophobia and the identified risk factors, including lack of exposure to neurological patients, limited faculty support, restricted educational resources, fear of mistakes, lack of confidence, and perceived complexity of neurology. The results highlight the prevalence of neurophobia among physical therapy students but indicate that no single factor showed a strong correlation, suggesting that neurophobia is likely a multifaceted issue requiring comprehensive intervention strategies.



The age distribution of the 324 participants ranged from 19 to 33 years, with a mean age of 22.83 years and a standard deviation of 1.8 years. This indicates that the majority of the participants were in their early twenties, representing a relatively young cohort typical of undergraduate and postgraduate physical therapy students. This demographic alignment reflects the target population expected to experience neurophobia during their formative educational years.

Figure 1 Gender Distribution of Participants



Descriptive analysis of PT students selected from different medical professional year was carried out to find their frequencies and percentages. Out of 324 participants, 46 (14.2%) from 2nd year, 58 (17.9%) from 3rd year, 111 (34.3%) from 4th year and 69 (21.3%) from 5th professional year were selected, respectively.

Figure 2 Year of Study Distribution of Participants

Table 1: Descriptive analysis of Gender of the participants

Variable	f	%
Male	143	44.1
Female	181	55.9
Total	324	100.0

Out of the 324 participants, 44.1% (n=143) were male, while 55.9% (n=181) were female, indicating a slightly higher representation of female participants in the study. This gender distribution highlights the demographic composition of physical therapy students, with females forming the majority in this sample.

Table 2: Descriptive analysis of frequencies and percentages for postgraduate PT students

Variable	f	%
Musculoskeletal PT	20	50%
Neurological PT	20	50%
Total	40	100%

The descriptive analysis of postgraduate PT students selected from IPM&R was carried out to find their frequencies and percentages. Out of 40 participants, 20 (50.0%) from Musculoskeletal PT, 20 (50.0%) from Neurological PT, were selected respectively (Table 2).

Table 3: Descriptive analysis of Neurophobia

Neurophobia	f	%
Have Neurophobia (N Score > 50%)	296	91.4
Have no Neurophobia (N Score < 50%)	28	8.6
Total	324	100.0

The descriptive analysis of neurophobia of the participants were carried out to find the frequency and percentage of the participants. From a total of 324 participants, 296 (91.4%) PT students have Neurophobia and 28 (8.6%) PT students have no Neurophobia (Table 3).

Table 4: Cross tabulation between risk factor and Neurophobia

		>50%	<50%	Total	P Value
Lack of exposure.	Yes	228	21	247	.820
	No	70	7	77	
	Total	296	28	324	
		>50%	<50%	Total	P Value
Limited faculty support.	Yes	162	23	175	.432
	No	134	25	149	
	Total	296	28	324	
		>50%	<50%	Total	P value
Limited educational resources.	Yes	139	10	149	.322
	No	157	18	175	
	Total	296	28	324	
		>50%	<50%	Total	P Value
Fear of making mistakes.	Yes	218	22	238	.656
	No	80	6	86	
	Total	296	28	324	
		>50%	<50%	Total	P Value
Lack of confidence.	Yes	170	14	184	.550
	No	126	14	140	
	Total	296	28	324	
		>50%	<50%	Total	P Value
Perceived complexity and difficulty of neurology.	Yes	210	16	226	.137
	No	86	12	98	
	Total	296	28	324	

The cross-tabulation analysis examined the relationship between neurophobia and various risk factors among the participants, with 91.4% (n=296) experiencing neurophobia (>50% score) and 8.6% (n=28) not experiencing it (<50% score). Among those with neurophobia, 70.4% (n=228) reported a lack of exposure to neurological patients during clinical placements, while 21.6% (n=70) had exposure. Similarly, 54.7% (n=162) indicated limited faculty support in neurology, compared to 45.3% (n=134) who had adequate faculty guidance.

In terms of educational resources, 46.9% (n=139) of participants experiencing neurophobia reported limited access, while 53.1% (n=157) had sufficient resources. Fear of making mistakes was prevalent in 73.6% (n=218) of participants with neurophobia, whereas 26.4% (n=80) did not share this fear. A lack of confidence in applying neurological assessment techniques was observed in 57.4% (n=170) of participants with neurophobia, compared to 42.6% (n=126) who felt confident. Additionally, 71.0% (n=210) of participants with neurophobia perceived neurology as highly complex and difficult, while 29.0% (n=86) did not share this perception.

Chi-square tests revealed no statistically significant associations ($p>0.05$) between neurophobia and any of the assessed risk factors, including lack of exposure to neurological patients, limited faculty support, restricted educational resources, fear of making mistakes, lack of confidence, and perceived complexity of neurology. These findings suggest that neurophobia is likely influenced by a combination of factors rather than any single identifiable cause.

DISCUSSION

The study investigated the prevalence of neurophobia among physical therapy students in Peshawar and examined its associated risk factors. It was observed that neurophobia was highly prevalent, with 91.4% of participants experiencing this phenomenon (16). The mean age of the participants was 22.83 years (± 1.8), reflecting a relatively homogenous group of young students. Female students were found to exhibit a slightly higher prevalence of neurophobia compared to male students. Among undergraduate participants, fourth-year students reported the highest prevalence, followed by fifth, third, and second-year students, highlighting a potential increase in neurophobia as students progress through their academic journey. This pattern could indicate that academic and clinical exposure to neurology, rather than mitigating neurophobia, might exacerbate it due to the increasing complexity and expectations associated with the subject (17).

The study revealed several factors linked to neurophobia, including fear of making mistakes, perceived complexity of neurology, lack of confidence in neurological assessment skills, limited faculty support, and insufficient exposure to neurological patients during clinical placements (18). Despite these associations, none of the risk factors demonstrated statistically significant relationships, suggesting that neurophobia is influenced by a complex interplay of variables. Interestingly, postgraduate students specializing in musculoskeletal and neurological physical therapy also reported experiencing neurophobia, albeit at rates comparable to undergraduate students. This finding highlights the pervasive nature of neurophobia across different levels of training (19).

A notable strength of the study is its comprehensive assessment of both undergraduate and postgraduate students, providing insights into neurophobia across varying levels of expertise. Furthermore, the use of a validated questionnaire ensured reliable data collection (20). However, the study is not without limitations. The cross-sectional design limits the ability to infer causality between risk factors and neurophobia. Additionally, the exclusion of other allied health professionals reduces the generalizability of findings to broader rehabilitation fields. Variability in teaching standards and resource availability across institutions could also have introduced bias, warranting caution in interpreting the results (20).

A recent comparative study conducted in Brazil in 2023 highlighted the prevalence and evolution of neurophobia among medical students. This cross-sectional research surveyed students across preclinical, clinical, and internship stages, finding a neurophobia prevalence rate of 63.3%. Interestingly, the study revealed that neurophobia levels tended to increase during internships, with students citing the need to master neuroanatomy and neurophysiology as key contributors to their apprehension. However, a comparison with data from 2015 showed a relative decrease in neurophobia prevalence, alongside improvements in neurology education quality and students' confidence in managing neurological conditions. These findings suggest that enhanced educational strategies and structured bedside tutorials have a positive impact on mitigating neurophobia. Nevertheless, the study emphasized the persistent perception of neurology as a complex and challenging discipline, reinforcing the need for sustained intervention to address this global issue.

Another recent comparative study conducted in Australia in 2021 evaluated neurophobia among medical students and junior doctors. The study found that neurology was perceived as the most challenging medical specialty compared to ten others, with 65% of participants citing inadequate teaching in neurology as a significant factor. The prevalence of neurophobia was particularly high among those who had not participated in neurology rotations during their education. Key contributors to neurophobia included a lack of understanding of neuroanatomy, diagnostic uncertainty, and insufficient clinical exposure. Interestingly, the study also observed that junior doctors exhibited a slightly lower prevalence of neurophobia compared to medical students, suggesting that hands-on experience during clinical

practice might reduce its impact. This underscores the importance of structured neurology rotations and targeted teaching interventions in mitigating neurophobia.

The findings align with previous studies reporting high rates of neurophobia among medical and allied health students, emphasizing the perception of neurology as a particularly challenging discipline. Although faculty support and educational resources were cited as factors influencing neurophobia, their impact was inconsistent, underlining the multifactorial nature of this issue. The results underscore the need for targeted interventions, such as enhanced clinical exposure, mentorship, and curriculum reform, to address the root causes of neurophobia and improve the confidence and competence of physical therapy students in neurology. These efforts would likely translate to better clinical outcomes and more effective patient care in neurological rehabilitation settings.

CONCLUSION

This study concluded that neurophobia is highly prevalent among physical therapy students in Peshawar, with female students and undergraduates being particularly affected. The findings highlight that limited exposure to neurology, perceptions of complexity, and insufficient institutional support within rehabilitation settings contribute significantly to this phenomenon. Addressing these factors through targeted educational reforms and enhanced clinical opportunities could help reduce neurophobia and improve confidence and competence in managing neurological conditions.

AUTHOR CONTRIBUTIONS

Author	Contribution
Muhammad Atif	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Shah Faisal wazir	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Syed Issam Ullah Jan	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Nafeesa Taj	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Aqsa Rehan	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Anosha Tariq	Substantial Contribution to study design and Data Analysis Has given Final Approval of the version to be published
Maria Naz	Contributed to study concept and Data collection Has given Final Approval of the version to be published

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