

# Neurophobia among students and interns at the Abidjan Faculty of Medicine (Côte d'Ivoire)

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## ARTICLE INFO

**Keywords:**  
Neurophobia  
Medical students  
Abidjan

## SUMMARY

**Introduction:** As defined by Jozefowicz in 1994, neurophobia is the fear of neuroscience and clinical neurology. We carried out this study, the first on neurophobia in the Ivory Coast, in order to assess its prevalence among medical students and interns in the Ivorian environment, to identify the factors involved and to propose solutions.

**Methodology:** This was a prospective cross-sectional study carried out during the 2022–2023 academic year at the Abidjan UFR of Medical Sciences. The study population consisted of all students in years 3<sup>ème</sup> to 6<sup>ème</sup> and hospital interns. The Schon questionnaire, transcribed using google form software, was sent to students using the “wathsapp” social network.

**Result:** We obtained 284 responses, i.e. 23 % of all respondents ( $n = 1228$ ). The sex ratio was 1.65 in favour of men. The subjects considered that they had a level of competence in neurology higher than 6 of the nine specialties selected. These were nephrology, cardiology, rheumatology, endocrinology, psychiatry and geriatrics. Neurology was considered more difficult than cardiology, endocrinology, psychiatry and geriatrics. Subjects' level of knowledge in neurology was rated higher than in nephrology, cardiology, rheumatology, endocrinology, psychiatry and geriatrics. The subjects' level of interest in neurology was higher than in the other specialties. 27.46 % of subjects surveyed were neurophobic.

**Conclusion:** The impact of neurophobia remains harmful to public health, as it is a factor in the sub-optimal management of patients with neurological disorders.

## 1. Introduction

As defined by Jozefowicz in 1994, Neurophobia is the fear of neuroscience and clinical neurology. It stems from the inability of students to put their fundamental scientific knowledge into clinical practice [1]. In his statement, which has no scientific basis whatsoever, Jozefowicz claimed that 50 % of medical students at any given time have “a fear of neuroscience and clinical neurology” [1]. Since then, a number of scientific studies have assessed neurophobia during medical studies, with varying results. However, the perception of neurology as a difficult speciality is common to all the studies. Neurophobia seems to be a problem observed throughout the world [2], so the scarcity or even

absence of data specific to sub-Saharan Africa in general justified this study. The aim of this first study on neurophobia in Côte d'Ivoire is to assess its prevalence among medical students and interns in the Ivorian environment, to identify the factors involved and to propose solutions.

## 2. Methodology

This was a prospective cross-sectional study, carried out during the 2022–2023 academic year at the Abidjan UFR of Medical Sciences. The study population consisted of all students in years 3<sup>ème</sup> to 6<sup>ème</sup> and hospital interns.

A questionnaire made using google form software was sent to

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<https://doi.org/10.1016/j.ensci.2025.100566>

Received 2 November 2024; Received in revised form 23 March 2025; Accepted 9 April 2025

Available online 15 April 2025

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students using the “watsapp” social network, via their head of year. The questionnaire was individual, voluntary and anonymous. It consisted of three parts: the first part concerned socio-demographic data and the second part was based on the Schon questionnaire [3], a validated questionnaire for assessing neurophobia. It comprises four items and assesses the following themes: interest, knowledge, difficulty and confidence in assessing a neurology patient. Neurology was compared with 9 other medical disciplines (cardiology, nephrology, rheumatology, endocrinology, gastroenterology, psychiatry, geriatrics, pneumology, infectiology). Scores ranging from 0 to 5 were applied to the various responses. The sum of the ratings for each response enabled us to calculate the averages by specialty (0 to 3.5). The averages obtained for each specialty were compared using the *t*-test (the significance threshold was 5 %). The last two questions of the Schon questionnaire, which measure difficulty and confidence in assessing a neurology patient, form a composite score for neurophobia. Lower scores indicate greater difficulty and lack of confidence. A total score of 4 or less for these two items indicates that the respondent is neurophobic.

The third part dealt with the reasons why neurology was considered a difficult subject.

### 3. Results

We obtained 284 responses, i.e. 23 % of all respondents ( $n = 1228$ ). The sex ratio was 1.65 in favour of men. The majority of the subjects surveyed were in their doctoral year (47.5 %). Residents represented 8.8 % of the subjects.

With regard to the careers envisaged by the respondents, clinical medical specialties accounted for 37 %, or around a third of the careers envisaged. They were followed by surgical specialties, fundamental and biomedical specialties, and general medicine in 27.1 %, 22.2 % and 1.8 % of cases respectively. The career envisaged was not known by 12 % of respondents.

With regard to the level of competence (Fig. 1), the subjects considered that they had a higher level of competence in neurology than 6 of the nine specialties selected. These were nephrology, cardiology, rheumatology, endocrinology, psychiatry and geriatrics. The difference was statistically significant for rheumatology, endocrinology, psychiatry and geriatrics ( $p < 0.05$ ). The level of competence in neurology was lower than in infectiology, pneumology and gastroenterology, with a significant difference for gastroenterology ( $p < 0.05$ ).

As for the level of difficulty (Fig. 2), neurology was considered more difficult than cardiology, endocrinology, psychiatry and geriatrics; this was not statistically significant. On the other hand, rheumatology, nephrology, infectiology, pneumology and gastroenterology were

considered less difficult than neurology, with a statistically significant association for infectiology, pneumology and gastroenterology.

The level of knowledge (Fig. 3) in neurology subjects was rated higher than in nephrology, cardiology, rheumatology, endocrinology, psychiatry and geriatrics. The difference was statistically significant for geriatrics, psychiatry, endocrinology and rheumatology ( $P < 0.005$ ). The level of knowledge in neurology was lower than in infectiology, pneumology and gastroenterology. The statistical difference was significant only for gastroenterology ( $P < 0.005$ ).

Subjects' level of interest (Fig. 4) in neurology was higher than in other specialties. The difference was statistically significant for infectiology, nephrology, rheumatology, endocrinology, psychiatry and geriatrics ( $p < 0.05$ ).

27.46 % of the subjects surveyed were neurophobic.

For the subjects surveyed, the top three reasons why neurology was considered a difficult subject were the need to know the basics of neuroscience, the need to be in a practical situation and the complexity of the clinical examination (Fig. 5).

### 4. Discussion

Clinical medical specialties remain the main career option for the subjects surveyed, followed by surgical specialties, while general medicine is the least considered. Our results are similar to those of the Rabat study [4], which found that neurology was a career option for 12.7 % of the subjects surveyed.

Neurology is considered to be a difficult discipline [3,5,6]. Neurophobia is a worldwide phenomenon [2,7,8] and was initially cited as affecting 50 % of medical students [1]. Recent literature reports that it affects around 30 % of medical students [9,10]. The French study by Mc Govern [11] found that a quarter of students in France suffered from neurophobia.

In Strasbourg [12], the level of interest in neurology is higher than in other specialties, and the level of objective knowledge is similar. This level of interest in neurology, which is higher than in other specialties, could be justified by a rather mixed level of knowledge, difficulty and competence.

However, our results are not superimposable on the data in the literature with regard to the level of knowledge, difficulty and competence. Studies carried out in the United States [7] and Europe [3,6] found that medical students and residents perceived neurology as the most difficult medical specialty and the one in which they had the least knowledge. More importantly, participants felt less confident in diagnosing, assessing and treating patients with neurological disorders compared to seven other specialties commonly encountered in primary

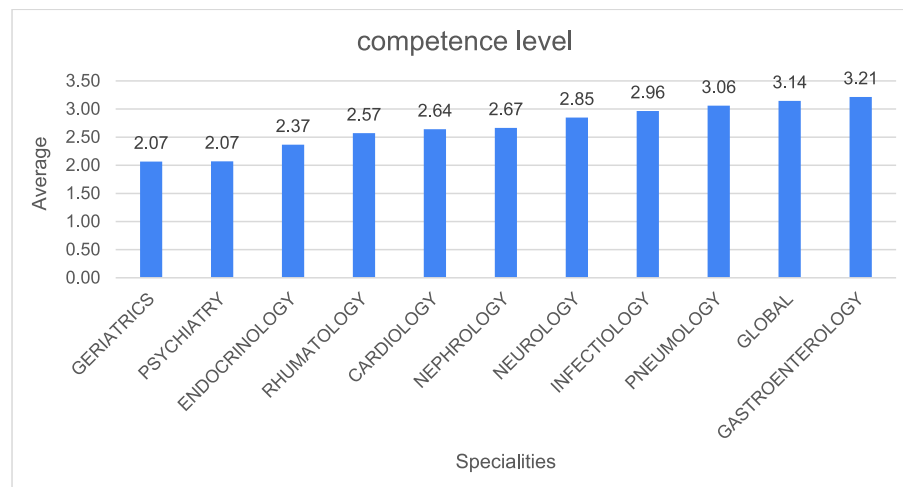


Fig. 1. Histogram breaking down the averages for the various specialties assessed by competence level.

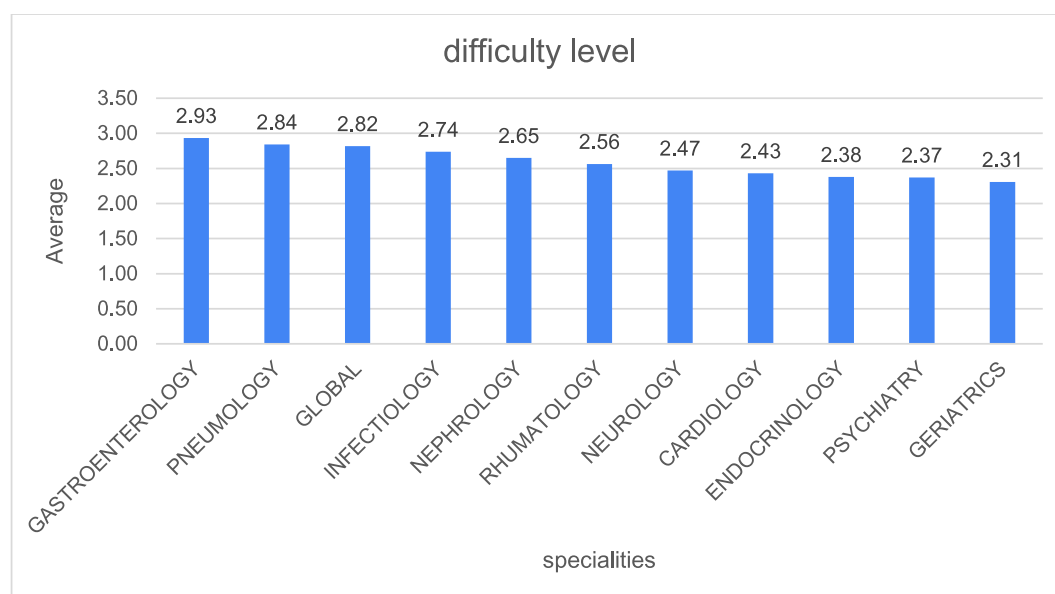


Fig. 2. Histogram distributing the averages of the different specialties evaluated according to the level of difficulty.

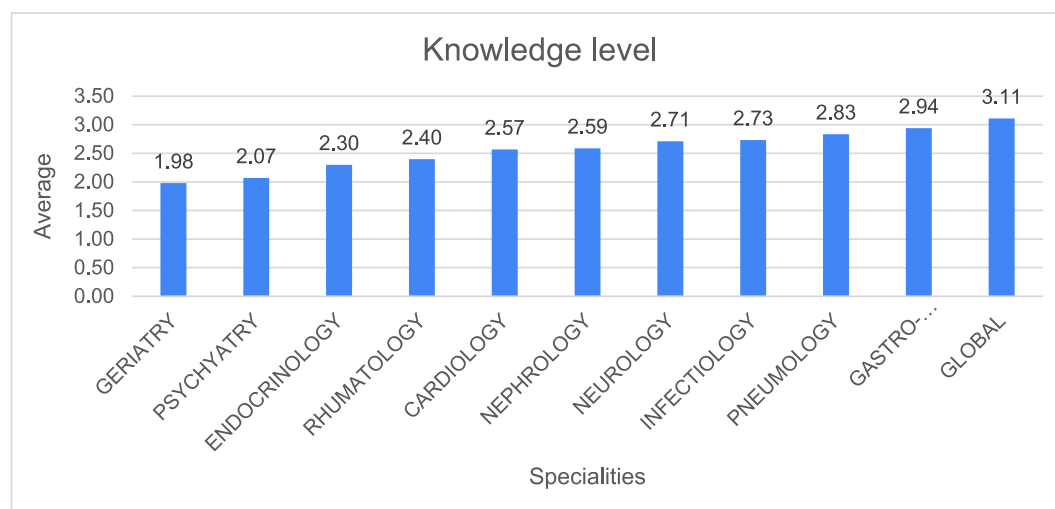


Fig. 3. Histogram distributing the averages of the different specialties evaluated according to the level of knowledge.

care settings. Neurology was perceived as difficult due to insufficient exposure to the subject, lack of teaching and perceived complexity [6]. The difference in the perception of neurology in our work compared with the literature may be related to the method of training used in our healthcare system, which is much more focused on bedside placements (of longer duration than lectures). Based on several studies on neurophobia, there is general agreement on the effectiveness of bedside teaching during hospital placements, ranked as one of the best teaching methods [4].

The need to know the basics of neuroscience (neuroanatomy and neuroscience) is pointed out as one of the main reasons why neurology is considered a difficult subject in our study. Indeed, in our country the absence of a neuroscience institute bringing together both fundamentalists and clinicians, with instead two very distinct university departments, could contribute to this lack of primary data useful to students in their learning. It should also be noted that clinical neurology is heavily dependent on neuroimaging data, the cost and accessibility of which remain a real challenge in our working environments, making patient management complex. However, the results of the American study [7] suggest that a detailed knowledge of neuroanatomy may not

be essential for the practical management of patients with basic neurological problems. The complexity of neurological diagnosis and basic neuroscience was also ranked as one of the top five contributors to the difficulty of neurology, in line with findings from the UK and Ireland [3,6].

This study, the first of its kind in Côte d'Ivoire, evaluates the attitudes of medical students and interns towards neurology. It is subject to a number of biases, in particular the low response rate and the level of understanding of the questionnaire, which may vary from one student to another. Although our study evaluates attitudes to neurology, it provides us with elements for improving the teaching of neurology, particularly in our context, which is more focused on consistent and sufficient practice at the patient's bedside. According to the results of the American study [7], it is not only the lack of exposure and teaching, but also the lack of appropriate integration of basic neuroscience and clinical neurology that constitutes an obstacle for trainees.

## 5. Conclusion

Neurophobia is a worldwide phenomenon, the importance of which

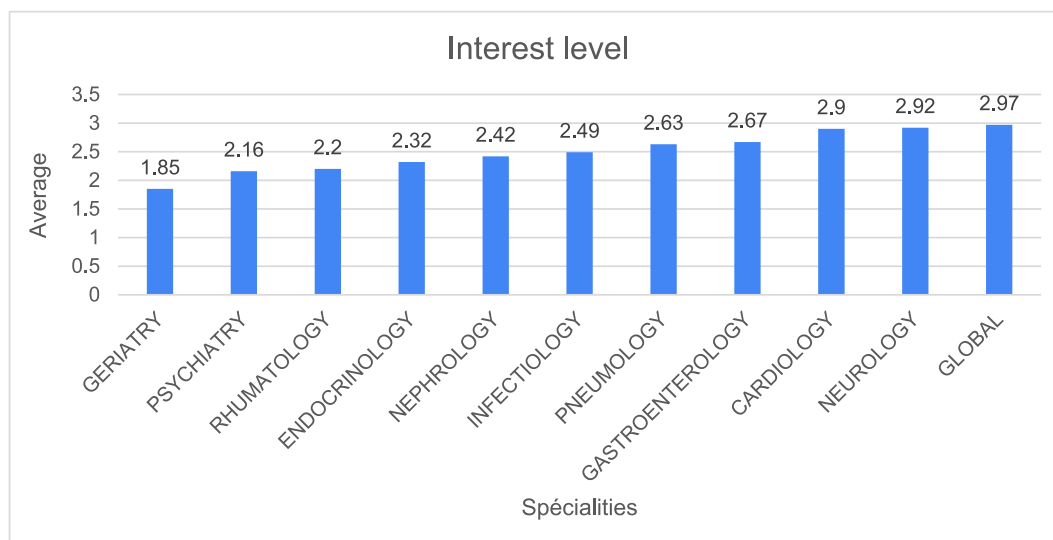


Fig. 4. Histogram showing the averages of the different specialties evaluated according to the level of interest.

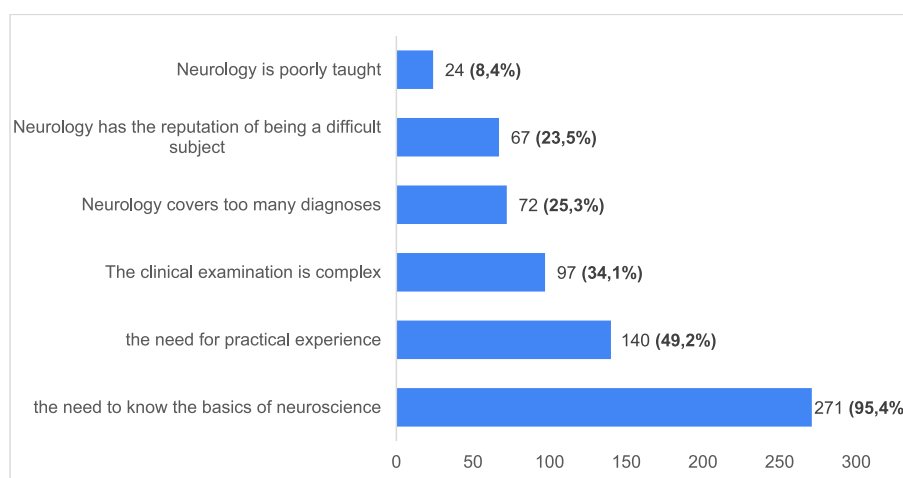


Fig. 5. Histogram representing in proportion the reasons given for the difficulty of neurology.

seems to have diminished over the years, certainly in conjunction with improvements in neurology teaching. The impact of neurophobia remains harmful to public health, as it is a factor in the sub-optimal management of patients with neurological disorders. To reduce the rate of neurophobia, neurology teaching needs to be improved, in particular by integrating fundamental neuroscience into clinical practice at an early stage, with more practical training at the patient's bedside.

#### CRediT authorship contribution statement

**Kadjo Claude Valery Cedric Aka:** Writing – review & editing, Writing – original draft, Validation, Methodology, Formal analysis, Data curation, Conceptualization. **Essoin-de Souza Tamia Nancy:** Writing – review & editing, Methodology, Formal analysis, Conceptualization. **Amon-tanoh Muriel:** Writing – review & editing, Methodology,

Conceptualization. **Agbo-Panzo Cedric:** Writing – review & editing, Methodology, Formal analysis, Data curation. **Offoumou Fiacre Delors:** Writing – review & editing, Methodology, Formal analysis, Data curation. **Aka Arlette Desirée:** Writing – review & editing, Validation, Formal analysis, Data curation. **Yapo-Ehounoud Constance:** Writing – review & editing, Validation, Supervision. **Tanoh Christian:** Writing – review & editing, Validation, Supervision. **Aka-Diarra Evelyne:** Writing – review & editing, Validation. **Baugnan Davide:** Writing – review & editing, Validation, Formal analysis, Data curation. **Toa Bi Axel:** Writing – review & editing, Validation, Formal analysis, Data curation. **Assi Berthe:** Writing – review & editing, Validation.

#### Declaration of competing interest

None.

## Appendix A. Questionnaire 1: Neurophobia in students and interns of the Faculty of Medicine

### Part I: Socio-demographic data

Age

Sex

Year of study

Intended career

Medical Specialty

Surgical Specialty

General Medicine

Not decided

Specific Specialty

## Part II: Schon questionnaire

Q1. What is your current level of interest?

	Little to no interest	Some interest	Moderate interest	Quite interested	Hot	Don't know
Global						
Neurology						
Cardiology						
Pneumology						
Infectious diseases						
Rheumatology						
Nephrology						
Endocrinology						
Gastroenterology						
Geriatrics						
Psychiatry						

Q2 What is your current level of knowledge?

	Little or not at all	Weak	Medium	Satisfactory	Good	Don't know
Global						
Neurology						
Cardiology						
Pneumology						
Infectious diseases						
Rheumatology						
Nephrology						
Endocrinology						
Gastroenterology						
Geriatrics						
Psychiatry						

Q3. Do you think the subject is easy or difficult?

	Very easy	Pretty easy	Medium	Quite difficult	Very difficult	Don't know
Global						
Neurology						
Cardiology						
Pneumology						
Infectious diseases						
Rheumatology						
Nephrology						
Endocrinology						
Gastroenterology						
Geriatrics						
Psychiatry						

Q4. If you see a patient and they have a problem with one of the specialties below, how do you feel?

	Very uncomfortable	Uncomfortable	Moderately competent	Confident	Very confident	Don't know
Global						
Neurology						
Cardiology						
Pneumology						
Infectious diseases						
Rheumatology						
Nephrology						

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	Very uncomfortable	Uncomfortable	Moderately competent	Confident	Very confident	Don't know
Endocrinology						
Gastroenterology						
Geriatrics						
Psychiatry						

Q5. Why is neurology considered a difficult subject?

	Unimportant factor	Possible factor	Important Factor	Very important factor	Don't know
There is a need to know neurophysiology					
There is a need to know the neuroanatomy					
The clinical examination is complex					
Neurology has a reputation for being a difficult subject					
Neurology covers too many diagnoses					
Neurology is poorly taught					
There is a need to be in a practical situation					

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