# Neurophobia among undergraduate medical students: a European experience beyond the Anglosphere

Álvaro Lambea-Gil, Ignacio Saldaña-Inda, Itziar Lamíquiz-Moneo, Ana I. Cisneros-Gimeno

**Introduction.** Neurophobia is defined as the fear of the neural sciences and clinical neurology that is due to the students' inability to apply their knowledge of basic sciences to clinical situations. This phenomenon, well documented in the Anglosphere, has seldom been studied in other European countries and never in our country. Our study aimed to determine whether said fear existed among Spanish medical students.

**Material and methods.** A self-administered questionnaire with 18 items was sent to medical students in the second, fourth and sixth years of medical school at a Spanish university during the academic years 2020-2021 and 2021-2022. They were questioned about their fears regarding neurology and neurosciences, causes and potential solutions.

**Results.** Out of 320 responses, 34.1% suffered from neurophobia and only 31.2% felt confident they knew what neurologists do. Despite Neurology being considered the most difficult discipline, it did also arouse the most interest among the students. Main reasons identified for neurophobia were too theoretical lectures (59.4%), neuroanatomy (47.8%), and a lack of integration between neuroscience subjects (39.5%). Solutions considered most important by the students to reverse this situation went along those lines.

**Conclusion.** Neurophobia is prevalent among Spanish medical students too. Having identified the teaching methodology as one of its fundamental causes, neurologists have the opportunity and obligation to reverse this situation. We should strive for more proactive involvement of neurologists at earlier stages of medical education.

**Key words.** Clinical neurology. Medical education. Medical students. Neurophobia. Teaching. University.

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## Introduction

In 1994, Ralph F. Jozefowicz, professor at the University of Rochester, coined the term 'neurophobia' to refer to the fear or apprehension experienced by medical students towards neurology [1]. Said perception had already been reported decades earlier by other neurologists, such as Charles M. Poser or Robert Wartenberg [2].

The emergence of this term coincided with a time when neurology was in the midst of a period of rapid change and Prof. Jozefowicz saw it as an opportunity to break old stereotypes among students and professionals [2,3]. However, since the beginning of the 21st century, various studies have confirmed Prof. Jozefowicz's feelings [4-7]. In fact, a search of the Medline database through PubMed shows a slow but steady increase in the term 'neurophobia' since 2006.

These studies, although scarce, confirm the fear that students feel towards neurology in comparison with other medical specialties, despite the initial interest that it may arouse in them. Several causes have been proposed for this phobia: the type of patient, the pathophysiology or the lack of treatment. However, most studies agree the main reason for this fear are the difficulties acquiring knowledge in neurosciences during the undergraduate period [4-7].

In recent years, this concept has gained greater interest among neurologists and other healthcare professionals. The social network Twitter shows an increasing use of the word 'neurophobia', having tripled its use in the last five years, from 42 references in 2017 to 128 in 2020 and 2021. However, this attitude of students towards neuroscience has been very little analyzed outside the Anglosphere. There are very few researches published in Ibero-America or other European countries that corroborate the findings, and none published in Spain [8-12].

The aim of this study is to determine the perception that undergraduate medical students outside the Anglo-Saxon university system have towards neurology and its related areas, and whether 'neurophobia' exists.

## Material and methods

A cross-sectional study was designed. Self-administered surveys were sent to students of the degree in Medicine at the Universidad de Zaragoza during the academic years 2020-2021 and 2021-2022. No changes were made to the curriculum or teaching methodology during the analyzed period. The Universidad de Zaragoza is the only university in the whole region which offers a medical degree.

The questionnaire was designed using Google Forms, within the Google Workspace for Education of the Universidad de Zaragoza. We employed a modified and adapted version of that used by previous studies [7,8]. The first version of the survey was reviewed by an independent neurologist with experience in undergraduate teaching. Subsequently, we carried out a pilot test with 20 newly graduated medical students to ascertain the clarity and relevance of the questions, which led to minor adjustments. Demographic data were included, along with aspects of perceived knowledge, attraction or fear towards neurology and other medical specialties. The questionnaire consisted of 18 questions, 10 of them with a Likert scale format of 1 to 5, three dichotomous, two trichotomous, one multiple choice, one numeric and one affiliation question. The 1-5 Likert format responses were further dichotomized for analysis into 1-2 or 4-5, depending on the items. The survey in its original version is available in appendix.

The questionnaires were sent by institutional email to second-, fourth- and sixth-year students (180 per promotion and year). As a six-year medical degree, we chose these curricular years to be the ones that include the subjects related to neurosciences, according to the syllabus: neuroanatomy and neurophysiology in the second year, neurology and neurosurgery in the fourth year, and clinical practices in the sixth year. We thus wanted to have a representative sample of the student body as a whole, and also of the different training periods: preclinical (second year), clinical (fourth year) and clinical with supervised internship (sixth year).

For the descriptive analysis, the qualitative variables were presented by frequencies and their percentages for each category. In the case of quantitative variables, indicators of central tendency (mean or median) and dispersion (standard deviation or interquartile range) were used depending on whether they followed a normal distribution or not, which was determined by the Saphiro-Wilk test. For the inferential analysis, statistical significance was established as $p < 0.05$ and the following contrast tests were used: chi-square or Fisher's exact test to compare proportions when both variables were qualitative; and in the case that one of them was quantitative, Student's *t* test or ANOVA for normal distributions, and Mann-Whitney U or Kruskal-Wallis for those that followed a non-normal distribution.

Statistical analysis was performed with jamovi version 2.2.5 [13] and graph design with Microsoft 365 and R-Studio version 4.1.2 [14] using the packages ggplot2, RColorBrewer, fmsb and ggpubr.

The research was approved by the Universidad de Zaragoza's Management and our regional Research Ethics Committee (Comité de Ética de la Investigación de la Comunidad Autónoma de Aragón, CEICA), with identification number PI21-324.

## Results

We received answers from 320 students, 158 from the 2020-2021 academic year (60 from second year, 58 from fourth year and 40 from sixth year) and 162 from 2021-2022 (60 from second year, 65 from fourth year and 37 from sixth year). The overall response rate was 29.6% (33.3% for second year, 34.2% for fourth year and 21.4% for sixth year).

Data from both surveyed courses (2020-2021 and 2021-2022) were analyzed together. No significant differences in the response rate was found between the two of each course (second, fourth and sixth). The methodology, syllabus and teaching staff remained unchanged.

The table shows the main variables analyzed in total numbers and distributed by course. Overall, the median age of the respondents was 21 years (interquartile range: 20-23). 156 (51.6%) students answered having had close contact with neurological diseases, either in first person, or through the support or care of family or very close friends. 103 (32.2%) would choose neurology or other related specialties as their area of specialty training. In turn, 109 (34.1%) feel a high or very high level of fear or rejection towards neurology.

Among the reasons identified by students for their difficulties, fears or rejection were, from most to least frequent: eminently theoretical teaching (59.4%, 190), neuroanatomy (47.8%, 153), poor integration of neuroscience subjects in the curriculum (30.9%, 99), neurophysiology (22.2%, 71), type of patient and their diagnoses (16.6%, 53), and neurological examination (12.5%, 40). Figure 1 shows these results by course.

A 68.1% (218) considered having little or very little knowledge in at least one of the basic areas of

neuroscience: 40.6% (130) in neuroanatomy, followed by histology (40.3%, 129) and neurophysiology (35.3%, 113). Statistically significant differences were also observed for some courses, as shown in the table. Among students in clinical courses (fourth and sixth), pharmacology (44.7% vs. 26.0%, $p$ = 0.008), together with neurological pathophysiology (51.2% vs. 27.3%, $p$ = 0.001) and its differential diagnosis (48.0% vs. 23.4%, $p$ = 0.001) were the only areas of knowledge in which there was a significant decrease in the perception of insecurity; while the rest remained the same or increased. Of the students in the clinical cycle, 53.0% (106) had not done bedside teaching in neurology or neurosurgery. Only 9.5% (19) believed they had sufficient opportunities to participate in neurology-related activities outside the academic curriculum.

Figure 2 summarizes the importance given by students who have already completed the neuroscience courses (fourth and sixth year) to different measures proposed to improve the quality of teaching. Both groups do not show statistically significant differences between them, except in the utility of more digital resources (40.7% in fourth vs. 19.5% in sixth, $p$ = 0.002). The initiatives that at least 50% of these 200 students considered fundamental or very useful were (score 4 or 5 on a Likert scale): more or better practices (89.5%, 179), lectures to large groups (60.5%, 121) and seminars or workshops to small groups (55.0%, 110).

Of the 320 students, 59.7% (191) consider the training in neurology and its related areas within the Universidad de Zaragoza medical curriculum to be sufficient. 34.4% (110) consider it scarce, and 5.9% (19) excessive, as shown in the table.

If we compare the perception of neurology with respect to other medical specialties among students who have already studied all these subjects (fourth and sixth year), our specialty is, together with cardiology, the one that arouses the greatest interest ($p$ < 0.001). At the same time, neurology is independently the one with the greatest perceived difficulty ($p$ < 0.001). When asked about the confidence in making a diagnosis, neurology, together with hematology and nephrology, showed the least confidence ($p$ < 0.05). We did not find consistent significant differences in the perceived safety when performing an examination, except when comparing the difficulty of neurology versus pneumonology ($p$ < 0.05). Figure 3 represents all the results in this regard between cardiology, endocrinology, gastroenterology, hematology, nephrology, neurology, pneumonology and psychiatry. Figure 4 comprehensively represents the 4 specialties that aroused the greatest interest among the respondents: neurology, cardiology, pneumonology and gastroenterology.

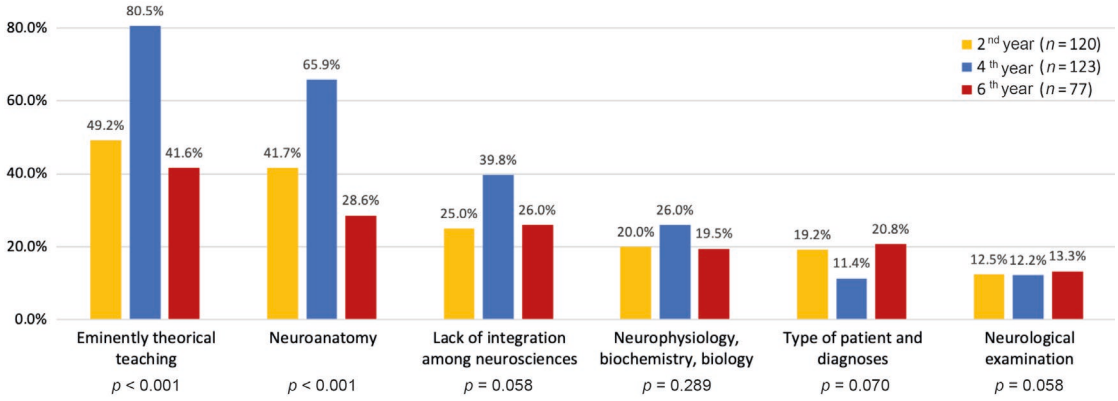
Lastly, only 100 out of the 320 students (31.2%) felt confident or very confident they knew what

**Table.** Results obtained during the academic years 2020-21 and 2021-22 about the perception of neurosciences among undergraduate students of the medical degree at our university, globally and separated by courses (second, fourth and sixth).

| | Total ($n$ = 320)[c] | Medical degree years at the Universidad de Zaragoza | | | $p$ |
|---|---|---|---|---|---|
| | | 2nd ($n$ = 120) | 4th ($n$ = 123) | 6th ($n$ = 77) | |
| Age, M (IQR) | 21 (20-23) | 20 (19-20) | 21 (21-21) | 23 (23-24) | <0,001*† |
| Exposure to neurological diseases, *n* (%) | 156 (51.6%) | 54 (45.0%) | 64 (52%) | 47 (61%) | 0.089 |
| Choice of neurology or related for ST[a]. *n* (%) | 103 (32.2%) | 28 (23.3%) | 53 (43.1%) | 22 (28.6%) | 0.003*† |
| Fear or rejection to neurology[b]. *n* (%) | 109 (34.1%) | 35 (29.2%) | 55 (44.7%) | 19 (24.7%) | 0.005*† |
| Poor knowledge[b], *n* (%) | | | | | |
| Neuroanatomy | 130 (40.6%) | 35 (29.2%) | 55 (44.7%) | 40 (51.9%) | 0.003* |
| Histology | 129 (40.3%) | 44 (36.7%) | 38 (30.9%) | 47 (61%) | < 0.001† |
| Neurophysiology | 113 (35.3%) | 32 (26.7%) | 43 (35%) | 39 (50.6%) | 0.002† |
| Semiology | 30 (15%) | NA | 20 (16.3%) | 10 (13%) | 0.528 |
| Neurological pathophysiology | 84 (42%) | NA | 63 (51.2%) | 21 (27.3%) | 0.001† |
| Differential diagnosis | 77 (38.5%) | NA | 59 (48%) | 18 (23.4%) | 0.001† |
| Pharmacology | 75 (37.5%) | NA | 55 (44.7%) | 20 (26%) | 0.008† |
| Teaching in neurosciences, *n* (%) | | | | | |
| Scarce | 87 (43.5%) | NA | 42 (34.1%) | 45 (58.4%) | 0.001† |
| Sufficient | 101 (50.5%) | NA | 71 (57.7%) | 30 (39%) | 0.01† |
| Excessive | 12 (6%) | NA | 10 (8.1%) | 2 (2.6%) | 0.134 |
| No NRL-NRSx clinical practice, *n* (%) | 103 (53%) | NA | 82 (66.7%) | 24 (31.2%) | <0.001† |
| Additional acces to neurociences, *n* (%) | 19 (9.5%) | NA | 14 (11.4%) | 5 (6.5%) | 0.251 |

Total $p$-values are shown, along with superscripts * and † when differences among groups are found: between the second and fourth (*) and/or between the fourth and sixth (†). IQR: interquartile range; M: median; NA: not applicable; NRL-NRSx: neurology-neurosurgery; ST: specialty training. [a] Response 4-5 on Likert scale (high or very high). [b] Response 1-2 on Likert scale (very low or low). [c] The total sample reported is 320 unless second year medical students are excluded as part of the preclinical course, in which case it would be 200.

**Figure 1.** Reasons identified by students of the degree of Medicine of the Universidad de Zaragoza as the cause of their difficulties, fear or aversion to neurology. Bar chart distributed by course, with multiple choice answers. Below each of the six options, and in italics, the p-value of the comparison between clinical courses (fourth and sixth year) is shown, calculated using two proportions Z-test.




neurologists do in their daily practice. The distribution by year was 16.6% in the second year, 38.2% in the fourth year, and 42.9% in the sixth year.

## Discussion

Our research is one of the firsts to analyze the perception towards neuroscience among medical students in continental Europe [12-15], and the first one in the Spanish university system. It shows that 'neurophobia' also exists outside the Anglo-Saxon system.

In our case, 34.1% of respondents felt a high or very high level of fear or rejection towards neurology. What could be something inherent to the way a student faces any medical specialty, it is set apart when we compare neurology against the rest of them. Students perceived neurology as more difficult than all other subjects, i.e. cardiology, endocrinology, gastroenterology, hematology, nephrology, pneumonology and psychiatry. In turn, they find neurology among the most interesting subjects. The ability to perform the physical exam or make a diagnosis does not seem to be a determining aspect of complexity compared to other specialties among our students, although there was a tendency towards statistical significance.

These data give us a first answer to why we speak of 'neurophobia' and not 'cardiophobia' or 'gastrophobia'. However, what are these fears due to? Our results support Prof. Jozefowicz's initial definition in which he summarized this term as the 'fear of the neural sciences and clinical neurology that is due to the students' inability to apply their knowledge of basic sciences to clinical situations' [1]. The three main causes highlighted by Universidad de Zaragoza's students are an eminently theoretical teaching (59.4%), neuroanatomy (47.8%) and a lack of integration in the study of the nervous system between the preclinical and clinical cycle (30.9%). It is worth noting the greater weight given to these aspects by students in the fourth year, when neurology is taught.

Neurologists themselves sometimes believe that it is neurology itself, with its ominous diagnoses and its theoretical lack of modifying treatments, what causes this fear or rejection. However, the problem seems to rather lie in the teaching methodology used, and the division between basic and clinical neurosciences, as Prof. Poser already elucidated in 1959 [2]. Our own students offer as the main solution an increase in clinical practices (89.5%), taking into account that up to 31.2% of them finish their degree without having done any internship in neurology or neurosurgery. This is followed by better large group lectures (60.5%) and a higher number of workshops or seminars (55.0%), without identifying better online resources or textbooks as significantly useful.

At the Universidad de Zaragoza's Degree of Medicine, of the 360 ECTS, approximately 22 correspond to neurosciences, distributed in first (embryology and histology), second (neuroanatomy with 9 ECTS, neurophysiology and semiology) and fourth year (clinical neurology with 4.5 ECTS). In our case, there is no compulsory supervised intern-

**Figure 2.** Weight given by students of the Universidad de Zaragoza who have already taken all the neuroscience subjects (fourth and sixth) to different measures proposed to improve teaching. Stacked frequency diagram of the responses on a Likert scale from 5 (would be fundamental) to 1 (would not contribute).

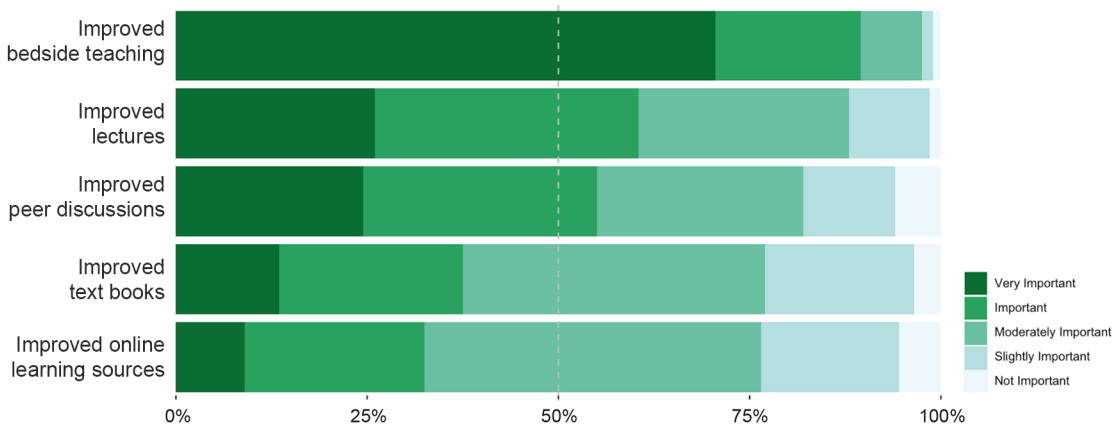



**Figure 3.** Bar chart of the perception of fourth- and sixth-year students of the Medicine degree of the Universidad de Zaragoza (UZ) regarding the different medical specialties in terms of interest in the subject (a), perceived difficulty (b), confidence in making a diagnosis (c) and comfort in performing a focused physical exam (d). Mean score of responses on a Likert scale from 1 to 5. A comparison of neurology versus cardiology, endocrinology, gastroenterology (gastro), hematology, nephrology, pneumonology, neurology and psychiatry is provided; identifying with (*) when the *p* value is <0.05 versus neurology. The *p* value was calculated using the Mann-Whitney test between each pair of groups with significance correction.

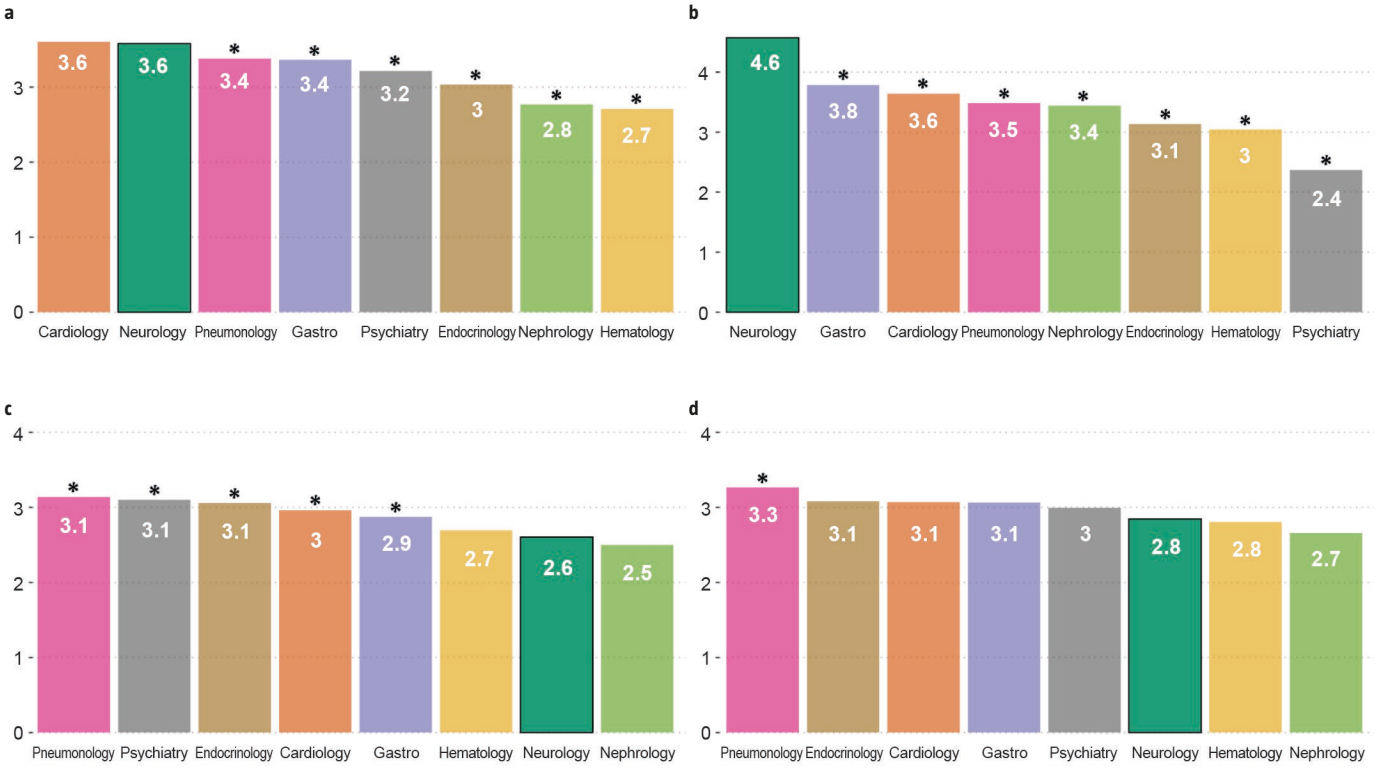


**Figure 4.** Radar plot of the four subjects that arouse the greatest interest and difficulty (neurology, cardiology, pneumonology and digestive) among fourth- and sixth-year medical students at the Universidad de Zaragoza. The mean response score is represented on a Likert scale from 1 to 5, with respect to the questions on: interest in the subject (interest), probability of choosing it for specialized training (choice), confidence in making a diagnosis (diagnosis), comfort in performing a physical exam (examination) and overall perceived difficulty (difficulty).


ship for neurology or neurosurgery. However, determining the number of hours necessary for a proper learning of the nervous system is challenging. To date, a statewide map of neurology teaching in our country is not available to explore possible heterogeneities among faculties. 59.7% of our surveyed students consider the teaching load offered by the Universidad de Zaragoza sufficient, but this percentage decreases as students approach the end of the degree, with 58.4% of sixth-year students considering it scarce. Perhaps the academic load is adequate, but an approach based on clinical practice and greater integration between all related subjects is needed [4,5,11,12].

Comparison with previous researches is limited given the existing variability in the approach and analysis of 'neurophobia'. As for its prevalence among undergraduate students, some studies estimate it to be around 50% [9,16], which is significantly higher than the perception of our students (34.1%), much closer to others [12,17,18]. The only previous experience in our country, a written communication at the 2019 Annual Meeting of the Spanish Society of Neurology (SEN), found that 84.4% of surveyed medical students at the Universidad de Extremadura perceived neurology as very complex, but without specifically asking about the feeling of fear, respect or rejection [19]. In our case, there was also a significant decrease in fear or rejection of neurology among the clinical academic years, from 44.7% in the fourth year to 24.7% in the sixth year, which goes hand in hand with a better perception of their general knowledge of neurological pathology, their ability to make a differential diagnosis and pharmacology, but not of the basic neural sciences. Regardless, the fact that a quarter of the students finish their medical degree with a sense of fear towards neurology is still noteworthy.

If we examine the reason for this apprehension, some studies show the physical exam and diagnosis of neurological diseases as a limiting factor for students [7,9,11,20]. We did not find similar compelling results among our students, although there is a trend in this regard. Nevertheless, what most groups agree on is to identify as a major problem the teaching methodology used and the integration of basic neurosciences with the clinical cycle, being of special concern for the students their knowledge of neuroanatomy or neurophysiology. A study at the Universidade Federal do Pará (Brazil) observed how these concerns increase as the end of the undergraduate degree approaches, in a similar way to our results [11]. However, concern for neuroanatomy among resident physicians seems to be a less important factor in terms of perceived difficulty to our specialty, with the practical application of knowledge remaining a priority [21].

All these findings raise the following question: is a meticulous thorough knowledge of the basic neural sciences necessary for the daily practice of neurology? The very term 'neurophobia', as 'irrational fear', may shift the burden of blame to the ones who suffer it. But, as we are witnessing, it is mostly the way of teaching, and therefore, lecturers, who could be the main culprits of this phenomenon. In this sense, neurologists would be part of the problem, but at the same time part of the solution. Most studies conclude that it would be a priority to restructure the current neuroscience curriculum, offering more applied teaching and a more practical component from the early stages of undergraduate studies [4,8,11,12,22]. For this task, clinicians should be crucial.

These strategies could allow us to bring neurology effectively closer to medical students, at a time when the number of Schools of Medicine and specialty training places in our country is on the rise [23]. Globally, neurological diseases are the leading cause of disability-adjusted life years lost and the second leading cause of mortality [24]. Therefore, although most of these future physicians will not end up as neurologists or neurosurgeons, they will have to deal with neurological problems on numerous occasions throughout their professional careers. With education as a fundamental tool for change [25], it is appropriate to recall for this task what Prof. Poser pointed out more than half a century ago: 'instructors would do well to stress that neurology is no longer a narrow, descriptive, almost esoteric branch of medicine' [2].

## Limitations

The main limitations of the study are those inherent to the use of self-administered surveys. The questionnaires were sent through the student representatives, following the usual university channels, but it is not possible to ensure with absolute certainty who answered them, nor the degree of information or educational commitment at the time of answering. This weakness is shared by works with similar collection methodologies, although in our case we collected the student's personal identification number, pseudonymized for the subsequent analysis, which makes it easier to ensure the target population.

The response rate (29.6% of the total number of possible subjects) would be another limitation. In our case, it could be related to the method used to send the survey, since previous studies estimate a response rate by e-mail of between 25-30% [7,18, 26]. However, our aim was to reduce possible cognitive bias in the responses, separating them from teaching activity and the evaluation process. Therefore, in order to increase the sample size, we decided to perform a joint analysis of the 2020-2021 and 2021-2022 academic years, after verifying a similar response rate and the absence of any curricular changes. Teaching methods and practical training Education during the period analysed was not affected by the SARS-CoV-2 pandemic. The only year that was directly involved in our university was the academic year 2019-2020.

It should be last pointed out that as a single-center study, the possibility of generalizing these results to the Spanish and therefore, continental university system as a whole, is limited. Although it is in line with previous findings [19], further studies on the perception of neuroscience or the heterogeneity of its teaching in the European faculties could be of great interest before addressing major changes in the curricula.

## Conclusion

Our research shows that up to one third of medical students at a Spanish university suffer from neurophobia. Considering this and some previous studies, we conclude that this feeling is not exclusive to the Anglo-Saxon university system; and the teaching methodology plays a fundamental role. It could be said that the problem in the 'synapse' of neurological training does not seem to reside in the axon or the dendrites, but in the synaptic cleft and the neurotransmitters. To address this, a neuroscience education focused on daily clinical practice is essential. More than half of the students finish their studies without clearly knowing what a neurologist does, despite the interest that our specialty awakens in them compared to other medical specialties. In this sense, neurologists have the opportunity, but also the responsibility, to get involved in university teaching from the earliest stages of the degree in order to break down stereotypes and offer better training to future physicians.

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**Appendix.** Self-administered survey using the Google Forms, within the Google Workspace for Education of Universidad de Zaragoza. Original version in Spanish.

Perception of neurosciences among medical students

1. Age: numerical response without decimals.
2. Year: second/fourth/sixth.
3. Have you done an internship in neurology or neurosurgery before? Yes/no.
4. Have you had direct contact with neurological diseases, in your own person, family or very close friend, that you have had to care for or support? Yes/no.
5. Would you choose neurology or other related specialties (neurosurgery, psychiatry, clinical neurophysiology) as your postgraduate area of specialization? Likert scale from 1 (unlikely) to 5 (very likely).
6. What is your perception of your knowledge in neurosciences? Likert scale from 1 (very low) to 5 (very high) for each of the following areas: a) neuroanatomy; b) neurophysiology, biochemistry, biology; c) histology and pathology; d) semiology; e) neurological diseases; f) differential diagnosis; g) pharmacology.
7. What is your level of fear or rejection towards neurology? Likert scale from 1 (very low) to 5 (very high).
8. To what would you attribute your fears, difficulties or rejection towards neurology? Multiple choice answer: a) neuroanatomy; b) neurophysiology, biochemistry, biology; c) integration of the teaching of neuroscience subjects; d) eminently theoretical teaching; e) neurological examination; f) type of patient and diagnoses; and g) others.
9. Do you think that teaching in neurology and related areas is sufficient? Scarce/sufficient /too much.
10. How do you think the following aspects would affect the improvement of teaching in neurology? Likert scale from 1 (would not contribute) to 5 (would be critical) for each of the following options: more or better online resources, more or better text materials, more or better lectures, more or better clinical practice, more or better seminars/workshops/small groups.
11. Do you have enough opportunities to participate in neurology-related activities outside the academic curricula (extracurricular internships, workshops, conferences, etc.)? Yes/no.
12. Are you aware of what a neurologist does on a day-to-day basis? Likert scale from 1 (very unclear) to 5 (very clear).

Neurology in relation to other medical areas

We would like to know your opinion of the different medical specialties that you deal with during your degree.

13. What is your personal interest in the subject? Likert scale from 1 (very low) to 5 (very high) for each of the following subjects: cardiology, endocrinology, gastroenterology, hematology, nephrology, pneumonology, neurology, psychiatry.
14. How difficult do you think this subject is for the students? Likert scale from 1 (very easy) to 5 (very difficult) for each of the following subjects: cardiology, endocrinology, gastroenterology, hematology, nephrology, pneumonology, neurology, psychiatry, psychiatry, neurology, neurology, psychiatry.
15. How comfortable do you feel when examining a patient with a problem of this type? Likert scale from 1 (very uncomfortable) to 5 (very comfortable) for each of the following subjects: cardiology, endocrinology, gastroenterology, hematology, nephrology, pneumonology, neurology, psychiatry.
16. How confident do you feel about the diagnosis of a patient with a problem of this type? Likert scale from 1 (very uncertain) to 5 (very certain) for each of the following: cardiology, endocrinology, gastroenterology, hematology, nephrology, pneumonology, neurology, psychiatry.
17. How likely are you to choose these subjects as your postgraduate specialization? Likert scale from 1 (very low) to 5 (very high) for each of the following subjects: cardiology, endocrinology, gastroenterology, hematology, nephrology, pneumonology, neurology, psychiatry.

## Neurofobia entre los estudiantes de medicina de una universidad española: experiencias más allá de la anglosfera

**Introducción.** Definimos neurofobia como el miedo a las neurociencias y la neurología clínica, fundamentalmente asociado a la falta de capacidad del estudiante para aplicar sus conocimientos teóricos. Esta sensación, bien contrastada en el sistema anglosajón, ha sido poco estudiada en otros territorios europeos y nunca en nuestro país. Nuestro objetivo es analizar si este miedo hacia la neurología también existe entre estudiantes de una universidad española.

**Material y métodos.** Estudio mediante encuestas autoadministradas a estudiantes de segundo, cuarto y sexto año de medicina de la Universidad de Zaragoza durante los cursos académicos 2020-2021 y 2021-2022. Cuestionario de 18 preguntas que recoge la percepción hacia la neurología y el resto de las neurociencias y su comparación con respecto a otras especialidades médicas.

**Resultados.** De los 320 encuestados, el 34,1% sufriría neurofobia y tan sólo el 31,2% tendría claro a qué se dedica un neurólogo. A pesar de ser la especialidad considerada más difícil, es también la que mayor interés despierta. Los principales motivos para ese miedo son una enseñanza eminentemente teórica (59,4%), la neuroanatomía (47,8%) y una falta de integración entre las asignaturas de neurociencias (39,5%). Las soluciones consideradas de mayor peso por los alumnos para revertir esta situación irían en esa línea.

**Conclusiones.** La neurofobia es también un problema en la formación universitaria española. Identificada la metodología docente como una de sus causas fundamentales, los neurólogos tenemos la oportunidad y la obligación de intentar revertir esta situación. Para ello, será necesario participar activamente en la formación de los futuros médicos desde las etapas más tempranas del grado.

**Palabras clave.** Docencia. Educación médica. Estudiantes de medicina. Neurofobia. Neurología clínica. Universidad.