



Research Article

Perception of Neurosurgery Teaching by Medical Students at the Faculty of Health Sciences, University of Lomé, Togo

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ARTICLE INFO

Keywords:

Perception
neurosurgery
medical students
Faculty of Health Sciences
Togo

ABSTRACT

Objective: To assess the perception of neurosurgery education among medical students at the Faculty of Health Sciences (FSS) of the University of Lomé (UL) in 2024.

Method: This was a cross-sectional study with prospective data collection conducted from February 1 to March 31, 2024. The parameters studied included demographic characteristics, neurosurgery education, and students' perception of this specialty.

Results: The participation rate was 72.52%, with a male predominance (sex ratio = 2.76). The average age of the students was 25.37 ± 1.12 years. Among the 256 students surveyed, 84.77% reported understanding the neurosurgery course, and 23.83% had completed an internship in this specialty. Additionally, 39.06% of the participants expressed a desire to pursue a career in neurosurgery. The primary motivating factors for this choice were intellectual challenge (21.38%), inspiration from a role model (17.24%), and understanding of the course (11.72%).

Conclusion: Neurosurgery education at FSS-UL is generally well-perceived by students. However, additional efforts are needed to enhance the attractiveness of this specialty and encourage more vocations.

1. Introduction

Neurosurgery is a surgical specialty that focuses on diseases of the nervous system. It requires advanced technical skills and rigorous training [1]. Globally, the number of neurosurgeons remains insufficient to meet the growing needs of the population [2, 3]. This shortage is even more pronounced in resource-limited countries. In 2016, there were 369 neurosurgeons in sub-Saharan Africa, representing a ratio of one neurosurgeon for every 2.5 million inhabitants [4]. In 2018, Nigeria had 75 neurosurgeons for a population of over 180 million inhabitants [5]. In Togo, by 2024, eight neurosurgeons served a population of eight million. As a result, in these low-resource countries, millions of neurosurgical cases go untreated each year [6, 7].

This shortage can be partly explained by medical students' low interest in neurosurgery. Indeed, students' perception of a discipline, shaped by its teaching, plays a crucial role in their career choices [8]. In the United Kingdom, neurosurgery is generally well regarded [6]. This is not true

in Ireland [7] and Nigeria [5]. In Togo, no data are available on medical students' perceptions of neurosurgery teaching. Therefore, we decided to carry out this study by asking the following question. How do medical students perceive neurosurgery teaching at the University of Lomé?

The main objective was to assess the perception of neurosurgery education among medical students at the Faculty of Health Sciences of the University of Lomé (FSS-UL) in 2024. The objectives were to evaluate neurosurgery teaching and identify the factors influencing the choice of neurosurgery as a future specialty.

2. Methods

We conducted a cross-sectional study with prospective data collection at the Faculty of Health Sciences of the University of Lomé (FSS-UL) in Togo from February 1 to March 31, 2024. The FSS-UL trains students in medicine, pharmacy, and dentistry following the Bachelor-Master-Doctorate (LMD) system. Neurosurgery courses are taught in the fifth

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year of the Master 2 program. Surgical internships are conducted during the second year of the bachelor's program (third year), the first year of the master's program (fourth year), and the second year of the doctorate program (fifth year).

2.1. Study Population

Our study population consisted of 6th-, 7th-, and 8th-year students from FSS-UL who had already attended the neurosurgery course and completed at least one surgical or neurosurgical internship.

2.2. Inclusion Criteria

All students regularly enrolled in the Doctorate of Medicine program at FSS-UL who consented to participate in the study and validated the neurosurgery module taught in the fifth year were included.

2.3. Exclusion Criteria

Students who did not answer all the questions were excluded.

2.4. Variables Studied

The study variables included:

- Demographic data: year of study, age, gender, marital status, nationality, surgical history, and the presence of family members working as surgeons.
- Evaluation of neurosurgery education (lectures and internships) using a Likert scale (Annex 1).

- Perception of neurosurgery as a specialty was also assessed using a Likert scale (Annex 1).

2.5. Data Collection and Analysis

Data were collected using a self-administered online questionnaire via KoBo Collect (version 2.024.2.4) and analyzed with Jamovi software (version 1.6.3). A univariate analysis was performed, followed by statistical tests (Chi-square test and Fisher's exact test) with a significance level of 5%, to examine the influence of various factors on the choice of specialty.

2.6. Ethical Considerations

Approval from the Ethics Committee of FSS-UL was obtained. All participants gave verbal consent. Anonymity and confidentiality of responses were guaranteed.

3. Results

3.1. Participation and Demographic Data

Of 353 regularly enrolled students, 256 responded to the questionnaire, yielding participation rate of 72.52%. The average age of the participants was 25.37 ± 2.12 years, with a range of 22 to 31 years. Males represented 73.44% of the respondents, with a sex ratio of 2.76. The distribution by year of study showed higher participation in the 8th year (Table 1). Among the respondents, 18 students (7.03%) were married. Fifty-seven students (36.33%) had a surgical history, of which 28.91% were personal and 7.42% were familial. Fourteen students (5.47%) had at least one family member who was a surgeon.

TABLE 1: Distribution of students by year of study.

Year of Study	Number	Percentage (%)
6th Year	89	34.77
7th Year	74	28.91
8th Year	93	36.33
Total	256	100

TABLE 2: Assessment of the neurosurgery course.

Items	Yes n (%)	No n (%)
Understood the neurosurgery course	217 (84.77)	39 (15.23)
Course adapted to prior knowledge	183 (75.39)	63 (24.61)
Content satisfactory for professional and educational guidance	182 (71.09)	74 (28.91)
Dynamic delivery of the course	205 (80.08)	51 (19.92)
Teachers are available	222 (86.72)	34 (13.28)
The course is difficult	57 (22.27)	199 (77.73)

3.2. Perception of Neurosurgery

3.2.1 Lectures and Internships

Table 2 shows that 84.77% of students understood the neurosurgery course, and 71.09% found its content satisfactory for their professional orientation. Only 23.83% of students completed a neurosurgery

internship. Additionally, 57.03% of students believed that it should be mandatory.

3.2.2. Discouraging Factors for Choosing Neurosurgery as a Specialty

The poor prognosis of neurosurgical conditions (61.72%) was the leading factor discouraging students from choosing neurosurgery as a future specialty, followed by its difficulty (57.81%) (Table 3).

3.2.3. Motivating Factors for Choosing Neurosurgery as a Specialty

Fifty students (19.53%) expressed an interest in specializing in neurosurgery. As shown in (Table 3), the main motivating factors were the intellectual challenge (21.38%), inspiration from a role model (17.24%), and the potential for an academic career in neurosurgery (14.48%).

TABLE 3: Factors discouraging the choice of neurosurgery as a specialty.

Factors	Percentage (%)
Poor prognosis of neurosurgical conditions	61.72
Neurosurgery is a problematic specialty	57.81
Neurosurgery is not profitable	52.73
Neurosurgery is depressing	11.33

3.2.4. Areas for Improvement in Neurosurgery Education

The principal suggested improvements in neurosurgery education were the presentation of practical case studies during lectures (27.34%) and

the creation of a Diploma of Specialized Studies (DES) in neurosurgery, as proposed by 21.09% of students (Table 4).

TABLE 4: Areas to improve in neurosurgery teaching.

Suggestions	Number	Percentage (%)
Presentation of practical cases during lectures	70	27.34
Creation of the Diploma of Specialized Studies (DES) in Neurosurgery	54	21.09
Radiological image interpretation sessions	42	16.41
Tutorials sessions	32	12.25
Increase lecture hours	26	10.16
Neurosurgical semiology lectures	19	7.42
No suggestions	13	5.08
Total	256	100

TABLE 5: Factors influencing the choice of neurosurgery as a future specialty.

Variables	Neurosurgery Choice Yes n (%)	Neurosurgery Choice No n (%)	Chi² / Fisher	p-value
Age (years)				
< 25	20 (40)	75 (36.41)	0.22	0.64
≥ 25	30 (60)	131 (63.59)		
Gender			0.21	0.65
Female	12 (24)	56 (27.18)		
Male	38 (76)	150 (72.82)		
Year of Study			Fisher Exact	0.01
6th Year	26 (52)	63 (30.58)		
7th Year	13 (26)	61 (29.61)		
8th Year	11 (22)	82 (39.81)		
Marital Status			0.4925	0.74
Single	45 (90)	182 (88.35)		
Married	5 (10)	24 (11.65)		
A family member is a surgeon.			Fisher Exact	1
Yes	2 (4)	12 (5.83)		
No	48 (96)	194 (94.17)		
Understanding of the neurosurgery course			Fisher Exact	0.05
Good	47 (94)	170 (82.52)		
Poor	3 (6)	36 (17.48)		
Neurosurgery Internship			2.28	0.13

Yes	16 (32)	45 (21.84)
No	34 (68)	161 (78.16)

3.2.5. Factors Influencing the Choice of Neurosurgery Specialization

The year of study and understanding of the course had a significant impact on the decision to pursue neurosurgery as a future specialty (Table 5).

4. Discussion

4.1. Study Limitations and Biases

Not all students participated in the study, with a participation rate of 72.52%. However, this rate is higher than those reported by Ekenze [8] in Nigeria (70.3%) and Boyle [9] in Ireland (66.4%). Moreover, this was a single-center study. Togo has two health sciences faculties; therefore, our results cannot be generalized to the entire country. The study describes the perception of neurosurgery education over a short period. Nonetheless, it helped highlight modifiable factors influencing the choice of neurosurgery as a future specialty. Longitudinal studies could better evaluate temporal dynamics and help adapt strategies over time.

4.2. Demographic Data

The average age of students (25.37 years) is comparable to that reported by Balogun in Nigeria (24.9 years) [5], but higher than that of Akhigbe in Ireland (23 years) [7]. We observed a male predominance (sex ratio = 2.76) in our study. This male dominance may be due to difficulties in accessing education and challenges for girls in pursuing scientific studies in resource-limited countries. This observation was also reported in Togo by Geraldo [10] and in Nigeria by Balogun [5], with sex ratios of 2.55 and 1.41, respectively. In contrast, in high-resource countries, changing social attitudes, equal opportunities, and more flexible working conditions have led to a feminization of the medical field [9]. Therefore, promoting women's access to education and raising awareness about opportunities in neurosurgery are crucial for achieving gender balance.

4.3. Perception of Neurosurgery Education

Most students (84.77%) understood the neurosurgery course at FSS-UL. This rate is higher than that reported by Balogun [5] in Ibadan, Nigeria, where only 64.5% of students demonstrated an understanding of the course. This difference may be attributed to the adaptation of course content to students' prior knowledge (75.39%) and the use of dynamic teaching methods (80.08%) (Table 2). However, there was a demand for more tutorials (12.25%) and practical clinical cases (27.34%) (Table 4). Enhancing the curriculum with more interactive and practical sessions is necessary [8, 11].

The low percentage of students who completed a neurosurgery internship (23.83%) contrasts with rates in the United Kingdom (69.19%) [6] and Nigeria (96.1%) [5]. Negative perceptions of neurosurgery (61.72%) due to the poor prognosis of neurosurgical conditions may deter students from pursuing internships in the field [5,

12]. Only 57.03% of FSS-UL students expressed a desire to complete a neurosurgery internship. Similarly, 55% of students in Saudi Arabia declined this internship [12]. Highlighting therapeutic advances during lectures could help change this perception and motivate students.

4.4. Desire to Specialize in Neurosurgery

Only 19.53% of students considered specializing in neurosurgery, which is lower than the 35% reported by Balogun [5]. As students progress through their studies, this declining interest may be attributed to exposure to other specialties [13]. Establishing a Diploma of Specialized Studies (DES) in neurosurgery at FSS-UL and developing mentorship programs early in medical education could strengthen student interest and support career orientation. Motivating factors, such as intellectual challenge, inspiration from a role model, and the prospect of an academic career (Table 5), should be emphasized [12, 14-16]. Improving neurosurgeons' salaries and benefits could also make the specialty more attractive, as observed in the United Kingdom [17].

5. Conclusion

Neurosurgery education at the Faculty of Health Sciences of the University of Lomé (FSS-UL) is generally well-perceived by medical students. However, the low rate of neurosurgery internships and the negative perception of the specialty due to the poor prognosis of neurosurgical conditions remain challenges. Additional efforts are needed to make the specialty more attractive. This could be achieved by enhancing practical sessions, introducing a Diploma of Specialized Studies (DES) in neurosurgery, developing mentorship programs, and improving working conditions for neurosurgeons. Such measures could foster more vocations among medical students.

Author Contributions

D.A.K. conceived the study, performed data collection, analysis, and interpretation, and drafted and revised the manuscript. Q.K., B.R., and K.E. reviewed the manuscript. All authors have read and approved the final manuscript.

Funding

None.

Availability of Data and Materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics Approval and Consent to Participate

This study was approved by the Commission Éthique de la Faculté des Sciences de la Santé, Ref. No.: 0101/2024/CE-FSS/19/01.

Consent for Publication

Not applicable.

Competing Interests

None.

Acknowledgements

Not applicable.

ANNEX 1: Likert scale for evaluating neurosurgery teaching and perception.

Item	Scale
I understood the neurosurgery course content	1 = Not satisfactory at all 2 = Slightly satisfactory 3 = Satisfactory 4 = Very satisfactory
The course was well adapted to my prior knowledge	1 = Not satisfactory at all 2 = Slightly satisfactory 3 = Satisfactory 4 = Very satisfactory
The course was delivered dynamically	1 = Not satisfactory at all 2 = Slightly satisfactory 3 = Satisfactory 4 = Very satisfactory
The course content was satisfactory for my professional and educational guidance	1 = Not satisfactory at all 2 = Slightly satisfactory 3 = Satisfactory 4 = Very satisfactory
Teachers were sufficiently available to answer questions	1 = Strongly disagree 2 = Disagree 3 = Agree 4 = Strongly agree
The neurosurgery courses were difficult to assimilate	1 = Strongly disagree 2 = Disagree 3 = Agree 4 = Strongly agree
Have you completed a neurosurgery internship?	Yes / No
The neurosurgery internship should be mandatory	1 = Strongly disagree 2 = Disagree 3 = Agree 4 = Strongly agree
Neurosurgery is an interesting specialty	1 = Strongly disagree 2 = Disagree 3 = Agree 4 = Strongly agree
Neurosurgery is a depressing specialty	1 = Strongly disagree 2 = Disagree 3 = Agree 4 = Strongly agree

References

[1] Christopher D Witiw, Vinitra Nathan, Mark Bernstein “Economics, Innovation, and Quality Improvement in Neurosurgery.” *Neurosurg Clin N Am*, vol. 26, no. 2, pp. 197-205, 2015. View at: [Publisher Site](#) | [PubMed](#)

[2] Michael C Dewan, Abbas Rattani, Graham Fieggan, et al. “Global Neurosurgery: The Current Capacity and Deficit in Providing Essential Neurosurgical Care. Executive Summary of the Global Neurosurgery Initiative at the Program in Global Surgery and Social Change.” *J Neurosurg*, vol. 130, no. 4, pp. 1055-1064, 2018. View at: [Publisher Site](#) | [PubMed](#)

- [3] Maria Punchak, Swagoto Mukhopadhyay, Sonal Sachdev, et al. "Neurosurgical Care: Availability and Access in Low-Income and Middle-Income Countries." *World Neurosurg*, vol. 112, pp. e240-e254, 2018. View at: [Publisher Site](#) | [PubMed](#)
- [4] A El Khamlichi "African neurosurgery: current situation, priorities, and needs." *Neurosurgery*, vol. 48, no. 6, pp. 1344-1347, 2001. View at: [Publisher Site](#) | [PubMed](#)
- [5] James A Balogun, Ayodeji M Adebayo "Perception and willingness to pursue a career in neurosurgery among final-year medical students in Ibadan, Nigeria." *World Neurosurg*, vol. 126, pp. e998-e1004, 2019. View at: [Publisher Site](#) | [PubMed](#)
- [6] Yiannis Skarparis, Callum A Findlay, Andreas K Demetriades "The Teaching of Neurosurgery in UK Medical Schools: A Message from British Medical Students." *Acta Neurochir (Wien)*, vol. 158, no. 1, pp. 27-34, 2016. View at: [Publisher Site](#) | [PubMed](#)
- [7] Taiwo Akhigbe, Mohammad Sattar "Attitudes and perceptions of medical students toward neurosurgery." *World Neurosurg*, vol. 81, no. 2, pp. 226-228, 2014. View at: [Publisher Site](#) | [PubMed](#)
- [8] S O Ekenze, F O Ugwumba, U M Obi, et al. "Undergraduate Surgery Clerkship and the Choice of Surgery as a Career: A Perspective from a Developing Country." *World J Surg*, vol. 37, no. 9, pp. 2094-2100, 2013. View at: [Publisher Site](#) | [PubMed](#)
- [9] E Boyle, D Healy, A D K Hill, et al. "Career Choices of Today's Medical Students: Where Does Surgery Rank?" *Ir J Med Sci*, vol. 182, no. 3, pp. 337-343, 2013. View at: [Publisher Site](#) | [PubMed](#)
- [10] Raouf Fayisall Geraldo, Boyodi Tchangai, Efoe-Ga Yawod Amouzou, et al. "Perception and criteria for selecting surgical specialization among medical students at the Faculty of Health Sciences, University of Lomé, Togo." *Eur Sci J*, vol. 16, no. 9, pp. 261, 2020. View at: [Publisher Site](#)
- [11] Kevin E Liang, Ilia Bernstein, Yoko Kato, et al. "Enhancing neurosurgical education in low- and middle-income countries: current methods and new advances." *Neurol Med Chir (Tokyo)*, vol. 56, no. 11, pp. 709-715, 2016. View at: [Publisher Site](#) | [PubMed](#)
- [12] Nayef Ghasham AlQahtani, Turki Alhumaid, Khalid Almazyad, et al. "Attitudes and perceptions of medical students toward neurosurgery as a career, Riyadh, Saudi Arabia." *Egypt J Hosp Med*, vol. 73, no. 1, pp. 5935-5939, 2018. View at: [Publisher Site](#)
- [13] Sami F Almalki, Abdulelah S Almousa, Abdullah K Alarfaj, et al. "Factors Shaping Medical Students' Intentions Toward Neurosurgery: A Cross-Sectional Study." *Cureus*, vol. 15, no. 12, pp. e51107, 2023. View at: [Publisher Site](#) | [PubMed](#)
- [14] Jacquelyn K O'Herrin, Barbara J Lewis, Layton F Rikkens, et al. "Why do students choose careers in surgery?" *J Surg Res*, vol. 119, no. 2, pp. 124-129, 2004. View at: [Publisher Site](#) | [PubMed](#)
- [15] Georgios Solomou, Ashwin Venkatesh, Waqqas Patel, et al. "A career in neurosurgery: perceptions and the impact of a national SBNS/NANSIG neurosurgery careers day." *Br J Neurosurg*, vol. 36, no. 5, pp. 620-626, 2022. View at: [Publisher Site](#) | [PubMed](#)
- [16] Olaoluwa Ezekiel Dada, Setthasorn Zhi Yang Ooi, George William Bukenya, et al. "Evaluating the Impact of Neurosurgical Rotation Experience in Africa on Medical Students' Interest and Perception of a Career in Neurosurgery: A Multicenter, Cross-Sectional, Continental Study." *Front Surg*, vol. 9, pp. 766325, 2022. View at: [Publisher Site](#) | [PubMed](#)
- [17] Charlotte Burford, John Hanrahan, Ali Ansari-pour, et al. "Factors Influencing Medical Students' Interest in a Career in Neurosurgery." *World Neurosurg*, vol. 122, pp. e367-e374, 2019. View at: [Publisher Site](#) | [PubMed](#)