Interest in neurology during medical clerkship in three Nigerian medical schools

Emmanuel O Sanya*1, Olugbenga E Ayodele2 and Timothy O Olanrewaju3

Abstract
Background: This study sought to ascertain perception of Nigerian medical students of neurology in comparison with 7 other major medical specialties. To also determine whether neurology was the specialty students consider most difficult and the reasons for this and to appraise their opinion on how neurosciences and neurology were taught in their different universities.

Methods: Self-administered questionnaires were used to obtain information from randomly selected clinical students from 3 medical colleges in Nigeria (University of Ibadan, Ibadan; University of Ilorin, Ilorin; Ladoke Akintola University of Technology, Osogbo).

Results: Of 320 questionnaires sent out, 302 were returned given 94% response rate. Students felt they knew neurology least of all the 8 medical specialties, and were not confident of making neurological diagnoses. About 82% of the students indicated they learnt neurology best from bedside teaching, followed by use of medical textbooks. Close to 15% found online resources very useful for learning neurology and 6% indicated that group discussion was quite useful in the acquisition of knowledge on neurology. Histology and biochemistry were the preclinical subjects participants opined were least useful in learning neurology. The most frequent reasons students felt neurology was difficult were problems with understanding neuroanatomy (49%), insufficient exposure to neurological cases (41%), too many complex diagnoses (32%) and inadequate neurology teachers (32%).

Conclusions: Nigerian medical students perceived neurology as the most difficult medical specialty and are not interested in specializing in it. Neurology education could be improved upon by provision of more bedside tutorials and increased availability of online resources to enhance learning. There is need to emphasize increased frequency of small group discussions amongst students so that they will be used to teamwork after graduation.

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dical students in neurology in comparison with
seven other major medical specialties in three Nigerian
universities. The study also sought to answer whether
perception of neurology as a difficult subject poses a seri-
ous challenge to students when they try to learn and
practice the subject and whether it influences their choice
of specialization.

Methods
Study design and Study sample
This is a cross sectional study involving medical students
from three generation of Nigerian universities. A medical
school was chosen from the first generation (University
of Ibadan), second generation (University of Ilorin) and
third generation (Ladoke Akintola University of Technol-
y) universities in Nigeria. Study participants were clini-
cal students in 4th, 5th and 6th year of medical training.
Ethical approval for study was obtained from ethics com-
nitee of our institution. Questionnaires were distributed
to the students immediately after a lecture and the stu-
dents were asked to fill the questionnaires without indi-
cating their names. Verbal consent was obtained from
each student after the aim and purpose of the study had
been explained to the students.

Instruments
A self-administered questionnaire was designed based on
previous similar studies [4,13]. The questionnaire con-
tains 10 questions which were divided into two sections.
The first section was designed to determine the depth of
students’ knowledge of neurology. The second section
addressed why students felt neurology was difficult and
possible solution on ways of improving the teaching of
neurology and neurosciences. The first section consisted
of four questions which addressed students’ perception
of their knowledge of neurology in comparison with seven
other medical specialties; their level of confidence in
making neurological diagnoses; their level of confidence
in managing neurological conditions; and lastly the set-
ting students felt they learnt neurology most in school. In
the second section, students were asked to rate teachings
of neurology and neurosciences in the preclinical and
clinical years. Furthermore, they were asked how relevant
they felt the preclinical subjects were when applied to
clinical clerkship in neurology. Students were asked to
rate their level of interest in four neuroscience disciplines
taught in our medical schools (neurology, neurosurgery,
psychology and psychiatry). There were two open ques-
tions in this section. The first question asked participants
to give reasons why neurology was perceived difficult and
second question asked the students to proffer probable
solutions. Students were finally asked about the likeli-
hood of specializing in neurology after their medical edu-
cation.

Responses were graded on a maximum scale of 3 or 5
depending on the structure of the question (1 was the
lowest possible score and 3 or 5 the highest). For example,
responses to questions on the usefulness of preclinical
subjects to clinical clerkship and why neurology was con-
sidered to be difficult had a maximum score of 3 (not a
contributor-1, a minor reason-2, major reason-3). The
responses to questions on how knowledgeable partici-
pants were of various medical specialties had maximum
rating of 5 (very difficult-1; moderately difficult-2; mildly
difficult-3; easy-4; very easy-5).

Data analysis
Data were analyzed with the Statistical Package for the
Social Sciences version 11 (SPSS Inc). Frequency tables
were generated for the variables. Means and standard
deviations were determined. Mean scores of responses
were calculated and student t-test was used to analyze the
differences in mean values of responses. P value less than
0.05 was considered statistically significant.

Results
Out of 320 questionnaires sent out, 302 were returned
giving a response rate of 94%. One hundred and eighty-
one participants (60.0%) were males and 121 (40.0%) were
females. Distribution of participants who returned the
questionnaire showed that 28% were in the 4th year, 15%
in the 5th year, and 51% in the 6th year.

Section 1
The students were asked to rate their level of knowledge
of 7 medical specialties in comparison with neurology.
Participants rated neurology least, followed by rheuma-
tology and geriatrics while gastroenterology and endocri-
nology were rated highest (Figure 1). The difference was
statistically significant (p < 0.05). A total of 296 students
responded to the question on how easy it was to make
neurological diagnoses. Students were not very confident
to make diagnosis of neurological disorders. Close to 46% of
them believed making neurologic diagnosis is moder-
ate to very difficult, while 8% opined it was relatively ease
(Table 1). With regards to their opinion on management
of neurologic disorders, 16% of participants felt it was
Table 1: Responses to questions on diagnosis and management of neurologic disorder

<table>
<thead>
<tr>
<th>Questions</th>
<th>Frequency of responses, n = 302 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diagnosis of neurological disorder is</strong></td>
<td></td>
</tr>
<tr>
<td>Very difficult</td>
<td>39(13%)</td>
</tr>
<tr>
<td>Moderately difficult</td>
<td>100(33%)</td>
</tr>
<tr>
<td>Mildly difficult</td>
<td>130(43%)</td>
</tr>
<tr>
<td>Easy</td>
<td>24(8%)</td>
</tr>
<tr>
<td>Very easy</td>
<td>3(1%)</td>
</tr>
<tr>
<td>No response</td>
<td>6(2%)</td>
</tr>
<tr>
<td><strong>Management of neurological disorders is</strong></td>
<td></td>
</tr>
<tr>
<td>Very difficult</td>
<td>12(4%)</td>
</tr>
<tr>
<td>Moderately difficult</td>
<td>36(12%)</td>
</tr>
<tr>
<td>Mildly difficult</td>
<td>130(43%)</td>
</tr>
<tr>
<td>Easy</td>
<td>36(12%)</td>
</tr>
<tr>
<td>Very easy</td>
<td>3(1%)</td>
</tr>
<tr>
<td>No response</td>
<td>91(30%)</td>
</tr>
</tbody>
</table>

Table 1: Responses to questions on diagnosis and management of neurologic disorder

moderate to very difficult, while 30% gave no response. Students were also asked the setting they learnt neurology most in medical college. Close to 82% indicated they learnt the most from bedside teaching and 59% from use of medical textbooks. Other common ways by which the students felt they learnt neurology were classroom lectures (38%) and from online resources (13%). Only 6%

Section 2

Of the basic medical science subjects, this group of students found histology and biochemistry least useful in the acquisition of knowledge in neurology. They found physiology and morbid anatomy most helpful in learning neurology, with mean score (SD) of 2.9 ± 0.5 and 2.7 ± 0.4, respectively (Figure 3). The most frequent reasons why medical students felt neurology was difficult were: difficulty with neuroanatomy teachings (49%), occurrence of complex diagnoses (35%), insufficient teaching (32%) and inadequate neurology teachers (32%) [Table 2]. About 25% of students had difficulty with neurologic examination. Responses to question on quality of teaching of neuroscience courses received in preclinical and clinical year had a maximum score of 5. There was a significant difference in the way students rated the teaching of basic neuroscience subjects of preclinical classes and clinical subjects. Lectures received in the clinical classes were rated higher than the preclinical ones with mean score (SD) 3.33 ± 0.6 vs. 2.49 ± 0.8, p < 0.05. The responses of the students on the level of interest in the four-neuroscience disciplines showed that a higher proportion of students were interested in psychiatry (60%) and psychology (51%) than neurosurgery (46%) and neurology 49% (p < 0.05). Only 4% of the students indicated they would like to become a neurologist upon completion of their undergraduate study. There were 329 suggestions on ways to improve neurology education and these were summarized under 8 main themes (Table 1). The frequent suggestion was the need for more neurology teachings with emphasis on clinical and bedside teachings, followed by provision of more teaching aids and models. The third
most common suggestion was the demand for increase in the number of neurology lecturers in the faculty.

**Discussion**

The findings of this study showed that Nigerian medical students perceived neurology to be the most difficult of all medical specialties. This is evident by respondents' rating of their knowledge of neurology least of all the eight medical disciplines. The subjects students felt they were most knowledgeable about were gastroenterology and nephrology. It was surprising that participants rated their knowledge of neurology below geriatrics and rheumatology, two specialties that are just being developed in most medical schools in Nigeria. It is presently difficult to give a reason for such a response. Participants felt they learnt neurology most during ward rounds. This observation underscores the effectiveness of traditional clerkship and bedside teachings whereby signs are demonstrated to clinical students. Other ways by which the participants learnt neurology most were through seminars, bedside teachings during tutorial sections and use of medical textbooks. Our result compares with those of Schon et al from UK [3] and that of Flagan et al in Ireland [13]. In both studies, students cited gastroenterology as the subject they were most knowledgeable in and considered neurology to be the most difficult of all medical specialties. The results of these studies and ours were on students' opinion and may not truly reflect the depth of their knowledge of these disciplines. Nevertheless, the finding is noteworthy and may require further study to relate their actual test scores with their opinions.

Of all the preclinical courses, histology and biochemistry were indicated to be least helpful for learning neurology. These 2 courses are usually taught early in medical schools in Nigeria. It may be that these subjects were taught in an unrelated manner so that it gave an impression they were unimportant in the latter part of their training [3]. Part of the reasons why the students found neurology particularly difficult is that they had trouble in understanding neuroanatomy, a situation made more complex by availability of limited number of teaching aids. They also had problem with too many complex diagnoses made by neurologists. Difficulty with understanding neuroanatomy is particularly a recurring theme from several similar studies [13]. The main reason that had been adduced for this is the abstract manner in which neuroanatomy had been taught, and there are opinions that this manner of teaching needs to be changed. This abstract method requires visuo-spatial activity, a function of the right cortex which is best suited for Faculty of Arts students rather than medical student. Even though the structure and functions of the entire central nervous system may be complex than most body organs, neurology is not so complicated if taught from basics and in a simplified manner in relation to common diseases [3].

Another interesting finding of this study is that only 6% of the participants indicated they learned neurology from their colleagues. It could be inferred that only few medical undergraduates in this study practice small group discussions with their peers. This observation is pertinent.

**Table 2: Responses (multiple) to open questions**

<table>
<thead>
<tr>
<th>Questions</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why is neurology difficult?</td>
<td></td>
</tr>
<tr>
<td>Trouble with understanding</td>
<td>148(49%)</td>
</tr>
<tr>
<td>neuroanatomy</td>
<td></td>
</tr>
<tr>
<td>Inadequate model/aids</td>
<td>137(45%)</td>
</tr>
<tr>
<td>Limited exposure to cases</td>
<td>124(41%)</td>
</tr>
<tr>
<td>Complex diagnoses</td>
<td>107(35%)</td>
</tr>
<tr>
<td>Insufficient teaching</td>
<td>97(32%)</td>
</tr>
<tr>
<td>Inadequate teachers</td>
<td>97(32%)</td>
</tr>
<tr>
<td>Trouble with neurosciences</td>
<td>83(28%)</td>
</tr>
<tr>
<td>Difficult neurology examination</td>
<td>76(25%)</td>
</tr>
<tr>
<td>Others</td>
<td>18(6%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How can neurology lecture be improved upon?</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide more teaching</td>
<td>152(52%)</td>
</tr>
<tr>
<td>More aids/models</td>
<td>98(32%)</td>
</tr>
<tr>
<td>More teachers</td>
<td>59(20%)</td>
</tr>
<tr>
<td>More clinical rotation</td>
<td>45(15%)</td>
</tr>
<tr>
<td>More tutorial</td>
<td>14(5%)</td>
</tr>
<tr>
<td>Reduce student population</td>
<td>9(3%)</td>
</tr>
<tr>
<td>Others</td>
<td>18(6%)</td>
</tr>
</tbody>
</table>

**Figure 3 How helpful are basic neuroscience courses to clinical clerkship**
because doctors often do not practice in isolation, but rather as a team with colleagues and other health care workers. Thus, these students might find it difficult to work with colleagues and other members of health team after graduation. A study that had looked at ways to improve medical education had suggested introduction of small group discussion. This is likely to encourage team work, increase students’ comprehension and make them lifelong learner [14].

Over 15% of our participants found online resources very useful for learning neurology. This proportion is more than 1% of student reported from Ireland [13] but less than the proportion of US students that reported that online resources are veritable tool for neurology education [15]. A recent study on alternative ways to facilitate learning of basic and clinical neurology in USA found use of e-textbook as a good alternative [16]. The conclusion of the study was that after 6 years of introduction of e-textbook and online resources, neurology education was made easier with marked increase in student's satisfaction with the subject [16].

Unfocused teaching in neurology is another reason that has been found to be responsible for why doctors and medical students are neurophobic. It is, therefore, important that the teaching in basic neuroscience and clinical neurology must be more effectively integrated. Neurologists in the past do pride themselves during ward rounds about making complex diagnoses of rare disorders and unusual syndromes more than any other medical specialties [12]. This view was corroborated by responses of more than a third of our students' responses that they had problems with the complex diagnoses made in this specialty. To overcome this view, teaching of clinical neurology should focus more on common disorders and this should be done using simplified terminologies. Over 52% of the students proposed provision of more teachings in neurology and increase in number of neurology teachers as ways of improving neurology education. We believe this suggestion is crucial to improvement of neurology education in Nigeria. The work of Ridsdale et al from UK supported this view [12]. In that report, after neurology had been taught for 13 weeks and mostly in consultant-led teachings, students' understanding and rating of neurology was comparable to other medical disciplines, while their skill of neurology examination was greatly improved upon [12]. The use of small group bedside teachings that the students found most beneficial will also facilitate better understanding of the subject. Therefore, provision of more focused teaching along with increased duration of neurology course will help in improving the interest of students in neurology. Furthermore, there is a critical need to encourage specialization in this discipline based on the recent disturbing report that the number of neurologist in most African countries is very few with estimated number of 0.03 neurologists per 100,000 populations [17]. Nigeria with current estimated population size of 140 million has only 50 registered neurologists [18]. More neurologists are needed in developing countries as practitioners to improve neurological practices and also as educators and health policy advisers and advocates. Unfortunately, only 4% of the study participants were interested in specializing in neurology. Thus, the teaching of clinical neurology will still have to depend on non-neurology specialists in most medical schools.

Conclusions

In conclusion, results of this study confirmed that medical students perceived neurology as a difficult subject than other medical subjects. This is likely to be the view of majority of medical undergraduates in the country because the study participants were drawn from three medical schools representing three generations of Nigerian universities. Reasons why the students found neurology difficult and uninteresting include difficulty in understanding neuroanatomy, lack of teaching aids/models and poor teaching of neurosciences subjects. This lack of interest in neurology could be a hindrance to the choice of neurology as a specialty. In order to stem the tide of the burden of neurological diseases in Nigeria, there is a need for capacity building in neurology and this can be achieved by improving on the teaching of neurosciences and neurology in order to stimulate the interest of students in specializing in this field. In addition, introduction of e-textbooks and online resources may likely facilitate better learning of neurology.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

EOS and OEA conceived the study. EOS coordinated the study, analyzed the data and drafted the initial manuscript. The collection of data and review of initial manuscript were carried out by EOS, OEA and TOO. All authors read and approved the final manuscript.

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