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Use of integrated clinical scenarios in neuroanatomy laboratory sessions a strategy to foster students' learning

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ORIGINAL STUDY

Use of Integrated Clinical Scenarios in Neuroanatomy Laboratory Sessions a Strategy to Foster Students' Learning

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Abstract

Objective: **Combinations of various teaching strategies have been employed to enhance neuroanatomy teaching, to little success. Herein, we describe the use of integrated clinical scenarios in anatomy laboratory sessions as an educational strategy to improve the learning process for students undertaking neuroscience course.**

Methods: **We assessed the perception and performance of students who utilised the integrated clinical resources in the neuroanatomy labs. We also compared the performance of the students on their neuroscience course with the performance of the previous year's students (who did not use the clinical scenarios).**

Results: **A total of (130) 88% of the registered student both male and female participated by filling out a questionnaire. A majority (80%) of students supported introducing clinical cases at this early stage and agreed that cases covered learning objectives well. Students (81%) preferred a decreased faculty participation and 68% strongly agreed that cases were well integrated with other disciplines and assisted critical thinking and conceptual understanding. Most of them (90%) approved using plastic models and pictures as resource-material. The average mark obtained for all block together between the two cohorts did not differ significantly, while student performance was significantly improved in neuroscience block of the cohort which had access to the integrated clinical scenarios.**

Conclusions: **Collectively, or specifically designed neuroanatomy lab sessions provided students with an empowering experience to help them apply critical thinking and use their basic neuroscience knowledge to solve clinical problems.**

Keywords: Neurophobia, Medical education, Clinical scenarios, Neuroanatomy, Neuroscience

1. Introduction

Neuroanatomy is an essential component of anatomy education [1] and it the cornerstone upon an understanding of the nervous system and associated clinical disorders is built. However, neuroanatomy is considered as an extremely challenging area in undergraduate medical education for both educators and learners [2,3]. Jozefowicz coined the term 'Neurophobia' referring to 'the fear of the neural sciences and clinical neurology among undergraduate medical students and trainee doctors [3—5], which can arise due to multiple reasons [6]. Didactic methodology, intellectual complexity, clear separation of basic and clinical science [7], and amount of time required to understand associated clinical signs are likely factors [8,9].

To confront such challenges, many educationists have pursued various instructional strategies, including a combination of lectures and lab demonstrations [10], problem-based and (PBL) and team-based learning (PBL and TBL) [11], and innovative initiatives involving e-learning and videos [12]. Utilisation of animal brain dissection [13] and construction of 3-D models have also been used to improve student neuroanatomy learning

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[14]. However, while such methods have been widely employed, none have been completely effective. Perhaps a more practical rather than theoretical approach is required [15], aiming to improve critical thinking skills, connecting teaching and learning, and training to tackle clinical problems [16]. One method to generate such critical thinking among students is the use of case scenarios, which in other applications have improved critical thinking, analytical, and interpretive skills amongst students while concurrently acquiring knowledge, through a congenial and collegiate learning activity [8,17–19].

In the Kingdom of Saudi Arabia, many medical schools including the Alfaisal University College of Medicine, continue to implement integrated medical curricula utilising various novel teaching modalities, including PBL and TBL [20]. However, despite much advance, most students in this region still perceive neurology as a difficult subject, with even fewer considering this field for a career [21] Herein, we introduced clinical scenarios as part of a novel anatomy lab tool in small groups, concurrent to other instructional activities at the primary phase of undergraduate medical education. We aimed to a) improve critical thinking and problem-solving skills, and b) improve students' understanding of complex concepts of neuroanatomy. To assess effectiveness, we examined student perception to observe the effect of this innovative teaching tool.

2. Materials and methods

2.1. Participants and ethical approval

All second-year undergraduate medical students of the 2014/15 cohort were included in this study, following informed written consent. Personal student identifiers including gender were anonymised as per ethical approvals granted. Ethical approval was granted by The Committee for Medical and Bioethics, Office of Research and Graduate Studies, Alfaisal University, Riyadh.

2.2. Neuroanatomy curriculum at Alfaisal University

The College of Medicine at Alfaisal University utilises an integrated hybrid curriculum involving three phases spanning five years of undergraduate medical studies. Anatomy and physiology are taught in all three phases of the curriculum as organ system-based courses/blocks. These are integrated with function, abnormality, and clinical application as students' progress from phase to phase. Neuroanatomy is taught over two phases (years 1 and 2), while a bridging block and Phase 3 (years 4 and 5) consist of the clerkship years.

During phase 1, the Neuroscience block places primary emphasis on the structure (anatomy) and function (physiology) relationship of the nervous system, combined with minor clinical application (pathology, pharmacology) over 8 thematically divided weeks. The block utilises various instructional strategies including lectures, PBL, TBL and most importantly weekly 2-h neuroanatomy lab sessions. Other blocks of study during the second year of study include Endocrine and Reproductive, Head Neck & Skin, Pathogenesis of Disease, and Cardiovascular system blocks. Students also have timetabled 'self-directed learning' sessions, integrated within each block. The final exam for all blocks consisted of multiple-choice questions, short answer questions and an objective structured practical examination.

2.3. Lab sessions

At Alfaisal, innovative integrated resource sessions (IRS) [22] are applied, whereby students in small groups are required to rotate through histology wet and dry stations during anatomy practical sessions. In the laboratory, teaching is conducted through the use of cadaveric prosections, plastic and plastinated models, radiological and histological images, and histological slides.

We integrated short clinical scenarios in the dry laboratory stations during the neuroscience block, whereby students were divided into four groups of 4–5 students each. Each group was given 2–3 short thematically relevant clinical case scenarios each week, focused questions to answer in 30 min. The questions were designed such that students needed to use labelled plastic models/pictures, CT/MRI images, brain cross sections, and angiograms to appropriately answer the given questions. During the session, facilitator-initiated discussion among the group as necessary, creating an active learning environment, give students opportunity to apply, analyse, synthesize and evaluate information provided earlier on other stations or during lectures [22]. At the end of the week, detailed answers are uploaded on our Electronic Learning System for students' additional practice. A typical clinical scenario with pictures is provided below.

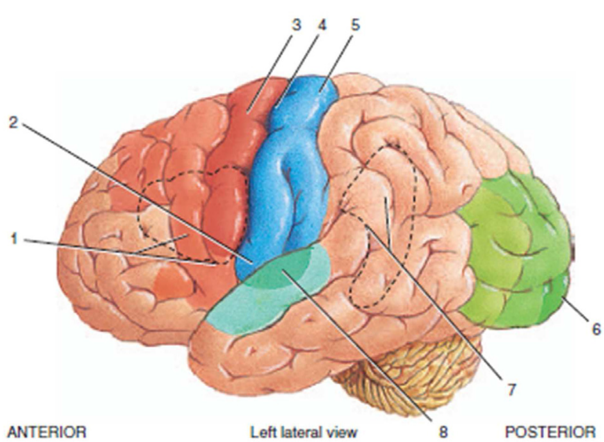
2.3.1. Example

A 63-year-old woman went to an ophthalmologist because of episodes of decreased vision in her "left eye" and headaches. Past medical history was notable for diabetes, elevated cholesterol, and coronary artery disease. About 5 or 6 weeks ago the patient began having episodes of sudden "blurry wavy" vision. She believed this was mostly in the left eye, but she did not try looking with one eye at a time. The episodes would last 15–20 min, occurring three to four times per week, and were accompanied by a severe left retro-orbital headache. She was able to recognize faces during the episodes but had difficulty reading. She denied any other symptoms. Two days ago an episode began that resulted in persistent decreased vision on the left.

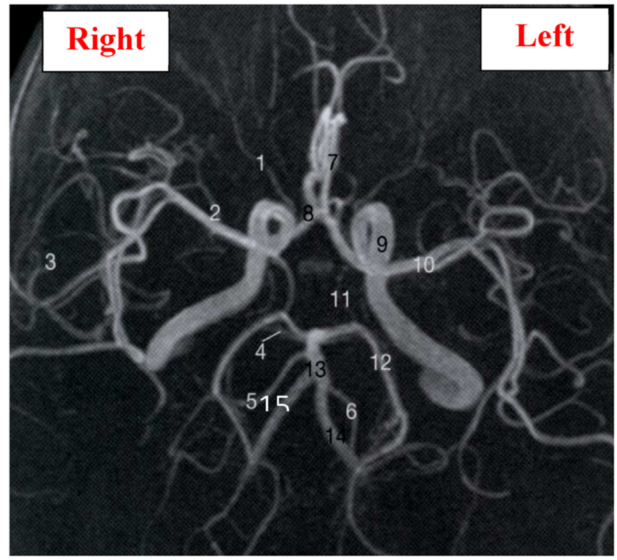
She was alert and well oriented with time space and person. Her speech was fluent. Visual field testing revealed a left homonymous hemianopia. Extra-ocular movements were intact. Normal gait with no motor deficit. Intact pinprick and joint position sense but pinprick and vibration senses were diminished in both feet.

2.3.1.1. Questions

1. On the basis of the symptoms and signs, which of the functional areas marked as A, B, C and D in the picture below, is involved in this case?
   A. 6 right Primary visual cortex



2. What is the most likely cause in this case?
   A. Infarction
3. Identify the vessel involved in the provided angiogram?
   A. 15, Right PCA



4. What is "left homonymous hemianopia"? Why this patient has this condition?
   A. Homonymous hemianopia (or homonymous hemianopia) is visual field loss on the same side of both eyes. Homonymous hemianopia occurs because the right half of the brain has visual pathways for the left hemi field of both eyes, and the left half of the brain has visual pathways for the right hemi field of both eyes. When one of these pathways is damaged, the corresponding visual field is lost.
5. Why episodes of blurry vision changed into persistent decreased vision later?
   A. The transient episodes of 15–20 min of decreased left-sided vision occurring over several weeks, followed by a persistent deficit, are suggestive of TIAs preceding a cerebral infarct

2.4. Data collection

Following completion of the neuroscience block, an electronic survey was distributed amongst students who completed the block, and surveys completed anonymously. At this stage, students were asked to answer this survey in comparison to other laboratory sessions they had which did not include the integrated clinical scenarios. The survey included 15 items, relating to the organization, delivery, and impact of the clinical cases during their lab sessions. The survey consisted of six Likert scale-based quantitative questions, five frequency qualitative and four open-ended qualitative questions. Quantitative questions were scaled from 1 to 5 depending on level of agreement (with 1 corresponding to least agreement and 5 relating to highest agreement). For qualitative close-ended questions, frequencies and percentages of student responses were noted. Both types of questions recorded student satisfaction regarding the introduction of clinical cases in the lab, and organization/ delivery. Some questions highlighted the impact and knowledge increment as a result of this innovative approach. Qualitative assessments were completed using four open ended questions at the end of the questionnaire, accommodating additional opinions/suggestions from students.

To provide a further insight on student performance, average grades and marks of concurrent blocks in the 2nd year were also examined in relation to the neuroscience block for our examined 2014/15 cohort, alongside the grades obtained by the previous (2013/14) cohort which did not have access to the clinical resource session. Namely, grades were compared from the Endocrine and Reproductive, Head Neck & Skin, Pathogenesis of Disease, and Cardiovascular system blocks for both cohorts.

The Alfaisal University College of Medicine Curriculum Committee ensured uniformity of course content, while relevant committees ensured a standard degree of assessment difficulty, and question distribution, throughout cohorts. The Assessment Office of the College of Medicine standardized characterization of exam questions and question difficulty indexes using the ExamSoft software package that was also uniformly used to administer the majority of summative assessment. Collectively, all these activities aimed to allow for a considerable degree of standardization in terms of the tests that were administered to all cohorts.

2.5. Statistical analysis

The statistical analysis was conducted using IBM SPSS version20. The Kaiser–Meyer–Olkin measure of sampling adequacy test (KMO) and Barlett's test of sphericity were used to determine whether data were suitable for factor analysis. Consequently, confirmatory factor analysis (CFA) was performed to assess the validity of the questionnaire. In addition, Cronbach's a coefficient test was used to measure the extent of internal uniformity among the tested items. All the values are represented as mean standard deviation or frequency and percentage where appropriate.

To examine grades obtained for both cohorts, Either the *t*-test (using Welch's correction to not assume equal standard deviations) was used to examine the difference between two datasets, or the two-way analysis of variance (ANOVA) was performed (followed by the Benjamini, Krieger, and Yekutieli two-stage step-up method to control the false discovery rate of multiple comparisons) to examine statistical significance between multiple datasets. Statistical significance was set as $p \leq 0.05$.

3. Results

3.1. Reliability and validity

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy test value was calculated at 0.80 and the Barlett's Test of sphericity was significant with ($X^2 = 275.10$, degree of freedom = 10) p value of <0.001, indicating suitability for confirmatory factor analysis. Confirmatory factor analysis of the questionnaire was performed using SPSS statistical software to assess the validity of the questionnaire which was acceptable and suggested adequate construct validity. Reliability wise, the Cronbach's -coefficient was 0.848 which was indicative of an acceptable internal consistency.

3.2. Student perception of clinical scenario as anatomy lab tool

A total of 88% (n = 130) of the cohort (both male and female) participated in the survey, excluding absentees. The overall perception regarding introduction of clinical case scenarios as an anatomy lab tool was satisfactory (3.96 ± 0.9). A majority of students agreed that this tool assisted in improving understanding of clinical concepts (4.05 ± 0.77) and critical thinking skills (4.04 ± 0.86) (Table 1). Similarly, students also felt that cases were well integrated with other disciplines (3.75 ± 0.88) aiding improvement in cohesive knowledge. Students also considered that this methodology effectively covered weekly learning objectives (3.97 ± 0.86), enhancing their learning (Table 1).

For the organization and delivery of clinical cases during lab sessions, students answered qualitative questions on a scale of 1–5 in each survey, where scale 3 is the most appropriate. A majority of students (81%) enjoyed lower levels of facilitator involvement (in terms of intervention levels), while >65% considered the difficulty level of case scenarios appropriate to the level of learning objectives (Table 2).

Table 1. Summary of student responses regarding conduct, organisation, and impact of the clinical scenarios in laboratory sessions.

Category	Questions	Strongly agree	Agree	Unclear	Disagree	Strongly disagree	Means ± SD
General Perception	Enjoyed the activity	26.2%	53.8%	12.3%	5.4%	2.3%	3.96 ± 0.90
	Disliked	10%	13.1%	22.3%	40.8%	13.8%	2.64 ± 1.17
Organization & Delivery	Objectives	25.4%	55.4%	13.1%	3.8%	2.3%	3.98 ± 0.86
Impact on Students	Integration	16.9%	51.5%	23.8%	5.4%	2.3%	3.75 ± 0.88
	Brain Storming	39%	67%	18%	3%	3%	4.05 ± 0.86
	Clinical Concepts	26.9%	55.4%	15.4%	0.8%	1.5%	4.05 ± 0.77

Table 2. Summary of overall student responses to levels of appropriateness of aspects of the clinical scenarios' implementation.

Questions	Much more	More	Appropriate	Less	Much less	Means ± SD
Level of scenarios	5.4%	27.7%	64.6%	0.8%	1.5%	2.65 ± 0.66
Instructor participation	4.6%	5.4%	80.8%	7.7%	1.5%	2.96 ± 0.61
Time duration	2.3%	6.2%	64.6%	22.3%	4.6%	3.21 ± 0.72

Most students (55%) suggested to keep the current participants number to 4–5 students per group, while the next dominant group of students (30.8%) suggested a slight reduction to this number (2–3 students per group). Very few students felt it appropriate to raise participant numbers higher than 5 per group (13.9%). Collectively, students (59.3%) felt that the utilisation of illustrative images and plastic models were more beneficial for the utility of these sessions compared to more clinically applicable images such as MRI and CT scans (40.8%).

3.3. Analysis of qualitative responses about the tool

Students emphasised various points pertaining to specific themes, which were ranked in order of highest percentage as the following: 1) effectiveness as a tool for critical thinking and conceptual learning, 2) a unique platform for the application of learned concepts, 3) integration of theory with clinical application and 4) immediate feedback for concept clarity (Table 3).

3.4. Student examination performance

As a brief measure of student performance, average exam marks and grade distributions of the neuroscience block of the 2014/15 cohort were compared with those of the previous 2013/14 cohort who did not have access to the integrated clinical scenarios in neuroanatomy laboratory sessions. Comparisons were also performed between concurrent blocks to examine relative student performance.

Collectively, we observed that the average mark obtained between the two cohorts was not significantly different, with both cohorts achieving and average of 70% for all comparative blocks in the Spring semester (Fig. 1A). The average mark

Table 3. Summary of qualitative statements made by students regarding the integration of clinical scenarios into the laboratory sessions. Student responses were themed into categories, and the percentage of students providing statements in respective categories are stated alongside illustrative quotations.

Themes	Percentage	Representative Quotes
Strengths		
Tool for critical thinking and conceptual learning	26.9% *(n = 35)*	'Encourages thinking and understands concepts better.' 'Makes you think critically.' 'Makes the students think clinically and allows the idea to stick in mind.' 'It help to improve problem solving skills.'
Unique platform for the application of already learned concept	24.6% *(n = 32)*	'Made me think and help to solidify the learned concept.' 'Get to practise unclear concepts from the lectures.' 'It strengthens the concepts further' 'Applying learned knowledge is the best advantage for this activity.'
Integration/correlation with other disciplines	16.2% *(n = 21)*	'Correlated with other subjects.' 'Related well to weekly objectives.' 'Well integrated and helps to cover the learning objectives.'

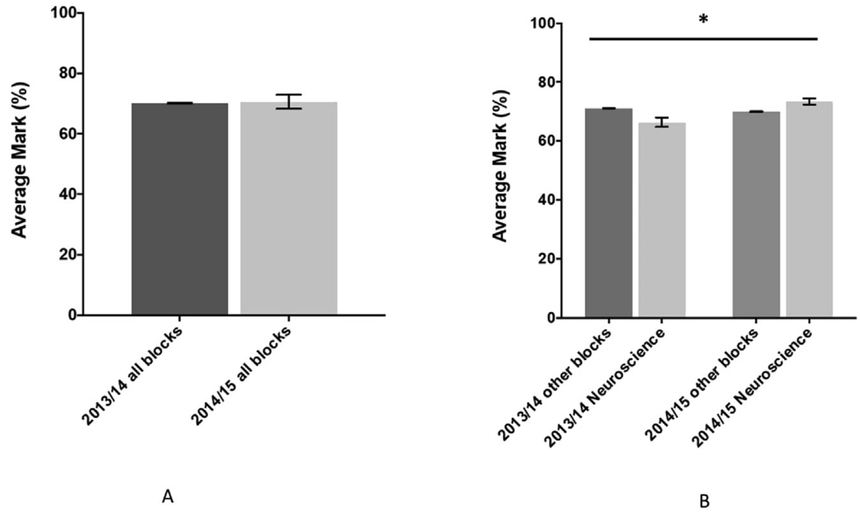


*Fig. 1. Representative histograms indicating differences between the average marks obtained following final exams for **A)** all spring semester blocks in the 2013/14 and 2014/15 cohorts, and **B)** between the neuroscience and other concurrent blocks for both 2013/14 and 2014/15 cohorts. Asterisk (*) indicates a statistically significant difference ($p \leq 0.05$).*

obtained for neuroscience was significantly lower than the other blocks in the 2013/14 cohort (66.4% vs 71.1%, respectively), while the opposite was true in the 2014/15 cohort, where students achieved a higher average mark in neuroscience compared to other blocks (73.4% vs 69.9%; Fig. 1B).

Finally, upon comparison of grade distributions achieved in the neuroscience block for both cohorts, we observed that a higher proportion of students from the 2014/15 cohort achieved grades A (48%) and B (31%) compared to the 2013/14 cohort grade A (23%) and grade B (20%), respectively. Furthermore, a lower proportion of students achieved grade C (8%) and F (19%) in the 2014/15 cohort compared to the 2013/14 cohort grade C (20%) and F (29%) (Fig. 2).

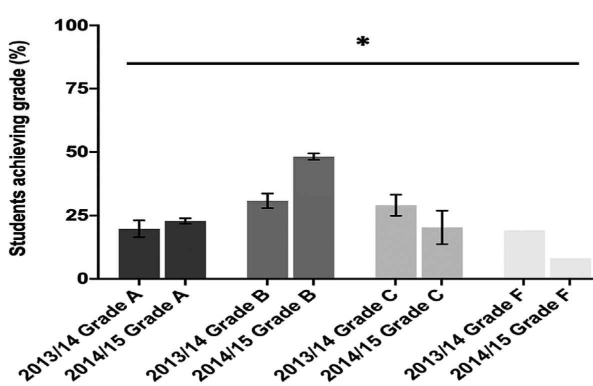


Fig. 2. Representative histogram indicating differences between distribution of grades (A–F) obtained in the neuroscience block by both the 2013/14 and 2014/15 cohorts. Asterisk (*) indicates a statistically significant difference ($p \leq 0.05$).

4. Discussion

Numerous methods have been utilised in attempts to subvert thinking that neuroanatomy is more difficult and less interesting than other specialties [15,16,18,23], but the application of real-life clinical scenarios as resource-material has been shown to be supremely effective in improving student attitudes towards this subject [8,24]. Herein, we describe the introduction of clinical scenarios as an anatomy lab tool in small groups, aiming to generally reduce perceived neurophobia and enhance student critical thinking and problem-solving skills (Table 4). To assess effectiveness, we examined student perception to observe the effect of this innovative teaching tool.

Collectively our current results suggest that responding students felt that integration of clinical scenarios into lab sessions tremendously enhanced student self-directed learning experience. We conducted these scenarios with the use of plastic models, cadaveric dissection cross sections of the brain using Anatomage, pictures of brain CT and MRI scans, which students felt aided development of critical thinking skills, and ability to connect the basic science to clinical relevance. Students enjoyed solving challenging clinical cases by working collaboratively in teams, exploring educational resources, expressing ideas, and sharing knowledge and constructive feedback.

Our current findings agree with those of Nathaniel et al. [25], who found that introduction of interactive clinical scenarios in small groups stimulated student interest in learning the basic components of neuroscience (neuroanatomy,

Table 4. Descriptive summary of differences between normal neuroanatomy laboratories and our novel integrated neuroanatomy activity.

	Type of Learning	Integration	Tools utilised	Modality	Learning outcome
Traditional Neuro-anatomy Lab	Passive	Minimal and unimodal	Cadavers/Plastic models	Instructor-led	Basic orientation and Identification
Clinical Scenario- Integrated Neuroanatomy Lab	Active and associative with real life clinical scenarios	Extensive and mulitmodal	Plastic models, cadaveric dissections, Anatomage images, pictures of CTs, MRI of the brain/spinal cord and laboratory data	Student/Peer-led with minimal facilitator involvement	Stimulate critical thinking and problem solving skills Holistic and associative understanding of key concepts in neuroanatomy

neurophysiology, neurobiology, etc). Our data also suggests that students felt motivated and challenged during the learning process, which may have positively impacted their learning process. Our designed laboratory sessions provided students with opportunities to constructively interact with each other, allowing them to challenge, self-reflect, and develop mutual respect for opposing ideas. Indeed, such activities have been shown to assist student learning strategy and ability to answer clinical problems [26,27].

A key issue in neuroscience education is to successfully apply key neuroscience concepts from various biomedical science disciplines to clinical practice of neurology [6,28]. Herein, through the use of clinical scenarios in laboratory sessions, we have attempted to integrate neuroanatomy, neuropathology, neurophysiology and neuroembryology with analysis of neurological and psychiatric disorders. Such hypothetical deductive reasoning helps students to develop strong foundations of clinical diagnosis. This method allowed students to use different tools to understand complex neurological pathways and the effects of their lesions. These modalities include, plastic models, cadaveric dissections, pictures of CTs, MRI of the brain/spinal cord and laboratory data. This multimodal approach allowed students to develop understanding of complex spatial arrangement of neuronal circuits and effects of their damage [29].

A point of note were student preferences for teaching material utilised, with the majority of students preferring utilisation of visual aids (pictures) and plastic models over the more clinically based images including MRI and CT scans. It has been demonstrated that student preference teaching methods can change over time, with first-year students preferring more hands-on approaches such as dissection over textbook-based learning, while second year students seem to prefer the opposite [30]. In other characterisations, pre-clinical students preferred learning based on gross anatomy, while students in their clinical years preferred reviewing/learning anatomy [31]. Such data perhaps indicates that as students' progress in the medical curriculum, learning method preference shifts from more traditional methodologies to methods offering a stronger clinical link [9]. Indeed, data indicates that students without clinical experience believe that methods such as radiology, MRI and CT are technically demanding, viewing the protocols involved as complicated and tiring. However, such attitudes shift following entry of students into clinical years [32]. To this degree our data reinforces such assertions, indicating a clear preference of second year students towards non-clinical learning resources at this early stage.

Crucially, our analyses indicated that the 2014/15 cohort who had access to the integrated clinical scenarios seemed to perform better on final examinations in comparison to both comparative blocks being conducted concurrent to the neuroscience block in the spring semester, as well as the previous (2013/14) cohort undertaking the neuroscience block without access to the clinical scenarios resource. Considering that there was no significant difference between the total average grade obtained between both cohorts for the spring semester cohort, one could assert that the examination capability between both cohorts was equal. This would then allow us to posit that conducting the clinical scenarios as a resource during neuroanatomy sessions aided student performance in final examinations. Indeed, the 2014/15 cohort achieved higher average marks, and larger proportions of grades A and B. This was observed concurrent to a decreasing level of grades C and F, indicating a potential upwards shift of grades being achieved.

Continuous formative assessments are considered more useful than summative examinations [33] aiding in improvement and growth of learners [34]. We suggest that the emphasis on teamwork and team-based consolidation of knowledge, supplemented with moderate and immediate feedback by facilitators during the laboratory sessions aided in an enhanced learning experience for students, and ultimately enhanced examination performance. Perhaps an underlying reason for this is provision of a structured method of knowledge review and consolidation in the form of our integrated clinical scenarios. Students struggle to evolve effective learning strategies from the low efficacy processes gained during earlier years of education (highlighting, re-reading, memorising and non-contextual summarizing), which of course are inefficient and ineffective for critical analysis of clinical knowledge required for higher education. Indeed, we have shown that improving accessibility and availability of revision material in a structured on non-pressured manned was key to improving student average performance in Neuroscience [35,36]. Perhaps a similar principle was applied herein allowing students to gain in knowledge, confidence, and summative assessment achievement.

However, a crucial point to note is that there could also be a whole number if contributory factors that could have led to the better achievement of the 2014/15 cohort compared to the 2013/14 cohort. Indeed, student assessment performance is a complicated matter, with many confounding factors involved. Furthermore, the integrated clinical scenarios employed in the neuroanatomy laboratory sessions would probably have had a higher impact in practical components of summative assessment (such as OSPE/OSCE), rather than final exams However, one could also argue that the integrated nature of the laboratory sessions may have allowed students to holistically review both practical and theoretical components, while developing requisite skills to critically analyse complex questions. Indeed, our surveys indicated that the majority students, at least, felt this way. Thus, while we note and accept that the improved exam results may have been due to a whole number of reasons, we posit that employment of our methodology was a contributory factor, and given the receptiveness to such modalities by students, represents a significantly useful tool to be employed in medical education.

Maseleno et al. [37], suggested that creativity lies at the core of a successful multi-cultural student educational model (as is the case for the significantly multi-cultural environment at Alfaisal University) in the context of their learning history. Indeed, this perhaps may be a causative factor underlying the enhanced success of our integrated laboratory sessions, which perhaps encouraged creative discussions within a friendly peer-assisted environment. However, such contributing factors may also not relate equally, and build sequentially from another. This could also explain the varying range of responses from students which would suggest that one size does not fit all.

5. Conclusion

Collectively our results indicated that students are generally supportive of and enjoy the integration of clinical cases into early stage medical curricula via anatomy laboratory sessions. Our survey results indicated that students enjoyed such sessions and felt these improved their understanding and receptiveness of Neuroanatomy. The clinical case scenarios in the neuroanatomy labs provided students an opportunity to discuss and solve complex neurological cases. This is an empowering experience which helps students to apply critical thinking and use their basic neuroscience knowledge to solve clinical problems. Our data also supported previous notions in the literature regarding student stage-specific preference for didactic methodology applied, further suggesting that such preferences can be utilised to facilitate the learning process more effectively in students in a stage-specific manner. Indeed, the potential success of such methods can be observed via the enhanced performance of student with access to this resource in summative assessments compared to those without access.

5.1. Recommendations/limitations

Of course, a limitation of our current study is that we only examined two cohorts at a single institution in one country, so it is currently far from established whether such methods do indeed serve to consolidate knowledge and enhance exam performance as a direct result. However, our current results add significant support to the notion that enhanced and structured support of students at various levels is key to perhaps not only eliminating neurophobia in medical education, but also enhance the learning experience for all subject involved.

Authors contributions

AY conceived and designed the study, analysed and interpreted the data. ASS conducted research and collected & organized data and wrote initial draft of the manuscript. JK analysed and interpreted data and edited the manuscript. MFI analysed and interpreted data and edited the manuscript. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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Conflict of Interest

No Conflict of interest declared by authors.

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