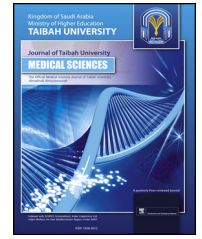




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Original Article

Assessment of learning environment among the first year Malaysian medical students



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المخلص

أهداف البحث: من المعروف أن جودة البيئة التعليمية هي بالغة الأهمية لفاعلية التعليم. تعطي ملحوظات طلاب الطب للبيئة التعليمية قاعدة مفيدة لتعديل وتحسين جودة التعليم الطبي. تهدف هذه الدراسة لتقييم ملحوظات طلاب السنة الأولى طب للبيئة التعليمية بجامعة كيبانجسان بماليزيا.

طرق البحث: تم توزيع استبيانات دندي الجاهزة لقياس البيئة التعليمية (دريم) على ٢١٣ من طلبة السنة الأولى طب بجامعة كيبانجسان. تحتوي الاستبانة على ٥٠ بنداً تحسب من مجموع ٤٠— على مقياس ليكرت (المجموع الكلي يتراوح من ٠ إلى ٢٠٠). هناك خمسة فروع في الاستبانة تتضمن ملحوظات الطلاب عن التعلم، والمعلمين، والجو العام، والملحوظات الذاتية الأكاديمية، والملحوظات الذاتية الاجتماعية.

النتائج: كان مجموع الدرجات الكلي لدريم في هذه الدراسة ٢٠٠/١٣٥.٦ الذي يشير إلى أن طلاب الطب يرون البيئة التعليمية بجامعة كيبانجسان بماليزيا أكثر إيجابية من سلبية. وكان مجموع درجات ملحوظات الطلاب عن التعلم، وعن المعلمين، وملحوظات الطلاب الذاتية الأكاديمية، وملحوظاتهم عن الجو العام وملحوظات الطلاب الذاتية الاجتماعية ٤٨/٣٣.٠٤، ٤٨/٣٣.٠٤، ٤٤/٢٢.١٦ / ٣٢، ٤٨/٣٣.١١ و ٢٨/١٧.٦٢ على التوالي. كما كان مجموع الدرجات الكلي لدريم أعلى بكثير بين الإناث (٢٠٠/١٣٧.٠٢) عن الذكور (٢٠٠/١٣٠.٨٤) (قيمة < ٠.٠٥). ولم يكن هناك علاقة بين ملحوظات الطلاب عن البيئة التعليمية والأداء الأكاديمي (قيمة $r = -0.06$ ، قيمة $p > 0.05$).

الاستنتاجات: أظهرت الدراسة أن طلبة السنة الأولى طب بجامعة كيبانجسان بماليزيا ينظرون بإيجابية لبيئتهم التعليمية. كما تم التعرف على المجالات ذات الدرجات المنخفضة للبيئة التعليمية التي تحتاج إلى التحسين في المستقبل.

الكلمات المفتاحية: الإنجاز الأكاديمي؛ دريم؛ الجنس؛ البيئة التعليمية؛ ملحوظات الطلاب

Abstract

Objectives: The quality of the learning environment has been identified to be crucial for effective learning. Medical students' perceptions of learning environments provide a useful foundation for modifying and improving the quality of medical education. The aim of this study was to assess first-year medical students' perceptions of the learning environment in Universiti Kebangsaan Malaysia (UKM).

Methods: The Dundee Ready Educational Environment Measure (DREEM) questionnaire was distributed to all 213 first-year medical students of UKM. The questionnaire contained 50 items scored on a 0–4 Likert scale (total scores could range from 0 to 200). There were five subscales in the questionnaire, including students' perceptions about learning, teachers, atmosphere, academic self-perceptions, and social self-perceptions.

Results: The total DREEM score recorded in this study was 135.6/200, which indicated that medical students' perceptions of the learning environment at UKM were more positive than negative. Students' perceptions of learning, students' perceptions of teachers, students' academic self-perceptions, students' perceptions of atmosphere and students' social self-perceptions scores were 33.04/48, 29.68/44, 22.16/32, 33.11/48 and 17.62/28,

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respectively. The total DREEM score was significantly higher among female (137.02/200) than male medical students (130.84/200) ($p < 0.05$). There was no relationship between the students' perceptions of the learning environment and their academic performance ($R = -0.06$, $p > 0.05$).

Conclusion: The study showed that first-year medical students at UKM positively perceived their learning environment. Some low-scoring areas of the learning environment were also identified, which require improvement in the future.

Keywords: Academic achievement; DREEM; Gender; Learning environment; Student perceptions

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Introduction

There is an increasing interest and concern regarding the role of the learning environment in undergraduate medical education in recent years. The World Federation for Medical Education highlighted the learning environment as one of the targets for the evaluation of medical education programmes.¹ The quality of the learning environment has been identified to be crucial for effective learning.² Evaluation of the learning environment is critical to the delivery of a high-quality, student-centred curriculum.³

Does the learning environment within which students are asked to learn (e.g., workload, teaching quality) have any real impact on the quality of the outcomes they are able to achieve? Or will students 'do well' or 'not so well' irrespective of their learning environments? Such questions are not just theoretically interesting but also practically significant for university educators seeking to understand the impact of their course design decisions on students' academic performance. Thus, the extent to which students' perceptions of their learning environment directly impact their academic outcomes remains unclear.

One method for assessing the learning environment is to evaluate students' perceptions of that environment. The Dundee Ready Educational Environment Measures (DREEM) questionnaire was previously validated as a universal diagnostic inventory to gather information regarding the learning environment in medical institutions. This tool can be used to highlight the strengths and weaknesses of an educational institution, compare the performance and effectiveness of different medical schools, and make comparisons among students in different years of study and differences between the genders.^{4,5} In addition, this instrument is used to help modify the curriculum, comparing past and present curricula and evaluating the efficacy of a university programme.^{6,7}

The Faculty of Medicine, Universiti Kebangsaan Malaysia (UKM), was established on 30th May, 1972, as a

medical institution. The undergraduate medical degree programme is five years in duration. The first two years incorporate an integrated curriculum based on organ systems whereby critical thinking, problem solving and independent learning strategies are stressed upon students. The latter three years concentrate on the clinical components.⁸

The aims of this study were to assess first-year medical students' perceptions of the learning environment at UKM, to compare the perceptions between male and female students and to determine the relationship between the perceptions and their academic performance. Similar studies in Malaysia have been published previously,^{9,10} but to the best of our knowledge, no previous studies in Malaysia have compared the perceptions of the learning environment between male and female students, and did not investigate the relationship between the perceptions and the students' academic performance. Furthermore, the results of this study will generally enable other medical schools to compare their performance and productivity with UKM medical faculty, which can be educationally insightful.⁷ By assessing medical students' perceptions of their learning environments, the areas of the learning environment that can be improved could be identified. One previous report has shown that students benefit from the improvements implemented following the results of a survey using the DREEM inventory.¹¹

Materials and Methods

Instrument

The Dundee Ready Education Measure (DREEM) is an internationally validated, non-culturally specific inventory that provides medical and health profession educators with a diagnostic tool to measure the state of their school's learning and teaching climate.¹² It can produce global readings and diagnostic analyses of an undergraduate learning environment in medical schools and other health profession institutes. It allows quality assurance comparisons between courses and even between components of a particular course. The items in the DREEM are designed to assess the learning environment surrounding the entire curriculum. Roff et al.¹³ developed the 50-item DREEM using a standard methodology utilising grounded theory and a Delphi panel of nearly 100 health profession educators from around the world, with validation by over 1000 students in countries as diverse as Scotland, Argentina, Bangladesh and Ethiopia. Participants were asked to measure and 'diagnose' the undergraduate learning environments for the health professionals. The instrument was designed to be a non-culturally specific instrument and was used in several settings including the Middle East, Oman, Thailand, Nepal, Nigeria, United Kingdom, Canada, Ireland, Indonesia, Malaysia, Norway, Sweden, Venezuela, the West Indies, Sri Lanka, and Yemen.¹³

The DREEM questionnaire contains 50 statements concerning a range of topics directly relevant to the educational environment. The respondents were asked to read each statement and to respond using a five-point Likert scale ranging from strongly agree to strongly disagree. Items were

scored as follows: 4 for strongly agree, 3 for agree, 2 for uncertain, 1 for disagree and 0 for strongly disagree. However, negative statements were scored in reverse. On this scale, a higher score indicates a more positive evaluation. The 50-item DREEM has a maximum score of 200, which indicates the ideal learning environment. It consists of the following five subscales:

- Students' perceptions of learning (12 questions, maximum score: 48)
- Students' perceptions of teachers (11 questions, maximum score: 44)
- Students' academic self-perceptions (8 questions, maximum score: 32)
- Students' perceptions of atmosphere (12 questions, maximum score: 48)
- Students' social self-perceptions (7 questions, maximum score: 28)

Items that have a mean score of 3.5 and above are classified as 'real positive points'. Items with a mean of two or less should be examined more closely, as they indicated problem areas. Items with a mean between two to three are aspects of the climate that could be enhanced.¹⁰

Subjects and settings

This cross-sectional study was conducted in the Faculty of Medicine, UKM. The study was approved by the Ethical Research Committee of the Universiti Kebangsaan Malaysia Medical Centre (Project Code: FF-433-2012). The DREEM questionnaire was distributed to all first-year medical students at the end of their first year in academic year 2012/2013 ($n = 213$). Students were given 20 min free time to respond to the inventory. Before the questionnaires were distributed, the students were thoroughly briefed about the purpose of the study, the data collection process, the confidentiality of the data and the meaning of some terms such as "factual learning", "ridicule", and "authoritarian". Written consent was obtained from all participants. The students' academic performance was assessed based on their cumulative grade point averages (cGPAs) achieved in the same academic year. The students were further categorised into three groups based on their cGPAs. High achievers were defined as having cGPA of >3.5 , medium achievers with cGPA ranges between 3.5 and 3.0 and low achievers as having cGPA of <3.0 .¹⁴

Statistical analysis

The data were analysed using SPSS version 19 software. The normality of the data was tested using a Kolmogorov–Smirnov test. A Mann–Whitney U test was used to compare the perceptions of the learning environment between male and female students. A Pearson correlation test was used to determine the relationship between the medical students' perceptions of learning environment and their academic performance. A one-way ANOVA test was used to compare the perceptions of the learning environment between low, medium and high achievers. Data were presented as the mean

(SD), and a value of $p < 0.05$ was considered to be statistically significant.

Results

Response

The response rate was 76.6% (total 163 out of 213 students). Among the 163 students, 38 (23.3%) were male and 125 (76.7%) were female. This ratio of male to female students is reflective of the overall student population, which is 30:70 male to female. The mean age of participants was 19.77 (SD 0.452) years.

Global and subscale ratings

The guide for interpretations of the DREEM scores for the five subscales is shown in Table 1. Table 2 shows the mean and percentage of DREEM global and subscale scores from this study. The global DREEM score for the overall sample ($n = 163$) was 135.61/200 (SD 14.66). The global score indicated that, overall, students had more positive than negative perceptions of their learning environment. The score for students' perceptions of learning (SPoL) was 33.04/48 (68.8%), i.e., more positive perception; students' perceptions of teachers (SPoT) was 29.68/44 (67.5%), i.e., moving in right direction; students' academic self-perceptions (SASP) was 22.16/32 (69.4%), i.e., feeling more on the positive side; students' perceptions of atmosphere (SPoA) was 33.11/48 (69.0%), i.e., more positive atmosphere; and students' social self-perceptions (SSSP) was

Table 1: Guide to facilitate analysis of results and interpretations of DREEM subscale scores as suggested by McAleer and Roff.¹³

Domain	Score	Interpretation
SPoL	0–12	Very poor
	12–24	Teaching is viewed negatively
	25–36	A more positive approach
	37–48	Teaching highly thought of
SPoT	0–11	Abysmal
	12–22	In need of some retraining
	23–33	Moving in the right direction
	24–44	Model teachers
SASP	0–8	Feeling of total failure
	9–16	Many negative aspects
	17–24	Feeling more on positive side
	25–32	Confident
SPoA	0–12	A terrible environment
	13–24	There are many issues that need changing
	25–36	A more positive environment
	37–48	A good feeling overall
SSSP	0–7	Miserable
	9–14	Not a nice place
	15–21	Not too bad
	22–28	Very good socially

SPoL: students' perceptions of learning; SPoT: students' perceptions of teachers; SASP: students' academic self-perceptions; SPoA: students' perceptions of atmosphere; SSSP: students' social self-perceptions.

Table 2: Global and subscale DREEM scores in all students (n = 163).

DREEM subscale	Maximum score	Mean	SD	Percent of perception
SPoL	48	33.04	4.36	68.8%
SPoT	44	29.68	3.38	67.5%
SASP	32	22.16	3.22	69.4%
SPoA	48	33.11	4.72	69.0%
SSSP	28	17.62	2.75	62.9%
Global DREEM score	200	135.61	14.66	67.8%

SPoL: students' perceptions of learning; SPoT: students' perceptions of teachers; SASP: students' academic self-perceptions; SPoA: students' perceptions of atmosphere; SSSP: students' social self-perceptions.

17.62/28 (62.9%), i.e., not too bad. The highest score was found in the subscale of students' academic self-perceptions (22.16/32 (69.4%)), and the lowest score was found in the subscale of students' social self-perceptions (17.62/28 (62.9%)).

Table 3 shows the individual item analysis of DREEM according to the five different subscales. Three items scored less than two. Among them, one item was from the students' perceptions of learning subscale, one item was from the students' perceptions of teachers subscale, and

Table 3: Individual item analysis of DREEM by different subscales.

Items	Mean	SD
Students' perception of learning (SPoL)		
1 I am encouraged to participate during teaching sessions	3.15	0.57
7 The teaching is often stimulating	2.87	0.76
13 The teaching is student-centred	3.01	0.74
16 The teaching helps to develop my competence	2.94	0.65
20 The teaching is well-focused	2.99	0.65
22 The teaching helps to develop my confidence	2.96	0.65
24 The teaching time is put to good use	2.93	0.60
25 <i>The teaching over-emphasizes factual learning*</i>	1.32	0.78
38 I'm clear about the learning objectives of the course	2.93	0.62
44 The teaching encourages me to be an active learner	3.03	0.62
47 Long-term learning is emphasized over short-term learning	2.92	0.70
48 The teaching is too teacher-centred*	2.10	0.70
Total mean score	33.04	4.36
Maximum score	48	
Students' perception of teachers (SPoT)		
2 The teachers are knowledgeable	3.50	0.56
6 The teachers adopt a patient-centred approach to consulting	2.99	0.67
8 The teachers ridicule the students*	2.01	0.97
9 <i>The teachers are authoritarian*</i>	1.66	0.93
18 The teachers have good communication skills with patients	2.95	0.74

Table 3 (continued)

Items	Mean	SD
29 The teachers are good at providing feedback to students	2.98	0.69
32 The teachers provide constructive criticism here	2.77	0.69
37 The teachers give clear examples	2.95	0.64
39 The teachers get angry in teaching*	2.52	0.93
40 The teachers are well-prepared for their teaching sessions	3.17	0.62
50 The students irritate the teachers*	2.18	1.07
Total mean score	29.67	3.38
Maximum score	44	
Students' academic self-perception (SASP)		
5 Learning strategies that worked for me before continue to work for me now	2.69	0.85
10 I am confident about my passing this year	2.71	0.76
21 I feel I am being well prepared for my profession	2.69	0.67
26 Last year's work has been a good preparation for this year's work	2.74	0.67
27 I am able to memorize all I need	2.12	0.87
31 I have learnt a lot about empathy in my profession	3.13	0.56
41 My problem-solving skills are being well developed here	2.99	0.65
45 Much of what I have to learn seems relevant to a career in healthcare	3.09	0.63
Total mean score	22.16	3.22
Maximum score	32	
Students' perception of atmosphere (SPoA)		
11 The atmosphere is relaxed during ward teaching	2.55	0.80
12 This school is well time-tabled	2.86	0.78
17 Cheating is a problem in this school*	2.63	1.05
23 The atmosphere is relaxed during lectures	2.79	0.72
30 There are opportunities for me to develop my interpersonal skills	3.14	0.55
33 I feel comfortable in class socially	2.96	0.68
34 The atmosphere is relaxed during class/seminars/tutorials	2.84	0.68
35 I find the experience disappointing*	2.39	0.98
36 I am able to concentrate well	2.67	0.80
42 The enjoyment outweighs the stress of the course	2.61	0.78
43 The atmosphere motivates me as a learner	2.98	0.64
49 I feel able to ask the questions I want	2.69	0.83
Total mean score	33.11	4.72
Maximum score	48	
Students' social self-perception (SSSP)		
3 There is a good support system for students who get stressed	2.36	0.84
4 I am too tired to enjoy the course*	2.23	0.89
<i>14 I am rarely bored in this course</i>	1.85	1.12
15 I have good friends in this course	3.18	0.69
19 My social life is good	2.97	0.69
28 I seldom feel lonely	2.15	1.06
46 My accommodation is pleasant	2.88	0.67
Total mean score	17.62	2.75
Maximum score	28	

: Negative items; italic: item scored ≤ 2 ; italic: low scored negative items; bolded: true positive points.

one item was from the students' social self-perceptions subscale. The students thought that the teaching at UKM over-emphasizes factual learning (1.32), that teachers are authoritarian (1.66) and that they feel bored (1.85). Nine items scored higher than three, indicating that students are encouraged to participate during teaching sessions (3.15), the teaching encourages them to be active learners (3.03), the teaching is student-centred (3.01), teachers are knowledgeable (3.50), teachers are well-prepared for their teaching sessions (3.17), students learn a lot about empathy (3.13), what they learn seems relevant to a career in healthcare (3.09), there are opportunities for them to develop interpersonal skills (3.14) and they have good friends in the course (3.18). Out of the nine items scoring greater than three, only one item (teachers are knowledgeable) had a very positive perception (3.50). The other 38 items had scores between two to three, which indicated aspects of the learning environment that could be enhanced.

Gender-wise comparison

There was a significant difference in global scores between male and female medical students, with female students having more positive perceptions of their learning environment than male students. The global mean score was 130.8/200 (SD 14.62) for males and 137.0/200 (SD 14.42) for females ($p < 0.05$). However, there was no significant difference in the five subscale scores between male and female students (Table 4). There were nine individual items with statistically significant mean scores between male and female students (Table 5). Female students' scores were significantly higher than male students' scores in all nine items listed.

Relationship between perceptions and academic performance

A total of eight per cent (13/163) of the respondents were high achievers, 31.9% (52/163) were medium achievers and low achievers were 60.1% (98/163). A Pearson correlation test showed that there was no significant relationship between the students' perceptions of the learning environment and their academic performance ($R = -0.06$, $p = 0.45$). The mean of the global DREEM score was 129.1/200 (SD 14.13) for high achievers, 136.62/200 (SD 16.19) for medium achievers and 134.66 (SD 14.5) for low achievers. There was

Table 4: Global and subscale mean (SD) scores according to gender.

	Males (n = 38)	Females (n = 125)	P value
SPoL (Max 48)	31.48 (4.48)	33.53 (4.22)	NS
SPoT (Max 44)	28.79 (3.30)	29.92 (3.38)	NS
SASP (Max 32)	21.56 (3.72)	22.31 (3.04)	NS
SPoA (Max 48)	31.95 (5)	33.47 (4.59)	NS
SSSP (Max 28)	17.11 (3.13)	17.78 (2.61)	NS
Overall (Max 200)	130.84 (14.62)	137.02 (14.43)	<0.05

SPoL: students' perceptions of learning; SPoT: students' perceptions of teachers; SASP: students' academic self-perceptions; SPoA: students' perceptions of atmosphere; SSSP: students' social self-perceptions; Max: maximum score; NS: not significant.

Table 5: Items showing significant differences between male and female students (mean item scores).

Question	Male	Female	P value
I am encouraged to participate in class	2.92	3.22	<0.05
The teachers are knowledgeable	3.24	3.58	<0.05
I am too tired to enjoy this course	1.82	2.36	<0.05
The teaching is often stimulating	2.66	2.94	<0.05
The teaching is well focused	2.79	3.05	<0.05
There are opportunities for me to develop interpersonal skills	2.95	3.20	<0.05
I have learned a lot about empathy in my profession	2.95	3.18	<0.05
The teachers give clear examples	2.76	3.01	<0.05
The teaching encourages me to be an active learner	2.84	3.09	<0.05

no significant difference in the perceptions of learning environment among low, medium and high achievers ($p = 0.27$).

Discussion

The DREEM questionnaire provided an overview of first-year medical students' perceptions about the learning environment at UKM and also highlighted the areas of concern. The global DREEM score of 135.58/200 indicated that, overall, students had more positive than negative perceptions of their learning environment. Other local studies that used DREEM showed fairly similar results: 134.42/200 amongst nursing students at the International Islamic University Malaysia,⁹ 117.9/200 amongst Universiti Sains Malaysia medical students¹⁰ and 121.5/200 amongst dental college students.¹⁵ Internationally, overall DREEM scores reported were 99.6/200 in Iran,¹⁶ 137.3/200 in Australia,¹⁷ 109/200 in Trinidad⁶ and 143/200 in the United Kingdom.¹⁸

Scores for all five DREEM subscales reflected positive perceptions by the students. There were three items that scored below 2.0, which indicated problematic areas of the learning environment. Item 25 (the teaching over-emphasizes factual learning) had the lowest score (1.32) in the questionnaire. This could be because this research was performed on first-year medical students in which their major learning focus was basic medical sciences, which required them to learn many facts. Students also felt that the teachers were too authoritarian (item 9, score was 1.66). Item 14 (I am rarely bored in this course) scored 1.85 and needs to be explored further to identify what causes such boredom and whether the courses can be made more engaging. These three items also scored below 2.0 in other local studies.¹⁰

There were nine items that scored greater than 3.0. One of the items is item 2 (the teachers are knowledgeable), which scored 3.50, indicating an aspect of the learning environment at which this institution excels. The students felt that the lecturers were well equipped with vast knowledge to guide them in this course and were well prepared for classes. Item 15 (I have good friends in this school) scored 3.18, which showed that students have good peer relationships. There were 38 items that scored between 2.0 and 3.0, indicating aspects of the learning environment that can be enhanced further.

In this study, female students perceived their learning environment to be better than male students. Other studies showed significant difference by gender, with female students having more positive perceptions of the learning environment.^{17,19,20} However, one study reported that male students had better perceptions than female students.²¹ The higher scores among female students might reflect the difference in learning styles and the way they perceived the learning environment compared to that of male students.²² Despite this difference, higher scores in females might be due to gender bias, whereby there were more favourable responses among the female students due to better interaction between female students and female lecturers.²³

Few studies have revealed a significant relationship between students' perceptions of the learning environment and their academic achievement.^{24,25} A similar study reflected that those with higher scores on their learning environment had higher cGPAs.¹² Contrarily, results of the present study showed that there was no relationship between students' perceptions of the learning environment with their academic performance.

This could be due to other contributing factors that could influence their academic achievement such as learning motivation, learning habits and examination performance. A study showed that there was significant influence of study habits on academic achievement, with significant difference among under achievers and high achievers. There was a close relationship between poor study habits and under achievement. High achievers had been shown to have better study habits.²⁶ Additionally, parents' socio-economic statuses and students' former school backgrounds were significantly related to students' academic achievement in university.²⁷

Conclusion

The learning environment is one of the most important determinants of an effective curriculum. First year medical students in UKM perceived their learning environment positively. Some grey areas were identified that require remedial measures to ensure and maintain a high-quality learning environment for the students.

Limitations and recommendations

The results of the present study could not be generalised for the whole UKM medical faculty because, in this study, the DREEM questionnaires were distributed to first-year medical students only without the involvement of medical students from other academic years. Further studies to assess the perceptions of medical students in other academic years (year two, three, four and five altogether) in UKM using DREEM inventory should be performed in the future for comparisons. An additional comment should be made regarding the level of generality of the present study. In the present study, students were asked to reflect on their learning experience at UKM to date in their current programme of study. Thus, students were reporting perceptions of learning environments that were a summative aggregate of a range of specific learning experiences (i.e., different subjects) in their programme. Such an inclusive frame of reflection across a number of potentially diverse learning contexts may be

problematic because of the implicit assumption that the learning environments may be consistent over time and across different subjects.

Based on the results of the current study, there is room for improvement regarding student boredom; teaching should be conducted in a more creative manner so that students would not easily get bored in class. Additionally, teachers should be more approachable and flexible while dealing with the students so that students would not feel as if the teachers were authoritarian. Students should also be encouraged to think outside the box. Furthermore, teachers should try to correlate the facts in the books with the real case scenario, and highlight the relevance of the subjects for clinical practice during teachings so that students would not feel that the teachings overemphasised factual learning.

Conflict of interest

The authors declare that they have no conflict of interest.

Authors' contributions

AU: Supervised the work, evaluating the data, writing the manuscript and coordinating the study. NAO: Performed the study, analysing the data and writing the manuscript. ZNAR: Performed the study, analysing the data and writing the manuscript. MMS: Performed the study, analysing the data and writing the manuscript. PNAKF: Performed the study, analysing the data and writing the manuscript. SFI: Supervised the work, evaluating the data and writing the manuscript.

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