

'Neurophobia' of medical undergraduates: does it affect exam performance? The Sri Lankan perspective

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Abstract

'Neurophobia' is the 'fear of neural sciences and clinical neurology held by medical students and doctors'. Neurophobia, results in doctors performing a poor neurological examination and referring patients indiscriminately to neurologist. It is said to originate in medical school. The extent of the problem in Sri Lanka is yet to be established. The present study aims to ascertain whether neurophobia actually affects the medical undergraduates' performance at the final year examination or is a simple 'perceived' phobia without an impact on students' performance.

Materials and methods: The marks of students' for the Structured Essay Questions (SEQs) were analyzed at three consecutive final year examinations (2008-2010). Data were analyzed using SPSS v14. A p-value ≤ 0.05 was considered statistically significant.

Results: Sample size for years 2008-2010 were 160, 151 and 155 respectively, while the average marks (\pm SD) for all SEQs were 58.1 ± 7.7 , 54.5 ± 7.7 and 59.8 ± 9.2 respectively. In the 2008 batch the marks in neurology (59.8 ± 14.6) was significantly higher only from marks for pulmonology question (53.1 ± 12.7). In 2009 the marks for the neurology question (69.4 ± 15.0) was significantly higher than all other questions, while in 2010 the marks obtained for the neurology (54.6 ± 23.4) was significantly lower than the marks for the cardiology (61.8 ± 9.2), pulmonology (77.6 ± 9.6) and nephrology (60.9 ± 9.2). The students' overall average decreased significantly by exclusion of the neurology question in 2009 from 58.2 ± 8.0 to 54.5 ± 7.7 ($p < 0.001$), but not in the other years studied. With the exclusion of the neurology question marks, the average of those having an overall average for all questions of < 50 improved, but in the better students (overall average > 50) the average remained unchanged.

Conclusion: The impact of neurophobia on the performance of medical undergraduates at SEQ examinations seems to be very minimal. However, further studies are needed in other areas to assess the impact of neurophobia, on clinical practice, on patient-based clinical examination and management.

Index words: neurology education, neurophobia, medical students, Sri Lanka

Introduction

The term 'neurophobia' is defined as the 'fear of neural sciences and clinical neurology held by medical students and doctors'¹. Neurophobia is a common phenomenon, and medical students and doctors at all levels have difficulties in dealing with patients having neurological problems²⁻⁴. This results in doctors performing a poor neurological examination or indiscriminately referring patients with simple conditions to neurologists in order to avoid dealing with them⁵. Neurophobia is said to begin in medical school⁶. The reasons identified for this are poor undergraduate training of neurology, complexity of the neurological examination and difficulty in understanding basic neuroscience. However, the extent of the problem in Sri Lanka and how it affects the student's performance at examinations is not known.

At Faculty of Medical Sciences, University of Sri Jayewardenepura, medical undergraduates learn basic neuroanatomy and physiology as a part of the first two years teaching programme in basic sciences. In the 3rd and 4th years the students learn clinical skills in general medical wards and at a two week attachment to a neurology unit in a teaching hospital. In addition during the fourth and final year they are taught neurology topics at lectures, and tutorials and in the final year during a two month attachment to the Medicine Professorial Unit. However, recently the curriculum was changed and a specialized module on neurology was introduced during the 3rd and 4th years. This study includes batches prior to the curriculum change.

In the present study we tried to ascertain whether the knowledge of neurology or the lack of it actually affects the medical undergraduates' performance at the final year examination at Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka.

Methods

This retrospective study was undertaken during September-October 2010. The marks obtained by the

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students for the Structured Essay Questions (SEQs) were analyzed. The results of the SEQs at three consecutive final year examinations (2008-2010) at Faculty of Medical Sciences, University of Sri Jayewardenepura were included in the study.

Structure of the SEQ question papers

The 2008 and 2009 papers carried four SEQs each, whereas the 2010 paper carried six questions. The sub-specialty areas of each year's questions are given below in the order they appeared on the question paper,

2008 – Cardiology, Neurology, Pulmonology, Short notes

2009 – Neurology, Nephrology, Cardiology, Short notes

2010 – Nephrology, Neurology, Pulmonology, Cardiology, Hepatobilliary, Metabolic

In 2008 the main themes of the questions were on heart failure, Guillain Barre syndrome and Tuberculosis, while the short notes were on diabetic nephropathy, rheumatoid arthritis and lung function tests respectively. In the 2009 SEQ paper the questions were on stroke, chronic renal failure and secondary hypertension, followed by short notes on oesophageal varices and

hyperthyroidism. The 2010 question paper carried questions on nephrotic syndrome, lateral medullary syndrome, bronchial asthma, myocardial infarction, hepatitis and syndrome of inappropriate ADH secretion in the given order.

Data analysis

All data were double entered and cross checked for consistency. All marks are given out of a total of one hundred. Data were analyzed using SPSS version 14 (SPSS Inc., Chicago, IL, USA) statistical software package. The significance of the differences between means was tested using Student's t-test or ANOVA. A p-value ≤0.05 was considered statistically significant in all analysis.

Results

Sample size for years 2008-2010 were 160, 151 and 155 respectively. The mean marks (±SD) of students' for all SEQs for the years 2008-2010 were 58.1±7.7, 54.5±7.7 and 59.8±9.2 respectively. There was no significant difference between the marks of the 2008 and 2010 batches. However the overall marks between 2008 vs 2009 and 2009 vs 2010 batches were significantly different (p<0.05). The average and range of marks obtained for each SEQ by the respective batches of students are given in Table 1.

Table 1. Average marks of students for each SEQ

		<i>Average±SD</i>	<i>Range</i>	<i>Average all SEQs±SD</i>
2008 (n=160)	Neurology	59.8±14.6	12.5-90	58.1±7.7
	Pulmonology	53.1±12.7*	15-83	
	Cardiology	60.2±8.8	33-83	
	Short notes	59.5±7.0	40-78	
2009 (n=151)	Neurology	69.4±15.0	24.5-100	54.5±7.7
	Nephrology	58.5±5.5*	36-71.5	
	Cardiology	45.7±16.0*	0-85	
	Short notes	59.3±7.4*	36-74	
2010 (n=155)	Neurology	54.6±23.4	0-95	59.8±9.2
	Nephrology	60.9±9.2*	30-82	
	Pulmonology	77.6±9.6*	40-95	
	Cardiology	61.8±9.2*	38-83	
	Hepatobilliary	49.8±12.0*	10-80	
	Metabolic	54.0±18.8	0-93	

* Statistically significant difference (p<0.001) observed between neurology question and the respective SEQ

In post-hoc analysis of variance for the 2008 batch the marks obtained for neurology (59.8 ± 14.6) significantly varied (higher) only from marks obtained for the pulmonology question (53.1 ± 12.7). There were no significant difference observed between the neurology question and the two other SEQs in the 2008 batch. In the 2009 batch the marks obtained for the neurology question (69.4 ± 15.0) was significantly higher than the marks obtained for all other individual questions (Table 1). In post-hoc analysis of variance for the 2010 batch the marks obtained for the neurology question (54.6 ± 23.4) was significantly lower than the marks for the cardiology (61.8 ± 9.2), pulmonology (77.6 ± 9.6) and nephrology (60.9 ± 9.2) questions, while being significantly higher than the question on hepatobiliary (49.8 ± 12.0) system (Table 1).

When students marks for different SEQs were

categorized into groups of <35, 35-50, 50-75 and >75 the marks obtained for the neurology questions in all batches demonstrated a wider dispersion than almost all other questions (Table 2). The students overall average was not significantly affected by exclusion of the neurology question in the 2008 and 2010 batches. However, the average significantly decreased when the neurology question was excluded from the 2009 batch from 58.2 ± 8.0 to 54.5 ± 7.7 ($p < 0.001$) (Table 3). The effect of the neurology question on the overall average mark of students having an overall average of <35, 35-50, 50-75 and >75 was analyzed and are presented in Table 4. The average of students who were having an overall average for all questions of <35 or 35-50 improved with the exclusion of the neurology question and in the better students (overall average 50-75 or >75) the average reduced significantly when the neurology question marks were excluded (Table 4).

Table 2. Number of students (%) obtaining marks in different category of marks

Batch	Marks	Number of students (%)					
		Neurology	Nephrology	Pulmonology	Cardiology	Hepatobiliary	Other
2008	< 35	6 (3.8%)		11 (6.9%)	1 (0.6%)		0 (0%)
	35 - 49.9	23 (14.4%)		52 (32.5%)	13 (8.2%)		8 (5.0%)
	50 - 74.9	99 (61.9%)		92 (57.5)	138 (86.2%)		144 (90.0%)
	≥ 75	32 (20.0%)		5 (3.1%)	8 (5.0%)		8 (5.0%)
2009	< 35	2 (1.3%)	0 (0)		37 (24.5%)		0 (0%)
	35 - 49.9	18 (11.9%)	8 (5.3%)		54 (35.8%)		10 (6.6%)
	50 - 74.9	63 (41.2%)	143 (94.7%)		53 (35.1%)		141 (93.4%)
	≥ 75	68 (45.0%)	0 (0)		7 (4.6%)		0 (0%)
2010	< 35	33 (21.3%)	3 (1.9%)	0 (0)	0 (0)	13 (8.3%)	23 (14.8%)
	35 - 49.9	28 (14.4%)	11 (7.1%)	1 (0.6%)	15 (9.7%)	59 (38.1%)	40 (25.8%)
	50 - 74.9	59 (38.1%)	133 (85.8)	41 (26.4%)	127 (81.9%)	79 (51.0%)	71 (45.8%)
	≥ 75	35 (22.6%)	8 (5.2%)	113 (73.0%)	13 (8.4%)	4 (2.6%)	21 (13.6%)

Table 3. Students average with and without the neurology question

Batch	Mean (\pm SD)		
	All questions	Neurology excluded	p
2008 (n = 160)	58.1 \pm 7.7	57.6 \pm 7.2	0.511
2009 (n = 151)	58.2 \pm 8.0	54.5 \pm 7.7	<0.001
2010 (n = 155)	59.8 \pm 9.2	60.8 \pm 7.9	0.289

Table 4. Average marks with and without the neurology questions in students of different overall average

Batch	Average category (n)	Mean (\pm SD)		
		All questions	Neurology excluded	p
2008 (n= 160)	<35 (0)			
	35-50 (21)	44.7 \pm 3.9	46.5 \pm 4.1	<0.05
	50-75 (137)	59.9 \pm 5.7	59.1 \pm 5.8	NS
	>75 (2)	75.2 \pm 0.0	71.2 \pm 1.2	<0.05
2009 (n=151)	<35(0)			
	35-50 (36)	45.1 \pm 3.1	49.0 \pm 4.1	<0.05
	50-75 (115)	61.2 \pm 6.3	57.6 \pm 5.8	<0.05
	>75 (0)			
2010 (n=155)	<35(0)			
	35-50 (25)	45.6 \pm 3.5	49.8 \pm 4.5	<0.05
	50-75 (127)	62.2 \pm 6.7	62.6 \pm 6.0	NS
	>75 (3)	78.6 \pm 3.9	77.0 \pm 3.6	<0.05

Discussion

This is the first report on the effects of knowledge of neurology and neurophobia on medical students' examination performance in Sri Lanka. We report little or no significant difference in the students' marks for neurology SEQs and other SEQs for the 2008 batch, a significantly higher average for neurology in 2009 and a lower one in 2010. The average marks of students for neurology in 2010 could be lower in comparison to other essay questions probably due to the question being on lateral medullary syndrome an area that the students are exposed to less frequently in wards and during

teaching activities, while in the same year the other SEQs being on nephrotic syndrome, bronchial asthma and myocardial infarction which are topics that are more commonly encountered and frequently taught. However, the exclusion of the neurology SEQ for the calculation of average did not significantly improve the average of the students in any of the years. In fact in 2010 a significant reduction in the average occurred when the neurology SEQ was excluded.

In students with an overall average below 50 the exclusion of neurology question significantly improved the overall average. In contrast the students with an

overall average above 50 the average either reduced or remain unchanged when the marks for the neurology question was excluded. This highlights the fact that better performing students tend to benefit more from neurology questions and that the students who were under performing in other subject areas were also weak in their neurology knowledge.

Although the impact of neurophobia on the performance of medical undergraduates at SEQ examinations seems to be very minimal, neurophobia has far reaching implications. The neurophobia begins at medical school and continues to clinical practice later in the career. In a recent survey among medical students, senior house officers and general practitioners in the UK basic neurosciences and clinical neurology were ranked highest in terms of difficulty in learning when compared to other organ systems⁶. It is indeed from this inability to apply basic sciences to clinical situations stems the root of the neurophobia¹. Integrating clinical neurology with the basic neurosciences, improved teaching of clinical neurology and paring down the basic neuroscience syllabus to the essential are some of the means adopted by neurologists around the world to combat this problem⁵⁻⁷.

In the Sri Lankan context at present there are no studies addressing this important aspect of medical education. The impact of neurophobia on the performance of medical undergraduates at SEQ examinations seems to be very minimal. However, further

studies are needed in other areas of clinical practice, like on patient-based clinical examination and patient management to assess the true impact of neurophobia.

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