

How do preclinical medical students learn physiology? A study in two medical schools in Khartoum

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Abstract: Objective: to evaluate the current study habits of medical students regarding how they learn the basic science physiology and suggest how that may be improved. Three hundreds undergraduate students from two Sudanese universities were randomly selected to fill in a questionnaire inquiring about different aspects of how they learn physiology. Ninety eight percent of the students responded that lectures are important. Out of 300 students, 77% think tutorials are important; but only 59% will attend if attendance is not taken. 28% of the students find physiology practical classes not useful, 67% use Concise Human Physiology as the main reference, 13% of students use the internet to get physiology information. Only 14% of students consult teachers when they encounter a difficulty. Students are sure (98%) that studying physiology is relevant to their goal of becoming doctors. In conclusion, students are motivated; they practice a mixture of learning styles that are partly teacher centered and partly student centered. Students appear willing to take responsibility for their own learning; they use references, consult amongst themselves to solve problems and use online resources.

Keywords: Learning physiology, medical students

Introduction

Medical education is currently undergoing noticeable transformation. This transformation aims to improve medical education worldwide and is being championed by the World Health Organization and The World Federation for Medical Education (WHO-WFME Task Force on Accreditation, 2004).

WFME has recommended a set of standards to be adopted as global standards of basic (undergraduate) medical education and to serve as the basis for any accreditation programme (WFME, 1998). The global standards document does not recommend any particular type of curriculum model, structure, content or instruction methods; but it asks for "the curriculum and instructional methods should ensure that students have responsibility for their learning process and should prepare them for lifelong, self-directed learning" (paragraph 2.1 of the WFME global standards document).

Medical educationalists have long argued that medical students are "adult learners" who should take an active role in their own education, rather than being passive learners. Students who are skilled in information gathering will have the capability of lifelong self-education i.e. they can keep up with the continuously changing and increasing medical knowledge. Medical schools are encouraged to expand on student-centered activities like seminars, problem-based learning sessions, student assignments and student research

projects. Teacher-centered activities like lectures are discouraged^(3, 4).

In the Sudan, most medical schools are modeled on the Faculty of Medicine, University of Khartoum where instruction is still largely teacher-centered, especially in the basic medical sciences. However, some activities, like seminars and tutorials, have the potential of being student-centered, if the students are keen. The University of Khartoum, and other universities, provide medical students with resources for self-education like libraries, computer laboratories with internet connection and skills laboratories.

Our medical school, the Faculty of Medicine, University of Khartoum, is on its way to introducing a reformed curriculum that would further encourage students to be active learners "The educational programme will adhere to the principles of adult learning and adopt innovative educational concepts"⁽⁵⁾. Self-education requires students to change some of the practices and attitudes they are accustomed to.

In this study, we assess the current practices and attitudes of medical students from two Sudanese universities towards learning one of the basic sciences i.e. physiology. Are students taking an active role in their own education or do they rely on their teachers? Information will be a useful feedback, to know how things are at present from the students' perspective. It is widely believed that knowing the practices and attitudes of students is necessary for getting them involved actively in the process of reform and for directing the process of reform.

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Materials and Methods

A total of 300 medical students participated in this study, 200 are from the government-sponsored Faculty of Medicine, University of Khartoum and 100 from the private medical school of the Academy of Medical Sciences and Technology. Half of the participating students of each university are junior students who are early in their study of physiology i.e. second year students at the University of Khartoum and semester two students of the Academy. The other half are senior preclinical students who are advanced in their study of physiology i.e. 3rd year students at the University of Khartoum and semester four students at the Academy.

A questionnaire of 14 questions was prepared inquiring about the different methods by which students learn physiology. All the questions were in one sheet of paper (two pages) and could be answered in a few minutes. Eleven of the questions required simply choosing "Yes" or "No" responses. Two questions gave four options to choose one from, and one question required the participant to write their answer. At the end of the questionnaire, students were allowed a space and asked to write any comments about how they learn physiology, if they wish. There were no questions about the name or gender of the participant.

Students were approached in one of their physiology practical or tutorial sessions, copies of the questionnaire equal in number to half the number of the students in that session were handed out to be distributed randomly. The students who got questionnaires were asked to fill them in when they have free time towards the end of the session, have it collected by a student to deliver. No student refused participation.

The study was conducted in May and June 2005. Data from the filled questionnaires were loaded on to the Excel programme to be grouped and analyzed.

Results

Students were sure (98%) that studying physiology is relevant to their goal of becoming doctors.

Preclinical medical students, juniors and seniors, are keen on lectures. Almost all students, 98% think lectures are important for them to learn physiology and 86% would attend lectures even if no attendance is taken (Table 1).

Table 1 also shows that 77% of all students think that tutorials are important, only 59% will attend them if no attendance is taken and less than 50% prepare for tutorials by studying the topics. Students of the Academy of Medical Sciences are far less interested in tutorials than their counterparts in the University of Khartoum (Table 1).

28% of all students find physiology practical classes not useful. Seniors of the Academy are the least interested (Table 1).

23% of all students think that lecture notes are enough to learn physiology (Table 2).

With regard to reference books, 67% of all students use 'Concise Human Physiology' book, 20% use 'Ganong's Review of Medical Physiology' and 12% use 'Guyton's Textbook of Physiology' (Table 2).

67% of all students use old examinations to guide their study of physiology. Students of the Academy of Medical Sciences use old examinations more often than Khartoum University students (Table 2).

Only 14% of students turn to their teachers when they encounter a difficulty in studying physiology. Most of them (48%) consult colleagues or senior colleagues and the others turn to references (Table 3).

13% of students use the internet to get physiology information; the juniors appear more interested in the internet than seniors. Only 5% of all students ever checked a scientific journal for physiology information (Table 3).

Table 1. How students rate the different methods of instructions:

Questions about methods of instruction	K n=100	2 A n=50	2 K n=100	3 A n=50	3 All students n=300
Do you think you need lectures to learn physiology?	96%	98%	99%	98%	98%
Would you attend physiology lectures if no attendance is taken?	89%	84%	88%	82%	86%
Do you think you need tutorials to learn physiology?	87%	66%	89%	66%	77%
Would you attend physiology tutorials if no attendance is taken?	68%	48%	72%	48%	59%
Do you prepare for tutorials by studying the topic?	53%	52%	68%	14%	47%
Do you find physiology practical classes useful	70%	82%	77%	58%	72%

n = number of students, K2 are Khartoum University second year students. A2 are Academy semester two students. K3 are Khartoum third year students. A3 are Academy semester four students. All students are K2 + A2 + K3+ A3.

Table 2 The sources from which students get physiology information

Questions about sources of information	K n=100	2 A n=50	2 K n=100	3 A n=50	3 All students n=300
Are lecture notes enough to study physiology?	18%	28%	24%	22%	23%
What reference books do you use?					
Concise Human Physiology (Sukkar et al) Blackwell	68%	80%	58%	62%	67%
Review of Medical Physiology (Ganonge) Langes	20%	16%	35%	10%	20%
Textbook of Medical Physiology (Guyton & Hall) Saunders	11%	4%	4%	28%	12%
Others			1%		1%
Do you use old examinations to help you study physiology?	52%	80%	60%	78%	67%

n = number of students, K2 is Khartoum University second year students. A2 are Academy semester two students. K3 are Khartoum third year students. A3 are Academy semester four students. All students are K2 + A2 + K3+ A3.

Table 3: Whom do students consult when there is a difficult topic in physiology:

Questions about who is consulted when a difficulty is faced.	K n=100	2 A n=50	2 K n=100	3 A n=50	3 All students n=300
Who do you consult if you face a difficulty?					
Teachers	14%	16%	17%	10%	14%
Senior colleagues	30%	34%	11%	12%	22%
Colleagues	22%	18%	31%	32%	26%
Turn to reference books	34%	32%	40%	46%	38%
Do you ever use the internet to get physiology information?	19%	18%	9%	6%	13%
Do you ever use scientific journals to get physiology information?	6%	2%	4%	8%	5%

n = number of students, K2 is Khartoum University second year students. A2 are Academy semester two students. K3 are Khartoum third year students. A3 are Academy semester four students. All students are K2 + A2 + K3+ A3.

Discussion

There are two types of medical schools in the Sudan: government-sponsored and fully private. In this study, students from two medical schools i.e. Faculty of Medicine, University of Khartoum and Faculty of Medicine, Academy of Medical Sciences and Technology, were included. These two represent the two types of medical schools. The 300 students who participated in this study represent 32% of all preclinical medical students in the two schools.

The results indicate that students are motivated enough to study physiology because they are convinced that it serves their purpose of becoming doctors. However, it is surprising that students find tutorials less useful than lectures. The majority of students do not bother to prepare for tutorials by studying the topic beforehand. Does this mean students are not interested? Or have teachers turned tutorials into repeat lectures that are not interesting to students any more? Alternatively, is it to do with the numbers of students that make it impossible to conduct tutorials as small group activities? Answers to these questions, from personal experience, and from the comments made by students at the end of the questionnaire, probably point to the ineffectiveness of the teaching/learning process. The student/teacher ratio does not allow tutorials to be small group activities; teachers are forced into doing most of the talking rather than directing a discussion. No wonder students lose interest because there is no teacher/student interaction. For many students tutorials become a waste of time. After all, students want to learn the subject and pass examinations in a limited period, and would only care for

academic activities that fulfill these goals.

Another disturbing finding is that more than a quarter of the students (28%) find physiology practical classes not useful. Are these classes not relevant or not properly conducted? That is something which should be investigated further.

Another unhealthy finding is the little contact between students and teachers at times of need. Only 14% of students consult their teachers when they face difficulties while studying physiology. Most of the students turn to their colleagues (48%) or reference books (38%). Is it because teachers are unavailable or inaccessible? It might be a good idea for teachers to allocate office hours to students.

The finding that 13% of all students use the internet to get physiology information is a good sign of a desire to be up to date because undergraduates do not need to use online information to pass their examinations (23% of students think that lecture notes are all they need, as shown in Table 2). Access to the internet is available to all students in the University of Khartoum and the Academy.

It is refreshing that the primary reference book is one of our own; 'Concise Human Physiology' a multi-authored book edited by Professors Sukkar, El Munshid, and Ardawi. More than two thirds of students use this book.

Large numbers of students use old examinations to guide their study of physiology. However, teachers have no input to this activity. What type of questions do the students get in these examinations? Are they relevant? Who answers the questions? It could be wise of the Department of Physiology to get involved to ensure the quality of this learning activity.

In conclusion, it can be stated that students are motivated, their learning is by hybrid ways that are partly teacher centered and partly student centered. Results of this study indicate that students are willing to take responsibility for their own learning: they use references, consult amongst themselves to solve problems, use online resources. However, the less than satisfactory interest in tutorials cannot be blamed on students alone.

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