Factors influencing academic achievement of medical students in the basic medical sciences at a conventional College of Medicine

العوامل المؤثرُة على التحصيل الأكاديمي لطُلابِ الطبّ في مرحلة العُلومِ الطبيةِ الأساسيةِ

في كليّة طب تقليدية.

Modified on May 7, 2007

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Short title: **Factors influencing academic achievement**

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الملخص

الخلفية: كليَّة الطبِّ بجامعة الملك سعود لديها النيةُ القويةُ لتَغيير منهجها بشكل كامل. لكي يكون التغيير مبني على الأدلة العلمية فقد تم إجراء هذه الدراسةِ.

الأهداف: تهدف الدراسة للتعرف على وجهاتِ نظر الطلاب حول العوامل المهمةِ والتي قَدْ تُؤثرُ على تحصيلهم الأكاديمي في مرحلة تعليمِ العُلومِ الأساسي بالكلية. كما تهدف الدراسة، أيضاً، للمعرفة اقتراحات الطلابَ لتَحسين نوعيةِ التَعَلّم في هذه المرحلة من دراسة الطب.

طريقة البحث: تم عقد مجموعة مركزة مَع عدد ستة من طُلابِ السنة الثالثة تناولت ابرز العوامل المهمةِ التي تُؤثّرُ على تَعَلّم الطلابِ في العُلومِ الأساسيةِ. تم تصميم استبانة بناءاً على تحليل نتائج الدراسة النوعية. تم تقسيم الاستبانة الى ثلاثة أقسامِ. القسم الأول احتوى على البياناتِ الديموغرافية، بينما القسم الثاني تخصيصه لتحديد أهم إثنى عشرَ عاملاً يؤثر سلباً في تحصيل الطلاب في المرحلة الأساسية. أما القسم الثالث فتم تخصيصه لتحديد أبرز إثنى عشرَ عاملاً يؤثر بشكل ايجابي في تحصيل الطلاب في المرحلة الأساسية. ولقد تم استخدام مقياس likerd المكون من خمس نقاط لقيَاس رَدود الطلابِ حول كُلّ عامل. تم توزيع الاستبانات لجميع (٦٠٦) طُلاب لسَنَةِ الثانيةِ والثالثةِ في شهر فبرايرلعام٢٠٠٥ أي في نهايةِ الفصل الدراسي الأول.

النّتائج: تم استرجاع ٤٠٩ (٦٧,٥ %) استبانة من أصل ٦٠٦. ثمانون بالمائة من الطلبة الذكور. أكثر منْ ٥٧ % من طلاب السنة الثانيةِ. أهم خمسة عوامل تؤثر سلباً في تحصيل الطلاب في المرحلة الأساسية هي كما يلي : ١. الكمية الضخمة من المحاضراتِ (٨٩,٥ %)، ٢. الفصل التام بين مقررات العلوم الأساسيةِ طوال السنوات (٨٥,١ %)، ٣. غياب دليل الطالبِ لجميع المقررات (٨٤,٨ %)، ٤. التعليم الذي يَعتمدُ بشكل رئيس على المُحَاضرَات التلقينية (٧٥,٣ %)، ٥. طرق تقويم الطلاب والاختبارات التي تُوجّهُ الطالب للتركيز على الحفظ و التعلُم السطحي (٧٤,٤ %). ومن ناحية أخرى فإن الدراسة كشفت عن أبرز خمسة عوامل تؤثر إيجابا في التحصيل الأكاديمي للطلاب. وهي كالتالي: ١. التداخل والتكامل الأفقي بين مقررات العُلومِ الأساسيةِ (٩٣,٢ %)، ٢. وجود دليل الطالب لكُلّ مقرر (٩٠ %)، ٣. تحسين مهارات المعلمين في إلقاء المحاضرات (٨٩,٢ %)، ٤. المحاضرات التفاعلية والتَعَلّم بطريقة حل المشكلات في مجموعات صغيرةِ (٨٧,٣ %)، ٥. تَخفيض عددِ المحاضراتِ وتَخصيص أوقاتِ محددة للتَعَلّم الذاتي (٨٤,١ %).

الخلاصة: لقد أثبتت الدراسة على أن منهج العلوم الأساسية بوضعه الحالي يحتاج إلى تغيير مِنْ المنهج التقليدي (كما هو الحال عليه الآن) إلى الطرق الإبداعيةِ الجديدة.

الكلمات المرجعية: تعليم العُلومِ الأساسي، التحصيل الأكاديمي لطُلابِ الطبّ، التعليم الطبي في المملكة العربية السعودية.

ABSTRACT

Objectives: To explore the medical student's views on factors that influence their academic achievement in basic sciences education.

Subjects and Methods: During the month of February 2005, a self administered, anonymous, questionnaire was distributed to all (606) medical students of second and third year at the end of first semester of basic sciences. A qualitative focus group was carried out on factors that influence students learning in basic sciences. The study questionnaire which was developed based on the analysis of focus group session, consists of factors that negatively interfere and positively enhance their academic achievements. A five point likerd scale was used to measure the responses.

Results: The response rate was 67.5%. Males were 80%. The five important factors that negatively interfere with their academic achievement were: huge amount of lectures (89.5%), disintegration between basic science courses (85.1%), absence of student guide for all courses (84.8%), instructional methodology that rely mainly on traditional lecturing (75.3%), and student's assessment tools that direct the learning towards recall and superficial domain of learning process (74.4%). And five factors that positively enhance their academic achievement were: horizontal integration between basic sciences courses (93.2%), presence of study guide for each course (90%), improving lecturing skills of basic science teachers (89.2%), interactive lectures or tutorials and problem-based learning in small group (87.3%), reduce number of lectures and to allocate protected time for self-directed learning (84.1%).

Conclusion: The results of this study indicate that our basic sciences curriculum has to be changed from conventional to innovative approaches.

Introduction:

Healing the sick—now called the practice of medicine, which is one of the oldest professions. Medicine has changed greatly in the last 100 years. To become a doctor, a person has to study for at least seven years after high school. A medical school is usually part of large university. Its function is to teach the wide variety of sciences and techniques a doctor must know. Medical Education is a lifelong process embracing premedical experience, undergraduate education, general clinical training, specialist or vocational training, subspecialty training, and continuing medical education. The effective student learning is based on the conditions (i) when they are trying to solve problems or answer questions that they regard as important, intriguing or beautiful (ii) when they are able to do so in a challenging yet supportive environment in which they can feel a strong sense of control over their own education (iii) when they can work collaboratively with other learners to grapple with the problems (iv) when they believe that their work will be considered fairly and honestly(1-5). Moreover, the scientific accomplishment of a student at medical school depends on personal, environmental and academic factors (6).

The under graduate medical curriculum consists of two broad phases—basic medical sciences and clinical medicine. Studies in the basic sciences involve learning in detail the normal structure and function of the human body and how these are altered by disease. Given the continued advances in understanding of the basic sciences that are fundamental to clinical medicine, it is important that the curriculum be designed to integrate basic science and clinical medicine throughout the course. Students develop a better appreciation of the importance of basic science when they can see the clinical applications of basic science knowledge, and they become better clinicians by understanding the scientific underpinnings of clinical medicine. In addition, given the importance of lifelong learning and the need for physicians to understand future advances in basic sciences through out their careers, it is essential that medical students develop a value system that recognizes the important link between basic science and clinical medicine, and that they acquire skills that facilitates future understanding of the interface of basic science and clinical medicine. Traditional medical school curricula required students to absorb impracticable

amounts of scientific information in Lecture format for the first two years, in preparation for standardized tests that grade their ability in basic sciences. But to increase the relevance of undergraduate medical school instruction in the basic sciences to clinical practice, and to improve students skills in the application of basic science knowledge, several medical schools began exploring the use of Problem-Based Learning (PBL) methods for basic science instructions(7). The College of Medicine at King Saud University was established in 1969, with a traditional medical school curriculum. But the curriculum and method of teaching has always been the subject of investigation and evaluation. As the college is having strong intention to change the whole curriculum, it is essential to look for specific scientific evidence. The current study was carried out (i) to explore the medical student's views about the important factors that influence their academic achievement in the basic sciences education and (ii) to identify their suggestions so as to improve the quality of teaching and learning in basic sciences education.

Methodology:

A descriptive cross-sectional study was conducted at the college of medicine of King Saud University, in Riyadh city, Saudi Arabia. A qualitative assessment of focus group was carried out with seven third year medical students. The two hours session was conducted with this group to discuss the important factors that influence students learning in basic sciences. An appropriate questionnaire was developed based on the analysis of the focus group session. The self administered and anonymous questionnaire was distributed to all (606) medical students of second and third year, at the end of first semester, 3 - 4 weeks before the start of examination, during the month of February 2005. Student in year 2 & 3 were qualified enough to respond to the study questions. In our university system all students admitted to the college of Medicine they have an excellent academic record and they must have completed one year preparation program in science & other university required courses. Furthermore, the targeted population of the present study were basic science students. Therefore, student in year 2 & 3 were qualified enough to respond to the study questions. Along with demographic data (gender, year of medical program), responses for the top12 factors that assumed to be negatively interfering with the student's academic achievement and responses for the top 12 factors that positively enhance their academic achievement were collected. The five point likred scale was used to measure the responses of students about each factor.

Statistical analysis:

The data was analyzed using a z-test for single proportion. A p-value of < 0.05 was considered as statistically significant. The responses of 5-point scale were collapsed into two categories for analysis and better interpretation of data.

Results:

Of the 606 students, 409 (67.5%) were responded. The response of second and third year students were 235 (57.5%) and 174 (42.5%) respectively. About 80% were males. The responses for the top12 factors that negatively interfere with their academic achievement was shown in Table.1 Out of these factors, the high proportion significant factors that the students agree and strongly agree were: the large amount of lectures(89.5%), the disintegration between basic science courses (85.1%), and the absence of study guide for all courses(84.8%). And other six academic related factors were also agreed and strongly agreed by the students as negative interference in their academic achievement, where all the proportions are statistically significantly higher than hypothetical 50%. Interestingly, the factor "study in English" as negatively interfering factor was felt only by 54% which is not a statistically significant proportion. The remaining two factors which could be related to social factors [lack of parking facilities (59%) and the university campus is far away from student's home (32%)] also felt by students as negatively interfere with their academic achievement.

The responses to the top 12 factors which positively enhance student's academic achievement were shown in table2. Highly statistically significant proportion of students agree and strongly agree for: the horizontal integration between basic sciences courses (93.2%), presence of study guide for each course (90%), improving the lecturing skills of basic science teachers (89.2%), and the interactive lectures or tutorials and problem based learning in small group (87.3%). The students also attributed the positive enhancement in their academic achievement, by agreeing and strongly agreeing for: reducing the number of lectures (84.1%), improving the quality of assessment tools (80%), improving the faculty–student relationship (80%), reduce the number of students in each batch (79%), and activating the role of academic counselor (78%). Only 24% of the students were felt that teaching and learning the basic sciences in Arabic language could positively enhance their academic achievement which is a statistically significantly lower proportion when compared with the hypothetical 50%.

Discussion:

This descriptive study had quantified the views of medical students on the qualitative factors which affects the positive enhancement and interfere negatively towards their academic achievements. The students were concerned mainly towards the large amount of lectures, instructional methods which rely mainly in traditional lecturing, higher number of students in each batch, assessment tools which directly relates to superficial learning and disorganized lecturers. All these factors were very much resembles to teaching pattern of basic sciences in a medical school of KSU where traditional curriculum is in practice. Even though this study has not quantified the performance of students in basic medical science courses and the reasons for their declining performance, but several authors previously reported in this area from different countries (8-10). Some of the workers felt that the large number of students and the young age of the students are the major contributing factors to the high failure rate in basic sciences exams (11). Others observed that the quality of teaching, disruptions of the academic calendar due to frequent stay at home orders by labor unions (12,13), inadequate facilities (14,15), the validity of pre medical school scores, the entry admission procedures and class size are the major factors affecting students academic achievements in the pre-clinical examinations (16,17). In the study by Habib-ullah Khan et al, it has been shown that the class attendance during teaching sessions has a direct impact on the examination results in basic medical sciences (18). The association of three group of factors [(i) factors related to students (ii) factors related to university environment (iii) factors associated with student's family] with low academic achievement of medical students was reported by Manee Pinyopornpanish et al (6). Some of the environment factors which negatively interfere with academic achievement were also reported in our study. Maurice B.Visscher (19) in his study has focused on different aspects of decline on the importance of teaching basic medical sciences in medical school curricula. Support for problem-based learning curriculum by basic science faculty and practical feasibility to implement in terms of time consumption by faculty was studied by Anderson and Glew (7). In our study also, the students expressed their views on the factors of improving teaching skills, modification of assessment tools, and reduction of class strength and for the introduction of problem based learning method for teaching which directly indicates towards more importance on teaching basic medical sciences. Knowledge loss of medical students on first year basic science courses at the University of Saskatchiwan was studied by Marcel FD'Eon (20), in which no reasons were found for the loss of knowledge. But in our study, the factor of

integration of basic science courses was stressed, so that students can understand in a better way all the courses and a result the loss of knowledge could be minimum.

By using the methodology of focus group discussion to develop a data collection tool, this study has brought out the quantified opinion of medical students on the factors affecting academic achievement in basic medical sciences. Based on the findings of this study, it can be concluded that there is a need to reform the existent conventional basic sciences curriculum and also to look into other areas of concern so that students can not only perform better, but also gain sufficient knowledge in basic medical sciences.

Acknowlegment:

The author is grateful to Dr. Shafi Ahmed and Professor Ashry Gad for their statistical assistance and valuable comments.

References:

1. Van den Hurk MM, Dolmans D, Wolfhagen I, Van der Vleute C. Quality of student-generated learning issues in a problem-based curriculum. Medical Teacher 2001; 23: 567-571.

2. Peterson M. A team-based approach to problem-based learning: an evaluation of structured team problem solving. Journal of Excellence College Teaching 1996; 7: 129-153.

3. Hmelo C. Problem-based learning: Effects on the early acquisition of cognitive skill in medicine. Journal of Learning Science 1998; 7: 173-208.

4. Dods R. An action research study of the effectiveness of problem-based learning in promoting the acquisition and retention of knowledge. Journal of Education of the Gifted 1997; 20: 423-437.

5. Vernon D, Blake R. Does problem-based learning work? A meta- analysis of evaluative research. Academic Medicine 1993; 68: 550-563.

6. Pinyopornpanish M, Sribanditmongkok P, Boonyanaruthee V, Chan-ob T, Maneetorn N, Uuphanthsath R. Factors affecting low academic achievement of medical students in the faculty of medicine, Chiang Mai University. Changi Mai Med Bull 2004; 43: 15-23.

7. Anderson WL, Glew RH. Support of a problem-based learning curriculum by basic science faculty. Med Educ Online 2002; 7:10. Available from URL http://www.med-ed-online.org.

8. Olaleye SB, Salami HA. Predictor of academic performance in the pre-clinical sciences: effects of age, sex and mode of admission at the Maiduguri Medical School. Afr. J.Med.Sci. 1997; 26: 189-190.

9. Barabara B, Sylvia IE. Educational Programs in U.S. Medical Schools, 2001-2002. JAMA 2002; 288: 1067-1072.

10. Adegoke OA, Noronha C. University Pre-Medical Academic Performance as predictor of Performance in the Medical School: A case study at the College of Medicine of the Unviersity of Lagos. Nigerian Journal of Health and Biomedical sciences 2002; 1: 49-53.

11. Oyebola DDO, Adewoye OE, Iyaniwura JO, Alada ARA, Fasanmade AA, Raji Y. A comparative Study of student's performance in pre-clinical Physiology assessed by multiple choice and short essay questions. Afr. J.Med. Med. Sci. 2000; 29: 201-205.

12. Bamgboye EA, Ogunowo BE, Badru OB, Adewoye EO. Students' admission grades and performance at Ibadan University pre-clinical MBBS Examinations. Afr.J.Med.Sci. 2001; 30: 207-211.

13. Nwoha PI. Students' attitude and predictor of performance in Anatomy. Afr.J.Med.Med.Sci. 1992; 21: 41-45.

14. Faisal AL, Annette SR. Can selection Assessment Predict Students Achievements in the Premedical Year? A study at Arabian Gulf University. Education for health 2001; 4: 277-286.

15. Patrick LE, Aitmaier EM, Kuperman S, Ugohini KA. Structured Interview for medical school admission Phase 1: initial procedures and results. Acad. Med. 2001; 76: 66-71.

16. Collins JP, White GR, Kennedy JA. Entry to medical School: an audit of traditional selection requirements. Med Educ. 1995; 29: 22-28.

17. Ten Cate O, Smal K. Educational assessment center techniques entrance selection in medical school. Acad Med. 2002; 77: 737-739.

18. Khan H, Khattak AM, Mahsud I, Munir A, Ali S, Khan MH. Impact of class attendance upon examination results of students in basic medical sciences. J Ayub Med Coll. 2003; Apr-Jun; 15: 56-58.

19. Visscher MB. The Decline in emphasis on basic medical sciences in medical school curricula. Ala J Med Sci. 1974; Jul; 11: 215-22.

20. D'Eon MF. Knowledge loss of medical students on first year basic science courses at the university of Saskatchewan. BMC Medical Education 2006; 6:5.

Table 1: Factors that negatively interfere with student's academic achievement.

No.	Factors	Agree and Strongly Agree (n = 409) No. (%)
1.	The large amount of lectures	366 (89.5%)*
2.	The disintegration between basic science courses	348 (85.1%) *
3.	The absence of study guide for all courses	347 (84.8%) *
4.	The instructional methods that rely mainly on traditional lecturing.	308 (75.3%) *
5.	The assessment tools that direct the learning towards recall and superficial learning	304 (74.4%) *
6.	The absence of effective academic counselor	289 (71%) *
7.	Too many students in each batch	275 (67%) *
8.	Weak faculty-student relationship	262 (64% *
9.	Disorganized lecturer	262 (64%) *
10.	Lack of parking facilities	241 (59%) *
11.	Study in English	222 (54%) **
12.	The university campus is far away from student's home	132 (32%) **

* Statistically significantly higher from hypothetical 50%.
** Not significantly different from hypothetical 50%.
** Statistically significantly lower from hypothetical 50%.

Table 2: Factors that positively enhance student's academic achievement.

No.	Factors	Agree and Strongly Agree (n = 409) No. (%)
1.	The horizontal integration between basic sciences courses	381 (93.2%)*
2.	The presence of study guide for each course	368 (90.0%) *
3.	Improving the lecturing skills of basic science teachers	365 (89.2%) *
4.	The interactive lectures or tutorials and problem-based learning in small group	357 (87.3%) *
5.	Reduce the number of lectures and to allocate protected time for self-directed learning	343 (84.1%) *
6.	Improve the quality of assessment tools	327 (80%) *
7.	Improve the faculty-student relationship	326 (80%) *
8.	Reduce the number of students in each batch	321 (79%) *
9.	Activate the role academic counselor, plus there should be a counselor for each student	320 (78%) *
10.	Provide appropriate parking facilities	303 (74%) *
11.	Provide appropriate housing facilities	185 (45%) **
12.	Teaching and learning in Arabic language	99 (24%) **

* Statistically significantly higher from hypothetical 50%.
** Not significantly different from hypothetical 50%.
** Statistically significantly lower from hypothetical 50%.