JKAU: Med. Sci., **Vol. 19** No. 4, pp: 73-84 (2012 A.D. / 1433 A.H.)
DOI: 10.4197/Med. 19-4.5

Perception of Medical Students during the Foundation Year at King Abdulaziz University

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Abstract. To assess the perceptions of the second year medical students regarding the courses they studied during the foundation year and compare the results of two consecutive years. Second year medical students, one hundred-forty males and females, from two successive years who had finished their foundation year study in 2008/2009 and 2009/2010 at King Abdulaziz University were included in this comparative cross-sectional study. A well-constructed questionnaire, which included questions on the nine courses taught this year, was distributed to the students. Focus group discussions were held with participants to validate the questionnaire results. The data was statistically analyzed using SPSS (version 16, Chicago, USA).The response rate was about 98 (70%) in each year. There was a significant improvement in the student perception in 2009/2010 in some courses *e.g.,* Computer Science and Statistics when compared to those of 2008/2009. The students offered some recommendations for improving the foundation year *e.g.,* "It is better to specify a pre-health foundation year for health colleges". In conclusion, the foundation year is important in preparing medical students, however, the student's perceptions regarding most of its courses were low and they recommend to be reshaped to include only the courses and necessary information for preparing competent physicians.

Keywords: Perception, Medical students, Foundation year, King Abdulaziz University.

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Accepted for publication: 05 March 2012. Received: 04 November 2011.

Introduction

No one denies the effect of the premed years in the undergraduate medical students. It was observed that even those students who successfully pass the premed, not all of them enter to Medical School[1].

So many members in several medical school admission committees see the premed years as an opportunity for the students to test themselves as applicants to the medical school, and see if they are fit for this profession. On the other hand, most of the premed students saw it as a path filled with difficulties or obstacles that they had to pass in order to gain entry to the medical school[1].

In 1910, Abraham Flexner formalized the idea of premedical education. Since then, most medical educators have questioned what are the best courses for the premedical years, and what is the best way to prepare students for medical school[2]. However, little research has been done to evaluate the premedical years and to address the different views. Recently, King Abdulaziz University introduced a foundation year for science colleges, which is considered a requirement for entry to medical school. The preparatory courses include mathematics, physics, English, statistics, chemistry, biology, and communication skills. However, what is really important, and what is missing from the curriculum for this foundation year? What is relevant and what is irrelevant to medical school later? All these questions have been addressed by Gross *et al.*[1]and Emanuel *et al.*[3]. In regard to the premedical curriculum in the United States and Canada; certain changes were proposed so that students will be properly prepared for the new science and business of medicine[4].

The aim of the study is to assess the perceptions of the second year medical students regarding the courses they studied during their foundation year and compare the results of two consecutive years.

Method

This comparative cross-sectional study involved male and female second year medical students in 2009/2010 who had finished their foundation year study in 2008/2009, as well as the second year medical students of 2010/2011 who had finished their foundation year study in 2009/2010.

Sample Size and Power of the Study Calculation

The number of total students in the year 2008-2009 and 2009-2010 were 344 and 364 students. The research team hypothesized the improvement to be ranged from 20 to 30% at level of confidence 95%. Therefore, the estimated sample is 91 students at each year; the target sample was increased to 140 students for each year to guard against non respondents.

A well-constructed questionnaire included five questions on each of the nine studied courses (total of 45 items) that were taught during the first and second semesters. These courses were mathematics, physics, English I, computer science, statistics, chemistry, English II, biology, and communication skills. For each of these courses, the five following inquiries were surveyed: 1. Clarity and appropriate use of objectives, 2. quality of faculty teaching, 3. feedback about the student's performance during the course, 4. fairness of examinations and grading, and 5. overall quality of the course.

A pilot study included 30 students which were done to test for the clarity of the questions. This resulted in improvement of the face validity of the questionnaire. The results of the pilot study were not included in the final study. The reliability of the questionnaire was tested and Cronbach's α (alpha) was 0.69 and 0.71 in 2008-2009 and 2009-2010, respectively.

About 38 male and female second year medical students in (2009/2010) were met during the focus group discussions to validate the questionnaire results. The students were allowed to express their views and concepts about the foundation year courses, indicating their thoughts on what was the best or worst course and their reasons for these evaluations.

Statistical analysis was done by using SPSS software version 16 (2005). Wilcoxon rank-sum test was done to compare the perception of the students during the two consecutive years. Significance was considered at p value less than 0.05.

Results

One hundred and forty males and females second year medical students from two successive years who had finished their foundation

year study in 2008/2009 and 2009/2010 were included in this study. The respondents were about 98 (70%) in each year.

The students ranked the courses they had studied in the foundation year 2008/2009 according to their overall quality as follows: mathematics, English I, physics, communication skills, computer science, English II, chemistry, biology, and statistics.

For the overall quality of the courses, 21 (21.1%) and 28 (29.2%) students considered mathematics as a good or excellent course, respectively. For English I, 15 (15.2%) and 29 (30.1%) students considered the course good or excellent, respectively; whereas, 14 (14.3%) and 28 (29.1%) students, respectively, considered physics as a good or excellent course. Moreover, 29 (30.2%) and 12 (12.3%) students considered communication skills as a good or excellent course. For biology, 21 (22.1%) and 17 (17.3%) students considered the course as good or excellent, respectively; whereas, 16 (16.1%) and 15 (15.2%) respectively, considered computer science as a good or excellent course. However, 14 (14%) students considered English II and chemistry as good and 14 (14%) as excellent courses. Only 10 (10.4%) and 18 (18.3%) students considered statistics as a good or excellent course, respectively.

Only 23 (22.2%) and 11 (11.3%) of the students found the objectives of the biology course of the foundation year 2008/2009 as good or excellent and considered the quality of faculty teaching as good or excellent.

For the communications skill course of the foundation year 2008/2009, 16 (17%) and 22 (22.1%) of the students considered its objectives as good or excellent, and 23 (23.2%) and 16 (16.1%) of them found the quality of faculty teaching good or excellent, respectively.

Regarding chemistry course of the foundation year 2008/2009, 20 (20.2%) and 29 (30.1%) of the students found its objectives good or excellent, respectively; whereas, 13 (13.1%) and 37 (38.3%) reported the quality of faculty teaching as good or excellent, respectively.

The same questionnaire was distributed to the 2nd year medical students who had the foundation year at 2009/2010, to compare their perceptions to those of 2008/2009. The return rate of the questionnaire was (70%) of the target students 98/140. The results of the comparison showed that there was a significant improvement in the student

perception in 2009/2010 in the following courses; computer science, statistics, chemistry, English II and communication skills. Tables 1 and 2 present the tabulations of the questionnaires for the foundation year courses that the students studied during the first and second semesters in the two academic years, 2008/2009 and 2009/2010.

Table 1. Table showing the perception of the second year medical student about courses in the first term of the foundation year 2008/2009 and 2009/2010.

	Year	Poor % (N)	Fair % (N)	Neutral % (N)	Good % (N)	Excellent % (N)
Math Course						
Clarity and appropriate use of objectives	2008	19 (19)	32 (31)	20 (20)	13 (13)	15 (15)
	2009	29 (28)	12 (12)	18 (18)	33 (32)	8 (8)
Quality of faculty teaching	2008	22 (22)	24 (24)	22 (22)	17 (17)	13 (13)
	2009	13 (13)	13 (13)	28 (27)	30 (29)	16 (16)
Feedback about your performance during the course	2008	9 (9)	14 (14)	33 (32)	21 (21)	22 (22)
	2009	13 (13)	15 (15)	35 (34)	29 (28)	8 (8)
Fairness of exams and grading	2008	7 (7)	19 (19)	29 (28)	16 (16)	29 (28)
	2009	15 (15)	16 (16)	29 (28)	22 (22)	17 (17)
Overall quality	2008	10 (10)	31 (30)	9 (9)	21 (21)	29 (28)
	2009	7 (7)	18 (18)	28 (27)	34 (33)	13 (13)
Physics Course						
Clarity and appropriate use of objectives	2008	23 (23)	34 (33)	9 (9)	16 (16)	17 (17)
	2009	21 (21)	38 (37)	14 (14)	15 (15)	11 (11)
Quality of faculty teaching	2008	23 (23)	39 (38)	8 (8)	7 (7)	22 (22)
	2009	36 (35)	17 (17)	10 (10)	31 (30)	6 (6)
Feedback about your performance during the course	2008	8 (8)	30 (29)	28 (27)	16 (16)	18 (18)
	2009	17 (17)	26 (25)	36 (35)	18 (18)	3 (3)
Fairness of exams and grading	2008	12 (12)	9 (9)	16 (16)	35 (34)	28 (27)
	2009	15 (15)	15 (15)	13 (13)	36 (35)	20 (20)
Overall quality	2008	12 (12)	30 (29)	15 (15)	14 (14)	29 (28)
	2009	17 (17)	19 (19)	17 (17)	36 (35)	10 (10)
English I Course						
Clarity and appropriate use of objectives	2008	12 (12)	34 (33)	11 (11)	26 (25)	17 (17)
	2009	31 (30)	12 (12)	12 (12)	31 (30)	14 (14)
Quality of faculty teaching	2008	15 (15)	17 (17)	14 (14)	39 (38)	14 (14)
	2009	10 (10)	30 (29)	9 (9)	31 (30)	20 (20)
Feedback about your performance during the course	2008	17 (17)	27 (26)	20 (20)	20 (20)	15 (15)
	2009	6 (6)	33 (32)	24 (24)	34 (33)	3 (3)
Fairness of exams and grading	2008	10 (10)	22 (22)	27 (26)	29 (28)	12 (12)
	2009	33 (32)	18 (18)	16 (16)	19 (19)	13 (13)
Overall quality	2008	12 (12)	27 (26)	16 (16)	15 (15)	30 (29)
	2009	28 (27)	18 (18)	14 (14)	26 (25)	14 (14)
Computer Science Course						
Clarity and appropriate use of objectives	2008	5 (5)	11 (11)	22 (22)	16 (16)	45 (44)
	2009	11 (11)	34 (33)	13 (13)	27 (26)	15 (15)
Quality of faculty teaching	2008	3 (3)	11 (11)	22 (22)	23 (23)	40 (39)
	2009	12 (12)	31 (30)	15 (15)	32 (31)	10 (10)
Feedback about your performance during the course	2008	6 (6)	12 (12)	22 (22)	9 (9)	50 (49)
	2009	11 (11)	35 (34)	14 (14)	34 (33)	6 (6)
Fairness of exams and grading	2008	11 (11)	11 (11)	10 (10)	20 (20)	47 (46)
	2009	17 (17)	13 (13)	27 (26)	31 (30)	12 (12)
Overall quality*	2008	10 (10)	31 (30)	28 (27)	16 (16)	15 (15)
	2009	9 (9)	11 (11)	15 (15)	33 (32)	32 (31)

** $p < 0.05$ is significant*

Table 2. Table showing the perception of the second year medical student about courses in the second term of the foundation years, 2008/2009 and 2009/2010.

	Year	Poor % (N)	Fair % (N)	Neutral % (N)	Good % (N)	Excellent % (N)
Statistics Course						
Clarity and appropriate use of objectives	2008	12 (12)	21 (20)	16 (16)	12 (12)	39 (38)
	2009	5 (5)	20 (20)	28 (27)	26 (26)	21 (20)
Quality of faculty teaching	2008	8 (8)	13 (13)	23 (23)	21 (20)	35 (34)
	2009	4 (4)	16 (16)	22 (22)	26 (25)	32 (31)
Feedback about your performance during the course	2008	9 (9)	17 (17)	14 (13)	29 (29)	31 (30)
	2009	7 (7)	28 (27)	17 (17)	33 (32)	15 (15)
Fairness of exams and grading	2008	24 (24)	34 (33)	10 (10)	17 (16)	15 (15)
	2009	7 (7)	12 (12)	31 (30)	27 (26)	23 (23)
Overall quality*	2008	24 (23)	39 (38)	9 (9)	10 (10)	18 (18)
	2009	5 (5)	12 (12)	23 (23)	34 (33)	26 (25)
Chemistry Course						
Clarity and appropriate use of objectives	2008	13 (13)	27 (26)	10 (10)	20 (20)	30 (29)
	2009	16 (16)	15 (15)	31 (30)	28 (27)	10 (10)
Quality of faculty teaching	2008	12 (12)	21 (20)	16 (16)	13 (13)	38 (37)
	2009	27 (26)	12 (12)	6 (6)	45 (44)	10 (10)
Feedback about your performance during the course	2008	9 (9)	15 (14)	24 (24)	23 (23)	29 (28)
	2009	19 (19)	34 (33)	12 (12)	24 (23)	11 (11)
Fairness of exams and grading	2008	7 (7)	14 (14)	20 (20)	24 (23)	33 (32)
	2009	13 (13)	17 (17)	29 (28)	26 (25)	15 (15)
Overall quality*	2008	11 (11)	32 (31)	29 (28)	14 (14)	14 (14)
	2009	14 (14)	19 (18)	10 (10)	42 (41)	15 (15)
English II Course						
Clarity and appropriate use of objectives	2008	14 (14)	33 (32)	14 (14)	15 (15)	24 (23)
	2009	31 (30)	16 (16)	11 (11)	25 (24)	17 (17)
Quality of faculty teaching	2008	16 (16)	24 (23)	21 (21)	24 (23)	15 (15)
	2009	14 (14)	29 (28)	3 (3)	36 (35)	18 (18)
Feedback about your performance during the course	2008	15 (14)	20 (20)	18 (17)	25 (25)	21 (21)
	2009	8 (8)	32(32)	16 (15)	32 (31)	12 (12)
Fairness of exams and grading	2008	14 (14)	22 (21)	15 (15)	29 (28)	20 (20)
	2009	14 (14)	15 (15)	28 (27)	24 (23)	19 (19)
Overall quality*	2008	11 (11)	32 (31)	29 (28)	14 (14)	14 (14)
	2009	13 (13)	31 (30)	10 (10)	29 (28)	17 (17)
Biology Course						
Clarity and appropriate use of objectives	2008	13 (13)	23 (23)	30 (29)	23 (22)	11 (11)
	2009	34 (33)	14 (14)	8 (8)	22 (21)	22 (22)
Quality of faculty teaching	2008	12 (12)	20 (19)	34 (34)	23 (22)	11 (11)
	2009	35 (34)	10 (10)	13 (13)	17 (17)	25 (24)
Feedback about your performance during the course	2008	15 (15)	21 (20)	17 (17)	26 (25)	21 (21)
	2009	30 (29)	14 (14)	22 (22)	21 (20)	13 (13)
Fairness of exams and grading	2008	14 (14)	21 (20)	16 (16)	28 (27)	21 (21)
	2009	7 (7)	12 (12)	33 (32)	32 (31)	16 (16)
Overall quality	2008	12 (12)	32 (31)	17 (17)	22 (21)	17 (17)
	2009	28 (27)	14 (14)	14 (14)	26 (25)	18 (18)
Communication Skills Course						
Clarity and appropriate use of objectives	2008	14 (14)	33 (32)	14 (14)	17 (16)	22 (22)
	2009	4 (4)	9 (9)	26 (25)	30 (30)	31 (30)
Quality of faculty teaching	2008	16 (16)	23 (22)	22 (21)	23 (23)	16 (16)
	2009	2 (2)	7 (7)	10 (10)	53 (52)	28 (27)
Feedback about your performance during the course	2008	11 (11)	31 (30)	29 (28)	15 (15)	14 (14)
	2009	6 (6)	12 (12)	13 (12)	51 (50)	18 (18)
Fairness of exams and grading	2008	15 (15)	28 (27)	23 (22)	18 (18)	16 (16)
	2009	4 (4)	7 (7)	12 (12)	39 (38)	38 (37)
Overall quality*	2008	10 (10)	23 (23)	25 (24)	30 (29)	12 (12)
	2009	3 (3)	8 (8)	8 (8)	34 (33)	47 (46)

** $p < 0.05$ is significant*

Results of the Focus Group Discussions

About 38 male and female second year medical students (2009/2010) met during the focus group discussions and were asked about the worst and best course they studied during the foundation year. About 12 (31.6%) of the students said biology was the worst course. They attributed this to many factors, specifically most biology subjects were unrelated to medical study; the learning resources were not well prepared; too many topics of less importance; the teaching was spoon-fed, and no active learning, and the exams depended on the test bank, therefore, no proper assessment.

About one third of the students chose chemistry as the worst course, attributing their assessment to the topics were not related to the medical study: "We did not gain benefit from the course; the course was not organized; the teachers were not helpful; the learning resources were not clear, and it was not fully comprehended due to the short time".

The students also had general comments on the foundation year: "It did not affect our medical study positively as expected; many courses were irrelevant to the health or medical colleges study, *e.g.,* physics and mathematics, and the course durations were distributed improperly".

In the focus group discussions, students offered some recommendations for improving the foundation year. It is better to specify a pre-health foundation year for health colleges. A pre-med foundation year will be beneficial for medical studies. A course of medical terminology should be taught in the foundation year. Reallocation of the time between the courses according to their contribution to the preparation of the students for medical studies is required.

Discussion

The Flexner report on medical education revolutionized medical colleges in the United States[2]. Currently, some educators believe that premedical educational requirements have become too scientific and rigid, even irrelevant, whereas others fear that humanity in the medical profession has been lost by training (concrete thinkers) that simply requires memorization of facts[4]. By introducing the science path year at King Abdulaziz University as a requirement for medical school

admission, many questions and queries will and should arise. The most important question should be: Does this foundation year give the students important base knowledge for future medical studies?

Focus group discussions revealed that about one third of the students thought biology was the worst course they studied. Their view was based on reasons, such as, “Most of its topics were not related or relevant to medical study”. Jules Dienstag discussed this topic in his study of premedical education at Harvard University. He found that “the topics covered in many courses in chemistry, physics, mathematics, and even biology are very far from human biologic principles, that they offer little value to the premedical or advanced human biology student”[4]. On the other hand, Barr *et al.* advocated science included in preparation for medical training in many universities in the United Kingdom and Europe, and described it as a "streamlined" with the chemical knowledge that the physician need to succeed in their career[5].

About one third of the students chose chemistry as the worst course. These findings were noticed also by Barr *et al.* when they looked at the specific courses, students mentioned as discouraging their interest in medicine. They found that students identified chemistry courses between four and five times more than the next category, biology[6]. These findings confirm those of Lovecchio and Dundes[7].

One of the general comments of the students on the foundation year was, “Many courses were irrelevant to the health or medical colleges study, *e.g.,* physics and mathematics”. This issue was raised many years ago by Gellhorn, who wrote, “In order to give the committed premedical student time for a broad education in the humanities and social sciences[9]. It is necessary to eliminate those courses which are not contributory to the medical study and to revise the course material in mathematics, chemistry, biology and physics so that it is directly pertinent to the biomedical disciplines”[8]. Another opinion was adopted by Emanuel; he viewed some of the premedical curriculum courses as irrelevant ones and of no or little value for the medical practice as calculus, organic chemistry, and physics. He recommended replacing of such courses by other more relevant and useful ones such as statistics, genetics, molecular biology, biochemistry, general ethics, and human psychology[4]. These recommendations were suggested also by Collier *et al.*[9].

In defense of the current premedical requirements, Kramer said, "I would not so hastily dismiss organic chemistry as a mere tool to thin the applicant herd. Indeed, I believe that no other premedical course so directly impacts clinical practice"[10]. Higgins, Reed and Gross *et al.*[1,11] were also wary about dismissing the value of hard science, thus, the authors totally agree with them in this regard. Therefore, it is recommended to thoroughly revise these science courses to minimize their topics to those directly related to medical study. This will give an opportunity to introduce some beneficial courses, like introduction to biostatistics, genetics, molecular biology, biochemistry, and medical ethics.

The incorporation of such courses, specially the medical ethics in the premed year was supported by Gross *et al.*[1]. They saw that teaching of these ethics come too late in the medical curriculum and recommended beginning in teaching of these ethics in the premed "or perhaps, even earlier"[1]. They advocated their opinion through illustrating the role of these ethics in shaping the physician morals. Rolfe *et al.* also presented some evidence that premed students with solid backgrounds in humanities, in addition to science, have lower medical school attrition[12]. Additionally, the early incorporation of these ethics expected to improve the doctor patient relationship and eliminate the patients' dissatisfaction[13,14].

A comparison was done between the students' perceptions of the foundation year courses of the two successive academic year 2009/2010 and 2010/2011. This comparison showed that there was a significant improvement in the student perception of the academic year 2010/2011 in some courses included; Computer Science, Statistics, Chemistry, English II and Communication Skills. As the objective of this study was to determine the students' perception of the foundation and compare it in the two successive years, a preliminary report was issued to the faculty and university administration at the end of the first studied year (2008-2009) included the concerns of students about the foundation years. This results of the comparison of the two years showed that there were attempts to improve the quality of such courses.

This study recommended to revise the foundation year courses for relevance and to reshape this foundation year to suit the health colleges.

Hence, expected to improve students satisfaction with this year as well maximize its benefit.

Conclusion

The foundation year is extremely important in preparing medical students, however, the students' perceptions regarding most of its courses were low and they recommend to be reshaped to include only the courses and necessary information for preparing competent physicians.

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تصورات طلاب الطب عن السنة التأسيسية في جامعة الملك عبدالعزيز

فاتن محمد السايس[١]، وباسم سلامة الديك[٢،٣]، ونصرة نعيم أيوب[٢،٤]، وحاتم محمود الأحول[١]، وأحمد بارفعه[١]

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المستخلص. يهدف هذا البحث تقييم تصورات طلاب الطب في السنة الثانية فيما يتعلق بالمقررات التي تم دراستها خلال السنة التأسيسية ومقارنة هذه النتائج على مدى سنتين متتاليتين. ضمت هذه الدراسة المقطعية مائة وأربعين من طلاب السنة الثانية الطبية (من كلا الجنسين) والذين أنهوا دراسة السنة التأسيسية في عام ٢٠٠٨/٢٠٠٩ و٢٠٠٩/٢٠١٠م في جامعة الملك عبدالعزيز. تم إعداد وتوزيع استبيان، والذي ضم أسئلة عن تسع مقررات تم تدريسها في هذا العام، على الطلاب وعقدت مناقشات مركزة مع المشاركين للتحقق من صحة نتائج الاستبيان. وقد تم تحليل البيانات إحصائيًا وكان معدل الاستجابة حوالي ٩٨ (٧٠٪) في كل سنة. وكان هناك تحسن كبير في تصور الطلاب في ٢٠٠٩/٢٠١٠م في بعض المقررات مثل علوم الحاسوب والإحصاء عندما قورنت بتلك الفترة ٢٠٠٨/٢٠٠٩م. وقد قدم الطلاب بعض التوصيات من أجل تحسين السنة التأسيسية، مثلاً "من الأفضل تحديد سنة تأسيسية للكليات

الصحية". الخاتمة: السنة التأسيسية مهمة من أجل إعداد طلاب الطب ولكن تصورات الطلاب فيما يتعلق بمعظم مقرراتها كانت منخفضة وأوصوا بإعادة تشكيلها لتشمل المقررات والمعلومات اللازمة لإعداد أطباء ذوي كفاءة عالية.