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## Evaluation of the reformed medical curriculum at King Saud University College of Medicine by its first graduates



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### المخلص

**أهداف البحث:** يعد مفهوم المنهج عند الخريجين من الجوانب المهمة في تقييم وتحسين البرنامج التعليمي. خَرَجَت كلية الطب بجامعة الملك سعود في يونيو ٢٠١٤م، الدفعة الأولى من المنهج الجديد المعدل، والمعتمد على حل المشكلات، والموجه حول أجهزة الجسم. وتهدف هذه الدراسة لتقييم خريجي المنهج المعدل للبرنامج التعليمي الجديد.

**طرق البحث:** تمت هذه الدراسة المقطعية بدعوة الدفعة الأولى التي تخرجت من البرنامج الجديد. وزعت الاستبانة الذاتية على الخريجين إلكترونياً بعد التخرج في يونيو ٢٠١٤م.

**النتائج:** أوضحت النتائج أن أعلى المعدلات في تقييم فاعلية البرنامج التعليمي كانت متعلقة بـ "معرفة العلوم والمهارات السريرية"، وأدنى المعدلات بـ "اكتساب المعرفة في العلوم الأساسية". أما ما يتعلق بمعدلات الرضا عن البرنامج التعليمي بما يخص اكتساب العلوم والمهارات الضرورية، فقد أعطيت أعلى المعدلات لـ "أخذ تاريخ المرض"، وأدنى المعدلات لـ "معرفة المبادئ والإجراءات في الطب المهني".

**الاستنتاجات:** بينت نتائج الدراسة الحالية محاذير خاصة بالمنهج المعدل، التي ستكون محل اهتمام ودراسة لمراجعة وتحسين المنهج. وأوصت الدراسة بمتابعة الأبحاث المستقبلية لمراقبة التطور في تصميم المنهج.

**الكلمات المفتاحية:** تعليم، الخريجين؛ منهج؛ طلاب الطب؛ تعديل المنهج؛ المعرفة بالعلوم الأساسية

### Abstract

**Objectives:** The College of Medicine of King Saud University (KSU), Riyadh, Kingdom of Saudi Arabia (KSA), recently graduated the first batch of students who studied the newly reformed, problem-based, system-oriented medical curriculum. The present study was conducted to determine the graduates' perceptions of the reformed medical curriculum and the effect of its educational program.

**Methods:** In this cross-sectional study, the first batch of the graduated students was invited to participate in a survey evaluating their perceptions of the reformed educational program. A four-scale, self-reported questionnaire was administered electronically to all of the participants.

**Results:** The highest score in terms of the education program's efficacy was given to 'clinical knowledge and skills', and the lowest score was given to 'the acquisition of 'basic science knowledge'. Concerning the acquisition of essential knowledge and skills, the highest score was awarded to 'history taking', and the lowest score was given to 'knowing the basic concepts and procedures of occupational medicine'.

**Conclusion:** The graduates' opinions about the first reformed medical curriculum at KSU raised special concerns about the acquisition of basic science knowledge and generic concepts related to occupational medicine. These opinions will provide valuable directions for

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curriculum revisions. Future studies are advised to explore the perceptions of the graduates in further details to monitor improvements in curriculum design.

**Keywords:** Basic science knowledge; Curriculum reforms; Graduates' perceptions; Medical curriculum; Medical students

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## Introduction

The King Saud University (KSU) College of Medicine is the largest in Saudi Arabia and was founded in 1969. The mission of the King Saud University College of Medicine is to train and educate future healthcare professionals in an innovative learning environment and to provide high-quality healthcare to the community.

Internationally, many medical schools have revised their medical curricula to meet the medical education standards. King Saud Medical College revised and reformed its curriculum in 2009 to be system oriented, problem based, student centred and community oriented.<sup>1,2</sup> The reformed curriculum was revised to meet international standards and has been accredited by the National Commission for Academic Accreditation and Assessment (NCAAA). The curriculum has been continuously revised according to the evaluations from the students and faculty and continuous feedback.

In June of 2014, the reformed curriculum at KSU produced its first graduates. These graduates represent an important source of information regarding the education program.<sup>3–5</sup> They can provide valuable insights into how well their educations prepared them for their work as graduates and practicing physicians.<sup>6–10</sup>

The present study aimed to determine the first graduates' perceptions of the reformed medical curriculum and education program.

## Materials and Methods

The study was approved by the Medical Education Department and the IRB at the College of Medicine of King Saud University. This study was a cross-sectional study in which a self-report questionnaire was distributed to the graduates. The study used the four-scale questionnaire that was developed by Ozan et al. to evaluate the curriculum of the Dokuz Eylul University School of Medicine, Department of Medical Education in Izmir, Turkey in 2005.<sup>11</sup> The authors adopted this survey as a framework and added items of interest in our context and modified the language to ensure that the students for whom English is a second language would be likely to understand the statements. The first scale evaluated the efficacy of the education program in terms of the content of the curriculum, educational methods, communication with educators and assessment methods and instruments.

Scale 2 was designed to evaluate the efficacies of each year of the undergraduate education and the overall curriculum. Scale 3 was prepared to evaluate the satisfaction level with the education program in terms of the acquisition of essential skills and knowledge. Scale 4 aimed to evaluate the students' self-efficacy levels regarding the knowledge and skills taught in the education program.

The questionnaires were distributed electronically to the first graduates of the reformed medical curriculum on the 1st of June, 2014, after graduation and were collected on the 30th of June, 2014. The graduates were volunteers. The parameters of the questionnaire were evaluated using a five-point scale (1 = minimum, 5 = maximum).

The data were analysed using the SPSS 10.0 for Windows. Descriptive statistics was used to characterize the studied sample. The qualitative variables are summarized using frequencies and percentages, and the quantitative variables are described with means and standard deviations. Analyses of variances (ANOVAs) were used to compare the differences in the graduates' satisfaction scores between the academic years. Post hoc tests were used to define the exact differences between the academic years. P-values below 0.05 were considered statistically significant.

## Results

The questionnaire was distributed to a total of 263 graduates (male = 165, female = 98). The overall response rate was 67.7%, and the rates for the males and females were 62.4% and 76.5%, respectively (Table 1).

Table 2 illustrates the graduates' evaluations of the educational program's efficacy. The highest score was attributed to 'clinical knowledge and skills' ( $3.46 \pm 1.19$ ). The lowest score was related to 'basic science knowledge' ( $2.31 \pm 1.1$ ).

The average scores for the graduates' satisfaction levels with the education program in terms of the acquisition of essential knowledge and skills are shown in Table 3.

The highest score was given to 'history taking' ( $3.64 \pm 1.12$ ), and the lowest score was given to 'knowing the basic concepts and procedures of occupational medicine' ( $1.98 \pm 0.98$ ).

The overall and academic year-based evaluations of the efficacies of the education program ranged from  $2.19 \pm 1.14$  to  $3.57 \pm 0.97$  (Table 4).

Significant differences in the scores were observed between years 1 and 2, years 2 and 3, years 3 and 4, and years 4 and 5 ( $p < 0.05$ ).

**Table 1: Demographic data of first medical students graduates of the reformed curriculum at KSU.**

Variable	Official enrolees		Participants	
	N	(%)	N	%
King Saud University				
Male	165	62.7	103	62.4
Female	98	37.3	75	76.5
Total	263		178	67.7

**Table 2: Evaluations of the efficacy of the educational program.**

Item	Mean $\pm$ SD
<i>Content of the educational program</i>	3.19 $\pm$ 1.03
<i>Acquisition of:</i>	
* Basic science knowledge	2.31 $\pm$ 1.1
* Clinical knowledge and skill	3.46 $\pm$ 1.19
* Community health perspective	2.89 $\pm$ 1.07
* Behavioural perspective	2.83 $\pm$ 1.19
<i>Using educational methods</i>	2.98 $\pm$ 1.03
<i>Communication with educators</i>	2.89 $\pm$ 1.03
<i>Assessment methods and instruments</i>	2.85 $\pm$ 1.17

## Discussion and conclusion

The present study revealed the perceptions of the first graduates of the reformed education program at KSU. It was difficult to gather information from the students after they had graduated and had scattered across multiple locations. However, because they were the first graduates of the reformed curriculum, these students were very cooperative and enthusiastic about the reformed curriculum throughout their years of study and after graduation.

Regarding the education program's efficacy in terms of content, the graduates gave the highest score to 'clinical knowledge and skills' (Table 2). Additionally, regarding the efficacy of the education, the graduates gave the highest score to 'history taking' (Table 3). Many medical schools' curricula have been revised to be vertically integrated to include the provision of early clinical experience, longer

**Table 4: The overall and academic year-based evaluations of the efficacy of the educational program.**

Item	Mean of score $\pm$ SD
1st year	2.19 $\pm$ 1.14
2nd year	2.80 $\pm$ 1.35
3rd year	2.31 $\pm$ 1.08
4th year	3.37 $\pm$ 1.10
5th year	3.57 $\pm$ 0.97

Minimum = 1; maximum = 5 points.

clerkships and increasing levels of responsibility.<sup>12–15</sup> The proportion time dedicated to clinical practice increases over the years in vertically integrated curricula.<sup>13</sup> The curriculum at KSU was revised to be vertically integrated and to consist of clinical scenarios and clinical skill laboratory sessions that begin in the first year. KSU's reformed medical curriculum consists of small-group sessions that include clinical scenarios that were designed to include clinical problems and clinical skills that are practiced in the college of medicine's clinical skills laboratory. In the traditional curriculum, theory is primarily discipline-based and is scheduled for delivery in the first 3 years, while clinical education is delivered in years 4 and 5.<sup>15</sup>

Previous studies have shown that students in medical programs that adopt PBL produce students with greater levels of clinical knowledge and skills compared with students from traditional programs. The reformed curriculum at KSU was implemented to meet the international standards that aim to train students to be good doctors.<sup>8</sup> In its

**Table 3: Levels of satisfaction with the educational program in terms of the acquisition of essential knowledge and skills.**

Knowledge and skills	Average scores $\pm$ SD
Acquisition of clinical reasoning skills	3.21 $\pm$ 1.22
Determination of knowledge limits and learning needs	3.09 $\pm$ 1.16
Reaching and using different learning resources	3.12 $\pm$ 1.35
Problem solving skills	3.37 $\pm$ 1.35
Planning, implementing and presenting a scientific research	2.85 $\pm$ 1.20
History taking	3.64 $\pm$ 1.12
Physical examination	3.33 $\pm$ 1.07
Developing a diagnostic algorithm and making differential diagnosis	3.22 $\pm$ 1.20
Selecting appropriate diagnostic test (lab, X ray etc.)	3.16 $\pm$ 1.15
Selecting appropriate treatment	2.60 $\pm$ 0.99
Implementing basic professional procedures (CPR, IV, catheter implementation, etc.)	3.21 $\pm$ 1.33
Emergency intervention	2.74 $\pm$ 1.05
Gaining knowledge on priority health problems of Saudi Arabia	2.87 $\pm$ 1.08
Gaining knowledge and skill on preventive medicine	2.60 $\pm$ 1.11
Gaining knowledge on health organization of Saudi Arabia	2.28 $\pm$ 1.06
Gaining knowledge on sociocultural and environmental factors influencing health	2.58 $\pm$ 1.09
Gaining a holistic approach to patient regarding biological, social, cultural and behavioural aspects	2.66 $\pm$ 0.91
Knowing legal responsibilities of a physician	2.44 $\pm$ 1.04
Knowing the managerial responsibilities of a physician	2.53 $\pm$ 1.19
Knowing the basic concepts and procedures of forensic medicine	2.48 $\pm$ 1.19
Knowing the basic concepts and procedures of occupational medicine	1.98 $\pm$ 0.98
Knowing the responsibilities of a primary health care physician	3.15 $\pm$ 1.28
Gaining interpersonal communication skills	3.15 $\pm$ 1.35
Knowing basic concepts of ethics and professionalism	3.45 $\pm$ 1.19
Knowing the concept of teamwork and its importance	3.42 $\pm$ 1.36
Gaining knowledge on multidisciplinary approach	3.26 $\pm$ 1.26
Knowing the basic principles of health education and counselling and taking responsibility for them	2.87 $\pm$ 1.09

Minimum 1; maximum 5.

document on undergraduate education titled ‘Tomorrow’s Doctor’, the General Medical Council (GMC) emphasized that medical schools should improve their preparation of students to become good doctors. In 2014, the quality unit at the medical education department of KSU College of Medicine conducted a large survey on the quality of its program. This survey was distributed to students in years 1–5 and revealed that the students were satisfied with the clinical knowledge and skills acquired in their education program.

The graduates gave the lowest score to the acquisition of basic science knowledge (Table 2). The same results were obtained by Ozan et al., in 2005.<sup>11</sup> Previous studies have demonstrated that students of traditional medical programs receive higher scores in basic science knowledge on the test of the National Board of Medical Examiners.<sup>16,17</sup> A study of the effectiveness of PBL conducted in 2001 revealed that students and PBL tutors gave the lowest ratings to the acquisition of basic science knowledge. Further investigations are needed to examine this issue, to revise the curricula and to strengthen to the basic science contents.

The overall satisfaction scores given by the graduates for each year of the education program gradually increased from year 1 to year 5 (Table 4). There was a slight drop in the students’ satisfaction in year 3. A lower score the first year was predicted because it was the first year after the implementation of the reformed curriculum. Feedback and evaluations were frequently gathered to revise and improve the curriculum, and these efforts were reflected in increased student satisfaction. Another point that should be considered is that the first graduates were the first students to be enrolled in the newly reformed curriculum. The students were anxious because they were the first batch; additionally, they were new to the employed learning modalities, including PBL sessions, clinical skill laboratories, vertical and horizontal integration and the student-centred learning concept. The students required some time to adapt to the newly structured curriculum compared with their peers in the traditional curriculum. Significant differences were observed between years 1 and 2, years 2 and 3, years 3 and 4 and years 4 and 5. Year 3 was associated with a significant drop in the students’ satisfaction, which was not surprising because year 3 is the beginning of clinical practice, and new disciplines are introduced. The curriculum of year 3 underwent several revisions based on the evaluations of the students and faculty.

In conclusion, the first graduates’ evaluations of the reformed medical curriculum of the College of Medicine at KSU revealed the graduates’ perceptions of the education program. This study presents valuable and important data for curriculum revision and improvement. Continuous connections with the graduates need to be maintained to evaluate their professional performances. Future studies are needed to compare the performances of the KSU graduates with graduates of other medical colleges and to identify improvements that can be made to different aspects of the education program. Future internal studies are advised to examine how the science content might be better integrated. Additionally, future qualitative studies are advised to explore the perceptions of the graduates in further detail to determine how the curriculum design can be advanced.

### Limitations of the study

The major limitation of this study was the lack of a control group. Another limitation was that no validation of the questionnaire was performed, which might have affected the results.

### Conflict of interest

The authors have no conflict of interest to declare.

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