Using Student's Examination Results in Evaluation of Curriculum Amendments at the Faculty of Medicine, University of Kordofan, Sudan

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ABSTRACT:

Background: Educational evaluation data collection and analysis is used for judging about capabilities and shortage of an educational program. **Methods:** The results of milestone examinations of students before and after the amendment of the curriculum were compared to see if there is any statistically significant difference between the two groups using SSPS.**Results:** There is improvement in the performance of students who have studied with the modified curriculum in final examinations results in physiology and biochemistry (p value ≤ 0.01, both of them). Also in clinical subjects as Medicine, Obstetrics & Gynaecology and Paediatrics, the performance of students in final examinations was better than their performance in these subjects before amendments, and this was obvious in their results in these examinations, (p value ≤ 0.01 in all these subjects). **Conclusion:** In our opinion, modified curriculum is better than the old one (before amendments), though student's examination results were the only available measure, but it may need more time and other assessment tools to be evaluated perfectly.

Keywods*: Curriculum, amendments, evaluation, medicine, Kordofan.*

INTRODUCTION

Medical schools provide an important service to society by creating a cadre of practitioners responsible for healthcare. It is thus important to ensure that medical education is of acceptable and consistent quality and produces practitioners who can meet society's needs [1]. Medical education is increasingly being acknowledged as an essential specialty in medical schools [2]**.** Educational evaluation data collection and analysis is used for judging about capabilities and shortage of educational programs [3]. Evaluation is an important tool for improving educational quality and assessment is entering every phase of professional development [4, 5]. Faculty of medicine and health sciences (FOMHS) at University of Kordofan was established in the year 1991. The educational program in the faculty of medicine was a traditional one, typical to that in the University of Khartoum (U of K) at that time. In 2002 the FOMHS organized a curriculum reform workshop. The workshop has been held in the Education Development Centre (EDC), Faculty of Medicine University of Khartoum. The workshop came out with certain recommendations for curriculum reform. The amendments which were recommended in the workshop were implemented through the period between the academic years 2002/2003 and 2011/2012. The aims of this study are to detect changes in student's level of learning following curriculum amendments and to measure improvement in student's level of learning caused by curriculum amendments and to check whether student's exam results can be effectively used to evaluated curriculum amendments.

METHODOLOGY

This is a case study conducted following received ethical approval from the Deanship of the FOM University of Kordofan. Student's academic records and faculty documents were reviewed.

Curriculum amendments were identified in the history of the faculty. The nature of the amendments, the time when it was implemented, and the batch of students who were the first to be subjected to it .The results of milestone examinations of students before and after the amendments were compared to see if there is any statistically significant difference between the two groups using SSPS. Amendments in the basic medical sciences phase , the results of Anatomy, Physiology and Biochemistry final exams before and after the amendments .For the students who wrote the exams before the amendments , students in batches 7 to 11 were chosen to represent the group before the amendments and students in batches 12 to 16 for the group after the amendments . For the pre-clinical phase the results of Pathology, microbiology and pharmacology for the same two groups of students. In the clinical phase results of final exams in Medicine, surgery, obstetrics & gynecology and pediatrics were used in the comparison between the batches 12 to 15 and batches 16 to 19. In any subject matter the mean mark and standard deviation were calculated and percent of students passed the exam first time. These two variables were used to reflect the level of student learning.

RESULTS

The students who sat for final examination in anatomy before and after the amendments were 646 and 755 students respectively. The mean mark in Anatomy before the amendments was 54.53 ± 9.91. The mean mark in Anatomy after the amendments was 52.78 ± 11.89. (t value 3.01 $p \leq 0.01$). The number of students who sat for final exam in physiology before and after the amendments were 632 and 756 respectively, the mean mark in physiology before was 52.62 ± 11.12, while the mean after was 56.99 ± 11.28. (t value – 7.25 $p \leq 0.01$). In biochemistry those who sat for final exam before were 640 and those sat after amendments were 756 students. The mean mark before was 53.19 ± 7.34 and that after was 54.83 ± 11.56. (t value -3.21 $p \leq 0.01$).

The number of students who sat for pathology exam before the amendments were 636 students while those who sat for the same subject exam after were 763 students, the mean mark in the first group was 53.46 ± 8.52 and it was 52.91 ± 10.95 for those who sat after the amendments. (t value 1.04 p = 0.2978). In the microbiology the number of students before were 636 and after were763 students. The mean mark for those sat before the amendments was 54.02 ± 8.06 and that for those sat for the final exam after the amendments was 54.15 ± 9.18. (t value – 0.27 p= 0.7837).

Students who sat for final exam in pharmacology before the amendments were 635 students and those who sat for the exam after were 763 students. The mean mark in the exams before was 56.11 ± 9.12 while it was 53.17 ± 11.25 for those who sat after the amendments. (t value 5.38 p ≤0.01).

The number of students sat for final exam in medicine before the amendments were 593 students and in the group who sat for the exam after were 479 students. The mean mark was 58.28 ± 8.36 and 61.74 ± 10.32 respectively. (t value -5.93 p ≤0.01). Students sat for surgery exam before the amendments were 590 and those who sat after it were 478 students. The mean mark before the amendments was 58.83 ± 8.75 after the amendments it was 58.53 ± 8.66. (t value 0.58 p = 0.5632).

In obstetrics & gynecology the number of students sat for the exam before were 585 and those sat after it were 466 students. The mean mark before was 59.69 ± 7.83 and that after was 63.21 ± 9.74. (t value – 6.50 p ≤0.01). Students sat for final exam in pediatrics before and after the amendments were 635 and 763 students respectively. The mean marks before and after were 58.29 ± 8.04 and 63.67 ± 9.38. (t value – 9.17 p ≤0.01).

Table 1: Statistical Analysis of the results of students in final examinations of Anatomy, Physiology & Biochemistry before and after amendment of the curriculum:

Statistics	Anatomy		Physiology		Biochemistry	
	Before	After	Before	After	Before	After
Average	54.53	52.78	52.62	56.99	53.19	54.83
SD±	9.91	11.89	11.12	11.28	7.34	11.56
N	646	755	632	756	640	756
T	3.01		-7.25		-3.21	
p-value	0.0027**		0.000**		0.0014**	

* = significant at 0.05; *

Table 2: Results of students in final examinations of Pathology, Microbiology Pharmacology before and after amendment of the curriculum**:**

Statistics	Pathology		Microbiology		Pharmacology	
	Before	After	Before	After	Before	After
Average	53.46	52.91	54.02	54.15	56.11	53.17
SD±	8.52	10.95	8.06	9.18	9.12	11.25
N	636	763	636	763	635	763
T	1.04		-0.27		5.38	
p-value	0.2978		0.7837		0.000**	

* = significant at 0.05; ** = significant at 0.01

Table 3: Results of students in final examinations of Medicine, Surgery, Obstetrics – Gynecology & Pediatrics before and after amendment of the curriculum:

Statistics	Medicine		Surgery		Obs. and Gyn.		Pediatrics	
	Before	After	Before	After	Before	After	Before	After

Average	58.28	61.74	58.83	58.53	59.69	63.21	58.29	63.27
SD±	8.36	10.32	8.75	8.66	7.83	9.74	8.04	9.38
N	593	479	590	478	585	466	594	472
T	-5.93		0.58		-6.50		-9.17	
p-value	0.000**		0.5632		0.000**		0.000**	

* = significant at 0.05; ** = significant at 0.01

Table 4: Number of students, mean marks, before and after amendments, per subject:

Subject	Number of students sat for final exam		Mean mark		T value	P value	Remarks
	Before	After	Before	After			
Anatomy	646	755	54.53 ± 9.91	52.78 ± 11.89	3.01	≤ 0.01	Negative change
Physiology	632	756	52.62 ± 11.12	56.99 ± 11.28	– 7.25	≤ 0.01	Significant improvement
Biochemistry	640	756	53.19 ± 7.34	54.83 ± 11.56	-3.21	≤ 0.01	Significant improvement
Pathology	636	763	53.46 ± 8.52	52.91 ± 10.95	1.04	0.2978	Negative change
Microbiology	636	763	54.02 ± 8.06	54.15 ± 9.18	– 0.27	0.7837	No change
Pharmacology	635	763	56.11 ± 9.12	53.17 ± 11.25	5.38	≤0.01	Significant improvement
Medicine	593	479	58.28 ± 8.36	61.74 ± 10.32	-5.93	≤0.01	Significant improvement

Surgery	590	478	58.83 ± 8.75	58.53 ± 8.66	0.58	0.5632	No change
Obstetrics & gynaecology	585	466	59.69 ± 7.83	63.21 ± 9.74	– 6.50	≤0.01	Significant improvement
Pediatrics	635	763	58.29 ± 8.04	63.67 ± 9.38	– 9.17	≤0.01	Significant improvement

DISCUSSION

Faculty of Medicine and Health Science (FOMHS) at University of Kordofan has decided to replace the annual system by a semester system, teaching of community medicine as a longitudinal course that starts in semester one and ends by semester ten. The substitution of some subjects such as, zoology, botany, general physics, chemistry and calculus with medical physics, organic chemistry, medical statistics and biology , starting Anatomy, Physiology and Biochemistry in semester two to end by semester five. An extra semester was allowed for Pathology, microbiology and pharmacology, the substitution of general pharmacology by clinical pharmacology. Provision of more time for clinical contact in teaching health facilities, concentration in two clinical subjects surgery & obstetrics or medicine & pediatrics in one semester and sitting for final examinations at the end of semester eleven, do the same for the other two clinical subjects in semester twelve. The old curriculum and modified one were evaluated by comparing the results of students at final examinations of basic medical sciences phase: Anatomy, physiology and biochemistry before and after the amendments, for the students who wrote the examinations before the amendments students in batches seven to eleven for the pre-clinical phase, the results of Pathology, microbiology and pharmacology for the same two groups of students. And in the clinical phase results of final examinations in Medicine, surgery, obstetrics & gynecology and pediatrics were used in the comparison between batches 12 to 15 and batches 16 to 19. So the results of milestone examinations of students before and after the amendment were compared to see if there is any statistically significant deference between the two curricula.There is improvement in the performance of students who have studied with the modified curriculum in final examinations results in physiology and biochemistry (p value $\leq$ 0.01, both of them). Also in clinical subjects: Medicine, Obstetrics & Gynecology and Pediatrics, the performance of students in final examinations were better than their performance in these subjects before amendments, and this was obvious in their results in these examinations, (p value $\leq$ 0.01 in all these subjects), and this due to positive modification of the curriculum. On the other hand subjects like Anatomy, Pathology, Microbiology and Surgery where the change is

either negative or no change was observed, other factors should be considered. The faculty staff over these years, like in other state universities, was subjected to continuous drainage due to emigration or local transfer to other universities where more earnings are offered. So improvement in the curriculum alone might not be of benefit without improving the numbers and capabilities of teaching staff.

Conclusion: We think that, modified curriculum is better than the old one (before amendments), and student's exam results can be effectively used to evaluate curriculum amendments.

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