Original Article

Evaluation of the Academic Performance of Private Admission Medical Students to the Public and Regional Admission Students at A Sudanese Medical School

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ABSTRACT

Background: Performance in Sudan School Certificate Examination (SSCE) has been the sole selection criterion for medical students in Sudan, and only high-achievers were selected for medical schools through public admission. In 1990s selection criteria have been loosened and more students with lower marks were also admitted to medical schools through private admission.

Objective: To compare the academic performance of private admission medical students to their public admission classmates at Nile Valley University.

Materials and Methods: The records of seven batches of students admitted during the years 2000 through 2006 at Nile Valley University, Atbara, Sudan were included in this study. The academic performance of 345 Sudanese medical graduates were reviewed and compared based on the type of admission.

Results: Female to male ratio was 4:1. There were statistically significant differences in the academic performance between private and public admission students. While only 78.4% of private admission students progressed without delay, 90% of the public admission students did so. The pass rate in all phases of medical study as well as the Cumulative Grade Point Average (CGPA) was lower among private admission students. This difference is proportionate to the difference in grades obtained at SSCE and number of re-sits.

Conclusion: The academic performance of medical students in Sudan is related to the previous academic performance in SSCE. Early academic counseling may improve performance.

Keywords: Selection criteria, academic performance, Nile Valley University, Sudan.

The academic performance of medical students depends on cognitive and non-cognitive factors. Performance in the pre-admission tests ranks on top of the cognitive factors[1-5]. Personal characteristics, learning strategies as well as institutional/curricular factors are among the most important non-cognitive contributory factors[6-15].

The determinant criterion for selection to a medical school in Sudan has long been the academic performance in the SSCE, and only very high-achievers were selected[16].

Before 1990 there were only 3 medical schools with a total capacity of less than 500 seats. Since early 1990s many new medical schools were established, so there has been a dramatic increase in the number of students admitted to medical schools. In order to finance the newly established schools, the policy of "private admission" was legislated[16]. In this type of admission, students who were not admitted through their grades in SSCE to public schools can compete to find a seat in the medical school as long as they can afford to pay more fees and their grades not lesser than 12% of the public admission grade. A special type of public admission is recognized as "regional admission" in which students from the region/state where the medical school is located are selected, usually 1% to 2% lesser marks than the national public competition.

The aim of this study was to compare the academic performance of the private admission medical students to their public and regional admission classmates.

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MATERIAL AND METHODS:

This is a retrospective, comparative analytical study, conducted at the Faculty of Medicine and Health Sciences – Nile Valley University (FoMHS-NVU) – Atbara – Sudan. FoMHS-NVU was established in 1998 with 43 students enrolled in the first batch. The intake progressively increased to an annual admission of about 90 students by the year 2012. As all public institutions in the country, the admission criteria for the FoMHS-NVU are those of the Ministry of Higher Education and Scientific Research (MoHE); based primarily on the Sudan School Certificate Examination (SSCE). FoMHS-NVU recruits two thirds of its annual student intake, equally, from the national public competition as well as the regional admission (for residents of River Nile State (RNS); and up to one fourth from the private admission. The private admission is for students who get lesser grades at SSCE, but not less than 12% from the public admission grade at specific year, as long as they pay more tuition fees.

FoMHS-NVU graduates medical doctors with an MBBS in 6 years; after studying a modified traditional (hybrid) curriculum with three pre-clinical and three clinical years. The basic sciences of Anatomy, Biochemistry and Physiology together with the Pathology, Microbiology and Pharmacology are taught in the first three years with formative assessment at each semester followed by a summative examination in the third year. Students must pass each subject in order to proceed to the next level of training. The fourth and fifth year curricula include study of Forensic Medicine and the medical sub-specialties, together with clinical training in hospitals. Community medicine is taught longitudinally in the first five years. In the final three years, students rotate in hospitals to be trained on Medicine, Surgery, Obstetrics and Gynaecology, and Paediatrics. This is followed by the final MBBS examination, which includes multiple choice question paper (MCQ), structured essay question paper (SEQ) and clinical problems. There is also an OSCE in addition to a clinical examination with short and long-cases in each subject-discipline. All examinations are under supervision of the Sudan Medical Council (SMC) and are attended and evaluated by experienced external examiners from other Sudanese medical schools. The academic performance is expressed as marks and grades for each subject-discipline at the end of the academic year.

The educational resources available at FoMHS-NVU are not different from other Sudanese public medical schools, characterized by limited infra-structure, less satisfactory training facilities, and few academic staff suffering of overload, limited training and lack of incentives. However, the curriculum at FoMHS-NVU is documented, well-structured and implemented, and the academic calendar is quite stable over the years.

Records of all students who were admitted to the medical faculty in the years 2000 up to 2006 , as well students from batches before 2000 who were delayed due to academic or non-academic causes, and who graduated in the years (2007 - 2012) were retrieved and reviewed.

Any Sudanese student admitted during the academic year 2000/2001 through 2006/2007 that has a full record and was admitted through either Public, Regional or Private Admission patterns was included in the study. While, students admitted through other types of admission (e.g. political, mature or scholarship), non-SSCE Certificates, non-Sudanese nationalities, students transferred from other universities, and students who discontinued their studies due to non-academic causes were excluded.

The total number of all graduates during the years 2007 through 2012 was 421. Students eligible for inclusion in this study were 345. The number of the private intake students, who fulfilled the study criteria were 74.

The registration types as well as the academic records of all participants were reviewed. The independent variables used were the type of admission, the SSCE grade and the CGPA. The dependent variables included: demographic as well as social data including sex, age, residence and guardian economic

status, the pass/fail rate, progression from class to class and years spent in the medical school.

All data were double-entered and cross checked for consistency. Data were analyzed using SPSS version 20 (SPSS Inc., Chicago, IL, USA). The significance of the differences between proportions, percentages and means were tested using Chi square-test, Student's t-test and ANOVA respectively. A p-value less than 0.05 was considered statistically significant.

Ethical issues:
Data was collected after obtaining the official approval of the stakeholders in the FoM-NVU. Data was used only for the purpose of this study. All personal data were not displayed. An ethical clearance was obtained from the Ethical Committee of the FoM-NVU. This work was also under the ethical supervision of the Educational Development Center (EDC) - University of Gezira.

RESULTS:
The main indicators of academic performance for the study groups were displayed in tables 1, 2, 3 and 4. The academic performance of private admission medical students in the preclinical subjects is significantly less satisfactory than their classmates.

The academic performance of private admission medical students in the clinical subjects is significantly less satisfactory than their classmates.

The academic performance of private admission medical students as indicated by the progression from class to class is significantly less satisfactory than their classmates of public and regional admission.

The private admission students obtained the lowest CGPA among their classmates compared to other types of admission (P=0.003).

Age has no significant effect on academic performance among private intake medical

Table 1: The relation between the type of admission and the academic performance in the basic sciences (n=345)

Type of admission	Academic performance		
	Passed without failure	passed after the supplementary exam	failed more than 50% of initial exams or supplementary exams
Public (n=145)	116 (80.0%)	20 (13.8%)	9 (6.2%)
Regional (n=126)	83 (65.9%)	36 (28.6%)	7 (5.6%)
Private (n=74)	34 (45.9%)	30 (40.5%)	10 (13.5%)

P value < 0.001

Table 2: The relation between the type of admission and the academic performance in the clinical clerkship (n=345)

Type of admission	Academic performance		
	Passed without failure	passed after the supplementary exam	failed more than 50% of initial exams or supplementary exams
Public	112 (77.2%)	31 (21.4%)	2 (1.4%)
Regional	100 (79.4%)	23 (18.3%)	3 (2.4%)
Private	43 (58.1%)	24 (32.4%)	6 (8.1%)

P value=0.005

Table 3: The relation between the type of admission and the progression from class to class (n=345)

Type of admission	Progression			
	smooth progression without any delay	Repeated one year	Repeated more than one year	Got external or dismissed
Public	132 (91.0%)	8 (5.5%)	3 (2.1%)	1 (0.7%)
Regional	114 (90.5%)	10 (7.9%)	1 (0.8%)	0
Private	58 (78.4%)	12 (16.2%)	1 (1.4%)	3 (4.1%)

P value=0.04

Table 4: The relation between the type of admission and the CGPA at graduation (n=345)

Type of admission	CGPA at graduation			
	Excellent (3.5 and above)	Very good (3-3.49)	Good (2.5 - 2.99)	Pass (2 - 2.49)
Public	6 (4.1%)	17 (11.7%)	38 (26.2%)	84 (59.9%)
Regional	4 (3.2%)	12 (9.5%)	33 (26.2%)	77 (61.1%)
Private	0.0%	5 (6.8%)	12 (16.2%)	55 (74.3%)

P value=0.003

students themselves, however, for the whole study group younger age group (15-17years) at admission is associated with better performance in preclinical (p=0.04), clinical clerkship (p=0.01), and the overall CGPA (p=0.02) than older age groups (18 years and above).

There was statistically significant association between grade obtained at SSCE and the number of years spent in the medical school. While 91% of public admission students, and 90.5% of regional admission spent 6 years in study only 78.4% of the private admission completed their studies in 6 years, 10.8% in 7 years and 8.2% in 8 years or more (p= 0.02) For the private admission graduates: the more the trials in SSCE the lower the CGPA (p=0.2).

DISCUSSION:

Medicine is one of the longest and the most stressful undergraduate studies [1]. Therefore, selecting tomorrow's doctors is a huge and challenging task for medical schools[17]. The unique nature of the medical profession requires certain capabilities to produce future doctors who will be competent in knowledge, skills and abilities [18,19], if patient safety is to be continuously guarded. Methods of

measuring desired characteristics need to be addressed in the admission process [18].

The prior academic achievement not only affects the academic performance during study years[20], but also the future professional career.[21] The private admission into medical schools in Sudan is a recently new experience that needs to be evaluated by educators. This study investigated the academic performance of those students admitted to FoMHS-NVU through private admission and compared their performance to their classmates admitted through public and regional admission types. It was obvious that all parameters and indicators of the academic performance at all phases of medical study were less satisfactory than their classmates. However, the overall academic performance of private admission students is above average if considered alone. With regard to sex, female students are predominating, as is observed in all Sudanese medical schools, the exact cause for this dominance is unknown but may be attributed to more effective learning strategies adopted by female students.

There were no statistically significant differences between male and female students performance in the basic subjects as well as

the overall CGPA, but females performed better in the clinical clerkship (p=0.001). This latter finding is consistent with that reported in UK [1] and Australia [22]. Female students are admitted and graduated at younger age and their mean grade at SSCE is higher than males. This indicates the better performance of female students even in the general education at the higher secondary schools. Some authors find this better achievement to continue even in postgraduate studies[1], but questioned the practical relevance of these sex differences[16] who claimed that women may sacrifice the profession to rear up their families or may not be able to serve in the remote poor areas of Sudan.

Students who live with their families during study performed better than those living in a boarding house (p=0.001). This finding may be attributed to psychological and social advantage of being at home.

Private admission graduates have a poor CGPA, as none obtained excellent degree, only 5 (10.6%) females obtained a "very good", but not a single male.

The percent obtained at Sudanese certificate was significantly associated with the overall CGPA obtained at graduation (P-value less than 0.001). This finding is in agreement with that reported from Australia which stated that prior academic achievement was the predominant and most consistent independent predictor of success in MBBS[22-24].

The statistically significant association between grade obtained at SSCE and the number of years spent in the medical school may be explained by the variable cognitive abilities of students, the lower the grade at SSCE, the more years spent in studying medicine. This finding is also augmented by the fact that the more the trials (re-sit) in SSCE the lower the CGPA. All students who were admitted to the medical school after 3 trials or more obtained just pass degree at graduation; and, at the other hand, all those private admission graduates who obtained the very good CGPA were admitted at their first trial in SSCE. The same impact of SSCE was also evident on the academic performance in

basic as well as clinical sciences. This is not in agreement with that reported from the Netherlands where the higher clerkship GPA was almost exclusively related to the non-academic selection criteria.[25]

The overall less satisfactory academic performance among private admission students is not consistent with that reported from Nepal, where they found no difference between students based on any selection criteria [26], this may be explained by the fact that the study in Nepal was conducted solely in a private medical school where the differences in admission criteria may be subtle.

In trying to explore other possible causes for the less satisfactory performance of some medical students Mohamadani found that students who study in Arabic perform better than those who studied in English, this may give a partial explanation for the poor performance of some students who may also be weak in their language ability[27].

Regardless to the ongoing controversy on selection criteria, educators need to reflect on the words of Flexner who recommended the increase in the prerequisites to enter medical training[28,29]. A main job of an educator is to predict "strugglers" and offer help[30].

This study has limitations. The small sample size of private admission graduates may not allow generalizations to be made about this type of admission to all medical schools in Sudan. The learning environment at FoMHS-NVU may not be the same for other Sudanese medical schools. This is a retrospective study, so non-cognitive factors were not included, as they are not part of the selection criteria of medical students in Sudan; however, they might have their effect on academic achievement.

This study excluded the non-Sudanese nationalities as well as non-Sudanese certificates and other types of admissions so as to reduce the confounding factors, and to study a homogenous group of students; however if those excluded were also included, the performance parameters for private admission students might have been different. Despite these limitations, the results of this

study may help predicting strugglers, potentially going to suffer academic difficulties, by academic counseling and closer monitoring.

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Declaration of interest:
The authors report no declarations of interest.

REFERENCES:

1. Ferguson E, James D, Madeley L. Factors associated with success in medical school: systematic review of the literature. Br Med J2002;324:952–957.
2. Iramaneerat C. Predicting academic achievement in the medical school with high school grades. J Med Assoc Thi. 2006; 89:1497–504.
3. Abdulrahman M. Al-Mazrou. Does academic performance in the premedical year predict the performance of the medical student in subsequent years?. J Family Community Med. 2008; 15(2): 85–89.
4. McManus IC, Powis DA, Wakeford R, Ferguson E, James D, Richards P. Intellectual aptitude tests and A levels for selecting UK school leaver entrants for medical school. BMJ. 2005; 331:555-9.
5. Salahdeen HM, Murtala BA. Relationship between admission grades and performances of students in the first professional examination in a new medical school. Afr J Biomed Res. 2005; 8:51-7.
6. Digman J. Personality structure: emergence of the five factor model. Ann Rev Psychol. 1990; 41:417–440.
7. Alnasir FA, Jaradat AA. The effectiveness of AGU-MCAT in predicting medical student performance in year one of the College of Medicine of the Arabian Gulf University. Educ Health. 2011; 24:447.
8. Bardes CL, Best PC, Kremer SJ, Dienstag JL. Perspective: Medical School Admissions and Noncognitive Testing: Some Open Questions. Acad Med. 2009;84(10):1360–1363.
9. Frisehenschlager O, Haidinger G, Milterauer L. Factors associated with academic success at Vienna Medical School: prospective survey. Croat Med J. 2005; 46(1):58–65.
10. Blue A, Gilbert G, Elam C, Basco W . Does institutional selectivity aid in the prediction of medical school performance. Academic Medicine. 2000;75:31–3.
11. Groves M, O'Rourke P, Alexander H. The association between student characteristics and the development of clinical reasoning in a graduate-entry, PBL medical programme. Med Teach. 2003; 25:626–631.
12. Blackman I, Darniawan I GN. Graduate-entry medical student variables that predict academic and clinical achievement. International Edu J. 2004;4:30–41.
13. James D, Chivers C. Academic and non-academic predictors of success on the Nottingham undergraduate medical course 1970-1995. Med Edu. 2001;35:1056–64.
14. Newble DI, Entwistle NJ . Learning styles and approaches: implications for medical education. Med Educ. 1986; 29:162–175.
15. Lumb AB, Vail A. Comparison of academic, application form and social factors in predicting early performance on the medical course. Med Edu. 2004; 38:1002–5.
16. Fahal A Hassan. Medical education in the Sudan: its strengths and weaknesses. Med Teacher. 2007; 29: 910 – 914.
17. Searle J, McHarg J. Selection for medical school: just pick the right students and the rest is easy! Med Educ. 2003; 37:458–463.
18. Arzuman H, Ja'afar R, Fakri N . The Influence of Pre-Admission Tracks on Students' Academic Performance in a Medical Programme: Universiti Sains Malaysia. Educ Health. 2012; 25:124-7
19. Owen Bodger, Aidan Byrne, Philip A. Evans, Sarah Rees, Gwen Jones, Claire Cowell, Mike B. Gravenor, and Rhys Williams . Graduate Entry Medicine: Selection Criteria and Student Performance.PLoSOne. 2011; 6(11): e27161.
20. Al-Rukban MO, Munshi FM, Abdulghani HM, Al-Hoqail I (2010). The ability of the pre-admission criteria to predict performance in a Saudi medical school. Saudi Med J. 31:560-4.
21. McManus IC, Smithers E, Partridge P, Keeling A, Fleming PR. A levels and intelligence as predictors of medical careers in UK doctors: 20 year prospective study. BMJ 2003;327: 139-142.
22. Annette Mercer and Ian B. Puddey. Admission selection criteria as predictors of outcomes in undergraduate medical course: a prospective study. Med Teach. 2011;33:997 -1004.
23. Wilkinson D, Zhang JZ, Byrne GJ, Parker MH, Peterson RF. Medical school selection criteria and the prediction of academic performance. Medical Journal of Australia. 2008;189:235–235.
24. Wilkinson D, Zhang J, Parker M . Predictive validity of the Undergraduate Medicine and Health Sciences Admission Test for medical students' academic performance. Med J Aust 2011;4:194:341-4.
25. Urlings-Strop LC, Stegers-Jager KM, Stijnen T, Themmen AP . Academic and non-academic selection criteria in predicting medical school

performance. Med Teach. 2013 Jun;35(6):497-502..

26. Pandey AS, Dixit HM . Selection criteria and pre-clinical academic performance in a private medical college in Nepal: a case study. Med Teach. 2011;33(4):e186-92.

27. Mahmdani AA, Abdel Rahman SH . Evaluating the impact of Arabization on medical students' acquisition, Gezira University, Sudan. East Mediterr Health J. 2006;12Suppl 2:S223-9.

28. Flexner Abraham. Medical education in the Unites States and Canada: a report to the Carnegie Foundation for the Advancement of Teaching. Bulletin No.4, New York City: the Carnegie Foundation for the Advancement of Teaching.1910.

29. Molly Cooke, David M Irby, William Sullivan, Kenneth M Ludmerer . American medical education 100 years after the Flexner Report. N Engl J Med. 2006;355: 1339-44.

30. Yates J, James D . Predicting the "strugglers": a case-control study of students at Nottingham University Medical School. BMJ. 2006;332:1009–13.