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Students admission grades and their performance at Ibadan University pre-clinical MBBS examinations

EA Bamgboye[1], BE Ogunnowo[2], OB Badru[1] and EO Adewoye [3]

Departments of Epidemiology, Medical Statistics and Environmental Health[1], Department of Community Medicine[2], Department of Physiology,[3] College of Medicine, University College Hospital, Ibadan, Nigeria.

Summary

Objective: The main objective of this study was to examine the admission grades in Senior School Certificate Examinations (SSCE) and Joint Admission Matriculation Board (JAMB) Examinations in relation to their performance at the pre-clinical class, at the University of Ibadan medical school. A descriptive, cross sectional study was carried out from December 1998-April 1999. Records of students' admitted into the medical school in 1991/92 session were studied. The results showed a stronger correlation in the performance of the students at the 100 level examination and the Part 1 MBBS examination with the SSCE grades than their JAMB scores. Students admitted on merit according to JAMB scores performed averagely better than their other counterpart with lower JAMB scores This result demonstrated that the SSCE scores are a better predictor of performance at preclinical MBBS examination than the JAMB scores. More attention needs to be placed on the quality of SSCE scores during admission into the medical school.

Keywords: *Students, Admission grades, performance, preclinical, Examinations*

Résumé

L'objectif principal de cette etude etait d'examiner les grades d'admission aux "examens SSCE et JAMB en relation a leur performance aux classes pre-cliniques, a l'Universite d' Ibadan, College medical. Une etude descriptive sectionne a ete effective de Decembre 1998 a Avril 1999. des dossiers des etudiants admis en medecine an cours de l'anres scolaire 1991/92 out ete etudies. Les resultats ont montre une granole correlation dans la performances des etudients an nivean 100 et a l'examen de iere annec Medecine (MBBS) avec leurs grades a l'examen SSCE contrairement a leurs notes an JAMB. A resultat a demonstre clairement que les notes de l:examen SSCE sout lun des moyenms les phy eficaces de prediction de la performance des etudiants a l'examen pre-clinique (MBBS) contrairement aux notes obtenues an JAMB. Une plus grande attention doit etre portee vers la qualite des scores a l;examen SSCE an cours des admissions an College Medical (a l'ecole de medecine).

Introduction

The University of Ibadan (UI), the Premier University in Nigeria, admits students into it's medical programme on the basis of their performance at the University Matriculations Examinations (UME) administered by a central body, theJoint Admissions and Matriculations Board (JAMB). Candidates who pass the Advanced Level General Certificate of Education (GCE) are also admitted directly into the university degree programme. The JAMB examinations replaced the concessional entry examinations earlier on conducted by each University until 1976. However, the final selection and registration of students into the MBBS course is based on the qualities of students scores in the JAMB and at least credit pass in Physics, Chemistry, Biology, Mathematics and English language, at the Senior School Certificate Examinations (SSCE) or equivalents [1].

Students admitted into the MBBS programme through the UME spend the first year called 100 level in the Faculty of Science studying Physics, Chemistry and Zoology. The students subsequently move to the Faculty of Basic Medical Sciences at the end of the 100 level and sit for the part I Bachelor of Medicine and Bachelor of Surgery (MBSS) examinations in Anatomy, Biochemistry and Physiology at the end of their 5th semester in the university. The part 1 MBBS examinations popularly referred to as the "2nd MB" is the main hurdle the students have to cross before they start the clinical training at the University College Hospital. In recent years, UI has experienced a high failure rate at the part 1 MBSS examinations. Failure rates of more than 50% have been recorded in some years and a number of students have been forced to withdraw at this level [4].

In the meantime, the observed poor performance of the students has been blamed partly on the quality of teaching, disruption in the university curriculum due to frequent strikes, inadequate teaching facilities (lecture rooms and reading materials,) and very strongly, the validity of the JAMB-UME scores and indeed the entire admission process. (personal communication).

In Nigeria, there is a dearth of published work on this issue and therefore, the present study examines the performance of students at the 100 level and part 1 MBBS examination and relate this to their JAMB scores and grades at the Senior School Certificate examinations. The study also examines the effect of age and sex on the performance of the medical students at both the Faculty of Science and Faculty of Basic Medical Sciences examinations

Materials and methods

The study population is composed of all students admitted into the University of Ibadan in the 1991/1992 academic session. Each student record contains detailed information on the personal characteristics, scores at JAMB, SSCE grades and academic performance at the 100 level examination and the part 1 MBBS examinations before their clinical years. These items of information were extracted manually from the students' records.

The grades in each of the five relevant subjects of the school certificate examinations (English language, Physics, Chemistry, Biology and Mathematics) were computed as indicators of quality of SSCE results. The maximum aggregate score attainable is 30 for the worst student who would have scored credit 6 in each of the 5 subjects and 5 for the very best student, who would have scored A1 in all the five subjects. These aggregate SSCE scores were categorised into 2 broad groups 5-15 for excellent performance and 16-30 for average performance.

Correspondence: Prof. E.A. Bamgboye, Department of Epidemiology, Medical Statistics and Environmental Health, College of Medicine, University of Ibadan, Ibadan, Nigeria.

The JAMB-UME cut-off mark of 267 for the selection of students based on merit in the 1991/1992 session was also used to categorise the students into merit admissions and other admissions. The age of students at entry was also categorised as below 18 years and 18 years and above. Students were grouped into four Nigerian geo-political zones- South West, South East, South South and the Northern zones based on their state of origins. The North was classified as one zone due to the small numbers in some of the northern geo-political zones . The foreigners were categorised as others.

The data was processed on a personal computer using Epi-info package 6.0 for data entry and statistical analysis. Frequency distributions and descriptive statistics were used to summarise the data. The analysis of variance technique and the students t-test were used to assess the effect of age, sex, quality of SSCE scores and the JAMB scores on the performance of students at the 100 level examinations as well as the Part 1 MBBS examinations. The student scores at the 100 level examination subjects, aggregate SSCE scores and JAMB scores were correlated with performance at the 100 level and Part 1 examinations using the Spearmans correlation coefficient. All statistical tests were at the 5% probability level.

Results

Table 1 shows the socio-demographic characteristics of students admitted into the MBBS programme in the 1991/1992 academic session. There were 227 students whose mean age on admission was 18.1 years with a standard deviation (S.D) of 1.8yrs. The sex ratio (M:F) was 2.1:1 while a higher proportion of students (82.7%) were Christians with 17.3% being Muslims. The geographic distribution showed that two-thirds of the students were from the southwest region while 9.3% were from the northern region and there were only three (1.3%) foreign students.

Table 1: The distribution of students by personal charateristics

Characteristics	Frequency	%
1. Age (years)		
15-17	103	45.4
18-20	101	44.5
21-25	23	10.1
2. Sex		
Male	154	67.8
Female	73	32.2
3. Religion		
Christianity	188	82.8
Moslems	39	17.2
4. Zone of Origin		
South West	150	66.1
South East	28	12.3
*North	21	11.0
Others	3	1.3
Total	227	100

**North was defined as one zone due to small numbers in some of the northern zones.*

Table 2 shows the frequency distribution of the students by their grades in the school certificate subjects relevant to medicine as well as the JAMB scores. The highest proportion of students (30.0%) had grade 1 in Physics while the proportion of students with grade 1 was least in English language (1.8%) followed by Biology (6.2%). The maximum score obtainable in JAMB was 400 and the students had a mean score of 252.6 with a standard deviation of 18.24. However, only 21.6% of the students scored 267 and above, the cut off point for merit admission for this group of students.

Table 3 shows the frequency distribution of the students by their scores at the preliminary examinations in Physics, Chemistry and Zoology and the Part 1 MBBS examinations in Anatomy, Biochemistry and Physiology. The mean scores in Physics was 55.2 (S.D = 9.59), Chemistry 62.6 (S.D = 9.9) and Zoology 53.0 (S.D = 7.55). The distribution of the scores showed that the students did best in Chemistry with 83.2% scoring at least 50% and the worst was Physics with 61.7% scoring 50% and above. (Pass mark for each subject is 50 marks). The frequency distribution of the students by their scores at the Part 1 examination indicated that Anatomy recorded the highest failure rate of 26.4%. The best was Physiology, which only 16.5% failed. In Anatomy, the mean was 52.6 (S.D = 8.5), Biochemistry had a mean of 53.7 (S.D= 7.5) while in physiology, the mean score was 53.0 (S.D = 7.0). (Pass mark for each subject is 50 marks).

Table 4 shows the distribution of mean scores at the preliminary and part 1 examination by age. Students aged less than 18 at entry had a higher mean score in all the subjects compared to those aged 18 and above and the difference was not statistically significant only in Physics and Physiology. Also, at the 100 level examinations, males performed averagely better than their female counterparts except in Zoology but the differences did not attain 5% level of statistical significance. At the Part 1 examinations, the pattern was reversed in favour of females except in Anatomy where the female students had a slightly lower mean score and this was not statistically significant. ($P>0.1$). These results are presented in Table 5.

Table 6 shows the distribution of students mean scores at the 100 level and Part 1 examinations by aggregate SSCE scores categorised as excellent and average performance. The students with excellent grades (score of 5-15) had statistically significantly higher score in all the subjects either at the 100 level or the Part 1 MBBS examination compared to those with average grade (score of 16-30) ($P<0.05$).

Table 7 shows the distribution of students mean scores at the preliminary and Part 1 examinations by the JAMB score classification. Students with a JAMB score at merit level (267 and above) had a statistically significantly higher score at the 100 level examinations. At the part 1 examinations, these merit students still demonstrated higher scores on the average but the difference was not significant.

Table 8 shows the correlation between the JAMB scores, aggregate SSCE scores and the performance at the preliminary and Part 1 examinations. In all the subjects as well as the aggregate scores at both exams (the sum of all subjects at the 100 level and Part 1 exams) the aggregate SSCE scores was more correlated with performance at the 100 level and Part 1 examinations than the JAMB scores. In addition, scores at the preliminary level or 100 level were better correlated with JAMB scores and the aggregate school certificate scores than at the Part 1 level . The correlation coefficient (s) between the JAMB scores and the aggregate 100 level examinations was 0.42 while the aggregate SSCE and aggregate 100 level examinations gave r=-0.56. Correlation between JAMB scores and aggregate scores at Part 1 examinations was 0.20 compared to r = -0.41 for the correlation between aggregate SSCE and aggregate Part 1 examinations.

Table 2: The frequency distribution of students' scores in senior school certificate examination subjects and JAMB

Subjects	Samples	Grades								
		1	2	3	4	5	6	7	Unknown	Total
Physics	n	68	31	59	21	12	32	-	4	227
	%	30.0	13.6	26.0	9.2	5.3	14.1	-	1.8	100.0
Chemistry	n	51	31	65	27	23	26	-	4	227
	%	22.5	13.6	28.6	11.9	10.1	11.5	-	1.8	100.0
Biology	n	14	37	128	18	12	14	-	4	227
	%	6.2	16.3	56.4	7.9	5.2	6.2	-		100.0
Mathematics	n	60	35	68	26	14	19	1	4	227
	%	26.4	15.4	30.0	11.4	6.2	8.4	0.4	1.8	100.0
English	n	4	19	85	43	26	45	1	4	227
Language	%	1.8	8.4	37.4	18.9	11.5	19.8	0.4	1.8	100.0

JAMB		Grades		
		200-	240-	280-
	N	56	161	10
	%	24.7	70.9	4.4

Table 3: The distribution of students' scores at the 100 level and Part I MBBS examinations.

Subjects		Frequency	Grades						
			25-	40-	50-	60-	70-	Missing	Total
100 Level									
1.	Physics	n	5	69	69	56	15	13	227
		%	2.2	30.4	30.4	24.7	6.6	5.7	100.0
2.	Chemistry	n	0	25	60	77	52	13	227
		%	0.0	11.0	26.5	33.9	22.9	5.7	100.0
6.	Zoology	n	7	65	101	39	2	13	227
		%	3.1	28.6	44.5	17.2	0.9	5.7	100.0
Part I MBBS									
1.	Anatomy	n	18	42	117	40	3	7	227
		%	7.9	18.5	51.5	17.7	1.3	3.1	100.0
2.	Biochemistry	n	9	37	125	50	1	5	227
		%	4.0	16.3	55.1	22.0	0.4	2.2	100.0
3.	Physiology	n	8	37	124	52	0	6	227
		%	3.5	16.3	54.6	22.9	0.0	2.7	100.0

**Pass mark for each subject is 50 marks*

Table 4: The distribution of students' scores at the 100 level and Part I MBBS examination

Subjects	Age (yrs)	Summary statistics				
		Mean	SD	N	t-value	P-value
100 Level						
1. Physics	15-	55.6	9.7	98	0.55	0.59
	18+	52.2	9.3	116		
2. Chemistry	15-	64.0	10.0	98	2.01	0.04
	18+	61.3	9.6	116		
3. Zoology	15-	57.4	7.6	98	3.02	0.02
	18-	54.3	7.4	116		
Part I MBBS						
1. Anatomy	15-	53.9	8.8	101	2.15	0.03
	18-	51.5	8.1	199		
2. Biochemistry	15-	59.2	7.7	101	6.17	0.01
	18-	53.1	7.3	121		
3. Physiology	15-	54.7	7.1	101	0.47	0.65
	18-	54.3	7.0	121		

Table 5: Summary statistics of scores at pre-clinical examinations by sex.

Subjects		Summary statistics				
		Mean	SD	N	t-value	P-value
100 Level	Sex					
1. Physics	M	56.0	9.6	144	1.55	0.11
	F	53.8	9.2	96		
2. Chemistry	M	63.0	9.8	144	0.74	0.53
	F	61.9	9.8	96		
3. Zoology	M	53.0	7.2	144	0.34	0.73
	F	53.3	7.9	96		
B. MBBS Part I						
1. Anatomy	M	52.8	8.3	149	0.55	0.59
	F	52.1	8.9	71		
2. Biochemistry	M	53.5	7.6	150	0.50	0.63
	F	54.1	7.3	71		
3. Physiology	M	54.4	7.0	149	0.66	0.52
	F	55.2	6.6	71		

Table 6: The summary statistics of scores at pre-clinical examinations by quality of their SSCE result.

Subjects		Summary statistics				
		Mean	SD	N	t-value	P-value
100 Level	*SSCE*					
1. Physics	5-	59.4	9.7	109	7.59	0.01
	16-	50.6	6.7	111		
2. Chemistry	5-	66.7	9.8·	109	7.04	0.01
	16-	58.1	7.8	101		
3. Zoology	5-	55.6	7.7	109	5.77	0.02
	16-	50.1	6.1	111		
B. MBBS Part I						
1. Anatomy	5-	55.2	8.6	109	4.61	0.03
	16-	50.0	7.7	111		
2. Biochemistry	5-	56.1	7.7	111	5.20	0.02
	16-	51.1	6.5	107		
3. Physiology	5-	56.3	6.9	111	4.04	0.05
	16-	52.3	6.8	106		

Table 7: The summary statistics of students' scores at pre-clinical examinations by JAMB cut-off point score for merit.

Subjects		Summary statistics				
		Mean	SD	N	t-value	P-value
100 Level	*SSCE*					
1. Physics	200-	53.5	8.7	166	5.09	0.01
	267-	61.0	9.8	48		
2. Chemistry	200-	60.9	9.4	166	4.69	0.02
	267-	68.2	9.6	48		
3. Zoology	200-	55.6	7.7	166	2.83	0.05
	267-	55.7	7.5	48		
B. MBBS Part I						
1. Anatomy	200-	52.1	8.1	171	1.68	0.09
	267-	54.4	9.5	49		
2. Biochemistry	200-	53.4	7.0	171	0.92	0.15
	267-	54.7	9.1	49		
3. Physiology	200-	54.2	6.7	171	1.05	0.30
	267-	55.4	8.1	49		

Table 8: Correlation matrix of SSCE, JAMB and performance at pre-clinical examinations.

Subjects	Phy	Chem	Zoo	Anat	Bioch	Physio	SSCE	JAMB	P I MBBS	100 L
Physics	1 0	0 61	0 71	0 49	0 53	0 51	-0 56	0 42	0 55	0 93
Chemistry		1.00	0 68	0 46	0 53	0 43	-0.53	0 44	0 51	0 93
Zoology			1 00	0 44	0 50	0 44	-0 43	0 26	0 50	0 86
Anatomy				1.00	0 77	0 79	-0 37	0 23	0 94	0 51
Biochemistry					1 00	0 73	-0 42	0 20	0.90	0 53
Physiology						1 00	-0 36	0 14	0 91	0 51
SSCE							1 00	-0 45	-0 41	-0 56
JAMB								1 00	0 20	0 42
Part I MBBS									1 00	-
100 Level										100

Discussion

The examination malpractices generally associated with UME in recent years may suggest that some JAMB scores may not be the true performance or ability of the students. Little attention is paid to the quality of credit passes at the SSCE whereas secondary school grades have been reported to be significantly correlated with scores at the first year examinations in the universities [2].

The results of this study can therefore be regarded as preliminary to a larger study of students in the last ten to fifteen years. Notwithstanding, there are important findings in this study that one needs to note. The age distribution at entry into the university is in line with the Nigerian system of education particularly the 6-3-3-4 system. This suggests that students will complete secondary school at about 17years or 18 years.

The sex distribution in favour of males has been the trend and appears better than in the past [1]. The new wave of gender balance could have encouraged more females into the profession recently. The catchment population of the university and the long-term imbalance in the educational pursuit of North and South favour the current distribution with majority of students coming from the southern zones.

The finding that the sex differentials in the performance of the students were not statistically significant is similar to the result of other studies, which have reported that sex was not statistically related to academic performance [3,4]. But this runs contrary to other studies that reported that sex was a significant factor in the performance of students [5].

Another important result is the issue of younger students performing better than their older counterparts. This is consistent with findings from another study where older students performed poorly in the basic courses than younger students [6]. However, in that study younger students were those below 24 as opposed to this study where the cut-off was 18 years. This finding that younger students perform better may be due to a cumulative effect of a probable early exposure of these students to good schools. The older ones may also fall prey to social pressure characteristics of University environments.

That students with the school certificate grade of excellent (aggregate SSCE score 5-15) had statistically significant better performance in all the subjects shows that this examination could be an excellent indicator of brilliant students.

The fact that students admitted on merit performed significantly better in all the subjects at the 100 level but are unable to maintain the advantage at the part 1 examination also deserves some comments. The students have now stayed under the same teaching conditions and any differential in opportunities to quality education prior to University admissions could have fizzled out with longer stay in the University. The academic freedom effect could crop in and some students may relax.

The correlation between the JAMB scores and the performance at the 100 level Examinations given as 0.42 is similar to those obtained from similar studies in the USA that reported correlation coefficients of between 0.3 and 0.5 [9] between medical admission scores and performance at basic medical courses. That the JAMB scores could only account for 4% of the variability at the Part 1 examinations as against 17% by SSCE suggests the SSCE as a better predictor of performance than the JAMB scores. This better correlation of the aggregate SSCE with the 100 level and Part 1 examinations than the JAMB scores runs contrary to the findings of other studies where the medical college admission tests (MCAT) was the highest predictor of performance [2,7,8]. The JAMB test and the MCAT, however, may not be comparable as the MCAT includes some other criteria not used by JAMB. In another study, the undergraduate scores and the medical admission tests were similar with regards to correlation with performance in basic medical courses [9].

In conclusion, the results support the usefulness of JAMB examination as a predictor of success of medical students especially at the 100 level and to a smaller extent at the Part 1 MBBS level. However, the aggregate school certificate scorewas better correlated than JAMB at both the 100 level and Part 1 examination and offers a better predictor of student performance.

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