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The Effect of Mode of Entry into Medical School on Performance in the First Two Years

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The study was designed to compare the relative performance of students admitted into the Medical Programme through Pre-degree Science with those of students admitted through the Joint Admissions and Matriculation Board (JAMB). The performance indices used were the University 100 level Cumulative Grade Point Average (CGPA) and Physiology examination score during the 200 level Comprehensive Examination. The files of students admitted into the Medical Programme in 1998/1999, 1999/2000 and 2000/2001 Sessions were obtained from the Faculty of Basic Medical Sciences. The following data were extracted from each file-age, sex, school certificate result, mode of entry (JAMB, Pre-degree, Direct at 100 level or transfer at 200 level), 100 level CGPA and Physiology score in the 200 level Comprehensive examinations. The study showed that the students admitted through JAMB performed better in 200 level Physiology examinations but there was no correlation between the University Matriculation Examination (UME) Scores and the O-Level aggregate, 100 level CGPA and 200 level Physiology results. The Pre-degree examination score however showed a strong positive correlation with the O-Level aggregate, 100 level CGPA and the 200 level Physiology examination scores. It is therefore recommended that the Pre-degree examination results be used in admitting students into Medicine, as it is a more reliable predictor of success in Medical School Examinations.

Key words: JAMB/UME, Pre-degree, CGPA, direct, transfer, O-level aggregates

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INTRODUCTION

The integrity of the UME/JAMB used by virtually all Federal and to a lesser extent State and Private Universities to admit candidates into University, has been called to question in recent times. Most Federal Universities which depend solely on JAMB/UME results for admission of students have come to realize that candidates with very high UME scores do not do well in the University and are often asked to withdraw (Bamgboye *et al.*, 2001; Oyebola, 2004). The examination malpractices generally associated with UME (Bamgboye *et al.*, 2001; Gabriel Dike, 2005; Fasua and Oseghale, 2005) in recent times has prompted many Universities to resort to conducting Post JAMB tests (Mgbi, 2006), which have generated a lot of controversy. Previous studies on the effect of mode of entry on performance of students in Medical School have reported no difference (Ayeni, 1972) between concessional and Direct Entry students, better performance by UME/JAMB students, against Direct Entry and Remedial (Pre-degree) Science students (Olaleye and Salami, 1997). Studies carried out at University of Ibadan (Bamgboye *et al.*, 2001) a Federal University and the University of Ado-Ekiti a State University (Oyebola, 2004), showed little correlation between UME scores and subsequent performance in Basic Medical Sciences. However these studies were carried out in Federal Universities, which did not run the Pre-degree Science Programme (Bamgboye *et al.*, 2001) and a state university which had not yet commenced its pre-degree Programme (Oyebola, 2004), an objective comparison could therefore not be made between students admitted through JAMB and those admitted through the University Pre-degree Programme.

In contrast to the overwhelming dependence on JAMB/UME candidate's results for admission by Federal Universities, LAUTECH like other State Universities admits students into their various courses through Pre-degree Science and JAMB/UME. The Medical Programme proper however commences at 200 level. Apart from students admitted directly into Medicine at 100 level, other students transfer into the Medical Programme at 200 level from other departments on the strength of a good 100 level CGPA. This arrangement therefore affords us an opportunity to study The Effect of Mode of Entry on performance in Medical School and also to investigate the predictive value of UME scores for success in Medical School. The present study is therefore designed to determine which mode of entry; JAMB/UME or Pre-degree Science (PDS) produces more successful candidates in terms of 100 level University examinations

and the Physiology examinations in the 200 level Comprehensive examinations of the University, the academic and demographic profile of students most likely to succeed in Medical School and determine the relative value of University Matriculation Examination (UME) scores as predictors of success in the first two years of the Medical Programme. The findings reported are expected to serve as a guide to developing objective selection criteria for admission into Medical Schools, particularly in the State Universities.

MATERIALS AND METHODS

The study population was composed of students admitted into the Medical Programme in 1998/1999, 1999/2000 and 2000/2001 Academic Sessions. The files of these students along with those of students transferred from other Departments into the Medical Programme were used. The following data were extracted from the files: age, sex and school certificate results in English, Mathematics, Physics, Chemistry and Biology. The mode of entry whether through Joint Admissions and Matriculation Board (JAMB) or Pre-degree Science Programme (PDS) or by Transfer from Other Departments (TOD) was also recorded. The UME scores, Pre-degree scores, Cumulative Grade Point Average (CGPA) at the end of 100 level and the score in Physiology examination during the 200 level Comprehensive Examinations conducted for the Medical students by the faculty of basic medical sciences at the end of the 200 level. The grades of each of the candidates in the five relevant O-Level subjects were summed up to provide an indicator of the quality of the School Certificate results in a modification of a method earlier described (Bamgboye *et al.*, 2001).

For each intake of students, those admitted directly into Medicine at 100 level were separated from those admitted at 200 level from other departments (i.e., transfer students) on the strength of a good 100 level result. These groups of students were further divided into those admitted via UME and Pre-degree Science Programme. The summary statistics of each of the groups (Pre-degree direct, UME direct, Pre-degree transfer and UME transfer) of students was calculated.

The data was processed on a personal computer using SPSS windows 10 for data entry and statistical analysis. The student t-test was used to assess the effect of mode of entry on the performance of students in 100 level, 200 level physiology and 200 level comprehensive examinations. The students O-Level aggregates, UME or Pre-degree science scores were correlated with performance at 100 level examinations (CGPA) and 200

level Physiology examinations using the Pearson's correlation coefficient. A Regression Analysis was done to determine the relationship between UME scores and Pre-degree Science scores and the O-Level aggregates, 100 level CGPA and 200 level Physiology scores. All statistical tests were taken at the 5% probability i.e. $p < 0.05$.

RESULTS

Table 1 shows the summary statistics (mean±SD) of the students admitted directly into the Medical Programme through JAMB and those admitted through the University's Pre-degree Science Programme. The intakes for 1998, 1999 and 2000 sessions were reviewed. Over the three sessions under review the UME students had better O-Level aggregate scores and 200 level Physiology examination scores. The O-Level aggregate scores were significantly lower (indicating better performance) in the JAMB admitted candidates in the three sessions studied. The 100 level CGPA results of the pre-degree admitted students were generally better and significantly better ($p < 0.01$) in 1998 and ($p < 0.05$) in 1999 session. The students admitted through JAMB had generally better Physiology scores in the three sessions studied but the better performance was significant only in 1999 session ($p < 0.01$).

Table 2 shows the summary statistics of transfer students. These students were initially admitted into other departments but transferred to Medicine at 200 level on the strength of a good 100 level CGPA. The JAMB admitted students again had consistently better (lower) O-Level aggregate scores than their pre-degree counterparts. There was a significant difference in favour of the students admitted through JAMB in the three years under investigation ($p < 0.01$ in 1998 and 1999, $p < 0.05$ in

2000). The UME students also had significantly better CGPA ($p < 0.05$) in 1999 and significantly better 200 level physiology results ($p < 0.01$) in 1998 and ($p < 0.05$) in 2000 sets.

Table 3 shows the summary statistics of students admitted through JAMB comparing the performance of those admitted directly into Medicine at 100 level with those transferred to Medicine from other departments at 200 level. The student admitted directly into Medicine had highly significantly ($p < 0.01$ in 1998, $p < 0.01$ in 1999 and $p < 0.05$ in 2000) higher UME scores than their counterparts admitted at 200 level by transfer. However, there was no significant difference in the performance of both groups at 200 level Physiology examinations in all the three sets studied. Moreover the transfer students had significantly better 100 level CGPA scores than the direct students. The Age and O-Level aggregate scores were not significantly, different in both groups over the three sessions investigated.

Table 4 show the summary statistics of students admitted through the University Pre-degree Science Programme into 100 level Medicine (Direct) in comparison to those Pre-degree Science students admitted into 200 level Medicine after 100 level University examinations. The direct students had significantly higher PDS examination scores than their transfer counterparts. However in contradistinction to findings in the JAMB admitted students, the Pre-degree direct students either had significantly higher scores or there was no significance in the 200 level Physiology scores and 100 level CGPA scores. The O-Level aggregate scores were significantly better in the direct group in the 1998 ($p < 0.05$) and 1999 ($p < 0.01$) sets.

Table 5 shows the correlation matrices of the O-Level aggregate scores, 100 level CGPA, 200 level Physiology scores and UME scores in students admitted directly into

Table 1: Comparison summary statistics of students admitted directly into the Medical Programme (at 100 l) by Mode of Entry (JAMB/PDS)

| Data | 1998 | | 1999 | | 2000 | |
|----------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | No. = 90 UME | No. = 162 PDS | No. = 127 UME | No. = 250 PDS | No. = 20 UME | No. = 163 PDS |
| Age | 19.58±2.90 NS | 19.73±1.86 | 19.27±1.86 * | 19.70±1.6 | 18.50±1.05 ** | 19.58±1.81 |
| O' Level | 19.72±5.60 ** | 23.06±5.14 | 20.00±5.55 ** | 22.54±4.60 | 16.60±4.76 ** | 21.21±4.85 |
| Aggregate score | | | | | | |
| 100 Level CGPA | 3.31±0.69 ** | 3.37±0.64 | 3.12±0.80 * | 3.41±0.48 | 3.67±0.61 NS | 3.74±0.49 |
| 200 Level Physiology | 47.82±9.23 NS | 47.34±9.17 | 52.04±6.88 ** | 48.74±5.92 | 56.68±6.11 NS | 55.36±7.40 |

* $p < 0.05$, ** $p < 0.01$, NS: Not significant

Table 2: Comparison of summary statistics of students admitted by transfer into the Medical Programme (at 200 L) by Mode of Entry

| Data | 1998 | | 1999 | | 2000 | |
|--------------------------|---------------|--------------|---------------|--------------|--------------|--------------|
| | No. = 31 UME | No. = 23 PDS | No. = 48 UME | No. = 10 PDS | No. = 11 UME | No. = 27 PDS |
| Age | 20.13±1.71 NS | 21.08±2.22 | 19.20±1.70 ** | 21.00±2.67 | 19.00±1.18 * | 20.18±2.99 |
| O' Level Aggregate score | 21.03±5.73 ** | 25.16±4.28 | 19.67±4.18 ** | 26.67±2.83 | 18.45±6.27 * | 22.43±4.41 |
| 100 Level CGPA | 3.42±0.58 NS | 3.28±0.54 | 3.58±0.36 * | 3.17±0.52 | 3.93±0.27 NS | 3.93±0.34 |
| 200 L Physiology scores | 49.17±5.00 ** | 41.80±10.3 | 50.68±6.11 NS | 49.21±6.77 | 58.71±6.85 * | 54.49±6.64 |

* $p < 0.05$, ** $p < 0.01$, NS: Not significant

Table 3: The summary statistics of students admitted through JAMB direct (100 L) or transfer 200 L

| | 1998 | | 1999 | | 2000 | |
|--------------------------|------------------|-------------------|------------------|-------------------|----------------|--------------|
| | No. = 121 Direct | No. = 32 Transfer | No. = 127 Direct | No. = 48 Transfer | No. = 20 | No. = 11 |
| UME | | | | | | |
| Age | 19.58±2.90 NS | 20.13±1.71 | 19.27±1.86 NS | 19.20±1.70 | 18.50±1.05 NS | 19.00±1.18 |
| O' Level Aggregate score | 19.72±5.60 NS | 21.03±5.73 | 20.00± 5.55NS | 19.67±4.18 | 16.60±4.76 NS | 18.45±6.27 |
| 100 L CGPA | 3.13±0.69 * | 3.42±0.58 | 3.12±0.8 * | 3.58±0.36 | 3.67±0.62 NS | 3.93±0.27 |
| 200 L Physiology | 47.82±9.23 NS | 49.17±5.10 | 52.04±6.88 NS | 50.68±6.11 | 58.68±6.11NS | 58.71±6.75 |
| UME scores | 222.51±18.75 ** | 201.97±16.33 | 221.09±15.35 ** | 203.82±12.88 | 219.42±15.66 * | 208.91±14.12 |

* p<0.05, ** p<0.01, NS: Not significant

Table 4: Comparison of summary statistics of students admitted through Pre- degree Science Programme (Direct 100 Level and Transfer 200 Level)

| | 1998 | | 1999 | | 2000 | |
|--------------------------|------------------|--------------------|------------------|-------------------|------------------|-------------------|
| | No. = 161 Direct | No. = 184 Transfer | No. = 256 Direct | No. = 10 Transfer | No. = 166 Direct | No. = 28 Transfer |
| Pre-degree | | | | | | |
| Age | 19.73±1.86 ** | 21.08±2.22 | 19.70±1.60 * | 21.00±2.67 | 19.58±1.81 * | 20.43±2.99 |
| O' Level Aggregate score | 23.06±5.14 * | 25.16±4.28 | 22.54±4.6 ** | 26.67 ±2.83 | 21.21±4.85 NS | 22.43±4.41 |
| 100 L CGPA | 3.37±0.64 NS | 3.28±0.54 | 3.41±0.48 * | 3.17±0.52 | 3.74±0.49 * | 3.93±0.34 |
| 200 L Physiology | 47.34 ±9.17 ** | 41.80±10.80 | 48.74±5.92 NS | 49.21±6.77 | 55.36±7.4 NS | 54.49±6.64 |
| Pre-degree score | 347.98± ** | 311.07±35.27 | 345.95±** | 300.10±24.41 | 352.40±** | 327.07 ± |

* p<0.05, ** p<0.01, NS: Not significant

Table 5: Correlation matrix of O' Level Aggregate Scores (UME score, 100 L CGPA and 200 L Physiology Scores) for JAMB admitted students

| Data | O-Levels | UME scores | 100 L CGPA | 200L Scores |
|-------------|----------|------------|------------|-------------|
| O-Levels | - | +0.0012938 | -0.4561746 | -0.2979653 |
| UME scores | | - | -0.0075039 | +0.086649 |
| 100 L CGPA | | | - | +0.58198522 |
| 200L Scores | | | | - |

Table 6: Correlation matrix of O' Level aggregate scores, PDS scores, 100 L CGPA and 200 L Physiology scores of students admitted directly into Medicine through Pre-degree Science Programme in 1999/2000 Session

| Data | O-Levels | PDS Scores | 100 L CGPA | 200L Scores |
|-------------|----------|--------------|---------------|---------------|
| O-Levels | - | -0.275720559 | -0.217237033 | -0.158568215 |
| PDS scores | | - | + 0.609525589 | + 0.280759096 |
| 100 L CGPA | | | - | + 0.36127115 |
| 200L Scores | | | | - |

the Medical Programme (direct) in 1999/2000 session. The results show that there was no correlation between the O-Level aggregate scores and the UME scores, whereas there was a strong correlation between the O-level aggregate scores and 100 level CGPA and Physiology scores. The UME scores also did not correlate with the 100 level CGPA and the Physiology scores whereas the 100 level CGPA correlated with Physiology scores.

Table 6 shows the correlation matrices of O-Level aggregates scores and 100 level CGPA, Physiology scores and PDS scores in 1999/2000 session. In contrast to the results in table 5 there was generally very good correlation between the O-Level aggregate scores and the Pre-degree Science score, the 100 level CGPA and the Physiology score. The Pre-degree Science score also correlated strongly with 100 level CGPA and Physiology scores whereas the UME scores as depicted in Table 5 did not correlate with either 100 level CGPA or Physiology scores.

DISCUSSION

The conduct of post JAMB tests by many Universities in recent times due to unreliability of the

UME scores of students seeking admission into University, has become a wide spread practice (Gabriel dike, 2005). However, the evidence in support of the conduct of post JAMB tests have been largely anecdotal (Gabriel Dike, 2005). The results of his study provide important baseline data on the reliability of UME scores as predictors of success in Medical School and by extension other departments in the University. Over the three sessions studied the age distribution showed a mean age, ranging from 18.5-19.6 years in JAMB admitted candidates and 19.6-19.7 years in candidates admitted through the Pre-degree Science Programme. These values are higher than 18.1 years reported in a similar study (1) 1991/1992 at University of Ibadan. The observed difference in age distribution may be due to the fact that most students admitted to LAUTECH Medical School have been previously unsuccessful applicants to other Universities. Most students particularly those admitted via UME probably failed to make the desired grade for admission in the first generation Universities. It is note worthy that the mean age in both UME and Pre-degree Science candidates consistently declined during the period of study. This would indicate that as the LAUTECH Medical School became well established and better recognized, more students made it their first choice.

The overall sex distribution shows an increasing male-female ratio ranging from 1.15:1 in 1998 to 1.49:1 in 2000. This is at variance with trends in advanced countries (Ferriman, 2002; Lumsden *et al.*, 2005) where the sex ratio is in favour of females. However it is in agreement with studies carried out by Bamgboye *et al.* (2001) who also found a male female ratio of 2:1. This may suggest that the influence of sociocultural factors on gender prevalence in medical school is very strong. A study carried out in the University of Maiduguri (Olaleye and Salami 1997) which is located in the conservative northern region of Nigeria, showed a male-female ratio of almost 5:1. This tends to support a strong influence of sociocultural factors, particularly religion, on gender of medical students in the developing countries.

The analysed data presented in this study showed that the students admitted through JAMB were more successful than their Pre-degree Science counterparts in 200 level Physiology examinations. However, this supremacy is not maintained in the 100 level examinations where the Pre-degree Science admitted students had significantly better average CGPA's. This discrepancy in the two indices of performance is most probably due to the fact that those candidates admitted directly into Medicine through JAMB at 100 level represent a mix of excellent and mediocre students. The mix arises from the fact that most students view the State Universities as a second choice or last resort. As a result of this most of the supposedly best JAMB students had been snapped up by the more popular federal first generation universities, leaving the dregs to the less popular third generation state universities. Some studies (Bamgboye *et al.*, 2001; Oyebola, 2004) have clearly demonstrated that UME scores do not correlate well with performance in the Medical Sciences. One study specifically cites the suspect validity of the UME results as a cause of mass failure in Medical School (Bamgboye *et al.*, 2001). Taken at its face value our results would appear to contradict these findings. However a close inspection of the data shows that the mean UME scores of the UME direct group ranged between 219 to 222; figures far below the mean at the University of Ibadan at 252.6 In 1991/1992 session (Bamgboye *et al.*, 2001). Hitherto, it had been observed that relatively more students with scores within this range (219-222) had high levels of performance. The relatively low mean CGPA recorded by the UME group was most probably due to the dismal performance of some of the UME group who were withdrawn at 100 level. The fact that transfer UME students whose mean UME scores ranged between 202-209 performed significantly better in 100 level University Examinations and marginally better in

200 level Physiology examination (Table 2) than their Pre-degree Science counterparts further buttresses the assertion that a mix of mediocre and excellent UME students were admitted directly into medicine. The subsequent better performance of UME candidates may be due to the withdrawal of the mediocre ones after the 100 level examinations. It is instructive that the failure rate at 100 level in 1999 set was higher in UME than Pre-degree Science students; this indicates that students of suspect scholastic aptitude had indeed been admitted through JAMB.

Overall, candidates admitted directly into 100 level Medicine via Pre-degree Science performed better in the 100 level examinations but were less successful in the Physiology examination at 200 level. This may be due to the acclimatization to University education in this group having spent a year in Pre-degree Science. This would seem to confer an advantage, which is lost at 200 level. The students admitted through the Pre-degree Science Programme did not perform as well as their counterparts admitted through JAMB in Physiology examinations. The poor performance of the Pre-degree students could be attributed to poor selection procedure, as quite a number were admitted into 100 level Medicine with just above average scores in the Pre-degree examinations. The Pre-degree scores were however better correlated with the 100 level CGPA and 200 level Physiology examination results than was the UME score. The UME candidates were similarly not properly selected but because of the non-correlation of the scores with academic performance, many excellent students were inadvertently admitted with low UME scores. These students eventually performed excellently well.

When other factors such as the age and O-Level aggregates are considered it becomes increasingly evident that the UME candidates are better academically. The students admitted through JAMB were significantly younger in both direct and transfer students compared to their counterparts in Pre-degree. Other studies (Bamgboye *et al.*, 2001) have shown that younger students perform better in the Medical Sciences than their older counterparts (Fiel *et al.*, 1998). Similarly students admitted through JAMB had significantly better (lower) O-Level aggregates. Since various other studies have documented high levels of performance of students with better O-Level results (Bamgboye, 2001; Oyebola, 2004; Oyebola, 1992). We may therefore conclude that the JAMB admitted students in the years under review were better academically. Their better performance in 200 level Physiology is therefore not unexpected since the O-Level aggregates have been found to be strongly correlated to performance in the Medical Sciences.

It is however surprising that despite the better performance exhibited by the JAMB admitted candidates the UME scores correlated poorly with O-Level aggregate scores, 100 level CGPA and physiology scores of the students. This paradoxical situation may not be unconnected with the unreliability of UME scores on account of the many documented instances of examination malpractice (Gabriel Dike, 2005; Fasua and Oseghale, 2005; Mgbi, 2006) with which the conduct of the examination is associated. Furthermore there is a consistently observable lack of correlation in the relationship between the O-Level aggregates and the UME scores of students. Students who have excellent O-Level aggregates rarely score above 220 in JAMB. This may indicate that there is a very wide gap in the standard attained at O-Levels and that expected for UME. It would seem that many students bridge this gap by attending special JAMB preparatory classes, which coach them specifically for the examination. The 6-3-3-4 educational policies of the Nigerian government, which was put into place in 1990's, was designed to meet this need for a bridging of the gap between Secondary and University education. However in its implementation virtually all Secondary Schools use the extra year provided for revision of School Certificate subjects. The 6-3-3-4 educational system was conceived as an alternative to A-Level and with its inception the A-Levels were scrapped. This eventually led to a gap between Secondary School and University. We suggest that the O-Level syllabus should last five years as before and that the extra year, (S.S.3) should be used in preparing students for the UME, Poly JAMB and NCE. With this adjustment, we are sure the discrepancy will be removed.

CONCLUSIONS

In conclusion, the results of this study shows that while the JAMB admitted students were more successful in 200 level physiology examinations, the Pre-degree students had generally better results in 100 level University examinations. However while there was no correlation between the UME scores of JAMB students with 100 level University examination scores or 200 level Physiology examination scores, the Pre-degree scores of Pre-degree Science admitted students correlated well with the 100 level University examination scores and 200 level Physiology examination scores. The Pre-degree Science score was found to be a better predictor of success in the first two years of the Medical programme and should be used predominantly when considering students for admission to Medical School. The UME scores were confirmed to be unreliable indicators of future performance in Medical School. Therefore admission

through JAMB should be done with caution possibly with rigorous screening of such candidates being considered for admission.

Generally candidates successful in the first two years of Medical School were younger and of the male sex. Selection criteria should be stringent with more consideration being given to the O-Level results of the students being considered for admission.

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