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Original Research Article

Factors influencing Bachelor of Science in Clinical Medicine students performance in Clinical Officer Council Licensure examination, Kenya

Eunice M. Kuria*, Margaret W. Nyongesa, Joseph K. Choge, Norbert Boruett

Deparment of Health System Management, Amref International University, Nairobi, Kenya

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***Correspondence:**
Eunice M. Kuria,
E-mail: kuriaeunice12@gmail.com

ABSTRACT

Background: Clinical medicine program has recorded high rates of student's enrolment to training while their performance in clinical officers' council (COC) licensure examination remains variable. This study investigated performance of clinical medicine degree student's in COC examinations by determining student characteristics, institutional and regulatory body factors in relation to performance.
Methods: A retrospective study, using mixed method approach to collect data. A sample total of 427 of students was analyzed while cluster and purposive sampling were used for key informants interviewed. Quantitative data was converted from Microsoft excel to statistical package for the social sciences (SPSS) software version 26 and analysed. Odd ratio was used to measure strength of association between students,institutions and regulatoy body charateristics and performance with $p<0.05$ being considered significant. Qualitative data was transcribed for content analysis.
Results: The results indicated that there was highly significant relationship among the performance of students in government and private institutions respectively ($p<0.001$) unlike faith-based institutions ($p=0.292$). Private institutions were 0.158 more likely to perform better than other institutions while government institutions were 5 times more likely to perform better than any other institutions.
Conclusions: Age, mode of study and years of experience were found to be significant factors associated with performance while intergrity in marking was an important concern. The recommendations from the study are that training institutions continue upgrading program but factors contributing to low performances should be looked into. There is need to select experienced faculty to teach and set competency based licensure examination after internship.The study has demonstrated that results can be used to predict performance which are reliable for developing recruitment and examination policies.

Keywords: Clinical medicine, Admission characteristics, Clinical performance, Academic performance

INTRODUCTION

Globally clinical officers are grouped as non-physician clinicians or (AMTC) accelerated medical trained clinician and are known as physician associates/assistants.[1] Training programs for physician assistants i.e. professions with comparable concepts of clinical delegation and patient management, started in the United States of America (USA) in the mid-1960's these grew to 75,000 in 2011 and has spread to Australia, Canada, Great Britain, The Netherlands, Germany and also India, Israel, Liberia, New Zealand, Saudi Arabia and Feldshers in countries formerly comprising the Soviet Union.[2,3] In USA the national board of medical examinations (NBME) offers the physician associates with a licensure examination known as physician assistant national certifying examination (PANCE) which they must pass before becoming a physician associate – certified. The commission of certification of physician associates (NCCPA) assumes the responsibility of setting and passing standard, certification and re-certification.

In Sub-Saharan Africa they are known as mid-level health workers (MLW's). Recently the term "associate clinician" has been adopted by MLWs as a unifying term in the professional development of this cadre.[4] In 2010 this category of health care providers was identified in 47 out of 54 countries in sub-Saharan Africa although their roles varied widely between countries.[5,6]

In Kenya a clinical officer is a health professional who is gazetted, qualified and licensed to practice medicine. They play an important role in the provision of health care and are the face of the health facilities, being the first technical person to listen and address patient/client's needs.[7] There are approximately 23, 800 clinical officers in Kenya (COC reports) among them 950 (COC RHRIS) are BSc graduates. Clinical officers are divided in four distinct groups: masters of science clinical officers (MScCO) trained at masters level (specialized areas), bachelors of science clinical officers (BScCO) who are trained at degree level, where degree pre-service (direct) student's takes four (4) years while the degree in-service (up-graders) student's takes three years and one year internship for each, specialist senior clinical officers (SSCO) who undertake further specialist training in a medical discipline at a higher diploma level for eighteen months and registered clinical officers (RCO) who are trained at diploma level for three years, and one internship. COC reports, indicates that Kenya has 65 approved clinical medicine training institutions, of these twelve are accredited universities which offer bachelors of science in clinical medicine programs. When fully qualified clinical officers serve with minimal supervision provided by their immediate supervisors are satisfied. Training of clinical officers in Kenya started at certificate level in 1928 until 1967 when the three-year diploma program was mounted and later the degree program in 2009. It is a well-regulated profession through the clinical officer council (COC) of Kenya which is mandated under clinical officer act No. 20 of 2017 of the laws of Kenya is to oversee training, registration, licensing of all clinical officers; to regulate their practice for connected purposes. COC been the professional/regulatory body as per the Act is mandated to regulate training, through measuring and monitoring acquisition of competencies by health professions. The expectation of COC is that graduates released to the public are competent enough, to be able to provide the highest quality of healthcare to Kenyans as enshrined in the constitution of Kenya 2010, article 43 (1).[8]

METHODS

The study design used was analytic, retrospective study using both qualitative and quantitative data collection methods. The sample selection involved multi-stage sampling technique. The training institutions were clustered into Government, private and faith-based categories. Proportionate allocation of participants into cluster was done basing on their level of representation. Faith based and private institutions were few, three (3) in number so they were allowed in the sample. Public institutions were four (4) here simple random was done, three out of the four were picked which is more than thirty percent acceptable for a sample. Data collection involved interviewing of the key informants and retrieving information for students from the clinical officers council RHRIS from Nairobi. Quantitative data was analyzed using statistical package for social science (SPSS) version 26.0. Regression analysis was also used to determine the relationship and strength of the effect the independent variables have on the dependent variable. Our data had dependent variable that was dichotomous in nature that had two entries of either pass or fail. The dependent variable showed the performance of the students who had either passed of failed the licensure examinations while the independent variables reflected the characteristics of the student's institutions and regulatory body characteristics. In order to analyze and interpret the meaning of the qualitative data, content analysis was used because it was regarded as a systematic and objective means to describe and quantify qualitative data. Descriptive data was presented using frequencies, percentages, means and standard deviation while inferential statistics used Chi-square test to measure association between independent and dependent variables. P values less than 0.05 were considered statistically significant.

RESULTS

Demographic characteristics of students

Age was distributed in groups with an interval of 10 years apart ranging from 20 years and below, 20-29, 30-39 and 40-49 years. Students between ages 20-29 years old were the majority with 193 (44.7%) followed by ages under 20 years old being 147 (34.4%), while the least were between age 40 to 49 years old being 16 (3.7%) of the total students who sat for licensure examinations. Government institutions had the highest number of students with the youngest student being 17 years and the oldest being 44 years. The mean age of government institutions students was 24.97 and a standard deviation of 7.079. Private institutions had the lowest mean age of 21.65 and standard deviation of 4.293 with the youngest student being 17 years old and oldest 40 years. Faith based institutions had the least number of students with the highest mean age of 30 years and standard deviation of 6.325. The oldest student was 49 years old with the youngest being 18 years old. All institutions had most of their students in the age between 20 and 29 with government institutions having the highest number of 96 out of 242 (39.7%) students while both private and faith-based institutions had 75 out of 143 (52.4%) students and 20 out of 42 (47.6%) students respectively. Students between 40 and 49 years were the least compared to the number of students in other age groups (Table 1).

Gender of the students

Out of the total 427, 219 (51.29%) of the students who sat for the examination were male while 208 (48.71%) were

females. Comparing all the institutions, the number of male and female from government institutions exceeded other institutions leading with 109 (45.04%) males and 133 (54.95%) females out of 242 students. The faith-based institutions had the least number of students with 29 (69.05%) male and 13 (30.95%) female out of 42 students. The government institutions had a highest number of students attending the direct entry mode of study who were female with 81 out of 255 (60.9%) and highest number of part time students who were male with 61 out of 172 (56.0%).

The least number of students recorded were from faith-based institutions, where five 5 (38.5%) females and one 1 (3.4%) male who were from direct entry mode of study. It also clearly shows most students on part-time mode of study whether male or female prefer government institutions (Table 2).

Overall performance basing on age and gender

Age is categorized into groups ranging from age under 20, 20–29, 30–39, and 40–49. Gender is categorized into two groups as either male or female (Table 3).

Type of institution and performance

The government institutions had majority of their students pass exams with a total of 233 out of 387 (60.2%) students. Faith based institutions had the least number of students who had passed exams of 40 out of 387 (10.3%) students. Faith-based institutions had the least number of students who had failed of being 2 (two) out of 40 (5.0%) while private institutions had the majority of students who had failed the examination being 29 out of 427 (72.5%) students (Figure 1).

Analysis of institutions and performance

There was highly significant relationship among the performance of students in government and private Institutions respectively (p=0.001) unlike faith-based institutions (p=0.292). Private institutions were 0.158 more likely to perform better than other institutions while government institutions were 5 times more likely to perform better than any other institutions (Table 4).

Mode of study and performance

The results indicates that there is a statistically significance between mode of study and performance, thus part time students performed much higher than direct entry students. (OR: 9.561, 95% CI: 2.898– 31.541, p=0.005). The results also indicate the odds ratio are 9.5 implying that part time students are 9.5 times more likely to perform better than direct students in COC examinations (Table 5).

School policies and performance

The teaching methods that the institutions reported to engage in were face to face methods which included two distinctive methods, student oriented methods where students undertake classes by listening, looking and taking notes either face to face or online and mixed methods where students alongside routine lectures, they can be interactive in either practical work problem solving exercises or discussions. The class attendance policies were different across all the institutions with some having it at 80% attendance and above while others had below 80%.

However, the respondents did not mention if the policies were enforced in their institutions. There is a statistical significance between class attendance and performance (OR: 0.158. 95% C.I: 0.089-0.414, p=0.05). This indicated that those students who had class attendance above 80% were 0.158 times more likely to perform better than those had below 80%.

Also, there was a statistical significance between the teaching methods and performance (OR: 0,192, 95% C.I: 0.077-0.328, p=0.05). The students who were being taught using mixed methods were 0.192 times more likely to perform better than students who were taught using student-oriented methods. However, there was no statistical significance between the pass marks and performance (p=0.292).

Table 1: Age of students by institution.

Training institutions	Faith based (%)	Government (%)	Private (%)	Total (%)
Grouped age in years				
Under 20	3 (7.1)	86 (35.5)	58 (40.6)	147(34.4
20-29	20 (47.6)	96 (39.7)	75 (52.4)	193 (44.7)
30-39	16 (38.1)	48 (19.8)	9 (6.3)	71 (17.1)
40-49	3 (7.1)	12 (5.0)	1 (0.7)	16 (3.7)
Total	42	242	143	427
Standard deviation	6.325	7.079	4.293	6.645
Mean	30.00	24.97	21.65	24.35
Min-max (years)	18-49	17-44	17-40	17-49

Table 2: Gender of the students.

Gender	Mode of study	Training institution (%)			
		Faith based	Government	Private	Total
Female	Direct entry	5 (38.5)	81 (60.9)	48 (77.4)	134 (64.4)
	Part time	8 (61.5)	52 (39.1)	14 (22.6)	74 (35.6)
	Total	13 (30.95)	133 (54.95)	62 (43.36)	208 (48.71)
Male	Direct entry	1 (3.4)	48 (44.0)	72 (88.9)	121 (55.3)
	Part time	28 (96.6)	61 (56.0)	9 (11.1)	98 (44.7)
	Total	29 (69.05)	109 (45.04)	81 (56.64)	219 (51.29)
Total (both male and female)	Direct entry	6 (14.3)	129 (53.3)	120 (83.9)	255 (59.7)
	Part time	36 (85.7)	113 (46.7)	23 (16.1)	172 (40.3)
	Total	42	242	143	427

Table 3: Overall performance basing on age and gender.

Variables	Remarks (%)		Total (%)
	Fail	Pass	
Gender			
Female	20 (50.0)	188 (48.6)	208 (48.7)
Male	20 (50.0)	199 (51.4)	219 (51.3)
Total	40	387	427
Age group in years			
Under 20	24 (60.0)	123 (31.8)	147 (34.4)
20-29	15 (37.5)	176 (45.5)	191 (44.7)
30-39	0 (0.0)	73 (18.9)	73 (17.1)
40-49	1 (2.5)	15 (3.9)	16 (3.7)
Total	40	387	427

Table 4: Analysis of institutions and performance.

Institutions	Remarks (%)			Logistics regression			
	Fail	Pass	Total	OR	95% C.I.		P value
	Count	Count	Count	Count	Lower	Upper	Count
Private	29 (72.5)	114 (29.5)	143 (33.5)	0.158	0.077	0.328	0.001
Government	9 (22.5)	233 (60.2)	242 (56.7)	5.211	2.414	11.250	0.001
Faith based	2 (5.0)	40 (10.3)	42 (9.8)	2.190	0.509	9.422	0.292
Total	40	387	427				

Table 5: Analysis on mode of study and performance.

Mode of study	Remarks (%)			Grouped age		Logistic analysis		
	Pass	Fail	Total	30 and above	Below 30	OR	95% CI	P value
Direct entry	218 (56.3)	37 (92.5)	255 (59.7)	7 (7.9)	248 (73.4)	0.105	0.032 - 0.345	0.000
Part time	169 (43.7)	3 (7.5)	172 (40.3)	82 (92.1)	90 (26.6)			
Total	387	40	427	89	338			

Table 6: Logistic regression of school policies and performance.

Independent variable	Remarks (%)		Logistic regression		
	Pass	Fail	OR	95% C. I	P value
Pass marks					
Below 50	90.10	9.90	0.457	0.105–1.964	0.292
Above 50	95.20	4.80			
Teaching methods					
Face to face	83.20	16.80	0.192	0.089–0.414	0.05

Continued.

Independent variable	Remarks (%)		Logistic regression		
	Pass	Fail	OR	95% C. I	P value
Mixed	96.30	3.70			
Class attendance					
Below 80	79.70	20.30	0.158	0.077–0.328	0.05
Above 80	96.10	3.90			

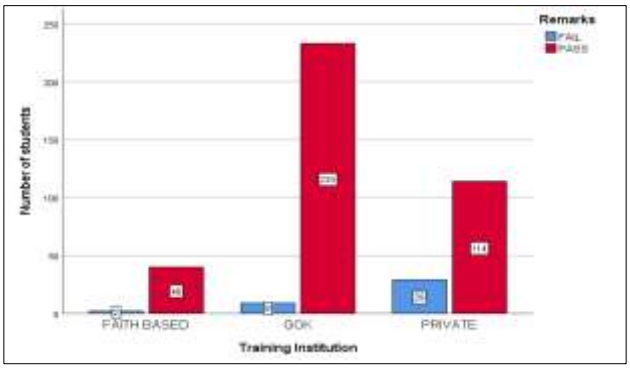

Figure 1: Performance by type of institution.

DISCUSSION

There was highly significant relationship among performance on students in government and private institutions respectively unlike in faith-based institutions. In the odd ratio of government institution (5.211) verses private institutions (0.077) government institutions were five (5) times likely to perform better than the private institutions. This give similar studies reported by Kumwenda et al, that students in public institutions outperformed students in private institutions.[9] Other studies identified strong relationships type of institutions and performance this was reported by Edward, where private schools performed best followed by faith-based (mission) and least performance was government (public).[10] In as much as percentages in faith based were higher than private institutions, the p value demonstrated no significance (p=0.292) but for private there was a significance (p=0.001). There was a significant relationship between mode of study and performance, part-time students performed better than direct students (OR: 9.6, 95% C. I: 2.9-31.5, p=0.005) showing there is a significant mode of study meaning there is a likelihood that part-time students preformed much higher than direct students. These results collaborate with the findings of Sharchar et al that part-time learners perform better.[11]

A study done in Moi and Egerton Universities provided information that a Kenya Certificate of Secondary Education (KCSE) aggregate grade at admission has no influence on students' performance in preclinical and clinical courses Obwoge et al.[12] There is a significant relationship between higher grades and performance in that students with higher KCSE grades performed correspondingly better than those with lower grades. However, it was noted that significantly high numbers of students with grades B and below were awarded less than 50% in their examination results. For part time students who mostly had a grade of C none got below the pass mark (50%). There was a significant relationship between lecturer's qualifications and experience and performance, government institutions which had lecturers who were more qualified and experienced their students had the highest mean scores and performed better. This was in agreement with finding of Idowu, who attributed lecturer's qualifications to better student performance, while shortage of qualified lecturers in any discipline lead to poor performance.[13] This also matches with Darling in a study that found long serving lecturers improved learner's outcome.[14] World Bank report also showed a positive correlation between teacher experience in years and learners' academic achievements.[15] There was a significant relationship between schools polices and performance. Institutions that mixed teaching (lectures and on-line performed better that only face to face face/lecture as their teaching method with an OR of 0.192 better than lecture methods. This study support Lag et al report which states flipping the classroom enables the student to integrate theory into clinical practice.[16] There was also a significant relationship between class attendance and performance, for those that had class attendance of 80% there was 0.158 times more likely good performance than those below 80%. Support a study by Rawlani et al that reports poor class attendance hinders student academic performance.[17]

CONCLUSION

There is a statistically significant relationship between age and performance, whereby candidates aged 30 and above perform better than younger candidates. Employment status of candidates, type of training institution, minimum entry grades during admission and lecturer qualifications and experience, timing of examinations, school policies are statistically significant predictors of performance in examinations. Lack of content validity, lack integrity in marking and time of the duration the candidate takes before sitting for the examinations are statistically significant predictors of performance in examinations. Since the study found that there was a significant relationship among predictors and actual performance of the candidate, null hypothesis was therefore rejected.

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