

The Perceived Role of Community-Based Medical Education Among Kenyan-Trained Medical Doctors' Choice of Rural Practice

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Abstract

Background: The recruitment and retention of doctors in rural and remote areas remain a challenge, leading to inequity favoring urban populations worldwide. Sub-Saharan Africa suffers a major challenge related to doctors not working in rural areas where over 60% of their population reside. The influence of community-based medical education (CBME) on medical doctors and rural practice has been documented in a few countries except Kenya.

Objective: To determine the perceived role of CBME in the choice of rural practice among Kenyan-trained doctors.

Study Design and Methods: An analytical cross-sectional study design was used. Six cohorts of medical graduates of the years 2000, 2001 and 2002 from Nairobi University and Moi University were interviewed.

Google forms were used to email the study questionnaires to the participants.

Results: The eligible number of participants for each cohort was 96, 83 and 90 for Nairobi University graduates and 49, 40 and 41 for Moi University graduates for the years 2000, 2001 and 2002 respectively. The response rates were 35.8% (45.8, 19.3, 42.2%) and 38% (32.7, 27.5, 53.7%) for years 2000, 2001 and 2002 for Nairobi and Moi University participants respectively. Factors found to be associated with a positive perception included: the medical school, rural upbringing, parents' level of education, and early rural posting. After multivariate analysis for confounders, it was observed that the medical school the participant graduated from was significantly associated with a positive perception on the role of CBME in the choice of rural practice [Moi University = 73.5 (95% CI: 60.6, 86.3) vs. Nairobi University = 45.9 (95% CI: 35.9, 56.6) chi-square, p-value = 0.002].

Conclusions: CBME played a positive role in the study participants' choice of rural practice.

Key Words

Role of Community-Based Medical Education; Choice of Rural Practice; Kenyan-Trained Doctors

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Background

The recruitment and retention of healthcare professionals, especially doctors, in rural and remote areas remains a major challenge and a contributor to inequity in healthcare services provision that favours urban populations worldwide. Also skewed, in favour of the urban centers, is the distribution of health facilities. This is particularly worrying in developing countries, especially those in Sub-Saharan Africa (SSA)¹⁻⁴.

Governments and global healthcare leaders have developed initiatives and strategies to improve the attraction and retention of healthcare workers in underserved areas in different countries globally, with mixed results of some success and failure.

Over the years, the government of Thailand has

used various strategies to increase the number of doctors serving in rural underserved areas. These strategies have involved coercion and financial and non-financial incentives. Coercion involves a compulsory three-year service in rural Thailand after medical training. Financial incentives include supplemented income with hardship allowances, non-private practice and professional allowances. The non-financial incentives include preferential consideration in promotion and increased opportunity for specialist training.

In 1994 the Thailand Ministry of Health and some medical schools developed an initiative that involved selecting cohorts of medical students to spend their clinical years of training in rural health facilities. After medical training, members of these cohorts would be posted to work in the same facilities. This

initiative was a collaborative effort between the medical schools and the Ministry of Health of Thailand^{5,6}. The positive outcomes of this initiative have been documented⁷.

Sub-Saharan Africa (SSA) has many documented challenges that result from the unavailability of doctors and other health workers in rural areas where over 60% of the population lives. A significant number of these doctors also leave their native African countries to work in Europe, United States of America, Canada and other countries that pay better than their own. This problem is compounded by the fact that medical schools in SSA are few and with limited capacity for enrolment of trainees. The number of non-African doctors interested in working in SSA is very small⁸.

Strategies that have been employed to retain doctors in some SSA countries include coercion, which involves bonding of medical graduates to serve in underserved areas for at least two years after medical training and internship. Other means involve financial incentives that include higher salaries and allowances. The World Health Organization policy, implemented by ministries of education and health, promotes the enhancement of community-based medical education (CBME) by making it a core course in the curriculum for undergraduate and graduate medical programmes^{2,7,9}.

Some countries have documented that CBME during undergraduate medical training played a positive role in attracting more medical doctors to rural practice.

In Australia, offering medical education and training with important insights into factors affecting preference for future rural practice has resulted in increased recruitment and retention in these rural areas¹⁰.

In Uganda, medical graduates of the Makerere College of Health Sciences who went through the medical training curriculum with community education and service (COBES) component spiraled in all levels of the training programme reported that COBES made them confident health workers in primary healthcare, especially when serving rural communities in Uganda¹¹.

In Kenya, health workers from three different underserved contexts were interviewed about the challenges they faced and what made it difficult for facilities in these areas to attract and retain workers. These different facilities were in Turkana (arid part of northern Kenya), Machakos (borders Nairobi but has a large semi-arid portion) and

Kibera (the largest slum in Nairobi, the capital city of Kenya). The factors that the health workers in these facilities attributed to poor attraction and low retention included low salaries, female workers finding it difficult to work in this environment, level of training (highly trained personnel avoided these areas), suboptimal working environment due to poor allocation of resources, work overload among the few available workers, among many others issues¹².

The Nairobi and Moi University medical schools are the oldest in Kenya, having been started in 1967 and 1989 respectively. The other approved public medical schools are in the universities of Kenyatta, Maseno, Egerton and Jomo Kenyatta University of Agriculture and Technology. Approved private medical schools are Kenya Methodist University, Uzima University and Mount Kenya University. Except for Nairobi and Moi University medical schools, the rest have developed within the last decade. Aga Khan University Hospital in Nairobi offers Masters of Medicine (MMed) programmes as a private university but does not have a medical school. Nairobi and Moi Universities also offer Masters of Medicine (MMed) and clinical fellowship programmes.

The Nairobi University School of Medicine (NUSOM) and the Moi University School of Medicine (MUSOM) both offer medical training curricula that have CBME as core courses in the medical training curricula.

Moi University offers spiral community-based education and service (COBES) courses in five of the six years of medical training. During the last decade, Nairobi University has started to offer community health courses in level two and five of the six levels of training. Before then, community health was offered only in fourth year of medical training.

My study explored what the medical graduates perceived as the role of CBME on the individual doctor's choice of rural practice.

Methods

Study Site: The study was carried out in Moi University School of Medicine while data were collected from participants using their contact details provided by the Kenya Medical Practitioners and Dentists Board (MP&DB) register. Other available medical directories were also used to complement the medical board contact details.

The implementation of the Nairobi University medical school community health course for medical students was accessed on the Nairobi

University School of Public Health webpage while the Moi University medical school community-based education and service (COBES) course for medical students was accessed from the School Curriculum Implementation and Evaluation Committee (CIEC) secretariat.

Study Design: An analytical cross-sectional study design was used to study both the exposure and outcome of CBME among Kenyan-trained medical doctors. Six cohorts of medical graduates (three from Moi University and three from Nairobi University) who graduated in years 2000, 2001 and 2002 participated in the study.

Target Population: Medical graduate cohorts of years 2000, 2001 and 2002 from Moi and Nairobi Schools of Medicine. These cohorts were conveniently selected as medical doctors who were

likely to have a significant degree of career stability and also beneficiaries of innovative medical education teaching and learning methods in these two oldest Kenyan medical schools.

Sample Size Determination and Sampling Procedures

The target population was small. All members of these cohorts were eligible to participate. The contact addresses and telephone numbers of the participants were provided by the Kenya Medical Practitioners and Dentists Board (MP&DB) secretariat and were supplemented by the Kenyan medical directories.

The study population (see table below) was small and all members of the different cohorts were eligible to participate.

Table 1: Illustration of the cohorts

Medical School	Medical Graduate Cohorts of Year 2000	Medical Graduate Cohorts of Year 2001	Medical Graduate Cohorts of Year 2002	Total
Moi University School of Medicine	49	40	41	130
Nairobi University School of Medicine	96	83	90	269
Total	145	123	131	399

Data Collection Procedures

The offices of the Deans of Nairobi and Moi medical schools were approached for authority to conduct the study and access to the alumni lists. The Kenyan medical board secretariat authorised access to the contact details of the participants.

The participants preferred online participation through Google Forms which were used to get consent and questionnaires (See appendix).

Responses were received within a short period of the participants finishing.

Data Management, Analysis and Presentation of Results

The Google Form responses were saved in MS Excel database. Reminders to participants were sent in the form of repeated email reminder messages, short text messages and telephone calls within six months.

It was not possible to determine who among the non-respondents were still residing in Kenya or whether they were alive or dead. The annual retention register of the Kenyan medical board bears only the names of doctors who pay up annual retention fees.

Data were exported to International Business Machines (IBM) Statistical Package for Social Sciences (SPSS) version 21 for analysis. Fisher's Exact test was used in the analysis of the categorical data. The data was categorical in 2 by 2 contingency tables. The sample sizes were small and the expected values were small. Chi-square test was used to test for association in the categorical variables. Multivariate analysis was used for confounders. The level of significance α was arbitrarily taken as 0.05 with 95% Confidence Interval (CI). Results were presented in frequency tables.

Ethical Considerations

Ethical approval was sought and granted by the Institutional Research and Ethics Committee (IREC) of Moi University.

Permission to conduct the study was sought and granted from the Deans of Nairobi and Moi University medical schools.

Informed consent was sought from all the participants. The names of the interviewees were not revealed on the database and confidentiality was maintained.

Data are stored in password protected folders and will be destroyed as guided by the rules and regulations of IREC.

Study Limitations

1. Dependence on recall by participants was foreseen as a limitation. This was minimised by limiting the questions to major events and avoiding questioning details on specific community-based rotations. The tool had been pretested on medical graduates from as long as four decades before my study and compared with those of the last decade. No significant variation was noted on the responses among various cohort members during the pretest.
2. The response rate of less than 50% of the study was a limitation. This use of a denominator as provided by alumni lists of more than 15 years may be misleading. My study did not sample but aimed to have all members of the six cohorts participate. The most recent available contact details as provided by the Kenya Medical Practitioners and Dentists Board. Vital statistics,

though updated in Kenya for new entrants, fall short because challenges in updating losses through migration and even death. It was noted that similar studies had published findings of response rates lower than 50%. The low response rates may also be attributed to medical graduates' reluctance to participate in activities outside their clinical duties.

3. The use of online self-administered questionnaires may have the disadvantage of the respondents' controlling their responses without the researcher's involvement. During the pretest, responses of interviewer-administered interviews were compared to the online responses. There was no significant difference between the two that could affect the objectives of this study.

Results

The study was conducted between February and September 2018.

The response rate was calculated against the list provided by the respective medical schools. A significant proportion of these graduates were not on the current Kenyan medical board retention register and did not respond to our email and telephone communication that was sent every fortnight. After six months, the effort to get responses from the non-responders was halted.

The eligible number of in each cohort was 96, 83 and 90 for Nairobi and 49, 40 and 41 for Moi University medical schools in the years 2000, 2001 and 2002 respectively. The response rates were 35.8% (45.8, 19.3, 42.2%) and 38% (32.7, 27.5, 53.7%) for Nairobi and Moi University participants respectively for years 2000, 2001 and 2002.

Table 2: Study population characteristics

Variable	Nairobi University	Moi University	Total	
	Freq(%)	Freq(%)	Freq(%)	
Age in Years				
35-40	24 (24.5)	15 (30.6)	39 (26.5)	
41-45	55 (56.1)	31 (63.3)	86 (58.5)	
>45	19 (19.4)	3 (6.1)	22 (15)	
Gender				
Male	67 (68.4)	28 (57.1)	95 (64.6)	
Female	31 (31.6)	21 (42.9)	52 (35.4)	
Marital Status				
Single	5 (5.1)	11 (22.4)	16 (10.9)	
Married	90 (91.8)	37 (75.5)	127 (86.4)	
Divorced	3 (3.1)	1 (2)	4 (2.7)	
Year of Graduation				
2000	44 (44.9)	16 (32.7)	60 (40.8)	
2001	16 (16.3)	11 (22.4)	27 (18.4)	
2002	38 (38.8)	22 (44.9)	60 (40.8)	
Employer				
Self	11 (11.2)	7 (14.3)	18 (12.2)	
Private institutions	12 (12.2)	8 (16.3)	20 (13.6)	
University	27 (27.6)	12 (24.5)	39 (26.5)	
Ministry of Health	48 (49)	21 (42.9)	69 (46.9)	
Research Institute	0 (0)	1 (2)	1 (0.7)	
Post-Medical Training				
None	9 (9.2)	15 (30.6)	24 (16.3)	
Masters in Medicine	73 (74.5)	27 (55.1)	100 (68)	
Masters in Public Health	11 (11.2)	2 (4.1)	13 (8.8)	
Masters in Palliative Care	3 (3.1)	1 (2)	4 (2.7)	
PhD	0 (0)	1 (2)	1 (0.7)	
Masters in Medicine plus Clinical Fellowship or PhD	2 (2)	3 (6.1)	5 (3.4)	
Where did you grow up?				
	Rural	78 (79.6)	29 (59.2)	107 (72.8)
	Urban	18 (18.4)	19 (38.8)	37 (25.2)
	Both	2 (2)	1 (2)	3 (2)
What was your father's level of education?				
	None	13 (13.3)	5 (10.2)	18 (12.2)
	Primary	18 (18.4)	14 (28.6)	32 (21.8)
	Secondary	35 (35.7)	14 (28.6)	49 (33.3)

The study population was youthful with 58.5% of the population aged 41-45 years. Sixty-eight percent of the respondents were Masters of Medicine graduates, the majority of whom worked in public service. Seventy-three percent reported growing up in rural Kenya.

Table 3: Rating the role of the CBME course during the medical training and good skills in early practice

Variable	Nairobi University Freq(%)	Moi University Freq(%)	Total Freq(%)
Rate CBME Year 1			
Poor	0 (0)	5 (10.2)	5 (3.4)
Good	0 (0)	21 (42.9)	21 (14.3)
Very good	0 (0)	11 (22.4)	11 (7.5)
Excellent	0 (0)	12 (24.5)	12 (8.2)
Not applicable	98 (100)	0 (0)	98 (66.7)
Rate CBME Year 2			
Poor	0 (0)	2 (4.1)	2 (1.4)
Good	0 (0)	15 (30.6)	15 (10.2)
Very good	1 (1)	19 (38.8)	20 (13.6)
Excellent	0 (0)	13 (26.5)	13 (8.8)
Not applicable	97 (99)	0 (0)	97 (66)
Rate CBME Year 3			
Poor	0 (0)	5 (10.2)	5 (3.4)
Good	0 (0)	22 (44.9)	22 (15)
Very good	0 (0)	17 (34.7)	17 (11.6)
Excellent	0 (0)	5 (10.2)	5 (3.4)
Not applicable	98 (100)	0 (0)	98 (66.7)
Rate CBME Year 4			
Poor	20 (20.4)	3 (6.1)	23 (15.6)
Good	30 (30.6)	24 (49)	54 (36.7)
Very good	42 (42.9)	15 (30.6)	57 (38.8)
Excellent	6 (6.1)	6 (12.2)	12 (8.2)
Not applicable	0 (0)	1 (2)	1 (0.7)
Rate CBME Year 5			
Poor	1 (1)	5 (10.2)	6 (4.1)
Good	1 (1)	17 (34.7)	18 (12.2)
Very good	1 (1)	17 (34.7)	18 (12.2)
Excellent	0 (0)	8 (16.3)	8 (5.4)
Not applicable	95 (96.9)	2 (4.1)	97 (66)
Rate CBME in Your Competence			
Poor	52 (53.1)	9 (18.4)	61 (41.5)
Good	30 (30.6)	24 (49)	54 (36.7)
Very good	16 (16.3)	13 (26.5)	29 (19.7)
Excellent	0 (0)	3 (6.1)	3 (2)

In Nairobi University School of Medicine, community health was offered only in fourth year with 80% of the Nairobi University medical graduates rating that experience positively. In Moi University School of Medicine, community-based education and service (COBES) was offered in years one to five. The positive rating of COBES was above 90% in all the years except year five (82%). The highest rating was for second year (96%).

Table 4: Rating the role of the CBME course during the medical training and good skills in early practice

Variable	Nairobi University Freq(%)	Moi University Freq(%)	Total Freq(%)	P-value
Rate CBME in the Choice of Early Posting to Rural Hospitals				
Poor	49 (50)	9 (18.4)	58 (39.5)	0.001
Good	32 (32.7)	24 (49)	56 (38.1)	
Very good	17 (17.3)	16 (32.7)	33 (22.4)	
Rate CBME in Rural Practice Choice After Internship				
Poor	53 (54.1)	13 (26.5)	66 (44.9)	0.002
Good	19 (19.4)	13 (26.5)	32 (21.8)	
Very good	26 (26.5)	20 (40.8)	46 (31.3)	
Excellent	0 (0)	3 (6.1)	3 (2)	
CBME Plays a Role in Competence				
Strongly disagree	5 (5.1)	2 (4.1)	7 (4.8)	0.719
Disagree	7 (7.1)	4 (8.2)	11 (7.5)	
Neutral	28 (28.6)	9 (18.4)	37 (25.2)	
Agree	29 (29.6)	16 (32.7)	45 (30.6)	
Strongly agree	29 (29.6)	18 (36.7)	47 (32)	
CBME Plays a Role in Current Rural Practice				
Strongly disagree	6 (6.1)	2 (4.1)	8 (5.4)	0.033
Disagree	19 (19.4)	12 (24.5)	31 (21.1)	
Neutral	40 (40.8)	8 (16.3)	48 (32.7)	
Agree	20 (20.4)	15 (30.6)	35 (23.8)	
Strongly agree	13 (13.3)	12 (24.5)	25 (17)	

CBME was perceived to be significantly associated with choice of early posting to a rural hospital (internship and immediately after internship) and the current choice of rural practice.

Table 5: Rating of the perceived role of CBME in the choice of early rural posting, considering competence and settling into rural practice

	Poor Freq(%)	Good Freq(%)
Medical School		
Nairobi University	53 (54.1)	45 (45.9)
Moi University	13 (26.5)	36 (73.5)
Age in Years		
35-40	15 (38.5)	24 (61.5)
41-45	44 (51.2)	42 (48.8)
>45	7 (31.8)	15 (68.2)
Sex		
Male	43 (45.3)	52 (54.7)
Female	23 (44.2)	29 (55.8)
Marital Status		
Single / Divorced	6 (30.0)	14 (70.0)
Married	60 (47.2)	67 (52.8)
Year of Graduation		
2000	28 (46.7)	32 (53.3)
2001	11 (40.7)	16 (59.3)
2002	27 (45)	33 (55)
Where did you grow up?		
Rural	46 (43)	61 (57)
Urban	19 (51.4)	18 (48.6)
Both	1 (33.3)	2 (66.7)
What was your mother's level of education?		
None	3 (15.8)	16 (84.2)
Primary	30 (56.6)	23 (43.4)
Secondary	13 (33.3)	26 (66.7)
College	20 (55.6)	16 (44.4)
What was your father's level of education?		
None	2 (11.1)	16 (88.9)
Primary	20 (62.5)	12 (37.5)
Secondary	19 (38.8)	30 (61.2)
College	25 (52.1)	23 (47.9)
Rating of rural experience		
Poor	11 (73.3)	4 (26.7)
Good	36 (36)	64 (64)
No Rural Experience	19 (59.4)	13 (40.6)
Rate CBME Year 4		
Poor	18 (75)	6 (25)
Good	48 (39)	75 (61)

Seventy-four percent of Moi University medical graduates rated the positively perceived the role of CBME in choice of rural practice compared to 46% in Nairobi University medical graduates.

Table 6: Groups' rating of the perceived role of CBME on the choice of rural practice

Variable	Odds Ratio	P-value	95% Confidence Interval	
Moi vs. Nairobi University	7.315	0.000	2.497	21.428
Mother's Education Level				
Primary vs. None	0.347	0.262	0.055	2.204
Secondary vs. None	1.178	0.873	0.157	8.855
College vs. None	0.372	0.389	0.039	3.525
Fathers Education Level				
Primary vs. None	0.049	0.005	0.006	0.407
Secondary vs. None	0.378	0.372	0.045	3.204
College vs. None	0.227	0.193	0.024	2.119
Rate Rural Experience				
Good vs. Poor	3.390	0.087	0.839	13.695
No Rural Experience vs. Poor	0.723	0.707	0.134	3.918
Rate CBME Year 4				
Good vs. Poor	1.865	0.337	0.523	6.649

Summary of Findings on the Perceived Role of Community-Based Medical Education (CBME) in the Choice of Rural Practice by Medical Graduates

It was observed that the factors that were associated with positive perception on the role of CBME in the choice of rural practice were: the medical school where a doctor trained, the doctor's mother's level of education, the doctor's father's level of education, the good rating of early career rural experience and a good rating of the CBME experience in year four.

On controlling for confounders for the five factors, it was observed that the medical school in which a doctor trained was found to have a statistically significant association to a positive perception of the role of CBME with the choice of rural practice. The proportion of Moi University medical graduates who rated the perception positively was 73.5% (95% CI: 60.6, 86.3) while in Nairobi University medical graduates the proportion was 45.9% (95% CI: 35.9, 56.6) [chi-square; p-value=0.002].

Discussion

Perception of Community-Based Medical Education (CBME) by Medical Students and Young Graduates

The positive perception on the role of CBME in career growth by my study participants was higher among medical graduates of Moi University than those of Nairobi University

Students' perception and perspective of CBME has been studied in different CBME delivery contexts.

There is evidence of reported perception of better preparedness for clinical roles in British young medical graduates who had CBME as part of their medical curriculum. The positive impact was in comparison with those that did not have CBME in their medical curriculum. The perceived positive impact was by both the medical graduates and those who supervised their internship activities²².

Australian medical graduates who had CBME as part of their medical training were found to demonstrate more social accountability and better skills to serve disadvantaged and rural communities than those who did not have CBME as part of their medical training²³.

Community-Based Medical Education versus Community-Oriented Medical Education

It was observed that Moi University Medical School offered a community-based education and service (COBES) programme in the form of spiral courses from year one to five that had up to six week rotations within communities. These are communities that the medical graduates are expected to serve. Nairobi University Medical School offered more of a community-oriented education (COE) programme with a single term in the fourth year of the medical training programme. The courses are provided by the Nairobi University School of Public Health and are mainly didactic, with several one-day visits to rural communities.

In Malaysia, Sahid documented a significant difference in the commitment to rural and

community health care for medical students who had in medical school been offered similar programmes during medical training²⁴.

In historical cohort comparison of three traditional medical schools in Quebec, Canada, transition from a tradition medical curriculum to one with a community-oriented problem-based learning component was associated with significant improvements in preventive care, continuity of care and improvement in indicators of diagnostic performance of the graduates compared to the ones before the transition. Graduates of medical curricula with CBME demonstrated improved skills and practice on disease prevention and emphasis on continuity of care²⁵.

The Medical Education Partnership Initiative (MEPI) for selected African medical schools is funded by the government of the United States of America to promote medical education with emphasis on enhancing CBME. This has impacted positively on improved skills and interest among medical graduates to serve in rural and underserved populations²⁶.

Factors Associated with Young Doctors' Choice of Rural Posting and Setting Up Rural Practices

My study findings were that some of the participants positively identified community-based medical education as one of the factors that influenced their choice of rural posting as new medical school graduates and later in settling for rural practice, employment or both.

The persistent global problem of attracting and retaining doctors to serve in rural underserved populations is well documented. The problem is worse in low and middle income countries (LMICs) where it has been attributed to many factors that include poor working conditions, lack of supervision, under-resourced health systems and low wages. Global and national health policy makers and health managers continue to grapple with possible ways of dealing with this problem²⁷. CBME as a major component of the medical training curriculum has been supported as one of the many interventions by health educators and policy makers²⁸.

Conclusions

The findings of this study concur with similar studies done in other contexts in the findings that community-based medical education has a positive role in the medical graduate's choice of rural practice.

The difference in perceptions on the positive role of

community-based medical occupation from Kenyan medical graduates whose only difference was the medical school they trained in and the way the course delivered was noted.

Exposure of rural Kenya to persons in early life, during training and early career posting played an important role in the choice rural practice.

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Conflict of interest

I declare no conflict of interest.

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