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## CAPACITY OF NON-TERTIARY KENYAN HEALTH FACILITIES SELECTED FOR DECENTRALISED DENTAL EDUCATION

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## CAPACITY OF NON-TERTIARY KENYAN HEALTH FACILITIES SELECTED FOR DECENTRALISED DENTAL TRAINING

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### ABSTRACT

**Objective:** To determine the capacity of six non-tertiary Kenyan hospitals enrolled as sites for decentralised dental education.

**Design:** A descriptive cross-sectional study.

**Setting:** The Dental departments of six non-tertiary Kenyan health facilities.

**Main outcome measures:** Capacity of the hospitals to be used as sites for decentralised dental education.

**Results:** Five out of the six facilities had capacity for final year undergraduate students to gain learning experiences in more than 60% of the clinical disciplines studied. All the selected facilities had challenges of lack of specialists, broken down dental equipment and inadequate materials.

**Conclusion:** Although the six hospitals faced various challenges in maintenance of equipment, availability of dental materials and specialist staff, five out of the six facilities had the capacity for dental student learning in more than 60% of the clinical disciplines studied.

### INTRODUCTION

Decentralised education (DE) exposes students to new knowledge, skills and values that may not be readily available in dental-school based clinical training. Students who participate in DE have been reported to treat large patient numbers, work with allied dental personnel and render care to a more diverse patient population (1). Additionally, they demonstrate higher clinical productivity upon return to the dental school environment (2).

The University of Nairobi Dental Hospital (UoNDH) is the teaching hospital of the University of Nairobi School of Dental Sciences (UoNSDS). This health facility also serves as one of the referral hospitals for patients with oral and maxillofacial conditions in Kenya. Majority of patients treated at the hospital are from Nairobi (the capital city of Kenya) and its environment. There was a perceived need to expose students to the management of patients outside the schools' walls and in a non-tertiary environment. This was seen as a way to prepare students to work and serve diverse patient populations as only 3.1 million people (7.8% of the Kenyan population) reside in Nairobi (3). These external rotations would also provide an opportunity

for students to evaluate career opportunities in rural and underserved areas which have an extremely low dentist to population ratio. The students would also get exposed to patient care outside a teaching setting, improve communication skills and gain appreciation of oral health issues outside the dental school environment. Kenya has about 1000 dentists serving a population of approximately 38.6 million, (3) hence a very low dentist to population ratio of 1:38000 against the WHO recommendation of 1:7000. Prior to embarking on the decentralised education it was necessary to evaluate dental departments at the sites where UoNSDS students would be posted. In Kenya and Africa as a whole there is paucity of data on the capacity of non-tertiary hospitals as sites for decentralised dental training and there are no defined metrics to assess this capacity. The aim of this study therefore was to develop variables to measure capacity to train in off-site locations and use the tool to assess and select rotation sites.

### MATERIALS AND METHODS

Ethical approval for this work was obtained from the Kenyatta National Hospital/ University of Nairobi Ethics and Research Committee (KNH-ERC/A/286).

This study was part of the larger Medical Education Partnership Initiative (MEPI) study with clinical training sites included having already been approved to host medical students. The criteria for a site to be selected to host medical students included a level 4 or above Ministry of Health or Faith-based health care facility with supportive administration and presence of consultants who would double up as preceptors to undergraduate students. Additionally they were board approved internship training sites for MBChB graduates.

A search for a pre-existing tool for the evaluation of these sites for decentralised dental education did not yield any tool. We therefore developed a tool guided by the principles stated by Mascarenhas and Henshaw, (4) in identifying and selecting community sites for dental education. The 3rd and 4th year Bachelor of Dental Surgery undergraduate curriculum and clinical requirements were used as the guiding documents in designing the tool. Based on the principles stated above the four requirements for a site were: 1. Licensure by the Medical Practitioners and Dentists Board, 2. Supportive hospital administration (a memorandum of understanding was eventually going to be drawn between the University of Nairobi (UoN) College of Health Sciences and the Ministry of Health which ran these hospitals at the time the study was conducted), 3. Sites already approved to host Medical students and 4. Dentists licensed to practice by the Medical Practitioners and Dentists Board.

Based on the 3rd and 4th year curriculum the second part of the tool evaluated the sites' staffing level, patient load, capacity for dental radiography, presence of a dental laboratory, capacity to render oral health services in eight disciplines of dentistry, functional dental operatories, continuing professional development in oral health and ongoing research in oral health.

During the months of April and July 2012, we conducted a baseline assessment of six dental departments in health facilities that had been enrolled in the pilot phase of the decentralised education programme by the partnership for innovative medical education in Kenya (PRIME-K) as sites for training of medical students. Key informant interviews with the heads of the dental departments and site visits were carried out using the tool described above

## RESULTS

Two provincial hospitals: Coast Provincial General Hospital and Garissa Provincial Hospital and four district hospitals: Kitui, Kisii, Karatina and Naivasha were assessed. These hospitals had been enrolled as sites for decentralised medical education by PRIME-K.

A total of 19 general dental practitioners rendered oral health services at the six hospitals. Other cadres

of personnel at the sites included: dental technologists (9), community oral health officers (7), dental interns (6) and dental specialists. Notable was that only two dental specialists: a Pediatric Dentist and Oral and Maxillofacial Surgeon were at Coast Provincial General Hospital; the other hospitals did not have any specialists.

The daily patient load of both paediatric and adults in the dental departments ranged from 24 to 45 in number. At Garissa Provincial General Hospital up to 100 patients per day requiring dental age assessment were recorded during the season when application for national identity cards was ongoing.

With regards to dental radiography only three (50%) of the hospitals carried out intra-oral peri-apical radiographs while one (16.7%) carried out bitewing views. None of the hospitals had capacity for dental tomography services (Table 1). When patients required radiographs that could not be carried out at the health facilities, they were referred to the nearest privately run health facility or government health facilities in neighbouring districts.

Four (66.7%) of the hospitals had a dental laboratory; the capacity of these being to fabricate removable acrylic dentures and removable orthodontic appliances (Table 1). Of the remaining two hospitals, Kisii Level 5 had a laboratory but the trimmer was not in working condition at the time while Garissa Provincial General Hospital did not have a dental laboratory (Table 1).

With regards to the learning experiences by thematic dental disciplines, one hospital Coast Provincial General Hospital (CPGH) had full capacity (100%) as shown in Table 2. Kitui District Hospital (KDH) and Karatina District Hospital (KADH) had capacity for students to gain learning experiences in seven (87.5%) out of the eight disciplines. Kisii Level five (KL5) and Garissa Provincial General Hospital (GPGH) had capacity for students to gain learning experiences in five (62.5%) of the eight thematic dental areas. Only Naivasha District Hospital (NDH) had capacity for students to gain learning experiences in four (50%) of the eight thematic dental disciplines.

A total of 21 dental operatories were recorded in the six hospitals. Out of these six were fully functional while five were semi-functional and nine were moribund. One unit was awaiting installation. Three (50%) of the fully functional operatories were at the CPGH while KL5, KADH and GPGH each had one fully functional operatory.

Only one hospital, CPGH had continuing professional development (CPD) in oral health which occurred bimonthly. The staff in the other five hospitals participated in CPD programmes targeting all health workers. None of the hospitals had ongoing research in oral health; however in one facility (CPGH) a research proposal was being developed.

**Table 1**  
*Capacity for dental radiography and dental laboratory services by hospital*

Hospital	Services rendered			Capacity of dental laboratories		
	Capacity for dental radiography BBW	IOPA	OPG	Acrylic partial and complete dentures	Removable orthodontic appliances	Crown and Bridge
Coast	X	✓	X	✓	✓	X
Kisii	X	X	X	X	X	X
Kitui	X	X	X	✓	✓	X
Karatina	✓	✓	X	✓	✓	X
Naivasha	X	X	X	✓	✓	X
Garissa	X	✓	X	X	X	X

**Table 2**  
*Personnel and learning experiences in thematic dental disciplines by hospital*

Dental Discipline	Coast (CPHG)	Kitui (KDH)	Hospital Karatina (KADH)	Kisii (KL5H)	Garissa (GPGH)	Naivasha (NDH)
Number of dentists	8	2	2	2	2	2
Number of dental specialists	2	0	0	0	0	0
Oral diagnosis and extractions	✓	✓	✓	✓	✓	✓
Periodontology (Prophylaxis and full mouth scaling)	✓	✓	✓	✓	✓	✓
Paediatric dentistry	✓	✓	✓	✓	✓	x
Minor oral surgery	✓	✓	✓	✓	✓	x
Conservative dentistry and endodontics	✓	✓	✓	✓	✓	x
Removable orthodontics	✓	✓	✓	x	x	✓
Removable Prosthodontics	✓	✓	✓	x	x	✓
Community outreach	✓	x	x	x	x	x
Total	8(100%)	7(87.5%)	7(87.5%)	5(62.5%)	5(62.5%)	4(50%)

## DISCUSSION

In evaluating the infrastructure for community based dental education, Mascarenhas and Henshaw, four describe a school "wish list". Since the literature did not provide a tool for measuring capacity of a site for decentralised dental education, we developed a tool guided by their criteria and focused on determining suitability of a site based on clinical facilities and infrastructure that can accommodate students and

provide them with diverse clinical experience under supervision by dentists at the sites. The Bachelor of Dental Surgery (BDS) undergraduate curriculum five at the UoNSDS and clinical requirements of the students were also utilised in developing the tool. In developing countries there is paucity of data on capacity of non-tertiary hospitals as sites for decentralised dental education. Another consideration was matching of competencies to be acquired during decentralised education with the

oral health needs of the Kenyan population. The UoN undergraduate curriculum is reviewed once every five years and one of the initial inputs during this process is feedback from stake holders, the Ministry of Health being one. The Ministry of Health receives quarterly reports from health facilities in the whole country indicating procedures undertaken and this serves as an indicator of the oral health needs of the population in various counties within Kenya. As a stakeholder, the MOH thus gives feedback on whether the curriculum and competencies taught at the SDS are in keeping with the population needs and types of treatment the dental students shall render upon graduation.

In Kenya, there is only one institution that carries out training of dental specialists at graduate level and this explains the finding of only two specialists and 19 general dental practitioners at the six hospitals. The Masters programme in Paediatric Dentistry had its inception in the year 2000 while that in Oral and Maxillofacial followed in 2001. Each of these programmes graduates approximately two specialists every year. The country also has specialists trained abroad; however due to the financial cost of procuring this training in foreign countries only few dentists return to work in Kenya, more so in the public sector. Government scholarships for post-graduate training in dental specialties are few possibly due to the high cost implications hence further explaining this shortage. Due to the small number of specialists, experienced general practitioners have more advanced knowledge and skills than those in countries with more specialists possibly due to clinical exposure and patient demand for advanced clinical services. They can therefore act as preceptors for students in diverse clinical specialties as has been demonstrated by previous studies (6). The main barrier in supervision of the students would be personal interest from the clinician to work both as a preceptor to the students rotating under their supervision while at the same time providing services to patients under their care. It would also be necessary for these educators to know the school curriculum, policies on patient care and acquire teaching skills in order to adequately support the learners who rotate at their facilities (7). Another implication of this finding is that students will only gain learning experiences in competencies which can be imparted by general practitioners. The specialists at the school would therefore have to augment the learning at the sites by carrying out site visits to teach and or demonstrate more complex clinical procedures.

All the sites had capacity for students to carry out diagnosis and simple extractions. This corroborates data from South Africa that over a four-month period, 39242 extractions as compared to 2992 restorations were carried out in the public oral health service hence demonstrating widespread availability of extraction

services in the region (8).

Five (83.3%) of the hospitals had capacity for students to carry out procedures in restorative dentistry, endodontics and paediatric dentistry with periodic challenges in availability of dental materials. The one hospital that was not offering these services stated that the process of procurement of materials was ongoing. Our findings thus support the report by Thorpe,(9) that in Africa availability of financial and human resources remains one of the major barriers in the provision of oral health services.

Two out of the six hospitals did not have capacity for students to carry out procedures in removable prosthodontics and orthodontics. One hospital lacked a dental laboratory while the other reported equipment mal-function hence the students who visited these two hospitals would not carry out procedures in prosthodontics. This finding points to the fact that there is a need to strengthen purchasing as well as maintenance of dental equipment in order for diverse clinical procedures to be carried out at these facilities. It is also possible that due to limited financial resources, the hospitals focus more on purchase of equipment and drugs used to manage life-threatening medical conditions while purchase of dental equipment which seen as costly is relegated to the bottom of the list.

All the facilities had capacity for students to carry out procedures in oral and maxillofacial surgery. There was some variation in types of procedures carried out from one site to another due to lack of some equipment for example hand pieces hence in some of the centers open disimpaction could not be performed. The one facility with a maxillofacial surgeon had full capacity as a site for decentralised education in that specialty and would offer students learning experiences in both minor and major oral surgery as well as ward rounds.

All sites had capacity for students to carry out some procedures in Periodontology; however this was limited to prophylaxis and full mouth scaling. Only one site had engaged community partnership meaning that student experiences in this area would vary markedly.

One of the study limitations was the exclusion of preventive dentistry. This decision was informed by the fact that when key informant interviews were carried out, it was established that preventive services are carried out on an individual clinician-to-patient basis and were therefore difficult to measure in a dental department as a whole. Prevention however remains a key component of oral health care and it is very important for students on decentralised education to be involved in rendering a preventive service to patients in the various disciplines in which they rotate.

Availability of working stations by way of functional dental operatories was a major challenge

at all the hospitals considering that students require adequate clinical facilities and infrastructure to attend to patients and gain learning experiences during their externship. Strategies such as pairing of students with one assisting the other would have to be used to ensure good utilisation of the time at the sites as this challenge could not be easily resolved by the Dental School. In the 2012/2013 fiscal year the Ministry of Health gross expenditure was approximately US \$1 million (10). Out of this, only a meager 0.0016 %, (11) is allocated to oral health. It is therefore not surprising that we report inadequate capacity in the infrastructure of oral health services in the health facilities thus posing a challenge if these sites are to be utilized for decentralised dental education.

Christensen *et al*, 12 reported that general practitioners who teach medical students need CPD to enhance quality of teaching. We however found that only one hospital had CPD in oral health sciences while in the rest the staff participated in hospital CPD that covered general medicine. There would therefore need to be a deliberate effort to initiate CPD relevant to oral health care, workshops, online programmes and discussion forums for the preceptors in order to enhance the learning experiences of the students during their externships.

We end by quoting a report by Thorpe, (9) that stated "the way oral health personnel are currently trained in Africa does not equip them to deal with community health as it is focused on specialised, urban-based curative care with little exposure to realities of life in Africa." There is therefore need to augment the training received at the University of Nairobi School of Dental Sciences (UoNSDS) with a decentralised education rotation in order to expose students to service provision in a non-tertiary environment. This will equip the students with skills to render care to patients from diverse cultures who remain largely underserved. The UoNSDS would also train dentists who are relevant to the country's oral health needs and are culturally competent.

In conclusion, we found that despite the fact that five of the hospitals had variable capacity for decentralised dental education there were major challenges such as variability of the clinical exposure by sites and inadequate functional dental equipment as well as shortage of dental materials. Only two dental specialists were reported in one out of the six hospitals. With the devolution of health care from central government to County governments, the Ministry of Health needs to formulate policies that advocate for

training of dental specialists and building capacity of the dental departments in the country as a whole. These will guide County Governments on how to better allocate resources that will ultimately lead to better provision of oral health services, stimulate demand and at the same time improve the capacity of the hospitals for decentralised dental training.

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