

The Cost of Setting Up an ENT Endoscopic Practice in Lower Middle-Income Countries of Sub-Saharan Africa

Abstract

Ear, nose, and throat (ENT) surgeons in developing countries are constrained to practicing with lower technology, lower cost surgery, and reliance on outdated surgical techniques carried out with improvised instruments when compared with their counterparts in the developed world. In this review, we planned to lay open the bottle necks militating against setting up an ENT endoscopy practice in our setting with possible outcomes. The literature search was carried out to retrieve relevant published articles, books, and guidelines. Unpublished literatures were excluded. The search was limited to articles in English. ENT clinical practice in lower middle-income countries (LMICs) where there are limited or no ENT endoscopic setup due to high cost of procurement and maintenance, human resources, lack of subspecialty training, and inadequate funding by policy makers poses major challenges that can militate against the provision of adequate and effective surgical management. A continually improved management practices will positively affect the organisational structure, efficiency, and safety of a system. That is, an affordable and standard ENT endoscopic setup will go a long way to improve the access to training and practice for both ENT clinical and surgical purposes. The expansion of ENT endoscopic specialist training will improve both the diagnostic and therapeutic acumen in ENT practice in LMICs. The budget for health and the health-funding systems of our institutions must receive special and specific attentions tailored towards putting our health facilities in better shapes, subspecialty training, and procurement of state-of-the-art endoscopic equipment with proper plans on maintenance culture.

Keywords: *Developing countries, ENT endoscopic setup, ENT practices, ENT surgeons, lower middle-income countries*

Introduction

Ear, nose, and throat (ENT) clinical and surgical practices in lower middle-income countries (LMICs) of Africa have suffered unavailability of basic equipment and worsen the limitation in providing ENT services in our localities.^[1] Surgical operations are performed at much lower rate in these resource-poor settings and under more limited circumstances. Typically, the primary health centres, and even in the tertiary levels, have a high percentage of emergency and complicated cases in a need of urgent and sophisticated interventions, but these institutions focus more on a limited set of interventions because of constraints with adequate and outstanding resources.^[2]

ENT surgeons in poorer or developing countries are also constrained to practicing with lower technology, lower cost type

surgery, and reliance on outdated surgical techniques carried out with improvised instruments when compared with their counterparts in the developed world because of the lack of modern equipment.^[3] Obviously, the potential benefits for an improvement in services are evidenced in the gross disparities in the outcome of patient management between LMICs and high-income countries (HICs).^[4] Mock *et al.* revealed that persons with life-threatening, but salvageable traumas are six times more likely to die in LMIC setting (36% mortality) than in a HIC setting (6% mortality).^[5]

A large gap has been created and needed to be filled up with all interventions marshalled towards speeding up the progress of development of innovative methods for a more robust ENT services in sub-Saharan Africa.^[1] Minimally invasive surgical techniques (MISTs) such as ENT endoscopic practices could produce tremendous subspecialty implementations with

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mouthwatering benefits even in LIMCs like ours.^[2,6] These advantages include but are not limited to the reduced cost of care (which includes the amount spent on medications, ward admission, etc.), shorter stay in the hospital, and reduced morbidity and mortality, especially as related to surgical complications and postoperative infections.^[7] Similarly, an affordable and standard endoscopic setup will go a long way to improve the access to training and practice of MISTs for both clinical and surgical purposes in LMICs.^[7] The aim of this review is to lay open the bottle necks and restrictions militating against setting up an ENT endoscopy practice in our setting with possible outcomes.

Materials and Methods

We did a literature search for relevant articles in PubMed/Medline, Scopus, Cochrane Library, Web of Science, and Google Scholar as well as relevant books magazines, leaflets, and professional body guidelines. The keywords used for the search include: ENT endoscopic setup, Developing countries, LMIC, ENT services, ENT surgical practices, and Sub-Saharan Africa. The Boolean operators “AND” and “OR” were used to achieve more focused and productive search. We ensured that relevant studies conducted many years ago and the recent ones were captured in the search results.

The search was also restricted to publications written in English, but not restricted by date or publication type. Abstracts, conference proceedings, unpublished articles, and/or studies with low relevance to the scope of this study were excluded. All downloaded articles were imported into the literature management software: Mendeley Desktop to eliminate duplicated records and for proper referencing.

The Need for an ENT Endoscopic Setup in LMICS

In all establishments, a continually improved management practices positively affect the organisational structure, efficiency, and even safety of the system. That is, a more robust health management system is directly proportional to a more enhanced and productive clinical and surgical practice. Conversely, many health facilities in LMICS at different levels are constrained by poor resources and poor health management practices resulting into limited productivity and poor resource allocation.^[2]

The access to adequate hearing screening and life-saving procedures such as tracheostomy (and tracheostomy tubes), bronchoscopy, balloon dilatation, and other ENT endoscopic interventions are not readily available or well distributed in our hospitals across LIMCs of Sub-Saharan Africa.^[8] ENT surgeries have been limited to the few urban specialist units with a resultant increase in the waiting list and the patient having to travel through long distances. Therefore, it is advisable to have ENT services decentralised to reach more people in the rural

settings and effectively reduce the ENT disease-related morbidity and mortality.^[9] Salisu and Jibril,^[10] for example, have shown that providing endoscopic ear surgery in the rural settings will result in an effective performance of the bulk of ear surgeries needing magnification in those settings and eliminating the costs associated with patient transportation to tertiary centres and long-waiting queues. There is a rising demand for endoscopic-assisted surgical procedures in Nigeria, because of their applications for diagnostic and therapeutic purposes. As it also applies to ENT endoscopy, they help in earlier diagnosis, the prevention of detectable pathologies, and improvement as regard to documentation, reliability, and review of results.^[11,12] More trained endoscopists will surely be needed to provide quality endoscopic procedures and simplify the process of treatment in LMICs like this.

The techniques of ENT endoscopic practice in a low-resource setting had been seen to have offered more advantages over traditional microscopic techniques as the equipment required is easier to transport; the images displayed are wider, clearer, easily displayable on a monitor, and useful for educating members of staff and patients alike.^[13] Nasopharyngolaryngoscopy for instance is very useful in the visualisation of the nose, pharynx, and larynx in a head and neck examination due to diverse indications.^[14] Every patient with chronic rhinosinusitis (CRS) should undergo a nasal endoscopy, which should be carried out by video monitoring rather than the use of eyepiece so as to pick the signs of infection, crusting and rule-out tumours, and the presence of foreign body or significant structural abnormalities.^[15] In fact, the recent criteria for diagnosing CRS and classifying it into cases with and without nasal polyps are now inclusive of nasal endoscopy.^[16] Furthermore, during the last couple of decades, both functional and extended endoscopic sinus surgeries have been widely advocated and employed in the management of CRS, especially for those that were not amenable to medical management and also complications arising from the disease or from the traditional open surgical management of chronic nasal and sinus diseases in HICs.^[9,17]

In a review of the availability of ENT surgical procedures in Zambia, Lukama *et al.*^[9] noticed that 70% of the hospitals available have no expertise to carry out these procedures in LIMCs; the general population is therefore exposed to complications of sinus infections and tumors such as orbital sepsis, blindness, brain abscesses, and eventually death. The problems with an incomplete excision of sinus disease, especially the complicated cases, could be better assessed and resolved with sinus endoscopy.^[18] A good endoscopic surgical dexterity, experience of a trained ENT surgeon, a good patient selection and preparation, availability of good endoscopes are well-known prognostic determinants. They will be useful in ensuring a complete excision of disease with good cosmesis and minimal injury to sensitive and delicate structures around the operation site.^[11,18]

Challenges Militating against Endoscopic Setup in LMICS

In a study on Africa's challenged ENT services, 64% of African countries had less than one ENT specialist per million population, 81% had less than one audiologist per million population, and 19% had less than one speech pathologist.^[19] Similarly, in many of these LMICs, the burden of ENT diseases has not been matched with the resources required to effectively manage them. The improvement in ENT services has almost always been met with challenges emanating from inadequate infrastructure and equipment, relatively small health budgets, shortage of medical personnel, and a lack of political will. As a result, only very few hospitals in LMICs can manage ENT conditions effectively like in HICs.^[9]

In another survey on ENT services in Africa, where an analysis of ENT personnel and training programmes were carried out, it revealed no ENT doctors and nurses, audiologists, and speech therapists in some African countries. Similarly, in a summary of ENT, audiology, and speech therapy training programmes, many countries have no training programmes, especially for endoscopic ENT practice, audiology, and speech therapy.^[3] Likewise, in a more recent studies, the availability of endoscopic equipment among other ENT instruments as well as maintenance and disinfection was noticed to have remained nil or poor in most centres in LMICs of Africa. Poor infrastructure and equipment are a deterrent to working in ENT facilities in these countries. There is, therefore, a clear need for investment into the procurement of state-of-the-art infrastructural development and equipment and to create training centres for ENT specialists for further training in the subspecialties as endoscopic ENT practice.^[1,7] The challenge of training is such that the majority of surgeons have to access further endoscopic training in highly developed countries. In cases where there are collaborations with trainers for local training of surgeons, surgeons in LMICs only have a few days to practice the techniques because of challenges with setting up a sustainable endoscopic system.^[7] Local training within Africa and provision of all necessary materials for continuity's sake will also make it more likely that trainees remain and work in Africa.^[1]

Other factors that have further limited the growing interest in ENT endoscopic practices in our setting include but not limited to the high cost of the initial setup, a lack of technological backup, human resources management, awareness of the burden, and the impact of ENT diseases in the field of medicine and surgery with perpetual presentation of our patients with advanced disease at the first hospital visit.^[1,7] Recent studies^[20,21] in Nigerian institutions where there are limited or no ENT endoscopic setup have being procured identified limited ENT endoscopic equipment because of the high cost of

procurement and maintenance, human resources, a lack of subspecialty training, and an inadequate funding by policy makers as the major challenges militating against the provision of adequate surgical management of ENT and head and neck problems.^[11,20]

Steps towards Overcoming the Challenges of Setting Up an ENT Endoscopy in LMICS

The question remains: can the standards recommended and achievable in the developed and HICs be made realistic in our own setting? An issue that needs to be resolved is whether or not ENT endoscopists in LMICs should set their own local standards based on the peculiarities and realities of our setting or adopt standards already recommended for their counterparts in HICs. Ismaila and Misauno^[11] resolved that despite the challenges militating against the setting up of standard endoscopic equipment in all health facilities in LMICs, endoscopy can still be performed competently by a local endoscopist with very good outcomes. However, the need for improvement in endoscopic equipment and more training for the provision of quality endoscopic services cannot be overemphasised. It will automatically result in a tremendous reduction in referrals to HICs and the encouragement of surgical tourism in our centres in the LMICs.

Progressive technological advancement in the areas of optics, illumination, and video technology has improved the ability to conduct good endoscopic views with an improved image quality and ability to store the images in retrievable storage system. Image acquisition is achieved by connecting the endoscope to a camera and to an audiovisual grabber device connected to a computer through a universal serial bus interface or through a monitor mounted on an ENT workstation.^[12] In an attempt to move forward gradually, further studies will be needed to explore which interventions will work to speed up the progress of ENT endoscopic services and the development of innovative methods to fill the gaps created by the lack of advanced ENT services in LMICs of Africa.^[1] Low-cost simulators, using a smartphone camera as vision system, have been well described and successfully used as an affordable laparoscopic camera system (ALCS) in LMICs by Gheza *et al.*^[7] They revealed that this system will only stimulate the need for more local training in low-resources health centres in LMICs as the primary goal for integrating specific ALCS training, which has been designed to accommodate novices and rural surgeons practicing in these settings. Therefore, the gadgets needed for the application of the coupling of a smartphone camera system with a telescope should be made conventional and available for ENT endoscopy so that ENT surgeons in our subregion can queue behind this success-driven step to improve ENT endoscopic practice in Sub-Saharan Africa.

Improving the standards in the area of ENT endoscopy will also require a deliberate investment into training,

infrastructure, and staffing, which will surely be facilitated by assistance and collaborative efforts of the HICs through collaborative programmes with these countries or organisations in such settings. The expansion of ENT endoscopic specialist training with local and international collaboration will also improve both the diagnostic and therapeutic acumen in ENT practice in LMICs.^[1,11,22] Similar to what is attainable everywhere in the world, education and hands-on training are at the heart of developing safe and effective endoscopic surgical care in the low-income setting, where the primary goal should be the development of a self-sufficient and sustainable local service rather than one that relies upon help from abroad all the time. Meara *et al.* also clearly stated such issues and the need for non-governmental organisations to integrate training programmes into their efforts in the development in the health sector.^[23] This also puts into consideration low-cost simulation programmes that will help develop and ensure competency that was not at the expense of patient care or limited hospital resources.^[13]

One aspect that must not be left out when working towards a quality and sustainable system is a regular and accurate local auditing of ENT endoscopic procedures in this region. While making efforts to identify and address the peculiar and local factors associated or militating against an improved system of operation, it is still advisable to compare our findings with those of the developed countries so as to prevent setting up lower standards.^[11]

Conclusions

Despite the challenges of poor equipment and ENT endoscopy training in LIMCs, there are still assurances that ENT endoscopic practice can be carried out competently and successfully by local ENT endoscopic surgeons in these settings with good outcomes. The processes and actual procedures needed to be applied optimally to achieving these goals, as well as the human and physical resources needed to carry out these procedures vary across the spectrum of economic resources of the nations of the world and the geographic location of the facilities concerned. In the LIMCs, the budget for health and the health funding systems of our institutions must receive special and specific attentions tailored towards putting our health facilities in better shapes, subspecialty training, and procurement of state-of-the-art endoscopic equipment with proper plans on maintenance culture. The need to improve local training for the provision of quality ENT endoscopic services and collaboration with international institutions cannot be overemphasised.

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Conflicts of interest

There are no conflicts of interests.

Authors' contributions

SOA: conception and design of the title, literature search, drafting of the article, revising the article critically, corresponding author, and approval of the version to be published; **SKA:** substantial contributions to the conception or design of the work, drafting of the work, agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved, and final approval of the version to be published.

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