

**REVIEW****Establishing Medical Schools in Limited Resource Settings**

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**ABSTRACT**

**INTRODUCTION:** *One urgent goal of countries in sub-Saharan Africa is to dynamically scale up the education and work force of medical doctors in the training institutions and health facilities, respectively. These countries face challenges related to the rapid scale up which is mostly done without proper strategic planning, without the basic elements of infrastructure development, educational as well as academic and administrative human resources. Medical education done in the context of limited resources is thus compromising the quality of graduates. In the future, a collaborative and need-based approach involving major stakeholders such as medical educators concerned, ministries, planners and policy makers is needed.*

**GOAL:** *This article identifies the challenges of establishing medical schools and sustaining the quality of education through rapid scale-up in Sub-Saharan Africa in the settings of limited resources. It also outlines the minimum requirements for establishing medical schools.*

**METHODS:** *A consensus building workshop was conducted in Bishoftu, Ethiopia, from Nov 8-12,2013. Participants were professionals from 13 Ethiopian medical schools, and representatives of medical schools from South Sudan, Somaliland, Somalia, and Mozambique. Participants are listed in Appendix 1.*

**RECOMMENDATIONS:** *The governments and stakeholders should jointly develop strategic plans and a roadmaps for opening or expanding medical schools to scale up educational resources. It is advisable that medical schools have autonomy regarding the number of student-intake, student selection, curriculum ownership, resource allocation including for infrastructure and staff development. Health science and medical curricula should be integrated within and harmonized nationally. An educational evaluation framework needs to be embedded in the curricula, and all medical schools should have Health Science Education Development Centers*

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**INTRODUCTION**

Most sub-Saharan countries including Ethiopia, Somalia, Somaliland, South Sudan and Mozambique have poor health status profiles

(FMOH, Ethiopia). In Ethiopia for instance, infectious and communicable diseases account for about 74% of deaths, and 80% of DALY1 HIV/AIDS and malaria remain as the

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major causes of morbidity and mortality. The maternal mortality ratio of 470/100,000 live births and infant mortality of 67/1000 stand higher than these cases in many countries. This situation is further aggravated by the high annual population growth, approximated to 2.7%. The average life expectancy at birth in Ethiopia is about 58 years (1,2). All these indices were even very lower than this just two decades ago.

Although the practice of western medicine in Ethiopia dates back to 1520s, organized and sustainable modern medical practice started only after around 1896 (3,4). The overall potential of health service coverage in 2008 was estimated at 89.6%, a 25.6% increase compared to 1996 (4). Much of the rural population in the region have had no access to or has been far from modern health care, leading to inability of the health care delivery systems to respond both quantitatively and qualitatively to the health needs of the people. One urgent goal of countries in the sub-Saharan Africa is therefore to scale-up the education and work force of medical doctors in the training institution and health facilities, respectively. Such a scheme has forced the health system to hire more medical doctors. However, the number of physicians in service is still very low compared with the actual need in the 23 years period (1984-2006). The highest and lowest physician to population ratios in the public sector were found to be in 1989 (1:28,000) and 2006 (1:118,000), respectively (5).

In response to the growing demand for health work force, countries in Africa like Ethiopia are establishing public medical schools at rapid pace adding to the very few existing schools which use conventional teaching philosophy. For example, since 2004 more than 20 medical schools were founded implementing either integrated or hybrid medical curriculum. Private medical schools are also contributing to this rapid scale-up (1).

Generally, establishing medical school is a challenging task. It requires a series of steps including addressing the need and assessing resources along with their costs for the

government. Approval of proposals following a tedious review at internal and external consultancy is mandatory before construction or acquisition of buildings (1,6). The time it takes for completion of these processes may vary under different circumstances, but it is often not short. However, establishment of regional or branch campuses of existing medical schools may reduce the length of time to implement and help contain overall costs (7). In ideal situations, the launching of medical school should follow accreditation by an appropriate national or sub-national regulatory body.

Expansion of medical schools is necessary but not a sufficient solution alone to address the rapidly growing demand for health care work force. Considering the number of years of physician training requires (mostly 6 years), planning has to balance between preparing for the ideal system and accommodating current health care use patterns. From current experience, planning for an ideal health care system alone cannot address the actual needs of the population (8). The planning should also include forecasting for future graduates proportion staying in the health care delivery system. The issue of brain drain and internal and external migration should not be forgotten (9,10), reminding the inclusiveness in the planning of motivation and retention as well as attractive career development.

Most medical schools, especially those in South-East Asia, are currently experiencing difficulties in providing the right quality and quantity of educational experiences as the curricula have failed to respond to the needs of the community and the country. The traditional approach of education was determined by mostly teacher-centered methods such as lecturing and lack of outcome and competency orientation. The pedagogic shift from this traditional approach to an outcome-based approach driven by the needs of the health care system requires a fundamental change of the roles and commitments of educators, planners and policy makers (11,12).

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<sup>1</sup>DALY is a health gap measure that extends the concept of potential years of life lost due to premature death (PYLL) to include equivalent years of "healthy" life lost by virtue of being in states of poor health or disability (1). DALYs for a disease or health condition are calculated as the sum of the years of life lost due to premature mortality (YLL) in the population and the years lost due to disability (YLD) for incident cases of the health condition.

Medical school curriculum development for a developing country should be firmly based on community and public health, reflect the medical problems of the country, enable joint teaching by different departments especially in the basic medical sciences, and allow for more economic and flexible use of staff and teaching facilities. If possible, the clinical disciplines should be introduced to students during their study of basic medical sciences, wide access to information should be provided, and self-directed learning encouraged (12,13).

The core medical curriculum consists of the fundamental theory and practice of medicine. And specifically consists of basic biomedical, behavioral and social sciences, general clinical skills, clinical decision skills, communication abilities and medical ethics. All these must be addressed by medical schools which aim to produce safe practitioners of quality (14). Teaching and learning methods moved from traditional, teacher-centered education to one that is fundamentally student-centered and outcome-oriented. The use of problem based learning (PBL), small group and collaborative learning models as well as community-based education and service have formed the key pedagogical elements of medical education (9). Whereas many countries have established national systems for the assessment of quality in higher education, some low-income countries have not fully developed such systems.

In line with these gaps identified, main points raised during the consensus workshop were organized in two parts. First, participants identified challenges encountered in establishing and running medical schools in low-resource settings in sub-Saharan Africa. Second, best practices from each represented medical school were listed and used to develop recommendations on the minimum requirement for establishing medical schools, based on the World Federation of Medical Education (WFME) standards.

## LITERATURE REVIEW

In the late 1999, the World Federation of Medical Education (WFME) started to develop a set of standards to be used for the global accreditation of medical schools (15). This set of international standards addressed the *process* of medical

education and focused on the structure and function of medical schools including educational procedures, duration of programs, facilities, number of staff available for instruction, and other resources necessary to provide educational experiences for students.

Research done in sub-Saharan countries reported that graduates from medical schools in sub-Saharan Africa are 10,000–11,000 per year. Differences between enrolment and graduation figures are mainly attributable to the opening or expansion of schools. A few universities admit large numbers of students before numbers are reduced in the second year. Fifty nine of 84 (70%) responding schools reported that at least 80% of first-year students graduate (16).

The Ethiopian Government is investing greatly in a workforce scale up plan based on a so-called flood and retains strategy, which involves a rapid, massive increase in the number of trained health workers and attendant retention measures. The Ministry of Education mandated all medical schools to expand their class sizes. Thus, Jimma University's (Ethiopia) first-year enrolment for 2009 increased from 200 to 250, and is expected to reach 350 for 2011. Actually, the 2013 admission was 400 students. The government supports this strategy by investing in physical infrastructure, including construction of a new teaching hospital at the university. The Hubert Kairuki Memorial University in Tanzania exemplifies private sector scale up, expanding from an initial intake of 25 first-year medical students in 1998, to 70 per year in 2010. The Tanzanian Government assisted this by providing student loans and grants to private school students, enabling more students to afford tuition fees (11). The number of teaching staff (salaried full-time or part-time, and volunteer) at 51 of 98 responding schools is fewer than 100, about half have between 52 (25th percentile) and 147 (75th percentile) teaching staff. Small salaries, limited career options, heavy teaching loads, growing enrolment, and absence of equipment and support staff are the main barriers to retaining faculty staff (11).

Deficiencies in medical education infrastructure are ubiquitous and restricting. At Jimma University, electricity, water, and telecommunications are unreliable, jeopardising training and innovation. At Ibadan University, informants expressed concern about daily power

outages. Departments have to purchase generators for clinical and teaching functions. At Catholic University in Mozambique, challenges include insufficient number of computers, restrictions in internet connectivity, and absence of student hostels. Inadequate student housing near clinical sites is also a difficulty at Walter Sisulu University and Mali University (11).

Insufficient coordination between the ministries of education and health can be a barrier to medical schools' ability to increase the capacity of the health workforce. The coordination between these two ministries was a problem in almost all countries visited. The ministry of education generally provides funds for medical schools, whereas the ministry of health is the main employer of school graduates. In many countries, coordinated planning for budgets, priorities, and outcomes between the ministries of health and education is poor, which contributes to inappropriate curricula and the graduation of doctors who cannot find employment in the country. In Mali and Sudan, the number of medical graduates substantially exceeds the in-country capacity to hire new physicians, despite the need for better health services (11).

**Challenges in establishing and running medical school:** There is often lack of guiding, favorable policy and genuine commitment for the coordination between ministries (the Ministry of Education and Ministry of Health) involved in the production and consumption of trained human resource. Lack of clearly defined responsibilities and mandates of various stakeholders is another shortcoming.

The increasing number of students has not been commensurate to the required capacity of educational resources and faculty. Scarcity of biomedical and senior clinical staff is a serious limitation. This mismatch is essentially due to inadequate strategic planning by stakeholders and poor autonomy of medical schools. Academic leadership and qualified administrative staff to deliver a good administrative support is also in short supply.

Financial scarcity to procure adequate equipment and recruit the necessary experts and faculty is common. However, sometimes the lack of strong and qualified administrative support to manage finances and other related activities to

achieve these needs are more the real underlying problems. In such an environment of lack of expertise, the financial and procurement regulations have turned out to be bottlenecks hindering the timely utilization of money towards the academic needs of teaching and research.

Lack of infrastructure, facilities and support is demonstrated in the shortage of laboratories, class rooms, practical sites (hospital facilities) and skill training labs. Teaching facilities, transportation, information communication technology (ICT), lab consumables, e-libraries, cadavers and other necessary inputs are compromised either due to planning, prioritization, or lack of efficient utilization of budget.

In post-conflict settings such as Somalia, Somaliland and South Sudan, establishing medical schools commonly face seven more problems due to destruction of infrastructure and massive migration of staff. In recruiting and retaining faculty, security issues top all other priorities. Moreover, governments often tend to be inclusive at the expense of quality of service.

Systematic and regular evaluation of educational process, output and impact at all levels is crucial for accreditation and certification of medical schools but is a challenge. For instance, in Ethiopia, although there are more than 30 recognized and operating medical schools, there seems to be no systematic and regular external or internal evaluation and accreditation procedures. Higher Education Relevance and Quality Agency (HERQA) provides accreditation in Ethiopia when an institution is initially founded but mainly serves for private medical schools. The team composition of the quality assurance bodies often lacks mandated health professionals. The application of a non-contextualized evaluation tool as is in the case of HERQA may reflect this gap.

Regional hospitals are not usually equipped and staffed with the standards required for medical education and training of students. In addition, there is inherent conflict of interest where the teaching hospitals are under the Health Bureau while the school is under the Ministry of Education. This scenario sometimes creates a problem on how to use the money allocated for training of medical students in these hospitals.

However, many schools reported progress in accreditation of institutions and assessment of graduates. In Mozambique, the newly formed

Medical Council plans to develop accreditation standards for medical schools and external examinations for medical students (11). In Ethiopia and the region, there is a demand for a higher number of enrolling medical students and quality doctors in limited teaching environments where the population is growing exponentially and the projected population growth is happening rapidly in future years. To address these challenges, a consensus workshop was incepted with the goal to address required objectives in running and establishing medical schools in the region with the use of instruments including WFME global standards for medical undergraduate education (10) and Higher Education Relevance and Quality Agency (HERQA).

Human resource management is a major challenge that requires expertise and well-defined strategy. Creating mechanisms for staff development and career promotion helps to motivate and retain them, but this is inadequately practiced. Staff recruitment requires strategies to attract employees through various material and non-material incentives, which are also scarce. Training staff in medical education is one area of staff development which benefits both the quality of education and the faculty member, who will not only apply scientifically verified teaching methods but also involve in research for educational quality development. Lack of representation of academic staff from medical educators in top management may affect prioritization of educational problems and subsequent allocation of budget to address them.

Communication gaps between school administrative wing and academic wing and the hospital is wide. School networking, collaboration, partnership, link with national and international organizations and stakeholders is minimal for most of the schools.

There are factors that lead to poor motivation staff in teaching and research activities. Staff are usually overloaded and give different services simultaneously. The poor facilities, the inadequate allocation of budget for research, and lack of reward system for meritorious activities are cited.

Conducive organizational structure is a prerequisite for efficient leadership, communication, appropriate use of time and financial resource. However, sometimes there is

unsuitable design that creates a hurdle rather than a support to various faculties and staff.

**Best practices and recommendations for establishing medical schools:** The local schools have fulfilled some of the best practices depicted in the WFME recommendations. The mission of the World Federation for Medical Education (WFME) is to enhance the quality of medical education world-wide, thereby promoting the highest standards in medical education.

Institutions must have institutional autonomy. There should be appropriate independence from government and other counterparts in matters of academic methods and environment while keeping a strong accountability. This will enable institutions meet government overall goals and objectives of producing competent and relevant professional graduates who would address societal problems effectively.

Students' admission to medical schools based on the national qualifying examination after two years of college preparatory education (11th and 12th grades) is an important step but is insufficient to ensure competence at basic level. Although placement of students with the highest board exam score is being practiced, there is no system for screening and recruiting those who are intrinsically motivated and appropriate for the field and identify students with special needs.

Involvement of students in curriculum development, review and quality assurance has given impetus to the educational programs in many of the schools. Thus, students need representation in academic councils, committees working on curricula and quality assurance.

Medical schools are able to select new graduates based on performance and recruit them to be academic staff after negotiation with MOH. This helped the schools in increasing the number of staff and also in implementing staff retention mechanism by providing further training opportunities.

With regard to development of the educational program, there is a strong culture of working on curriculum development among universities. There is also participatory involvement of the faculty from within and stakeholders such as MoE, and MoH from outside the universities.

Academic staff/faculty attraction, retention and motivation mechanism should be enhanced.

Recognizing best instructors, researchers, department, and free scholarship for family members are some of the strategies to adopt in this regard, but are not widely practiced. The government must take into account teacher-student ratios relevant to the various curricular components. Staff retention strategies should be designed in medical schools through a variety of means. This can be done by applying a clear staff recognition and merit-based promotion strategy. Faculty development on effective teaching skills, student assessment, curriculum revision, research methodology, manuscript writing as well as through long term trainings (PhD, specialty and sub-specialty, MSc) will help in retention of staff.

In collaboration with partners, the establishment of Health Sciences Education Development Center (HSEDC) has enhanced training of staff in Medical Education and organizing short term and continuous trainings on instructional skills, design, and student assessment. Each institution should open HSEDC to organize trainings in instructional skills, design, student assessment protocols, curriculum review to include innovative methods of teaching and medical education module in the curricula, to encourage educational research, organize skill lab and evaluate the quality of medical education on regular basis.

Educational resources such as owning a hospital and constructing modern hospital is essential and many of the colleges particularly in Ethiopia are in the process of doing so. For instance, Jimma and Gondar universities are building and equipping state of the art hospitals, while Mekele and Hawasa universities have already done so. Some universities like the University of Gondar have established simulation centers, which assist clinical skill teaching specially in the context of a high student-patient ratio. Using anatomical models is also similarly helpful and is commonly practiced in nursing training and should also be encouraged for medical colleges. Self-directed learning and accesses to reading materials should be increased using e-books and e-courses. Government and stakeholders should be involved in scaling up educational resources. Collaboration and networking between institutions should be given high priority. Joint procurement of standardized equipment and exchange of educational methods

and skills can alleviate the problem. Medical schools should have their own hospitals; where there is no such facilities, there should be MOU with other hospitals.

Program Evaluation should include tracking graduates (tracer studies) and giving feedback to instructors. A tracer study of graduates from all disciplines was done by Jimma University in 2012 which identified good qualities of graduates and gaps perceived by their employers (17). Similar kinds of tracer and cohort studies should be done specifically for medical school graduates.

Evaluation of faculty by the students is a standard practice by all colleges which is a prerequisite to the promotion of each faculty at all or many of the colleges. However, this evaluation should include courses and the tool should be regularly updated to reflect changes in the educational system.

Introduction of systematic and continuous quality assessment and evaluation framework should be embedded into the system of medical schools. A national medical council should be established to give accreditation of new schools, monitor quality in existing schools, and prepare qualifying examinations. Professional associations should be present in the peer review and site visit across medical schools.

Governance and administration should not be neglected. A forum should be established to create a win-win solution between the government and the institutions. Training of the administrative staff is essential and is to be enhanced. Consensus for a clear and acceptable organizational structure should be designed to achieve efficiency and effectiveness.

With regard to governance and administration, most schools have very good communication with top management of the respective universities. There is some planning to allocate budget for required resources, but further decentralized authority to utilize and account for the finances are not yet functional. At the university level, there are different ways of generating additional incomes but this should be decentralized enough for the schools to acquire financial autonomy and benefit from it.

Many of the schools have the freedom to build partnerships and collaborative links which have flourished over the years. For instance, Jimma University and University of Gondar have links

with UK and German schools such as Nottingham, Leicester and Ludwig-Maximilians-University.

### ESTABLISHING MEDICAL SCHOOLS: RECOMMENDATIONS

This section concentrates on quality standards for establishing and running medical schools in the settings of limited resources and rapid growth of educational capacity in Sub-Saharan Africa, to better meet the needs of evolving health care systems in the future.

1. The curricula should be horizontally and vertically integrated
2. The government should develop and implement proper strategic planning and guiding rules before establishing medical schools
3. There should be a network of medical schools overseen by central governing body for resource sharing.
4. There should be sufficient autonomy in allocation and utilization of resources by medical schools in accordance with their ever-growing need which is assessed by all stakeholders involved.
5. There should be a functional monitoring and evaluation framework for the program relevance, learning outcomes of graduates, governance, academic and support staff, educational resources, curriculum, teaching, learning and assessment, student support, research and student exchange activities, collaboration and networking activities, and quality assurance in all medical schools using the customized HERQA tools.

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#### **APPENDIX 1: LIST OF ALL PARTICIPATING INSTITUTIONS WITH NAMES OF PARTICIPANTS**

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