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Full Length Research Paper

Reforming Respiratory Physiology Education in Tanzania: Aligning Medical Curricula with Primary Care Needs

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Effective management of Chronic obstructive pulmonary disease (COPD) by General Practitioners is likely to be compromised by respiratory physiology training that has main focus on acute respiratory diseases with high mortality and little focus on empowering medical and nursing students and practitioners on respiratory care. Results of this study indicate that lack of responsiveness of respiratory physiology courses for undergraduate and postgraduate and lack of structured in-service training programmes on respiratory care and inadequate training facilities for lung function assessment are key challenges to the medical schools. It is concluded that concerted effort is required through global partnership to enhance training and re-training of general practitioners and nurses on primary respiratory care and making accessible relevant resources needed for building competencies in lung function assessment and interpretation of results.

Key words: Respiratory care, respiratory care practitioners, chronic obstructive pulmonary disease.

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is an incurable disease and currently, is the fourth leading cause of death world-wide (Pauwels et al., 2001). COPD is associated with a significant symptom burden and poor quality of life (Lynn et al., 2000). COPD prevalence is on the increase and becoming a major cause of mortality also in developing countries. While smoking is the single most common cause of COPD in developed countries, outdoor air pollution and indoor air pollution from cooking and heating with biomass fuels are primary causes of COPD in developing countries (Pandey, 1984; Yach et al., 1985; Perez-Padilla et al., 1996; Kunzli et al., 1997). Recent studies of dust exposure and chronic respiratory symptoms in Tanzania (Mwaiselage et al., 2005; Mamuya et al., 2007; Kayumba et al., 2008; Mashalla et al., 2009) have suggested that COPD is a growing public health concern requiring services of respiratory care practitioners.

Respiratory care is defined as rendering or offering to render to individuals, groups, organizations, or the public, any service involving the evaluation of pulmonary functions, the treatment of pulmonary impairment, the assessment of treatment effectiveness, and the care of patients with deficiencies and abnormalities associated with the pulmonary system. In developed countries, respiratory care is a profession, candidates take specific courses leading to respiratory care practitioners awarded certificate, basic and postgraduate degrees by univer-sities and colleges. Respiratory care practitioners are found in hospital intensive care units, delivery rooms, and medi-flight teams. Airway and ventilator management, as well as clinical assessment, are the main clinical roles they provide. Some are specially trained in helping in the operating rooms, high risk deliveries, extracorporeal membrane oxygenation, chest and central line insertion. Respiratory care practitioners may also play very important roles in the home care where unlike in hospital settings, with limited resources, they rely more on clinical assessments and experience-related decision making when evaluating a patient's condition.

Respiratory care in developing countries is part of the general care where most training programmes for general practitioners still focus on addressing acute conditions with high mortality rates and little focus is given to

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chronic respiratory care. Because of the importance of understanding respiratory physiology as a foundation for effective respiratory care services, the purpose of this study is to determine the adequacy of the current respiratory physiology training programmes at four medical schools in Tanzania (an example of a developing African country) and suggest ways of improving the focus of respiratory physiology courses in order to provide solid foundation for effective respiratory care practices.

MATERIALS AND METHODS

Tanzania has three established universities offering medical education. These include the Muhimbili University of Health and Allied Sciences (MUHAS), Hubert Kairuki Memorial University (HKMU) and the International Medical and Technological University (IMTU), all located in Dar es Salaam. In addition to the universities, the country has two established medical colleges, the Weill Bugando University College of Health Sciences (WBUCHS) located in Mwanza and the Kilimanjaro Christian Medical College (KCMC) located in Kilimanjaro region. In this study information was collected from the three universities (MUHAS, HKMU and IMTU) because of their long history of establishment and from WBUCHS because it is the most recently established college offering medical education in the country. The study collected information from discussions with heads of departments of physiology, websites and analysis of the content of undergraduate and postgraduate respiratory physiology courses at each institution in order to determine the emphasis and focus in providing basic knowledge and skills required for primary respiratory care. Specific questions were asked to determine existence of specific short and long courses for training In-service general practitioners and nurses on respiratory care, and the number of basic laboratory equipment including spirometers, peak flow meters needed for practical training on diagnosis and assessment of respiratory function. Information on the number of annual undergraduate medical student enrolments and number of technical staff who have skills to carry out lung function assessment was included to determine the effectiveness of the training programmes in providing practical training on the techniques of assessment of lung function.

RESULTS

There is similarity in the organisation of respiratory physiology courses, focus, delivery and quality assessment systems in the four medical schools. At all institutions, basic respiratory physiology training was being offered to undergraduate of medical and nursing students together in the first year. Also where dentistry and pharmacy programmes exist such students are included in the group of medical and nursing students. At all medical schools, respiratory physiology courses in the pre-clinical years focus on basic normal respiratory function. At MUHAS, WBUCHS and HKMU, a clinical respiratory physiology course is offered to second year medical students focusing on providing a brief review of basic normal respiratory physiology, pathophysiology of respiratory failure and common acute respiratory diseases and compensatory mechanisms in respiratory disorders. Summary of focus of the basic and clinical respiratory physiology courses at each institution is presented in Table 1.

During clinical years emphasis of the courses is towards clinical presentation of respiratory diseases, diagnosis and treatment. There is no specific reference in the studied respiratory physiology courses to respiratory care at the undergraduate level.

In Table 2, the postgraduate programmes offering physiology courses are presented. Except for IMTU which offers only one MMed postgraduate programmes in obstetrics and gynaecology speciality with only two candidates in the academic year 2010/2011, physiology is taught in the other three medical schools to postgraduate students during Part One of the Master of Medicine (MMed). The respiratory physiology component of the physiology courses focus on review of normal physiology, pathophysiology of respiratory disorders, compensatory mechanisms and physiologic basis of treatment. MUHAS has in addition introduced an MSc (physiology) programme and is the only institution offering specific postgraduate physiology programme. The respiratory physiology component of the MSc programme is allocated 70 h of teaching focusing on imparting in-depth knowledge of normal and pathologic respiratory disorders. Only two hours are allocated for pathophysiology, investigation, and treatment of COPD. As in the undergraduate respiratory physiology courses there is no strategic focus on respiratory care training at postgraduate and none of the institutions has in place short courses for in-service or specific degree programmes for training primary respiratory care professionals.

In Table 3, the annual undergraduate first year medical student's intakes at each institution in the academic year 2010/2011, the number of trained technical staff and laboratory equipment (spirometers and peak flow meters) for teaching students techniques of assessment of lung function are presented. At IMTU, exact number of spirometers could not be determined because the sources provided variable figures ranging between 5 and 15.

DISCUSSION

In resource limited countries like Tanzania, General practitioners are arguably the best primary care professionals to manage respiratory conditions. This is because they are well trained as general practitioners and there are no other health care professionals better positioned to assess and manage interactions of respiratory conditions with other conditions, for example, heart failure, hypertension and to motivate behavioural change in patients. Although specialist consultations are needed for severe or complicated cases of respiratory conditions like COPD, the overall responsibility for diagnosis and treatment is that of general practitioners assisted by nurses. Therefore comprehensive training of

Table 1. Focus of undergraduate respiratory physiology courses at medical schools in Tanzania.

Institution	Focus of undergraduate respiratory programmes		
	Pre-clinical years	Clinical years	Respiratory care
MUHAS	Basic, normal function	Acute and chronic respiratory diseases	Nil
WBUCHS	Basic, normal function	Acute and chronic respiratory diseases	Nil
HKMU	Basic, normal function	Acute and chronic respiratory diseases	Nil
IMTU	Basic, normal function	Acute and chronic respiratory diseases	Nil

Table 2. Focus of postgraduate respiratory physiology courses at medical schools in Tanzania.

Institution	Focus of postgraduate respiratory physiology programme		
	MMed	MSc – Physiology	Respiratory care
MUHAS	Review basic and pathophysiology	Review basic, pathophysiology	Nil
WBUCHS	Review basic and pathophysiology	Nil	Nil
KHMU	Review basic and pathophysiology	Nil	Nil
IMTU	Review basic and pathophysiology	Nil	Nil

Table 3. Number of enrolled undergraduate students, trained technical staff and equipment for assessment of Lung function at medical schools in Tanzania.

Institution	Enrolment 2010/2011	Technical staff	Laboratory equipment	
			Spirometers	Peak flow meters
MUHAS	223	4	3	15
HKMU	82	2	1	0
WBUCHS	150	0	1	0
IMTU	110	1	5*	0

*variable figures

these professionals is required to deliver quality respiratory care services.

The medical schools in Tanzania are facing challenges in the training of professionals required for delivery of quality primary respiratory care. We have shown in this study that the respiratory physiology courses in the medical schools are general with little focus on respiratory care. None of the institutions has either short or specific long programmes focusing on training primary respiratory care professionals. Even with compact nature of most medical education programmes it is still important for general practitioners and nurses to understand COPD and relate complications and management because this can reduce considerably exacerbations, hospitalization, mortality, and improve overall function and the quality of life. General practitioners and nurses need to stay abreast of research on trends of disease conditions in communities they serve. This can be achieved if the medical schools will engage in comprehensive revision of their respiratory physiology courses and develop short tailor-made courses for undergraduate, postgraduate students and in-service practitioners that focus on empowering them to understand COPD and related complications and to render quality respiratory care. Application of Information and Communication Technology (ICT) infrastructure would easy the costs of training significantly by making accessible to students, general practitioners and nurses guidelines, Internet resources, Global Educational Programmes and current information on the patho-physiology, diagnosis and management of COPD. Establishing networks with international institutions like Global Alliance against Respiratory Diseases (GARD) and the International Primary Respiratory Care Group (IPRCG) would enhance training by organising short courses and facilitating expert staff visit to countries in the south to participate in training.

The simplest way of assessing lung function is to make a spirometric measurement. Previous studies have shown that with appropriate training, office spirometry is both practical and gives reliable and valid results (Derom et al., 2008). We have shown that the studied medical schools enrol large numbers of undergraduate students but have critical shortage of technical staff and basic laboratory equipment necessary for training undergra-duate students, postgraduate students, and practitioners

on the techniques and skills for assessment and interpretation of lung function. While it is increasingly being accepted that the diagnosis of many lung diseases should involve a measurement of functional capacity of the entire respiratory system because it represents a substantial improvement on the diagnostic criteria based solely on history examination and plain chest radiography (O´Donnell et al., 1999; Jones, 2001), the American Thoracic Society (ATS) and European Respiratory Society (ERS) (Celli et al., 2004) and the Global Initiative for Chronic Obstructive Lung Disease (GOLD) programme (Rabe et al., 2007) are well appreciated because now the need for objective diagnosis of common conditions especially COPD is widely appreciated. The diagnosis of airway obstruction requires accurate and reproducible spirometric measurements, which should comply with ATS/ERS guidelines. Training and re-training of practitioners and support staff may produce and maintain good quality testing, promote use of spirometric results in clinical practice and enhance the quality of interpretation. The findings reported in this study suggest that the training programmes at the studied institutions are far from supporting the global initiatives to improved primary respiratory care in our countries. It is recom-mended that medical schools should review respiratory physiology courses to introduce concepts of respiratory care at undergraduate and postgraduate training, develop specific tailor-made training programmes on respiratory care for in-service practitioners and improve on the number of basic equipment necessary for training on techniques for assessment of respiratory function.

Conclusion

While the importance of making an accurate diagnosis is not in doubt for patients with diabetes mellitus and renal failure, the global community has been slow to adopt a similar rigorous approach to respiratory conditions especially COPD. This is reflected by the training practices in the institutions offering medical education training in Tanzania. The trend described may however, not be unique to Tanzania but can also be found in other African countries. This calls for concerted effort through global partnership to enhance training and re-training of general practitioners and nurses on primary respiratory care and making accessible relevant resources including funds for procurement of training equipment required for building competencies in the assessment and interpretation of lung function results.

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