

Development of Diagnostic Microbial Services in a Hospital Setting in Sudan

Sowsan Atabani

University College London Medical School

I. Michael Kidd

University College London Hospitals, UK

Abstract: This paper describes a proposal for the development of adequate and standardized services for the diagnosis, treatment and management of bacterial, viral, fungal and parasitic infections in Sudan. The paper outlines how the existing services can be upgraded and enhanced and then subsequently extended upcountry, with the provision of links for clinical liaison and management, along with a sustainable technology transfer. This would help to reduce the inequality gap in the quality of investigative and treatment options observed among patients in the capital city versus those based in more remote areas of the country. The establishment, development, upgrading, and enhancement of pathology services should be an integral part of a federal plan to improve population health; which itself is critical to support all other sustainable developments on a national scale.

1 Introduction

Infectious diseases account for at least half of all hospital admissions in developing countries, and many of these diseases are known to be endemic in Sudan. The provision of services for diagnosing the bacterial, viral, fungal or parasitic organisms responsible for disease is attainable in most hospital settings; and would support evidence-based decisions on the appropriate clinical management and treatment. Immunosuppressed patients – whether a result of emerging infections such as HIV/AIDS or iatrogenically immunocompromised through transplantation - are increasingly prevalent groups in developing countries. Their vulnerability to opportunistic infections, and their inability to easily control other potentially dangerous pathogens, highlights the necessity of providing adequate diagnostic services. The establishment, development, upgrading, and enhancement of pathology services should be an integral part of a federal plan to improve population health; which itself is critical to support all other sustainable developments on a national scale.

2 Objectives and Strategic Approaches to the Development of Diagnostic Services in the Sudan

The main aim of developing adequate and standardized diagnostic services would be to provide timely and accurate diagnoses for infectious diseases and for their appropriate clinical treatment and management. The development of these diagnostic services must occur within an existing framework devised at the national level, in partnership with the Ministry of Health. In the capital, Khartoum, the existing microbiology services would be expanded and enhanced to act as a centre of expertise and reference unit, providing the foundation for succession planning of the future maintenance and development of pathology services throughout the whole of the country. These primary diagnostic services would then be utilized to establish national and international

surveillance networks for example in the early detection of emerging infections and the presence of multidrug-resistant microbial variants.

The diagnostic services could firstly be set up within the existing Khartoum infrastructure, thus serving a large enough population size in order to take advantage of the economies of scale. A well-structured diagnostic service should be directed by patient need, providing laboratory investigations based on scientific knowledge, within defined operating and safety procedures. Depending on the admission population, more extensive and specialist investigations should be included.

This diagnostic centre may also act as a reference unit for less commonly encountered but important micro-organisms. The available infrastructure may require expansions to allow isolation facilities and testing for dangerous pathogens at UK ACDP category 3 micro-organisms (eg tuberculosis), as well as endemic organisms within the context of control and eradication programmes such as onchocerciasis, schistosomiasis and mycetoma, all endemic infections which cause a massive health burden and negatively impact human development within the Sudan. Undoubtedly coverage by an uninterrupted power supply would be essential to maintain the output of this reference centre. Quality control schemes such as NEQAS and QCMD have international collaborations and would help establish and maintain a standardized service, accreditation, an essential part of clinical governance.

Once the main centre has been established, some services can be offered progressively further away from the capital. Links with primary health care facilities and other hospitals run by governmental and non-governmental organizations can then be established to provide diagnostic services to their populations and, more importantly, transfer of some of these services to be performed 'on-site'. Viable transportation links, not easily affected by civil conflict, must be established for transfer of laboratory supplies and clinical samples; as well as for sustainable technology transfer.

Results should be made available via a user-friendly web-based computer program, which would require a fully-functioning IT department, along with telephone, email and other communication links with the outreach services to provide result interpretation and clinical support for treatment options and disease management. This would help to reduce the inequality gap in the quality of investigative and treatment options observed among patients in the capital city versus those based in more remote areas of the country. In addition to cable and mobile phone networks for data transfer, some planning should also include satellite data links in order to provide some immunity from civil conflict. When an effective data network is established, further services such as video-links between clinicians in Khartoum and their counterparts in rural hospitals or clinics should be explored as additional support facilities for diagnosis and treatment of infectious disease. Such links would have considerable value on other areas of medicine.

3 Staffing, Training & Research

The centre of excellence should be staffed with highly-trained medical and non-medical personnel and should be actively involved in undergraduate and postgraduate training of medical students and biomedical staff. The role of the consultant microbiologist and/or virologist should include liaison between the laboratory staff and the clinicians to provide accurate interpretation

of diagnostic results and, as part of a multi-disciplinary team, and active involvement in the monitoring and management of patients with complicated infective processes such as infective endocarditis, osteomyelitis or reactivation of herpesviruses in the immunocompromised. The consultant should take a lead role in management of infection control issues within the hospital and provide consultation on public health issues at a local, national and international level. The consultant should also be actively involved in training of medical and non-medical staff to ensure continuity of the service.

In addition, the specialized diagnostic facilities should develop collaborative links with national and international research units who are investigating the molecular pathogenesis of infectious diseases; and identifying potential treatments and preventative measures such as vaccines. There should be the aim of developing intrinsic research and development capability, closely linked to the training of medical and non-medical personnel, and career pathways mapped out to retain valuable staff members as much as possible. Ideally a substantial proportion of the research and development effort should be directed towards improving the clinical service to patients, and a sustainable translational route is built to support the transfer of research knowledge into clinical practice.

The resources for the development, expansion and maintenance of the diagnostic services still remain to be identified and allocated and must be backed by a political commitment. However, the provision of such services is paramount for attaining the best possible outcome for the patient and ultimately is critical to support all other sustainable developments on a national scale.

References

- Archibald & Reller. Clinical Microbiology in Developing Countries. Emerg Infect Dis 2001.
Abiose, Homeida, Liese et al. Onchocerciasis control strategies. Lancet 2000
Homeida, Goepf, Ali et al. Medical achievements under civil war conditions. Lancet 1999