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Investigating and improving medical education and library resources at the Tamale Teaching Hospital in Northern Ghana : a case report part 2.

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INVESTIGATING AND IMPROVING MEDICAL EDUCATION AND LIBRARY RESOURCES AT THE TAMALE TEACHING HOSPITAL IN NORTHERN GHANA: A CASE REPORT – PART 2

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ABSTRACT

In part one of this case report, published in the Spring Issue of *Kentucky Libraries* (Volume 76, Number 2), I described my journey to Tamale, Ghana to provide a series of training workshops at the Tamale Teaching Hospital (TTH), Nursing Training School (NTS), and the University of Development Studies (UDS), and to conduct a needs assessment to gather information to develop a series of grant proposals to assist the local health sciences libraries with improving their collections. Part two of this report briefly describes the consultations that took place and the planning and project outcomes to-date.

TOURS, CONSULTATIONS AND NEEDS ASSESSMENTS

The day of our arrival we visited the medical library at the Tamale Teaching Hospital, which consists of a small room with several computer stations and a sparse collection of medical journals and monographs. Few of the items I examined were current, and many were worn from use. The computer equipment was dated and is illustrative of the technology challenges in medical institutions and schools throughout Africa. Although the Teaching Hospital has a wireless network, and high-speed voice and data transmission via 3G cellular networks are available throughout the Northern Region, antiquated computer hardware and a general lack of essential software limit the ability of the institution to access and take full advantage of the many free educational resources available online. The lack of computers and an information and communication technology infrastructure to provide high-speed data transmission is a major problem in every region of the African continent. A recent survey of medical schools in Africa delineates this dilemma and the urgent need for solutions:

> *Particularly in East and West (including Cameroon) Africa, Internet connection speeds are a significant barrier to downloading medical information, especially bulky files containing video, audio, large documents and pictures. The authors' experience in Uganda and Tanzania reflects this, with typical download times of 3-6 minutes for short Adobe PDF documents from European and North American websites. Given the growth of open-access journals and other online initiatives to improve access to health information, slow download times are concerning* (Williams, Pitchforth, & O'Callaghan).

The library at the adjacent Nursing Training School was slightly larger but no better equipped. It too contained a few computers for student use, none of which was of recent manufacture, and its collections were not much better in terms of coverage. The lack of books, journals, and other materials at NTS was indicative of a gener-

Tamale Nursing Training School Library

al lack of equipment and material needed for training the nursing workforce, which is vital to medical care in a region that has few physicians per capita. Moreover, the school, which is designed to serve approximately 175 students, currently has an enrollment of over 700.

The second day of our visit we journeyed to the outskirts of Tamale to meet with Dr. Edward N. Gyader, the Dean of the School of Medicine and Health Sciences at UDS, and tour the medical school library. The UDS Tamale campus, which is still under construction, is being built on land donated to UDS by a local chief. The completed buildings are spacious and well-designed. The medical school library is part of a multi-campus library system (UDS has four campuses in Northern Ghana). It is housed in its own building, but given the current lack of library materials and equipment, much of the available space is used for instructional classrooms. While time did not permit a thorough analysis of the collections, I observed some of the same deficits and issues I encountered in the other libraries. However, the UDS medical library held larger collections of reference materials, serials and textbooks, and had the best-equipped computer lab I encountered during our visit. Moreover, it was organized and managed by several professional librarians and library staff. The library provides access to several electronic databases including EBSCO, HINARI (Health InterNetwork Access to Research Initiative), Emerald, Bioline International, and Directory of Open Access Journals (DOAJ).

I went to Northern Ghana primarily to gather data and information to assist Dr. Muriel Harris and her research team at the School of Public Health and Information Sciences at the University of Louisville (UofL) in developing grant proposals for funding to improve library and information resources for research, education, disease prevention, and medical care. The research project conceived by Dr. Harris and her team focuses on developing interventions to reduce maternal and child morbidity and mortality in Northern Ghana (Renn, Asamoah, Daniel, & Wills). Maternal mortality is a major problem throughout the nation of Ghana, but is highest in the Northern Region. A recent study of trends in maternal death at the Tamale Teaching Hospital from 2008-2010 offers a set of sobering statistics that reinforce the critical need for effective interventions:

> There were 280 maternal deaths from 1st January 2006 to 31st December 2010. The maternal mortality ratio dropped from 1870 per 100,000 live births in 2006 to 493 per 100,000 live births in 2010, a fall of nearly 74%. Using 2008 as the baseline, maternal mortality ratio dropped from 842 per 100,000 live births in 2008 to 493 per 100,000 live births in 2010, a fall of 41.4%. The main causes of 139 audited maternal deaths from 2008 to 2010 were sepsis (19.8%) hypertensive disorders (18.6%), haemorrhage (15.8%), unsafe abortion (11.5%), obstructed labour (5.7%), anaemia (8.7%), sickle cell disease (5.7%) and malaria (5.0%). The ages of the 139 audited maternal deaths ranged from 14-48 years; with mean age of 26.5±4.6 years. Nearly 50% of the maternal deaths were aged 20-29 years and about 10% were 14-19 years. Eighteen (13%) of the maternal deaths were from towns over 150km from Tamale (Gumanga et al.).

The 74% decrease in the maternal mortality ratio during the four-year period audited represents a remarkable achievement by TTH. Nevertheless, the current ratio (2010) of 493 deaths per 100,000 live births is unacceptably high. To place these data in a broader perspective, recent estimates of the

Entrance to UDS Library – John Chenault, Dr. Edward Gyader, and Gwendline Chenault

U.S. ratio from 1998-2005 (which itself is high when compared to other industrialized nations) indicate 14.5 per 100,000 live births (Berg, Callaghan, Syverson, & Henderson). Dr. Harris and her team have developed a set of strategies and initiatives designed to build on the amazing successes already achieved at the hospital. As part of the comprehensive planning for the project, Dr. Harris identified the need to increase educational materials and resources, in general, and specifically in the areas of child and maternal care. The acquisition of additional teaching and learning resources in the areas of nutrition, preventive medicine, health education, and primary care, has been deemed essential to the effort to maintain and expand the significant gains made in this critical area of medical service.

Before my departure for Ghana I had a good idea of what to expect. Nevertheless, I decided to set aside any preconceptions about resources and infrastructure, no matter how well- founded, to meet with an open mind the stakeholders, administrators, and key personnel providing medical and library services. So when I was not engaged in doing workshops, my time was spent listening, observing, and taking notes. What was most revealing from this process was how much the leadership and staff at TTH had accomplished in recent years in the face of massive health care needs and with the limited fiscal and human resources available to them. Despite the challenges posed by a resource-poor environment, TTH has made significant improvements in the delivery of medical care to hospital patients, and in recent years has reduced maternal mortality at the hospital, although it still remains at unacceptably high levels (Gumanga et al.). Recruitment and retention efforts have resulted in a substantial increase in clinical staff. And through the establishment of key international partnerships, the hospital has launched an ambitious program to build a new facility, renovate its current facility, and acquire vital new medical equipment. Despite these achievements and forthcoming opportunities, the hospital CEO and his team expressed several concerns about sustaining and building on the successes of TTH in view of the continuing problems of limited resources and the critical deficits in technological infrastructure and tools. The issue of what to do until additional funding can be secured, or in the event funding is not forthcoming, remains a major challenge faced by the hospital leadership.

Throughout my visit I made sure to manage expectations about outcomes and not make promises about the possibilities of securing financial support in the short term. In view of the uncertainty about the fundraising environment, I suggested a focus on additional training and support for the institution's human resources could make a meaningful and measurable impact on health programs and services in the interim. Some training initiatives could be provided at relatively low costs. And while professional training and development programs cannot substitute for essential equipment and materials, they can be designed to help an institution move forward in key and critical areas of program planning, development, and implementation, and to improve basic human services. The transmission of skills, information, and knowledge from library and medical professionals at my institution to the librarians, library staff, medical students and professionals in Tamale could be done for the costs of transportation, food and housing, using a few dedicated volunteers from the UofL Libraries. The library volunteers would present a series of workshops designed to "train the trainer" (faculty, librarians, and IT staff), in addition to providing classes to improve the research and knowledge management skills of clinicians, and medical and nursing students. Selected attendees also could be trained and prepared to assume future instructional duties and integrate the workshops into a regular schedule of educational programs for the various constituents in the Tamale health care community. "Training the trainer" would facilitate the transfer of skills in an active and interactive manner that would empower local library and educational professionals, and make them responsible and accountable for the introduction and implementation of new teaching and learning regimes and their applications and outcomes. Moreover, this program would help the Tamale libraries move from a resource-centered, institutionalized and physically bound concept and method of library service, to network-based librarianship. This transformation to new modes of operation and service requires well-trained digital library staff with new skills and competencies. In-service education and hands-on training, in this particular case, constitute the prerequisites for making this transition to 21st century librarianship (Fadehan & Hussaini).

Despite the strategic focus on human resource training as a method to improve basic skill

14

sets, service delivery, and service effectiveness, the problem of the lack of medical books and other materials remains a significant hurdle in meeting the short and long-term educational and professional development needs of students and clinicians in Tamale. Such challenges demand creative solutions. After giving the matter some thought, I suggested we tackle the problem of acquiring library materials (textbooks and journals) in a novel way—through the adoption and use of e-readers as a delivery platform. The acquisition, distribution and use of e-readers would facilitate broader access to core literature for students, faculty, and clinicians, and would expand access to essential learning materials to rural clinics and health centers spread across the vast geographical area served by the hospital and the university. Funding would be needed to purchase e-readers, but the devices and core collections of educational materials could be acquired for less than the costs of purchasing and shipping books internationally. After a consensus was reached in Tamale, I held further discussions with Dr. Harris upon my return to Louisville and then outlined and developed the ideas and suggestions into the four (4) goals listed below along with their descriptions. These goals comprise a template for a process and program that can be implemented anywhere in the so-called "developing world" to enhance and improve medical and health sciences education. The problems outlined in this article exist throughout the African continent, and similar workshop training projects, as proposed below, have been established to tackle these issues. What I believe is unique in the model I offer is the inclusion of e-reader technology specifically to enhance under-resourced health sciences library collections. I believe this model can be tested and implemented quickly wherever needed. Implicit in this approach also is the fact foundations, governments, and other funders seek solutions to local and global health care issues that can be easily replicated and applied. Thus, what follows is designed with economy, flexibility, and adaptability in mind.

Goal 1: To increase library resources and materials available to the health care providers, medical and nursing students, and administrative staff at TTH and the educational institutions it supports (UDS School of Medicine, and Nursing Training School).

Given the steady growth in the availability of medical e-books and the growing trend in electronic publishing, it would serve the long-term interests of TTH and its affiliates to have the option of embracing new technology as it emerges, rather than relying solely on older methods of collection development. Moreover, given the limited budgetary resources available, the institutions would receive a far greater return on their investments from purchasing less expensive electronic resources than from purchasing print, which comes with the additional high costs of shipping, storage, and preservation. The *Kindle E-reader Mobile Medical Library Program*, as it has been named, is designed to support a strategic collection development project tailored to address the acute shortages that were identified during our consultations and needs assessment, and to meet other pedagogical goals outlined in this proposal. The program will provide an innovative method to deliver and circulate up-to-date health and medical books to a diverse audience of health science students and professionals. Textbooks and other literature for distribution via the e-readers would be selected from the following specialties: Basic Sciences, Clinical Medicine, Nursing (administration, clinical specialties, nursing fundamentals), Associated Health Professions (pharmacy, dentistry, etc.), and Other Disciplines (medical education, public health, hospital administration, library and information science).

The Amazon Kindle was chosen as the preferred delivery method for medical literature for this project for the reasons listed below:

1. A single device can hold up to 3,500 books and articles.
2. The device is easy to learn, use, recharge, and maintain.
3. It is less expensive to ship loaded Kindles abroad than crates of books.
4. New books and materials can be downloaded to e-readers electronically in a matter of minutes, rather than waiting for shipments from abroad.
5. The device introduces new, cutting-edge technology to a region and facilities with limited technological resources.
6. Most e-publishers allow their titles to be installed on up to four (4) devices simultaneously, thus multiplying and expanding the availability of key texts.
7. Kindles can be connected to computers via USB and used to access other materials including PDFs.
8. A mobile learning platform can be a very

effective tool for clinicians, residents, and nurses rotating through various rural clinics in TTH's vast service area.

9. The Kindles will remain in Tamale to support new medical staff and students, and sustain the project's educational efforts after the three-year program is ended.

To achieve this goal we need funds to purchase approximately 300 core clinical titles currently lacking in the collections of the Tamale medical libraries and 300 Kindle e-readers with WiFi capability. The titles would be organized into various core collections and pre-loaded on the e-readers before delivery to Tamale. The delivery of the e-readers would be "staged" in three separate allotments over a period of three years to test several approaches to their distribution, circulation, management, and maintenance, and give project coordinators time to evaluate and revise policies and procedures as needed. By these means the project coordinators will find the optimum method for integrating e-readers into the work and learning processes and cultures at the hospital and its affiliated educational institutions.

Goal 2: To improve the basic clinical research skill sets of medical professionals, medical and nursing students, and medical library staff at TTH and UDS.

A primary aim of the *Database Research Workshop Series* is to introduce the requisite skill sets needed for students and scholars to become confident and competent database researchers. As part of that effort we would provide training for MEDLINE via PubMed, the electronic portal of the National Library of Medicine of the United States (NLM), and PubMed Central, NLM's repository of open-source medical journal articles. NLM has the largest collection of biomedical information products and services in the world. However, a recent study has shown that many librarians in Africa are not aware of it, and few use it on a routine basis (Kanyengo, Ajuwon, Kamau, Horta, & Anne). This is equally true of clinicians and students who rely on librarians for guidance. Health institutions in Ghana also have free access to HINARI, a program established by the World Health Organization in partnership with major academic publishers. HINARI is one of the world's largest collections of biomedical and health literature, with more than 8,000 information resources in 30 different languages. Local medical librarians

would be asked to provide HINARI training during the workshop series to ensure attendees are familiar with and capable of accessing all available online resources.

Once funding is secured, we would arrange for Kornhauser medical librarians to travel to Tamale to conduct workshop sessions once a year over a period of three years. Beginner and intermediate workshops would be offered annually to ensure broad coverage of all target audiences and to capture new staff and students. The PubMed workshops would introduce and demonstrate the tools and features of MEDLINE including *Advanced Searching, Clinical Queries, MeSH Subject Headings, Filters, Clipboard, and Collections*. Attendees would learn how to construct searches, save searches, manage and transmit search results, locate and retrieve full-text articles (when available), and create their own free accounts in PubMed to manage their collections. Evidence-Based Medicine (EBM) theories, methods and resources also would be presented to medical professionals, medical students, and nursing students via this series, and free EBM online resources will be identified for access and use. Additionally, attendees would learn about PLOS (Public Library of Science), Google Scholar, and the Wolfram/Alpha Computational Knowledge Engine.

A second objective associated with this goal is to design and offer a set of workshops to assist Tamale medical librarians and library staff in acquiring the digital skills needed to support the research activities and information needs of medical professionals and students. The building and provision of online collections of free and open source educational materials, with user-friendly modes of organization and distribution, would serve the institutions well with respect to their current budget limitations. The training sessions would address how to locate and collect free medical tools and resources available online to supplement and enhance existing print and electronic collections. A resource-poor environment can be transformed and enriched immensely via open source and free courses, lectures, syllabi, and other tools, but awareness of those resources is lacking in the Tamale medical community. The rapid growth of biomedical literature and the increased ease of accessing it also pose immense management challenges for even the best-equipped libraries. Therefore, it is essential to have a system and method to organize, manage and share web sites and materials with

16

users. To this end, participants will receive instruction and training in the curation, management, and distribution of online information resources using Evernote, Dropbox, Symbaloo, Scoop.it, LiveBinders, and other web-based tools. The basic purpose of these workshops is to expose librarians and library support staff to electronic resources that can be used to increase and supplement library materials and collections with peer-reviewed and scholarly resources retrieved online.

A third objective associated with this goal is to identify and select key librarians to train in citation management software programs to provide the expertise to establish and maintain an information policy focused on knowledge management within the medical and educational institutions for their researchers and clinicians. This effort will be undertaken in addition to the other library web skill training and development sessions offered via the workshops. The specific skill sets involved would be used for basic information management purposes, to support the planned establishment of journal clubs, and to assist with the development by the administrations of a culture of research and publication amongst the clinicians and faculty at the hospital and medical school. Instruction would be provided in how to use, install and teach Mendeley, Zotero, and EndNote citation and publication management programs.

The fourth objective provides for the training of librarians, library assistants, and IT staff members at the three institutions in the installation and operation of web-based tools that can improve the productivity and efficiency of the libraries and library services, and support the information management needs of the Tamale medical institutions. The *Digital Training Workshop Series* is based on the "Train-the-Trainer" model and is designed to produce a cadre of personnel who can install and configure selected web-tools in the libraries and throughout the medical and administrative offices and departments of the institutions. The "digital library" cadre also will train and support faculty, staff, and students in the use of Gmail, Google Documents, Dropbox, Jing, and other free tools and services.

Goal 3: To provide programs and selected educational resources that can directly impact TTH's effort to improve the outcomes for maternal health and childcare.

As stated above, reducing morbidity and mortality related to maternal and child health is a primary goal of Tamale Teaching Hospital and the Ghana Ministry of Health. A workshop series designed to focus on search strategies to identify and locate evidence-based interventions and practice guidelines specifically to improve maternal and child health care outcomes would be offered over the three-year project period. The workshops will be revised and repeated frequently throughout the project to provide maximum coverage and allow periodic updates of the content and materials.

A second objective related to this goal is to increase the educational materials available to physicians for the routine and critical care and treatment of women and infants through the identification and acquisition of free materials and the purchase of electronic textbooks and other core medical and health literature relevant to maternal and child health. Selected materials would be organized into a core collection as a central resource for care providers and students. The collection would be made available via the Kindle e-readers and through various web-based resources identified and presented in the workshop series. Materials would cover evidence-based medicine and nursing practices and care in obstetrics, gynecology, antenatal care, delivery, postnatal care and well-baby follow-ups. Information for nurses and midwives would receive major coverage.

SUMMARY OF GOALS, OBJECTIVES AND PLANS:

The three goals described above were conceived with full consideration of the current capacity of the medical institutions to incorporate and utilize new training programs, resources, and tools. They also reflect the long-term plans currently being developed by the SPHIS to collaborate with TTH in addressing critical areas of maternal and child morbidity and mortality. The philosophy and theory that inform the SPHIS approach and method are adapted from the European Community Health Promotion Indicator Development Model (EUHPID) developed by the EUHPID Theory Working Group and the EUHPID consortium in the European Union (Bauer, Davies, & Pelikan). This socio-ecological program planning and implementation model takes into consideration the ways individual behaviors are influenced by environmental factors at the interpersonal, organizational/institutional, community and policy

levels. It provides a strategic approach to planning and monitoring health promotions and interventions:

> *The EUHPID Health Development Model provides the theoretical basis for a planning tool to identify, implement and assess appropriate launch points for various public health intervention strategies and methods related to both pathogenic and salutogenic approaches. Further investment in understanding interventions into the health development process is needed by initiating and analysing a range of practical case studies of health promotion and related public health interventions. … The EUHPID Model offers a common frame of reference and classification system for monitoring a range of public health and health promotion interventions* (Bauer et al. 158).

This approach emphasizes disease prevention through strategic health planning and interventions. It is especially relevant in planning consumer health promotion and education programs, and will be useful in tackling the problems of maternal and child morbidity and mortality that have been identified as top priorities by the Ghana Ministry of Health, and for which the research team from SPHIS is developing its long-term research project aimed at intervention (Ghana Health Service).

INNOVATION AND IMPACT

The goals outlined above reflect a broader vision to change the existential reality of the people who need disease prevention and health care services in Northern Ghana and the healthcare providers who serve them. Collectively, the goals constitute an innovative approach to medical education and training that can make a positive impact on medical care and service delivery by achieving the following broad objectives:

- Infusing new educational materials that will expand medical library resources immediately throughout the entire Northern Region of Ghana, an area that covers nearly 30% of the nation
- Identifying and providing a core collection of medical texts for clinicians, faculty and students that will enhance their learning and medical practices and further aid them in achieving their educational and professional career goals
- Improving the access and use of scientific, technical and medical information by providing free, specialized training and instruction for medical professionals and students

serving large populations with severely limited resources
- Introducing cutting-edge technology in the form of e-readers to expand the availability and use of essential medical education texts and materials in an area where few have access to computers
- Providing a technology infrastructure that can be expanded and sustained by local initiatives and efforts long after the project has been completed
- Increasing technological resources for mobile medical information access and use in an area with far-flung clinics and hurdles to transportation
- Training a cadre of library, IT, and information specialists to become trainers within their professional communities to sustain and expand the educational mission of the project
- Transforming and expanding resources for curricula, teaching, and educational methodologies through the introduction and use of open source and free materials available via the Internet
- Enhancing personal and organizational productivity and efficiency through the introduction of free digital tools, websites and software programs
- Establishing a collaborative effort between institutions that can serve as a model for other international partnerships

We believe a major investment in the development of the existing human resources through instruction and in-service training will produce measurably positive outcomes and impact all sectors and populations. The EUHPID Model discussed above guided the formulation of this strategy. The socio-ecological program component of the model identifies the individual, the organizational, and the community levels as three levels at which this project anticipates it will make an impact. At the individual level, those who participate in the project (physicians, students, administrators, librarians) will have access to educational materials and technology to improve their knowledge and skills, and enhance individual productivity and efficiency. The improvement of knowledge and skills should lead in the long term to improved patient care and a calculable reduction in rates of morbidity and mortality for women and children at TTH and in the region. At the organizational level, a major increase in the availability and access to library materials, technology and IT support in this resource-poor environment will directly

18

impact medical education, clinical care and service delivery. At the broader community level, this intervention will contribute to our understanding of how resource-poor countries can improve health outcomes for women and children, and reduce the rates of morbidity and mortality for all population sectors.

SUSTAINABILITY

This project adopts a philosophy of "teach people to fish" and as such plans to produce a cadre of faculty, librarians, and other specialists who can continue to provide training and professional development in the critical service areas we have identified. After the project ends, the e-readers would continue to furnish a sustainable platform for acquiring and maintaining new texts and materials as they become available. The devices would enable project participants at TTH and allied institutions to connect to Amazon or other vendors and purchase items for their use. Since Kindles connect to computers, they can be used to access free materials in the form of PDFs to create, update and expand virtual libraries. The e-readers also can deliver teaching materials needed as part of the ongoing institutional collaboration between the Tamale Teaching Hospital (TTH) and the Schools of Medicine, Nursing, and Public Health at UofL. In essence, this project provides a foundation for other training initiatives by UofL or other institutions and increases TTH's overall capacity for training, education and collaboration.

Although Kindles are one amongst a range of similar products with e-reading technology, they were selected due their costs, features, WiFi capabilities, and the likelihood that institutions and individuals in Ghana eventually will be able to purchase them and increase the reach of this project's benefits. The expanded use of e-readers combined with improvements in the technological infrastructure currently underway in Ghana will ensure more affordable access to medical and health literature in the future.

CONCLUSION

Our primary task at this time is to secure the necessary funding through grants and donations to support both ventures identified and discussed above: the workshop series and the e-reader program. We estimate a budget of $150,000 will be needed over a three-year period to deliver the proposed training, materials, and equipment. The first proposal we submitted in September 2011 was not selected to receive funding. However, we were invited to re-submit our package in the next round. In the interim, however, the foundation has reduced the total amount that can be requested for multi-year grants to $100,000. Consequently, in the preliminary proposal we submitted in June 2012, we requested funding only for Kindle e-readers and the electronic collections of textbooks and monographs. We currently are investigating other funders who may assist with this project and others designed to support the research and training mission and goals of the Tamale Teaching Hospital, the Nursing Training School, the University of Development Studies and the UofL School of Public Health. With or without additional funding, I plan to return to Ghana in the near future to continue the work we have started. It has been an honor to contribute in my small way to the efforts of the Tamale Teaching Hospital, its affiliates, and its dedicated staff in achieving its stated mandate of "becoming one of the leading tertiary level hospitals in the West African Sub region" (Tamale Teaching Hospital).

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