
THE CONTRIBUTION OF THE TELEMEDICINE PROGRAMME OF KOSOVA ON E-LEARNING AND CONTINUOUS MEDICAL EDUCATION: THE OUTCOMES OF THE FIRST DECADE

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Abstract

Introduction: To assist in rebuilding the medical system of Kosova, the International Virtual e-Hospital Foundation in collaboration with Ministry of Health of Kosova has established a robust tele-education programme through the Telemedicine Centre of Kosova (TCK). **Methods:** A retrospective review of the results of educational activities was conducted. **Results:** Since January 2003, sixty-two universities, medical centres and health organizations from more than 20 countries around the world have broadcast 638 educational activities with over 150 lectures. The CME programme, consisting of approximately 80 lectures, had over 2,800 participants. The electronic library and resource room provides services 24 hours a day, 365 days a year with access to current medical literature through HINARI and other database had 64,167 visits since 2003. Overall 211,357 visits were recorded at the TCK, since its inauguration. **Conclusions:** The Telemedicine programme of Kosova has become an important catalyst of elearning and CME in this country. The success in Kosova has led to the development of similar programmes in other developing countries and has become a model of use of technology to improve educational capacities.

Keywords: Telemedicine; telemedicine programme of Kosova; International Virtual e-Hospital Foundation; e learning; continuous medical education; Kosova.

Introduction

The republic of Kosova is the newest independent country in South-eastern Europe, and it is part of the Balkan region that is constituted by Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Greece, Macedonia, Montenegro, and Serbia. It covers an area of 10,000 km² and has a population of over 2 million inhabitants. A decade of war and neglect in the 1990s destroyed much of the country's health and educational infrastructure. Although much has changed since the war ended, the medical infrastructure was never rebuilt after the war, leaving Kosova decades behind the rest of the world in terms of healthcare. Like many medical schools in developing world, the only public medical school (Medical Faculty of the University of Prishtina) in Kosova, cannot afford subscription to expensive medical literature. Continuous medical education (CME) has only recently become mandatory.

To assist in rebuilding the medical system of Kosova, the International Virtual e-Hospital (IVeH) has established a robust tele-education programme in Kosova.¹⁻⁴ This programme applies innovative technology and infrastructure for virtual educational programmes, electronic libraries and seminars, fulfilling the need of CME. Access to current medical literature is done through the Health InterNetwork Access to Research Initiative (HINARI), the World Health Organization (WHO) project set up by the WHO and major publishers, that enables developing countries to gain access to one of the world's largest collections of biomedical and health literature. HINARI offers up to 11,400 journals (in 30 different

languages), 18,500 e-books, and 70 other information resources available to health institutions in more than 100 countries, areas and territories worldwide.⁵

The aim of this paper is to report the success of the IVeH in terms of educational activities as a model to strengthening medical education in developing countries.

Material and Methods

A retrospective analysis of the records of educational activities and clinical programmes of IVeH was performed by studying the types and number of activities held at the Telemedicine Centre of Kosova (TCK). For each activity, the total number of participants was recorded on a regular basis, including the type of profession such as medical doctor (MD), resident, nurse, technician or medical student. For our study an MD is a medical practitioner who has completed their residency programme, whereas a resident is a medical graduate still in a residency programme. Educational activities were divided as Continuous Medical Education (CME), seminars, lectures, and ground rounds. Clinical programmes such as teleconsultations (through video conference and store and forward) and telesurgery were also analyzed as contributors of telemedicine programme. Trained staff of TCK was responsible for monitoring and recording all the activities analyzed.

All activities at the TCK are supported through a network that connects the Centre with regional hospitals and universities and medical centres around the world. The regional hospitals are connected through a 512 kilobits per second (Kbps) dedicated link and 10 megabits per second dedicated link at TCK.⁶ The communications system is supported by a Polycom VSX7000 view station for point-to-point and multipoint communications via a Polycom MGC-25 Multiconferencing Unit (Polycom, Pleasanton, CA). All communications are recorded and streamed live on the Internet using a Polycom RSS2000 Recording and Streaming Unit. The TCK has an electronic auditorium, telemedicine training room, electronic medical library, servers, and administrative offices.¹⁻³

Results

Since its implementation in 2003, a total of 638 activities were organized at the TCK. Of these, 379

(59%) were educational activities and 243 (38%) clinical activities made up of clinical programmes such as live tele-consultations, store and forward consultation as well as tele-surgeries. (Table 1)

Table1. Activities from January 2003 to June 2013 (N=638).

Activity	n (%)
CME	79 (12.4)
Lectures	154 (24.1)
Seminars	60 (9.4)
Grand rounds	17 (2.7)
Workshops	69 (10.8)
Commercial presentations	16 (2.5)
Telesurgeries	13 (2.0)
Teleconsultations	230 (36.1)

A total of 79 CME lectures (local and international sessions), with over 2,800 participants took place in the TCK. Participants were medical doctors, residents, nurses and medical students (figure 1).

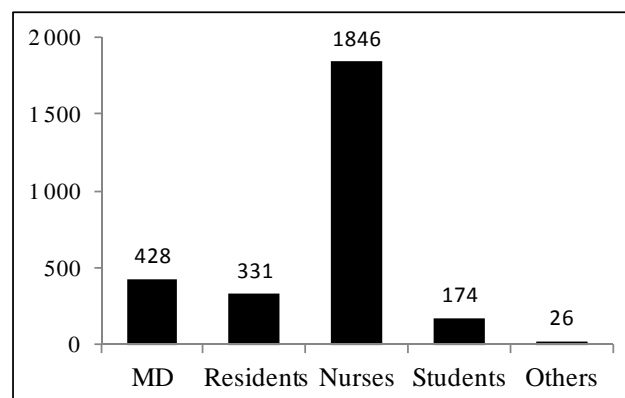


Figure 1. Number of participants in CME activity by category.

Results show that twice as many nurses than doctors participated from the lecture series (1846 nurses and 759 medical doctors and residents).

Sixty-two universities and medical centres from 20 countries around the world have broadcast 154 lectures to TCK and the 6 telemedicine centres in the regional hospitals of Kosova. Topics included surgery, paediatrics, obstetrics and gynaecology, internal medicine, nursing education, health systems administration and policy-making, with over 4,399 participants made up of 1,834 nurses, 1,618 medical doctors, and 875

residents and medical students participating in these programmes.

Beside the international collaboration, various local institutions have been actively using the TCK infrastructure to deliver seminars and conferences across Kosova, improving local collaboration and strengthening local institutions. (Table 2) Seminar sessions covered a large spectrum of medical information and served as informational tool for the University Clinical Centre in Kosova (UCCCK) staff with a total of 60 seminars given over the years

Table 2. Local institutions using TCK infrastructure for education.

American International Health Alliance
American University of Kosova
Assoc. of Anaesthesiologists of Kosova
Assoc. of Biochemical Professionals of Kosova
Assoc. of Chemotherapists of Kosova
Assoc. of Gastroenterologists of Kosova
Assoc. of Oncologists of Kosova
Association of Urologists of Kosova
Blood Transfusion Centre of Kosova
Centre for Continuing Nursing Education – Ministry of Health
Institute of Public Health of Kosova
KFOR Med Battalion in Kosova
Kosova Centre for Positive Psychotherapy
Ministry of Health of Kosova
National Library of Kosova
Nursing Dept, Paediatrics Clinic UCCCK
Prishtina International Summer University
Dept of Paediatric Surgery UCCCK
Dept of Dermatology Surgery UCCCK
Faculty of Dentistry, University of Prishtina

Although this paper is not looking into teleconsultations, international teleconsultations through videoconference and store and forward played an important role in the medical system by preventing needless and expensive patient travel abroad. A total of 230 teleconsultations were performed with more than 941 scans of CT's, MRI's, X-rays and other laboratory reports scanned and sent as part of the teleconsultation. (Table 3)

Another main information resource that TCK provides is the electronic library. This facility provides

Table 3. Number of cases and scanned documents for teleconsultations 2004 – 2013.

Year	Cases	Documents Scanned
2013	16	92
2012	22	95
2011	51	275
2010	29	80
2009	21	75
2008	20	79
2007	23	64
2006	19	59
2005	18	78
2004	11	44

24 hours a day, 7 days a week access to medical databases like Up-to-Date, PubMed, MD Consult and HINARI. Since 2003, 64,167 visits to the electronic library of TCK have been recorded. This facility has specially trained e-librarians who assist users 24 hours a day. As of June 18, 2013, over the past decade 211,357 visits were recorded at the TCK, with a trend of increasing use for the past five years, marking this as a significant contribution to clinical education of Kosova (figure 2).

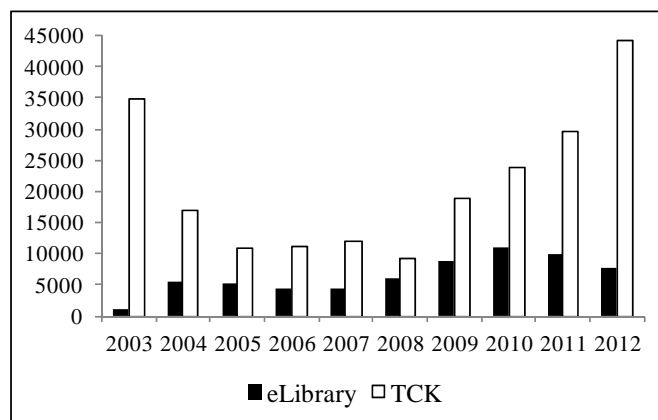


Figure 2. Number of visits to the eLibrary and TCK between 2003 and 2012.

Discussion

Telemedicine and e-health technologies can deliver medical education anywhere, anytime through virtual seminars, lectures, electronic books, and other online educational training tools.⁷ Although these systems

have great potential, there are only a few developing countries that have adopted advanced technology to augment and develop their educational programmes.

In South Africa, at the University of KwaZulu-Natal, a CME programme via videoconferencing has been running for over 10 years and by 2010 delivered 40 hrs of interactive sessions each week.⁸ Since its initiation this programme has grown from offering existing postgraduate seminars to expanded into the provision of academic programmes in telemedicine and medical informatics to students in nine African countries.

Other projects in Africa have utilized videoconferencing to target special-need areas such as HIV training and education, as well as cytology training. The Pan African eNetwork is an African Union and Indian Government initiative, which provides connectivity between India and 47 African countries by utilizing videoconferencing and teleconsultation services.⁸

Development of regional and national telemedicine networks offer a unique opportunity to pool available resources among geographically separated locations. IVeH has successfully developed a model for the implementation of successful and sustainable telemedicine programmes around the world.

Several aspects are key for the success of any telemedicine programme. A robust network and dedicated information technology team that allows the connectivity with the different sites⁴ and for various clinical applications.⁹⁻¹¹

The cost effectiveness of the Kosova programme has been well documented, showing that it is an optimal option to reduce the cost of educational activities.² Investment in tele-education infrastructure will provide the framework and foundation for clinical programmes, research and international partnership.^{3,12}

Through the TCK, IVeH has advanced the quality and availability of medical education in Kosova, fulfilling the CME needs of health professionals using local and international expertise. The electronic library has provided the latest in evidence-based practices allowing the health professionals to access information, as they need on a day-to-day base.^{2,3} The use of the telemedicine network for other medical services beyond educational activities is under development in Kosova with promising clinical and research applications such as remote patient monitoring, teliabetes, telestroke, and teletrauma programmes. The success in Kosova has led to the

development of similar programmes in other Balkan countries like Albania and other countries.¹² Recently IVeH has completed the new telemedicine programme in Cape Verde, Africa and is in the process of or has initiated programme in a few other African countries such as Tanzania, Nigeria, Madagascar as well as in Vietnam.

Conclusions

Telemedicine programmes can improve medical education and access to current medical literature in developing countries. Tele-education programmes pool resources and increase access to information. The variety of lectures broadcast illustrates the broad outreach of telemedicine delivered educational programmes for all medical sub-specialties. In addition, the high number of nurse participants would support future initiatives to specifically target continuous nursing education. These systems are cost effective and open the doors for research and international partnership. The model used in Kosova, created by IVeH is being applied to other countries successfully.

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Conflict of Interest: The author declares no conflict of interest.

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