

**IMPROVEMENT OF HEALTH CARE DELIVERY THROUGH
THE APPLICATION OF INFORMATION AND
COMMUNICATION FACILITIES.**

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ABSTRACT

It is said that health is wealth and health is life. Due to modern technology, the rapid transmission of health knowledge has catalyzed notable achievements, opportunities and challenges in healthcare delivery. Healthcare (including disease prevention and adopting a healthy lifestyle) has greatly improved due to the development in information and communication technology (ICT). This paper discusses the effects of ICT on healthcare and health education in the context of globalization. It also shows how ICT could improve dissemination of health information across physicians and patients for the good of all.

Key-Words: Health delivery, ICT, Globalization, Health knowledge, Dissemination

1.0 INTRODUCTION

Globalization and rapid technological change have made knowledge a critical determinant of competitiveness in the world. ICT promotes the acquisition and absorption of knowledge and information. Health professionals agree that ICT are of tremendous importance to the future of education in the health domain. Health is profoundly affected by the application of ICT, which change the way people can access knowledge and the way they communicate with one another in daily behaviour.

Globalization is a process of interaction and integration among the people, companies, and governments of different nations, a process that is an inevitable phenomenon in human history that's been bringing the world closer through information, knowledge, culture and exchange of goods. This process has effects on the environment, on culture, on political systems, on economic development and prosperity, and on human physical well-being in societies around the world. Among many forms of globalization there is information and knowledge access and

sharing. According to Maud Huynen et al (2005), globalization and global health draw attention to the complexity of the movement of ideas, and people through time and space and the direct and indirect impact that it is having on people's health.

1.1 HEALTH EDUCATION

Promoting good health, preventing illness and communicating about health issues are important aspects of effective health care. Increasingly, health communication is moving from a simple one-way delivery of messages to a more interactive dialogue that engages people in the issues, helps them find acceptable and appropriate solutions to health problems and encourages people and communities to play a vital role in protecting their own health.

Information and communication technologies have been seen as new and powerful tools in efforts to improve health care dissemination.

1.2 INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

ICT, in the globalization context, is all about global knowledge, access, participation and governance in the information age. Satellite Internet connectivity and other wireless technologies eliminate the need for telephones for dial-up access, thus Internet connectivity has expanded strongly.

Both the falling cost of computers and the explosive growth of the Internet as a communications and information resource have increased awareness of the potential for information technology to be a tool for disseminating information.

According to Mobolaji E. Aluko, PhD(2004), ICT are enabling technologies (both hardware and software) necessary for the delivery of voice/audio, data (high-speed and low-speed), video, fax and Internet services from Point A to Point B (or possibly to multiple points B, C, etc.) using wired and wireless media and associated equipments that are connected via Internet Protocol (IP)

and non-IP networks, where the option exists that any or all of the communicating points may be fixed or mobile during the communication process.

1.3 ICT AND HEALTH CARE

According to Berland G.K et al (2001), every nation is seeking to improve the quality of its health care and at the same time to control escalating costs. Information is seen as a key element to achieving these objectives, as is a workforce trained in the appropriate health information skills.

According to Patricia N. (2002), informatics systems for health education represent a viable solution for disseminating information and knowledge in the health education domain that can offer global access to disease-related information including prevention, diagnosis, management and treatment, trends, and research on such issues and improved collaboration among health professionals and sense of “connectedness”.

Growing evidence demonstrates that ICT can make a significant contribution to health education under the right conditions. The Internet can facilitate interaction between health professionals and health consumers and manage the demand for information. From a health communication perspective, e-health application, interactive programs providing tailored health delivery and other services to users, can be effective in helping people manage their own state of health, access health services, and obtain knowledge that can lead to change behaviours.

2.0 ICT AND ITS IMPACT UPON GLOBALIZATION OF HEALTH DELIVERY

Globalization itself was fueled by new developments in information and communication technologies.

According to Carol Dalglish(2006), advances in ICT, knowledge and information sharing have transformed globalization process making the world a “global village”.

Information is the basis of a well-functioning health system. Knowledge is the key agent for transforming both our global society and local communities. Sharing and strengthening health knowledge can be enhanced by ensuring equitable access to information for educational, scientific activities, leading to a strong public health domain of information.

ICT have clearly made an impact on health care also by improving dissemination of health information, and finding a quick solution to health problems. The flow of medical information and knowledge is shifting with increased access to the Internet, mobile phones, and data retrieval systems and that leads to adaptations in behaviour.

2.1 ACHIEVEMENTS AND OPPORTUNITIES

When applied to health education and health care, ICT can provide considerable benefits and capabilities. Tremendous developments in health information technology have been recorded in recent years in the context of globalization. Sharing and comparing health information, increasing communication through the Internet have brought opportunities for enhancing the quality of life by increasing access of medical knowledge and for broadening the availability of quality education materials.

The interactivity and global reach of ICT allows customized sharing of knowledge, materials, and databases, quickly and cheaply over long geographic distances.

ICT can provide new and innovative means to bring information and educational opportunities to greater numbers of people of all ages, including those who have historically been excluded, such as populations in rural areas and women facing social barriers.

3.0 TELEMEDICINE

According to Nancy B.(1995), worldwide, people living in rural and remote areas struggle to access timely, quality specialty medical care. Residents of these areas often have substandard access to specialty health care, primarily because specialist physicians are more likely to be

located in areas of concentrated population. Because of innovations in computing and telecommunications technology, many elements of medical practice can be accomplished when the patient and health care provider are geographically separated. This separation could be as small as across town, across a state, or even across the world.

As the health care system continues to change and adapt to the new realities associated with finance and management restructuring, the technological side of patient care also has changed.

Telemedicine is a new word found in the constantly changing vocabulary of the health care system. Telemedicine is the use of electronic information and communication technologies to provide and support health care when distance separates the participants. It is a system that connects primary care physicians, providers, specialists and patients. Telemedicine is not a new concept. It has existed for a number of years in the form of the telephone and fax machines. In recent years, with the improvements made in access, technology, and communications systems, telemedicine has expanded and, in a time of limited resources, has become a feasible alternative for smaller and rural medical facilities to provide routine and specialized services. Particularly in rural areas, it offers the potential of both improved access to care and improved quality of care.

According to the telemedicine report(1997),telemedicine is defined as a medical care and health supporting practices based on patient information derived from images transmitted from a remote site.

3.1 APPLICATIONS OF TELEMEDICINE

The primary applications of telemedicine are clinical, educational, administrative, and research.

Clinical applications include initial patient evaluations, diagnosis (tele-diagnosis), and

Consultation (tele-consultation). Physician supervision of non-physicians and monitoring of patient status are possible. Continuing education for professionals is available, as is patient and community education (tele-education). Administrative uses, such as conferences, scheduling, and utilization and quality review may be provided. Research is enhanced by aggregation of data from multiple sources and coordination. Telemedicine allows access to the wealth of information available on the Internet. This allows information to be at the touch of a finger. The availability of e-mail allows an efficient mechanism of communication between consulting and primary physicians. Communication between facilities is enhanced.

3.2 TRANSMISSION AND EQUIPMENTS

Text, images, and sound are transmitted. Text includes EKG results (heart tracings), lab results and patient records. Images range from still photographs to full motion imagery. Radiological images, slides and graphics may be transmitted, as well as voice and chest sounds. Transmission may be done in one of two methods: Real-time or Store and Forward.

i. Real-time transmission: is utilized when immediate feedback is essential. Emergency triage, interactive treating situations and meetings are a few examples. When immediate feedback is not required, store and forward may be implemented.

ii. Store and Forward: data is stored, forwarded and accessed at the hub at a scheduled time or at the convenience of the hub personnel. This is less costly as data can be compressed and batched for transmission.

Transmission equipment varies according to the transmission mode, analog or digital, and the means of transporting the mode, satellite or terrestrial. There are two transmission modes. they are analog and digital.

i. Analog: is the transmitting of waves, similar to television broadcasts. Its advantages include high resolution and familiarity. The high expense associated with transmission, large size, and complexity of required hardware are disadvantages.

ii. Digital: this mode utilizes the transmission in the form of "bits". Transmission costs, smaller equipment, simplicity of operation, ease of interface, (including the storage and revival systems for image and data) are several benefits of this mode. The digital mode is preferred due to cost, usability, and expansion potential.

The transmission mode may be transported via satellite or terrestrial media. Terrestrial modes include microwave, fiber-optic, and conditioned copper cables. Satellite transmission allows a full motion broadcast quality picture. Most satellites transmit analog signals. Signals may be transported on C-Band or KU-Band. The **C-Band** is often utilized by local telephone companies, requiring coordination of availability. The **KU-Band**, utilized by television stations, is more widely available.

Satellite transmissions have no boundary restrictions. It allows transmission of large amounts of information. It is ideal for sending visual information to multiple locations. The disadvantage is the cost. It is approximately eight times as expensive as terrestrial transmission. Terrestrial transmission is less expensive to operate on an hourly basis but is limited to areas that are linked to the appropriate line. Video transmission normally requires a bandwidth (carrying capacity) of 90 million bits per second (Mbps). A telephone call requires 64 thousand bits per second. The fastest speed available with current digital technology is 7.2 Mbps. This requires a bandwidth commonly referred to as T1. T1 consists of 24 voice channels which may be combined with higher bandwidth as needed. The higher the bandwidth, the better the image quality. Higher cost is the trade off for better image quality.

Fiber-optics are available from long distance and local telephone companies. Optical fibers consist of strands of hair-thin glass and uses light to transmit telecommunication signals. They may be leased as a dedicated line or on-demand basis. Optical-fiber has a wide bandwidth allowing for choices of transmission speed. Due to cost constraints, T1 line is not available in all areas. Satellite transmission requires an up-link to the satellite and a down- link to the location. The KU-Band satellite dish is relatively small and portable on a truck. The C-Band satellite dish is large and not very portable. If the satellite transmission is digital, equipment is needed at each site to translate analog signal to digital.

The CODEC (Coder,DECoder) is the heart of the system. The CODEC transforms the analog signal (the picture) picked up by the video camera to a digital signal and compresses it for transmission to the distant site. Another CODEC, at the distant site, transforms the digital signal for viewing on the video monitor. The CODEC, a computer, needs enough memory to transmit and store text and images, such as patient records and educational material.

Each site requires a camera to transmit live images. At each site a speaker and monitor are required so users can see and hear each other. In addition, a site requires a multiplexer, a device that allows two or more signals to be sent over the same path. A CSU/DSU (Channel Services Unit/Data Services Unit) converter is needed to interface to the T1 service. A wide variety of medical devices (e.g. cardiac monitors) are available for the remote sites.

3.3 BENEFITS

i. Leveling of regional differences: The same information can be accessed from the next room and from a medical facility several thousand kilometers away. The quality of medical care will be largely improved because accessibility to special medical care can be extended to rural areas.

ii. Improved service for patients: It is a large burden for sick patients to physically go to a hospital. Ideally, a patient could receive a doctor's visit in the comfort of his own home. However, it has not been possible to achieve such ideal care efficiently. A patient's psychological comfort would be greatest if they could be monitored constantly by physicians. Telemedicine will bring patients much closer to that ideal situation.

iii. delivery of medical care where not accessible: physicians will have greater opportunities to deliver medical care to patients in places where medical care is not otherwise accessible. The most typical case would be to use telemedical communication between a hospital and an ambulance. This sort of usage will be further expanded to ships, planes, and even spacecrafts in the future.

iv. Improved efficiency of medical care: In some rural hospitals where few operations are performed, there is not enough work for full-time pathologists. Currently, traveling pathologists visit such hospitals, but further propagation of telemedicine will lead to a more efficient solution.

v. Effective method of international medical cooperation: The technology used in telecommunications is basically the same throughout the world. Thus, it will be possible for a country making use of telemedicine to give advice and to support its medical projects stationed in other countries.

3.4 CHALLENGES

i. Cost: this is a significant barrier to access. It has been estimated that the startup cost for a rural facility is very expensive. In addition to start up costs, consideration must be given to the charge by the consultation team.

ii. Depersonalization: conferences and video can't replace valuable time between doctor and patient or more personal discussion that doctors and physicians might otherwise have with each other

iii. Legal complications: these are raising another red flag. Laws and a set code of rules and ethics will first need to be applied before telemedicine can be used regularly in various capacities. This alone might take some time.

iv. Payment of professionals: services and how professionals get paid for them will all need to be resolved as telemedicine becomes a more fluent practice. This can prove to be a difficult determination.

4.0 CONCLUSIONS

Globalization has brought about some conducive environment for sharing information, knowledge and experience. According to Rigby .M (2004), all countries need to take a broad view of their changing health information needs and how health can be improved by the use of all forms of information and communications technology.

Because prevention and early detection of disease are becoming an increasingly important aspect of health care delivery, telemedicine applications has greatly improved the health care and has played a great role in ensuring that patients have quick and reliable response to their problems.

Used effectively, health delivery systems have enormous potential as tools to increase information flows and the dissemination of evidence-based knowledge, and to empower citizens regarding their own state of health.

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