Telemedicine in Developing Countries

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https://doi.org/10.7916/vib.v1i.6503

Technology and medicine have evolved over time. Growing up, I recall my father receiving pages on his beeper when patients needed care; upon receiving these notifications, he would locate the closest landline phone and return the call to the hospital. Over time, a cell phone replaced his beeper/landline communication, improving the speed of communication and increasing his access to patient information. When my father began practicing medicine, remotely accessing charts was a difficult process. Now he has an "app" on his phone where he can check a patient's electronic record from any location.

Telemedicine has undoubtedly improved the quality of healthcare in developed nations. I would like to assess how telemedicine impacts patients in the developing world. In particular, I will evaluate whether telemedicine should be expanded in developing countries. One might argue that telemedicine will benefit developing countries by increasing access to healthcare; however, a broad assessment of telemedicine in relation to the principles of bioethics (beneficence, nonmaleficence, autonomy, and justice) should be made.

The World Health Organization (WHO) defines telemedicine as:

The delivery of health care services, where distance is a critical factor, by all healthcare professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities.[i]

Telemedicine involves any form of technology that assists in the gathering and communication of health information. Telephones, Skype, iPads, and the Internet are all examples of Information and Communication Technologies (ICTs). Telemedicine can occur either in real time (synchronous telemedicine) or via delayed communication such as with email (asynchronous telemedicine; also known as the store-and-forward method). Both synchronous and asynchronous telemedicine can enhance the practice of medicine, however, in situations where Internet speed is slow, asynchronous telemedicine may be preferred.

Typically, in urban hospitals, physicians order diagnostic tests that are sent to nearby radiologists who are available to quickly interpret the results. Small clinics in rural locations do not have the benefit of a variety of specialists available for patient care. Telespecialties such as teleradiology could be extremely beneficial. Through telemedicine, physicians can surpass geographic barriers and interpret X-rays (teleradiology), cell pathology (telepathology), and images of disease (teledermatology), as well as perform psychiatric evaluations (telepsychiatry) from remote locations.

In 2010, WHO published a report on the state of telemedicine and its future success in global implementation.[ii] This report was created in response to the overwhelming international demand for increased information regarding the potential benefits and risks involved in telemedicine. I will first explain WHO's findings and will then explain why I believe that the principle of beneficence outweighs

nonmaleficence (do no harm) with respect to the implementation of telemedicine globally. Further, I will explain why telemedicine should be promoted based on the principle of justice since it improves access to healthcare in developing countries. Despite my positive evaluation of telemedicine, each country should individually evaluate specific factors that support or inhibit the local implementation of telemedicine.

One important factor, which affects the reasonableness of telemedicine, is the cost. Countries, particularly developing countries, are concerned with both the start-up and maintenance costs. ICT infrastructure in developing countries is limited; thus, developing countries have a greater challenge in the initial implementation of telemedicine. In fact, according to the 2010 WHO survey, cost was the number-one barrier to telemedicine across all countries.

Although the cost of telemedicine concerns many countries, WHO rightly notes that technology has become increasingly affordable over the years. What was once prohibitive due to costs is now accessible to many. It is true that the cost-effectiveness of telemedicine must be evaluated to justify the investment in ICTs, however, this can occur through the implementation of ICTs on a trial basis. Through pilot programs, governments can gather sufficient data to determine future efforts in telemedicine. I believe that now is the time to experiment with ICTs

After ICTs are implemented, one might wonder who is going to pay for the services rendered through telemedicine. Many patients in developing countries cannot afford physician consultation fees; thus, one option is that physicians volunteer time to these technologies. Apart from the altruistic reasons, telemedicine can also be used as a teaching tool for medical students. Medical students often develop diagnostic skills through the evaluation of textbook cases. One might ask, why use a published case (whose purpose is solely pedagogical) when one can use an on-going case that might benefit a real patient?

Telemedicine can and should be used as a teaching tool in medical education, of course with the quality assurance that an attending physician oversees and confirms diagnoses. In fact, this mutual benefit does not fall solely upon healthcare professionals in the United States (U.S.); telemedicine may also benefit local healthcare professionals by confirming or refuting their independent diagnosis. For example, Operation Village Health (a telemedicine program) uses asynchronous telemedicine so that Harvard-affiliated physicians in Boston can review the diagnoses of healthcare professionals in Cambodia.[iii]

Bioethicists are not only concerned with patient health outcomes; they are also concerned with professional ethics and patient care. One might oppose telemedicine if that person believes that the treatment of local healthcare workers by remote physicians may be paternalistic and overbearing. This issue, however, is not unique to telemedicine, but is found in all professional medical organizations. Medicine is a uniquely collaborative field and respect for others (both colleagues and patients) should be developed in urban hospitals and rural clinics alike. Further, unlike humanitarian organizations that send physicians to developing countries to treat patients in-person, telemedicine can further empower local healthcare professionals by supporting self-sufficiency. In a way, telemedicine supports local physician autonomy by informing, yet respecting their decisions about patient care. Instead of referring patients to distant hospitals for a second opinion, local healthcare professionals can, through telemedicine, gather an e-opinion from a distant specialist in the field.

Another proposed barrier to the success of telemedicine is the difference in culture; WHO states: “Most challenging of all are linguistic and cultural differences between patients (particularly those underserved) and service providers.”[iv] Although this is a concern, it is not unique to telemedicine. Any physician

practicing medicine in a foreign country faces the same issue. Still, one might argue that in-person assessments might mitigate cultural differences since it is easier to interact with an individual in-person than through a device. While I agree that face-to-face interaction is preferable, as stated previously, this may not be an option in rural locations—telemedicine is the next best option. In weighing beneficence against nonmaleficence, it seems that the benefit to patient health outweighs the challenge of cultural barriers, however, actions should still be taken to improve the cultural competency of physicians providing remote care.

In the U.S. legal obstacles are significant barriers to telemedicine. This is because in the U.S., physicians are licensed by state medical boards; and the regulation of medical procedures may vary in each state. Unlike the case in the U.S., telemedicine in developing countries faces far fewer legal hurtles. Nonetheless, physicians must maintain a high standard of ethical care. Telemedicine may lead to concerns about patient confidentiality and medical liability. I believe that measures to ensure patient confidentiality should be in place; but I admit that questions regarding medical liability may be difficult to answer. Legislating liability internationally may reduce the number of physicians willing to volunteer time, although arguably this may better protect patients. While these are serious concerns, which should be addressed, physicians rarely perform medical procedures remotely through telemedicine; instead, telemedicine is used primarily as a diagnostic tool to support the local healthcare system.

A final important concern that relates to developing telemedicine is the feasibility of the technology. For example, low-bandwith can lead to poor image resolution, which can compromise medical diagnostics. One telemedicine program that provides breast cancer screening to women in remote areas of Mexico solved this problem by saving images on a CD and sending these images through the mail to a nearby diagnostic center. Ideally, technology would be improved in rural locations to maintain a high degree of efficiency, however, compromises can (and should) be made. Each country should set up a task force to look into ICTs and determine which ICTs are economically possible. Even if technology is not cutting-edge, it may still have a huge impact on patient care; for instance, sending mammogram images in the mail in Mexico saved many women the cost and time required to commute to another clinic. Telemedicine will likely improve clinical care in many developing countries. Further, an assessment of telemedicine according to the principles of bioethics shows that telemedicine promotes local physician autonomy, increases access to care (justice), and fulfills the duty to perform care that will benefit patients with minimal harm (beneficence; nonmaleficence).

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