

Possibilities of using telemedicine in developing countries on the example of Ghana and Kenya

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Abstract

The paper addresses the problem of the lack of access to medical services and qualified medical staff in developing countries on the example of Kenya and Ghana. The paper presents possibilities of using telemedicine in Kenya and Ghana. It was proposed to appoint the function of a medical coordinator. The project of implementing telemedicine in Kenya was described and the possibility of implementing the system for Ghana was indicated. The benefits of using telemedicine for both medical personnel and the patient are presented.

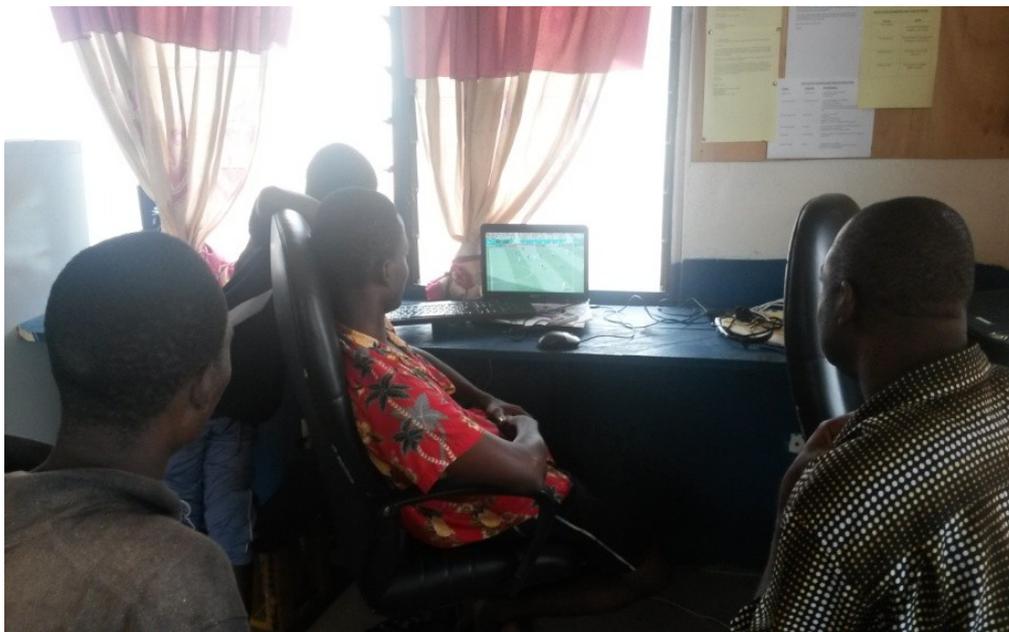
INTRODUCTION

African countries are associated Europeans with shamans, herbal medicine and witchcraft. Contemporary Africans, with health problems, most often apply to health care workers. Hospitals, despite the shortage of financial resources, lack of equipment and medical staff, try to provide healthcare services at the highest possible level. Unfortunately, insufficient number of doctors, nurses and paramedics as well as limited access of the

population to specialist medical care causes a number of undesirable health behaviors among the inhabitants of Ghana and Kenya. An example of such behavior is the overuse of drugs, especially those available without a prescription, and pharmacological self-medication. A partial solution to the problem in Ghana could be the introduction of telemedicine.

THE PROBLEM OF ACCESS TO MEDICAL CARE IN GHANA

Ghana is struggling with the problem of high mortality. The expected life expectancy for people born in 2015 is only 64 years for women and it is 61 years for men [1]. Long distances between hospitals, insufficient number of medical staff, lack of specialists and poor access to specialized medical care are only some of the problems affecting developing countries [2]. It is also indicated that there is limited access to medical transport and the lack of trained medical rescuers driving at the Ambulance Service. Technological progress in Africa has gained momentum and globalization is proceeding much faster than in the past in Europe. According to Pew Research Center data from 2015 about 83% of the population of Ghana has mobile phones, of which 21% have smartphones that allow connection to the Internet [3]. 25% of the population has access to the internet, at least occasionally [3]. These indicators are much higher among educated and well-paid Ghanaians. Young doctors are eager to use mobile devices. This potential can be used in health care. The use of new technologies gives doctors access to exchange specialist information beyond geographical barriers.



Fot 1. Year by year increasing use of electronic devices in subsaharan Africa

In Africa, there is a deficit of qualified personnel to ensure an adequate level of medical care. Medical universities do not offer specializations in all areas due to the deficit of funds and training staff. A small number of specialists causes that educated medical staff is settled mainly in large cities, where large medical centers are located. The possibility of using telemedicine would allow specialist consultations even in small hospitals located in isolated areas which do not have specialists in their team, e.g. neurologists, neurosurgeons, urologists, cardiac surgeons. [4] In 2014, no neurologist worked in the Brong-Ahafo and Ashanti region. [4] The use of telemedicine would increase the chance of conducting a specialist diagnosis at a distance. The possibility of sending ECG, X-ray pictures or ultrasound results for further diagnosis would enable specialist medical consultations and adequate actions even in hospitals with a deficit of qualified medical staff. It is obvious that making the right diagnosis and implementing adequate therapy not only prevents the patient from losing health and life, but also significantly improves the quality of life after the therapy. A great example is the Dorma Presbyterian Hospital, where at the beginning of 2017 there were numerous problems with ECG assessment by hospital staff. The use of telemedicine in this hospital could give the chance to send an electrocardiographic record to a cardiologist on duty in any place in the world. After analyzing the ECG, result can be sent to the cell or smartphone by Internet with a procedure for further medical action attached. Such activities not only increased the patient's chances of survival, but also guarantees adequate actions, such as pharmacotherapy, electrotherapy and fluid therapy. Telemedicine could also be useful if the patient after the implementation of the treatment at the site had a chance of survival, but due to the lack of qualified medical personnel, knowledge, experience, equipment deficits needs to be transported to a distant hospital. Of course, such action is fraught with unfavorable prognosis of decreased chances of patient's survival. Most medical procedures must be implemented as soon as possible from the moment an accident occurs because any delay in action reduces the chance of survival of the patient. Another problem is the lack of equipment in ambulances however an accurate diagnosis and sending an algorithm of action for the ambulance staff would significantly improve the prognosis for some patients even without specialistic equipment. A retrospective analysis of the medical cases of the Emergency Rescue Team would allow identifying the most frequent interventions and would allow the implementation of targeted training and retrofitting of ambulances.

PROPOSAL TO CREATE A MEDICAL COORDINATOR FUNCTION IN GHANA

Not only physicians, but also other medical staff would be able to use telemedicine. According to the World Health Organization, in Ghana in 2015, the number of doctors per 1,000 inhabitants was only 0.096. [1] As mentioned above, most doctors work in large and medium cities. In small health centers located in rural areas, only nurses and Physican Assistants work. It should be emphasized that approximately 70% of health care facilities are located in small villages. These clinics employ only Physican Assistants [5]. The use of a satellite or radio transmission regarding the assessment of a patient's health implies the need to appoint a medical coordinator. The medical coordinator, based on an interview conducted by the Physican Assistant and the results of the patient's examinations, after consulting the Physican Assistant would help in diagnosing and determining the further therapeutic path for the patient. The possibility of consultation between Physicist Assistants and doctors from larger centers would make it possible to improve the quality of health care in rural areas.



Fot. 2 Easy internet access and common use of mobile devices In Ghana and Kenya

Telemedicine also gives the opportunity to improve the qualifications of doctors and health care professionals. Contact with specialists or doctors with greater medical experience broadens knowledge and creates the possibility of applying knowledge in practice under the supervision of a specialist. The use of new technologies enables virtual coaching during medical procedures, e.g. complicated operations. In addition, it is possible to conduct on-line training on medical platforms.

PIONEERING APPLICATION OF TELEMEDICINE ON THE EXAMPLE OF KENYA

Kenya is a pioneer in the use of information technology in Africa. 90% of Kenyans have a mobile phone. 44% of Kenya's population has smartphones. 40% of Kenyan residents had access to the Internet, while in the group of people with higher education, this rate was around 70% [3]. Technological development in Kenya is at a very high level, and the number of mobile applications is growing year by year. Medicine uses the country's IT potential. "mHealth" is already in a common use especially in the northern part of the country.

There are 69 high-quality telemedicine projects in Kenya, 41 of which cover more than one region. From 14 regions that were classified as regions with low access to health, eHealth projects were implemented in 10 [6]. Among all projects there were 47 mHealth projects, 9 information health information system projects, 8 e-learning projects for healthcare professionals and 5 projects of telemedicine including the majority of the country [6]. Achieving such high results is possible only thanks to the very high level of computerization of the country.

In Kenya, it was estimated that at places with long distances between medical facilities using a weekly SMS consultation among HIV-infected patients, the cost of obtaining one QALY decreases by \$ 1,037 compared to weekly visits of health care workers [7]. Telemedicine reduces broadly understood health-related costs, which is particularly important in the case of a low budget for healthcare, which is unfortunately a common phenomenon in developing countries.

For remote consultation, it is not necessary at all to have specialized equipment and specialistic software in order to use telemedicine. In the absence of hardware, all you need is a social messenger installed on your phone or computer. An example of creativity are existing Whatsapp groups in Kenya and Ghana, associating doctors who consult with more experienced colleagues in case of problems with making a diagnosis. It seems appropriate to quote a well-known maxim that need is the mother of the invention. All you need is a smartphone and an internet connection. Using cell phone camera, you can send a picture of the performed X-ray, ECG, ultrasound or results of laboratory tests and consult the result and the proposed treatment plan with other doctors. These groups are used in particular by young medics who lack experience but there are also experienced doctors who seek specialist advice for more difficult cases.

CONCLUSION

Globalization makes it possible to share knowledge and experience over long distances. The use of telemedicine in Africa's developing countries enables consultations and remote diagnosis. Thanks to the widespread implementation of telemedicine, it would be easier for people to access specialist medical care. The possibilities of improving the qualifications of medical staff would also be increased and the research carried out in various medical centers would be facilitated. As a consequence, the level of healthcare provided in developing countries would increase. This is particularly important where access to the doctor (and in particular a specialist doctor) is very limited. Rapid technological progress in Ghana and the related increased access to telecommunications devices enable the introduction of telemedicine services in Ghanaian health care. On the example of Kenya, it can be concluded that despite financial deficits in health care, telemedicine is growing, undoubtedly improving the quality of medical services provided. The very fact of implementing telemedicine, of course, will not solve all the problems related to health care in developing countries. However, based on the success of implementing telemedicine in Kenya, it should strive to implement telemedicine in Ghana. It would not only help to improve the quality of help for the victims, but more broadly, it would make it possible to establish medical cooperation with other scientific centers. It would be possible not only to exchange experiences between medical personnel but also to analyze the most common medical interventions among the residents of Ghana. Finally, through the use of mobile applications, the level of training of medical personnel would be raised and the analysis of medical interventions would allow action to be taken to adequately equip ambulances with medical equipment.

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