CHANGES IN PHYSICIANS' PRACTICE USING A CARDIOLOGIC TELE-EXPERTISE NETWORK IN MONGOLIA: AN ETHNOGRAPHIC STUDY ON IMPLEMENTATION OF TECHNOLOGY IN MEDICAL PRACTICE

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Abstract

The Luxembourg Government has supported the Mongolian Government in cardiologic care since 2001 through a telemedicine project. The fundamental strategy was to create a centre disseminating knowledge and providing assistance to physicians through a tele-expertise network. To better understand what factors contributed to the successful implementation of the project. This ethnographic study aims to understand how the project has changed doctors' practice to identify elements that facilitate acceptance of telemedicine. A qualitative approach based on the central role played by physicians was used. The purpose of this research is to contribute to the development of telemedicine in capitalising on the experience of the Mongolian telemedicine project. We gathered physicians' insights through participant observation and in-depth interviews of nineteen physicians of the project, added to focus group interviews including nine physicians from the most remote provinces. Our findings show that the technical and social aspects of the project reinforce each other in fostering doctors' greater autonomy, creating a sense of belonging to a community and promoting ownership of the project, crucial elements for acceptance. The project offers technological support through a tele-expertise network and a dedicated website that help improving professional capacities and participate in increasing physicians' self-confidence and autonomy. Meanwhile, the technological structure is supported by strong collaboration between physicians, their participation to the project development and involvement toward new professional activities. It results in structuring a community of cardiologists with a great sense of belonging and ownership that created a social environment for the technology to work.

Keywords: Tertiary care; qualitative research; Mongolia; cardiovascular diseases; collaboration

Introduction

Telemedicine is a medical activity using information and communications technology to overcome physical barriers in accessing healthcare services related to distance.[1] The WHO recognises the value of telemedicine to strengthen health systems and improve quality and safety of care services.[2] However, Edirippulige et al. deplore that "policies at national and international level have not yet been able to facilitate e-health". Development of telemedicine involves providing evidence of its potential impact on health systems and showing benefits and successes from on-going projects.[3]

The project MON/005, launched at the end of 2011, aimed to improve cardiologic care services in Mongolia, especially for the population living in remote areas. Cardiovascular diseases represent a major public health issue because of their prevalence, especially among young adults, and the social cost of disability. Furthermore, unequal access to health care between the rural and the urban areas remains one of the major health issues with severe lack of effective

health care services available for the rural population.[4] Since 2001, the Luxembourg Government has supported the Mongolian Government in cardiologic care through MON/002 and MON/003, the predecessors of the MON/005 project. Both previous phases tested a pilot telemedicine model in a restricted number of provinces, and in MON/005 the model was made available to the whole country.

Telemedicine appeared to be a solution to overcoming the problems of great distances, lack of infrastructure, and harsh climate in Mongolia by decreasing the number of unnecessary and costly referrals to Ulaanbaatar (UB) through improving the skills of physicians in provinces and districts.[5] The Cardiovascular Centre located in Shastin hospital (a tertiary care facility in UB) was created to disseminate knowledge and provide assistance to physicians working in provincial and district public general hospitals through a tele-expertise network. The operation mode was built on the software MnCardio, a simple web-based medical record allowing discussion and exchange of data through the network. It is designed to facilitate quick entry of the patients' medical records, and to easily extract and upload anonymous data, including echocardiography images and ECG results. It is used when advice is sought from doctors through the network, and for referrals and follow-up procedures between the Cardiovascular Centre and general hospitals. Moreover, different actions were taken to improve professional capacities.

Formal lectures and training were held in UB and abroad in countries such as Taïwan, Russia and France. A specialised website (www.telemedicine.mn) was created enabling doctors to upgrade their professional knowledge. The physicians can find algorithms on the case management of the most common cardiovascular diseases. At each of the key decision points, explanation can be found from attached self-learning material.

A quantitative evaluation of the project showed a decrease of unnecessary referrals.[5] However, it was unclear what exactly was crucial in the implementation of the project that could explain the success. Therefore, a complementary qualitative investigation was done among physicians to better understand what factors contributed to the successful implementation of the telemedicine model. This study aimed to understand how the project has changed doctors' practice to identify elements that facilitate acceptance of telemedicine.

Methods

An ethnographic study was conducted in Mongolia from May to July 2015. Nineteen participants were selected among the sixty-eight doctors of the project MON/005 for individual interviews and participatory observation – eight from provincial hospitals (provincial doctors: PD), six from districts hospitals (district doctors: DD) and five from the Cardiovascular Centre (central doctors: CD). We used purposive sampling with maximum variation according to doctors' activity and use of the network recorded in 2014. Activity is the number of consultations registered in the electronic system and the use of the network corresponds to the number of requests and comments posted in the network. Moreover, during the annual National Conference in UB, nine doctors from six of the most remote provinces participated in two focus group interviews (FI).

Understanding the changes in physicians' practices implies understanding physicians' insights to appreciate the effects of the implementation of technology on their medical practice. Thus, an interpretativism paradigm with an ethnographic approach to the technological implementation was used to explain the meaning, nature, and challenges associated with the lived-experiences of physicians using the tele-expertise network through different but complementary methods. A participative approach, allowed the researcher to interact directly with the physician during his working hours, and gain a greater understanding of his experience. Interviews were conducted with the physicians assisted by an interpreter. An open-ended questionnaire was used in the interviews. It explored different factors such as satisfaction, motivation and autonomy in professional practice, as well as the repercussions of the project on daily practice and team work, and also their involvement in the project. Interviews ranged from 30 minutes to two hours, were tape-recorded and subsequently transcribed by the investigator and the translator. Two focus groups were set after analysis of the interviews in the first phase of the study. Another topic guide was adapted from the first analysis, to stimulate discussions between the participants.

The analytical process used in this study was qualitative content analysis. We elaborated initial coding by conventional content analysis. This method consists of defining categories directly from the text without imposing preconceived categories or

theoretical perspectives.[6] From the data we drew an important number of codes. Then, as analysis proceeded, additional codes were developed and relationships among categories were identified using a deductive category application. The initial coding scheme was refined and reduced to a smaller number of categories and major themes were defined according to existing research. Coding transcripts was done using the software MAXQDA 11.

The study was approved by the biomedical ethical review committee of the Mongolian Ministry of Health. All participants gave an oral informed consent after receiving an information form in English and Mongolian.

Results

Doctors noted four main changes in their daily practice and advantages and challenges that they relate to the implementation of the telemedicine model developed within the project.

Improvement of professional capacities and collaboration between physicians
Doctors stated that improvement of their professional capacities to manage patients autonomously was the first change in daily practice. They emphasised the key role of the tele-expertise network in building strong collaboration with peers; asking for advice helps to learn from their peers and discussing patient cases is seen as an opportunity to improve knowledge and increase experience. The electronic medical file also represented a learning tool.

"When I send patients to Shastin, the doctors in Shastin write everything they do in MnCardio, all the results, pictures so I can see what the diagnosis is and compare with what I thought. So the biggest advantage is that I can compare my diagnosis with the one from Shastin so I can learn"(PD n°4).

The second crucial change at work was the improvement in collaboration between doctors in general hospitals and Shastin hospital through the tele-expertise network. It was responsible for a better management of patients in provincial and district hospitals. Indeed, the network gave an opportunity to ask for advice that helped doctors to take care of a particular situation autonomously. Moreover, it has improved screening of patients who need to be referred to Shastin hospital for diagnosis or specialised therapy. The referral process is improved by prior

discussion and preparation of the patient case because the software allows transferring the medical file together with the request.

"Before that, they just sent the patient for us but now we can see the ECG, exams results and some experienced doctors can perform the echo and send the echo report for us so this is really good" (CD n°4).

The network also improved the follow-up process. Central doctors said they that could now depend on provincial and district doctors to consult patients after the specialised procedures like pacemaker implantation for example. Information about the procedure, the patient's health and its evolution was shared in the electronic medical file and the central doctors can give recommendation without seeing the patient in UB for follow-up.

"I can talk to them through the system. Usually, I ask my patients that I discharge to go see the doctor within a week and ask them to ask the doctor to post the information online so that I can check" (CD n°1).

Consequences of these changes in their practice have improved doctors' self-confidence in their professional capacities and their autonomy in managing patients is enhanced. Although doctors see their improved autonomy as an advantage, it also created new challenges. Doctors reported an improvement of patients' trust toward their capacities. Consequently, they experienced an increase in workload that might be difficult to handle because it increases pressure in their daily work. They also deplored the lack of time to devote to prevention, learning and research activity as much as they would like to develop themselves professionally.

"You know in foreign country they do work and research at the same time so they can improve themselves in many ways. If you don't have enough doctors and nurses you do it all by yourself and you are so so so busy, you don't have time to learn"(CD n°4).

Moreover, improving doctors' skills consequently made them more aware of what was needed and increased demands for costly procedures like surgery or angiography. Therefore, the lack of resources from the public health system became more visible. They regretted that their environment has not improved at the same pace as their skills and knowledge.

"The biggest challenge that I face in my work is the inability of some patients to afford expensive but necessary treatment like for example pacemaker; patients have to pay 7 million Tugrik (around 3,500 euros) and that's a big burden for them and in the majority of time they can't afford it so I just sit and don't know what to do" (CD n°1).

Structuring the cardiology profession and emergence of a community

The third major change in doctors' practice was related to teamwork and the structure of the cardiology profession in Mongolia. Doctors experienced the birth of a strong cardiologist community that emerged from the connection through the network, added to frequent training and meetings organised by the project annually.

"I know almost all cardiologists in Mongolia and I can learn from them. They connect to each other very closely and they can call each other to ask anything and this close relationship comes from the project" (DD n°3).

Moreover, a participatory approach was central to meet doctors' needs. The project team went to the provinces and districts to learn about working conditions and asked for feedback. Frequent meetings between central doctors and the project coordinator allowed reporting of activities and performance, as well as requests for training in specific fields or any bottlenecks encountered in the use of the system. Consequently, doctors experienced a sense of belonging and ownership to a team and to the project; they were active actors who were listened to and had a say about the organisation.

A sense of belonging to a community represented an important incentive to participate and work hard to attain the project objectives.

"Being part of a strong team with consideration for independence and improvement of doctors' working conditions and capacities are great incentive for me to stay part of this hospital" (CD n°1).

Despite these advantages, the team spirit faced some challenges. A ranking system, based on the number of patients registered and discussions opened in the network by year, was used to select candidates for international training and conferences. Some doctors experienced this competing process as a great incentive to use the network more whereas others thought it may be unfair because it did not reflect on all doctors' activities in daily practice.

"About the rating on MnCardio, it's just because of how many answers or comments you wrote to others. Also how many times you made the discussion. But I don't agree all these things can describe all doctors' job" (FI n°2).

Doctors affiliated to the internal medicine department did not have access to the project's resources. Therefore, they only registered patients on the network when they needed advice or when referring a patient to Shastin. Moreover, doctors maight experience difficulties in having a fast and continuous Internet connection where they work.

"I am not using MnCardio to register patients in the internal department because I have no Internet connection there" (PD n°5).

Encouraging professional involvement

Doctors experienced growing involvement towards their new professional activities as the fourth main change in their practice; they took part in decisions and suggested organisational changes to improve working conditions. In addition, they organised presentations and training locally for family doctors and within their hospital for other doctors and nurses. They thought the project played an important role in encouraging them toward these new roles by giving them access to training and opportunities of networking in an international context.

"When I was in Taïwan I visited the hospital and the ER department and I have learnt many things about organisation of human resources" (PD n°2).

Therefore, the project has transformed professional relationships in increasing popularity and credibility of doctors within local hospitals. They feel privileged compared to other doctors for having access to training and opportunities to go abroad. Thus, they embrace a new role of teacher and adviser for their peers.

"I am a trained and professional cardiologist, so they ask a help from me. I always want to help and advise other doctors because we work together and also it is our duty" (FI n°1).

These new roles and responsibilities stimulated professional interests and created a great sense of ownership as a major incentive for doctors to continue working in the public sector despite relatively low salary.

"Now we are designing our own programs so I do many more things than seeing patient everyday and that's quite motivating" (CD n°1).

However, these new roles and responsibilities required organisational changes related to working organisation and accessibility to resources from the project. Indeed, positive effects of the project could be limited if adjustment in organisation are not made and it may create power issues with the administrative health structure.

"The chief doesn't want to give me access to echocardiography despite that I have been trained for it, so I can't access the room with the equipment and I can't do echography myself" (PD n°6).

Discussion

In order to get a better understanding of the success factors of the implementation of telemedicine within the project MON/005, a qualitative investigation was done to understand how physicians changed their practices as a result of the implementation of telemedicine. This approach was taken because focusing on perspectives of actors involved can help to explain which factors in the implementation of technology on medical practice contributed to its success (or failure).[7] It involves using complementary methods; semi-structured interviews with open questions and observation and enables participants to express themselves freely and act naturally as well as help them understand the investigator's goal.[8] A focus group approach allows the investigator to improve his understanding from participants' feedbacks.[9]

Nineteen of the sixty-eight doctors registered in the project were included in the first phase of the study that was based on observation and individual interviews. The small number of respondents may be a limit to generalising and considering the findings as a complete overview of challenges and benefits of the project. Moreover, due to the particular geography and population distribution of Mongolia, time and distance constraints, only doctors working in provinces relatively close to UB and easily accessible, were included in the research. However, we used purposive sampling with maximum variation; therefore, the study population represented a diverse selection according to doctors' activity and use of the network recorded in 2014.

Furthermore, an additional sample of nine doctors from the most remote provinces participated in focus group interviews that added to the diversity of the study population. Maybe not all relevant factors might have been found, data collected are relevant to our objective and contributes to identify positive and negative impacts on professional practice from the doctors' interviewed perspectives. Although implementation of telemedicine is always a context specific process, and findings cannot be directly extrapolated to other context, insights in success factors might be relevant for others that can translate conclusions to their own contexts.

Wade et al. established that the willingness of physicians, the main users of telemedicine networks, to change their daily practice (defined as acceptance) is a key factor for the successful and sustainable implementation of telemedicine services into the delivery of healthcare.[1] Our findings show that the technical and social aspects of the project reinforce each other in fostering doctors' greater autonomy, creating a sense of belonging to a community and promoting ownership of the project, crucial elements for acceptance.

We found that doctors consider the project a key element in improving their knowledge and professional skills through training and technological support. Especially discussion and advice contributed to increase their experience. It supported their confidence in their knowledge and assessment of a particular situation. In improving doctors' capacities and self-confidence, the project improved their autonomy in decision-making and management of patients. Obstfelder et al. also highlighted the relationship existing between greater autonomy and improvement of skills and knowledge.[10] Therefore, the project has reinforced physicians' professional identity and doctors feel proud of their professional capacities. This seems to contribute to the successful implementation of the project. Indeed, May et al. identified autonomy as an important factor of physicians' acceptance.[11]

We also noticed that the project created a social environment for the technology to work. First of all, collaboration through the network helped doctors take care of a particular situation autonomously in allowing discussions about patient cases without imposing any decisions. Indeed, sharing experience with others and asking for advice through the network helped them feel supported and doctors in Shastin felt that they can depend on provincial and district doctors to ensure follow-up of patients after specialised procedures like pacemaker implantation or heart surgery. It created a strong relationship between doctors based on exchanges and mutual respect.

Gagnon et al. assumed that a strong collaboration between healthcare professionals increases effective communication and coordination of care.[7] Indeed, doctors do not see a contradiction between autonomous management and teamwork; on the contrary, it has strengthened their feeling of autonomy and created an environment of trust that fosters exchanges and participation. Collaboration through the network promoted teamwork between cardiologists across the country and facilitated the structuring the profession and the creation of a community. In addition, doctors of the project are actors and not only users; they are involved in decision making, designing and developing tools and activities through a participatory approach. Doctors also have access to training and opportunities to go abroad as supporting activities. It has resulted in stimulating their professional interest and increasing their symbolic capital. Bourdieu refers to symbolic capital as the resources available to an individual on the basis of honour, prestige or recognition.[12]

All in all, doctors felt they were taking part in a pioneering organisation that aimed to structure their profession by improving their connection, knowledge and skills. It fostered a great sense of belonging that was responsible for creating a social environment for the technology to work. It enhanced confidence for doctors to ask questions and participate in the project as active actors to attain the project objectives and therefore contribute to a healthier population in Mongolia. Indeed, doctors took ownership of the project and experienced an improvement of their capacities and autonomy without feeling dependent on what was happening in Shastin hospital or abroad.

Some challenges emerged from the imbalance between improvement of doctors' capacities and autonomy, and their working environment in the public health system in Mongolia. Power tension and conflicts with the administrative health structure locally can create organisational issues related to distribution of tasks, access to equipment or working conditions. An adequate working environment is needed to achieve the project objectives and therefore improve health services in the areas of cardiovascular diseases. It requires a strong commitment from the project to define its objectives according to the system and increase coordination with the public health structures locally as well as with the Ministry of Health and Sports of Mongolia. Moreover, the project created opportunities for doctors to improve professional capacities that results in increasing demands for high cost procedures such as cardiac surgery, angiography or pacemaker implantation. Therefore, potential cost is rising, but resources of the public health system are limited, which represents a major pitfall in improving cardiovascular care services in Mongolia.

Conclusion

This study defends that acceptance of telemedicine is facilitated by greater autonomy of physicians, development of a sense of belonging to a community and promotion of ownership of the project. The technical and social aspects of the project reinforce each other. The project offers technological support through a tele-expertise network and a dedicated website that helps to improve professional capacities and increase physicians' self-confidence and autonomy. Meanwhile, the technological structure is supported by strong collaboration between physicians, their participation in the project development and involvement in new professional activities. It results in structuring a community of cardiologists with a great sense of belonging and ownership that created a social environment for the technology to work.

However, as doctors' capacities and autonomy evolve and improve, issues in the public health system in Mongolia become more visible. It highlights the need to improve doctors' working environment as well. Therefore, the project has a role in advocating for an institutional restructuration that should include making available high cost procedures in the social security system, financing research and training, and developing public health measures and academic specialised medical training that may benefit the public health system more generally.

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