Teknologirådet

MOBILE HEALTH FOR CHRONIC ILLNESS

Summary

More people with chronic illness requires new solutions

In the Norwegian population, more people are living longer and many must live with chronic illness. Calculations show that with the present organisation we will need almost twice the number of employees (FTEs) in health care by 2060. This is not sustainable and new thoughts are needed on how health services are provided in Norway.

Mobile technology can give people with chronic illness better health

Most people in Norway have a smartphone. This can be connected to a wide range of sensors to measure blood pressure or ECG, for example. Apps on the mobile phone give people a better and simpler overview of their own health. People with diabetes, COPD and heart failure can take measurements more often and more precisely at home, and do not need to visit the doctor as frequently. Mobile health technology can provide an active patient role, better quality and a more effective health service.

Different incentives are needed in the health service

The technology already exists and is easily available, but financing of the health service is currently based on physical attendance. To be able to start using the new opportunities and to address the major resource issues that the health service is facing, there must be stimulation of consultations and ongoing follow-up on the internet and of transferring tasks from health service to patient, as well as between health personnel.

Norwegian authorities must set personal protection requirements

Private suppliers are offering more and more technological solutions and services for managing chronic illness. This development is moving fast in a global market and Norwegian health authorities will gain better results faster by facilitating the use of these products. Health data is however sensitive, and if it goes astray the consequences could be very serious. The authorities could and should set requirements for privacy for the companies on behalf of the patients: requirements for how the data is stored and communicated and who can gain access to it.

Self-service health

Most people have become used to using self-service solutions on the internet, whenever and wherever it suits them. Internet banking is an example: it given an overview of personal finances and most transactions can be done from home. In future, people will expect to be able to monitor their health using mobile health solutions.

Six out of ten Norwegians have a tablet and three out of four have a smartphone. This means that most people are carrying a powerful computer that is connected to to the internet, that has its own sensors such as a camera and motion sensor and that can be connected to sensors that measure pulse, blood pressure, ECG and blood sugar, among other things. This kind of equipment is cheap and available to most people and could partly replace the readings that are taken at the doctor's surgery today.

Mobile health technology is not a new form of medical treatment. What is new is that it generates, collects, sends and gives feedback on relevant medical information - continuously and wherever people are. Neither is self-measurement anything new - diabetics already do it. What is new is that self-measurement can now be done by far more people and for more types of medical condition, such as heart disease and COPD.

Sensors give precise and frequent self-measurement

Regular monitoring and taking the right medicines are important for being able to live a good life with a chronic illness. Readings that are taken frequently an in domestic surroundings will give a truer picture of the

state of health than a one-off reading in the doctor's surgery.

According to the Norwegian Prescription Database, more than a million people were treated for heart and circulatory illness in Norway in 2013. Today, heart patients visit the doctor 3 to 4 times a year to check their blood pressure, weight and pulse. Sensors can measure these frequently during normal daily life and so give faster and better information about any deterioration. Patients will be able to take more precisely prescribed medicines and will have less need for personal consultations.

Health apps can give the patient control of his or her own life

Apps on mobile phones and tablets can receive readings from sensors and compile and visualise the health data so that the patient gets a better picture of his or her own health developments. The readings can be taken automatically so that they have little effect on day-to-day activities.

The Public Health Report 2014 estimates that about 218,000 people in Norway have a diagnosis of diabetes. Their challenge is to keep blood sugar readings even. Research at the National Centre for Interaction and Telemedicine shows that people with diabetes who transfer their blood sugar readings to a mobile app and keep a diary of their state of health have a better understanding of what affects their blood sugar levels. It becomes easier to make the right choices in everyday life and to master the illness.

Similarly, people with other chronic illnesses such as COPD and heart failure should be encouraged to use technology that can help them to monitor the illness at home.

Ongoing monitoring on the internet can increase security

Health data from patients' own readings can easily be shared with others to receive advice and follow-up. Many patients already have good experience of sharing selected health readings in a patient network or with families.

The National Budget for 2015 estimated that between 250,000 and 300,000 persons in Norway have COPD. COPD patients who have recently been discharged from hospital are at high risk of relapse. In a trial in the United Kingdom, newly-discharged COPD patients used a security alarm and equipment to measure blood pressure, body temperature and oxygen levels at home. Selected readings were shared over the internet with qualified health personnel. The patients found that they felt secure and well looked after with this follow-up over the internet.

People with chronic illnesses who take their own readings should be able to be monitored over the internet on a regular basis by health personnel as part of the course of treatment. The patients can improve their mastery of the illness and their perception of day-to-day security and will also save travelling and waiting time.

Doctor and patient can decide together what to be measured and how often, what to be shared with the health service, when it is important for the patient to contact the health service, how data is assessed and in what cases the health service should contact the patient.

Health personnel can be assisted by computer systems that sort and visualise the state of health of the patients.

New tasks for health personnel

The health personnel can follow up with the patient by giving motivational messages or calling in for consultation if there is a negative development. The consultations can be performed by telephone, chat, SMS text, e-mail or video, or by physical attendance depending on the situation.

Stavanger University Hospital and Dalane District Medical Centre (DMS) have performed trials of follow-up with COPD patients over the internet. The task of following up with the patients has been transferred from the hospital to specialist nurses at DMS.

Following up on patients with chronic illness over the internet will involve new tasks for health personnel relating to facilitation and monitoring of the readings. Many of these tasks should be performed by people other than the doctor, so that doctor resources can be released and the health service becomes more efficient. Employees at pharmacies, hospitals, doctor's surgeries and local authority health care services could have important roles. This kind of transmission of tasks is in line with the ambition of the Coordination Reform to move services closer to where people live.

How to choose the right equipment

The patient and health personnel should decide together what equipment and apps are to be used in treatment. Where necessary, the health personnel should also give the necessary training and check and calibrate the equipment.

The pace of development of mobile health solutions is rapid. It is difficult to maintain an overview of which solutions are safe to use and which are best suited to the individual.

Mobile health solutions that are "meant to be able

to diagnose, prevent, monitor, treat or relieve illness, injury or handicap" are regulated by legislation on medical equipment, which is part of the EEA agreement. The rules require suppliers to certify and CE-label medical equipment. The rules are aimed at the health service as purchaser of the equipment. These rules are being challenged by the great volume of new mobile health solutions that are intended for consumers. The EU and the Norwegian authorities are now reviewing the rules and assessing the need for revision.

Patient organisations, the industry and some countries' health authorities, such as in the United Kingdom, have established recommendation services that evaluate and rank mobile health solutions.

The health authorities in Norway should establish such a recommendation service to help patients and doctors choose health apps and equipment that have been quality-assured and are suited to Norwegian conditions.

The service should involve users, health personnel and technologists in assessing certification, sources, information security, privacy requirements and how useful the solution is for given treatments. The service should be linked to Helsenorge.no.

New incentives in the health service

Today, the health service primarily rewards physical attendance. Rates have recently been introduced for so-called e-consultation, but this is limited to text that is exchanged between doctor and patient in the form of messages. They do not cover images, sound and video, nor real-time communication between doctor and patient. The present financing model is therefore an obstacle to the necessary modernisation of the health service.

Given the major resource issues that the health service is facing, it is necessary to move some tasks from the doctor's surgery to the patients themselves, and from the doctor to other health personnel. A future financing model should allow for such an organisation.

Private health services do not have these limitations and can achieve financial gain by offering their patients internet consultations. Several private clinics in the Nordic region already follow up with patients over the internet: Aleris' Videodoktor in Denmark offers video consultations, while skin specialists at Doc24 in Sweden can evaluate images of the patients' skin changes within 24 hours.

Equate internet consultations with physical attendance

To make it financially profitable for doctor's surgeries to perform internet consultations, these should be on a par with physical attendance. The rates should be technology-neutral and take into account present and future communication models.

Reward ongoing follow-up over the internet

If health personnel are to follow up on patients' self-measurements, they must be paid for it. There are no tariff rates for doing this today. Rates for ongoing follow-up over the internet should take into account the time that health personnel use on reviewing the patients' own readings and allow for investment in new technological solutions that will simplify the work.

Make the tariff rates profession-neutral

There are currently different rates for the same tasks in the health service, depending on who performs them. This makes it less financially attractive to delegate tasks to personnel who are paid at a lower rate. The rates should be changed so that they are profession-neutral. The principle that all preventive and health-promoting work should be performed as close as possible to the home environment (the LEON principle) should form the basis.

Let patients use their own equipment

Many patients will have great interest in being able to choose equipment themselves as part of the follow-up from the health service. Most people in Norway have a smartphone. The equipment and mobile apps needed to take one's own readings are easy and cheap to obtain. A public refund scheme could involve long approval routines, out of pace with technological development. We therefore recommend that to begin with patients pay for the equipment they themselves choose to use.

The principle that everyone should have access to equal health services is key in Norway. The health authorities could consider introducing simple support schemes for patients with chronic illnesses who do not have the resources to obtain the equipment themselves.

The health authorities could also consider paying for the use of solutions that prove to be useful for following up on selected chronic conditions, so that these are inexpensive or free for Norwegian patients.

Sharing patients' data

To be able to monitor patients over the internet, the health service must be able to receive the readings from the equipment used by patients.

It must be a long-term goal for the patients' key readings to be entered in their medical records. The Directorate of Health is offering a national personal health archive on Helsenorge.no, starting in 2015. The Norwegian Board of Technology recommends that

citizens should be able to store their health readings safely and securely in this health archive, so that they can be shared with the health service in a proper manner.

In the expectation of this being done, the health service should immediately start to receive health data from patients in parallel systems. This presupposes that the systems have undergone an adequate risk and sensitivity analysis.

The patients' personal data protection

It is the users of the mobile health apps who decide which persons or organisations they wish to share health data with. It can however be difficult for the ordinary internet user to know where the health data is kept, who has access to it and what it may be used for.

It is currently the patients who are the most vulnerable link in the commercial data chain on the internet and they bear the greatest risk. The health authorities can reverse this power relationship so that it is the service providers rather than the patients who must accept a set of basic conditions. The Norwegian authorities should therefore set requirements for the companies, on behalf of the patients, including the following areas:

- Transparency: The companies should regularly send patients information about what health data about them is being kept, in as transparent a manner as when the banks send their customers bank statements. In this way, patients will not need to have to ask for this information themselves and it will be easier for them to require health data to be deleted.

- Sharing data: The companies must be ordered to set strict requirements regarding who data is shared with as the default setting, so that the patient must make an active choice to be able to share with others.

- Information security: The companies should secure all health information, by encrypting the data for example. In this way the patient can be confident that health data is stored and communicated safely.

Mobile health solutions that satisfy these privacy requirements should be identified on and be able to be integrated with Helsenorge.no.

Free services are often attractive, but users do not necessarily know that they are paying with personal data that can be used for advertising and other purposes. The Norwegian health authorities could consider paying for the use of selected health apps on behalf of the inhabitants in order to avoid the information being used for other purposes. Many suppliers satisfy some of these requirements already.

This is a process that could take time. It is therefore appropriate to make an early start. User-friendliness is an important consideration that should be weighed up against good privacy.

RECOMMENDATIONS

» The health service should enable as many people as possible with chronic diseases to be able to monitor their health at home, while at the same time receiving the necessary ongoing follow-up from the health service.

» The health service should immediately begin to receive readings from the patients' own equipment and use these in a justifiable manner. In the longer term, these should be included in the medical records.

» The health authorities should establish a recommendation service on Helsenorge.no to help patients and doctors to choose from quality-assured mobile health solutions.

» The health authorities should develop a new financing model that would give incentives for the health service to move tasks to the patient and between health personnel. Elements in the model might include:

» Equate internet consultations with physical attendance. In this way, patients can save time and doctors can plan their time better.

» Reward ongoing follow-up over the internet. In this way patients can feel more secure and receive a rapid response from the health service.

» Make the tariff rates profession-neutral in order to promote the efficient organisation and use of the health personnel's expertise.

» The health authorities should formulate requirements for the suppliers to give patients the sovereignity of their own data.

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The Norwegian Board of Technology is an independent advisory organisation for technological evaluation.