e-Health
a Tool for
Chronic Kidney
Disease Patients
Learning outcomes

• To gain an understanding of e-Health initiatives available to CKD patients and how they can be used as tools to enhance care, self-management and remote monitoring

• To identify how e-Health may enhance the quality and equity of patient care but at the same time show how it has the potential to increase health inequalities

Introduction

Chronic conditions require on-going and frequent contact with the multi-disciplinary team to assess changes in clinical status, deliver patient education, and encourage and promote self-management. There are a number of ways in which e-health initiatives and information technology can be fostered and embraced by chronic kidney disease (CKD) patients as tools to improve individual health and the delivery of healthcare. Increasing access to health information and online health professional expertise has the potential to enhance a person’s ability to make informed decisions, and better manage their own health. It is on this premise that this chapter provides a brief overview of some useful e-Health initiatives available to CKD patients.

Promoting self-management

Telehealth self-monitoring is effective in empowering patients to take a more active role in their healthcare, and it has been shown to indirectly improve the quality of life of those living with chronic illness. Indeed, e-Health technology such as personal
electronic health records, or secure programs providing access to an individual’s clinical information (blood test results, blood pressure, weights) (such as Renal PatientView⁴) give CKD patients the opportunity to monitor their disease, symptoms, and also communicate problems effectively to the care team⁵. Something as simple as self-monitoring blood pressure at home has been associated with better blood pressure values and control of hypertension⁶,⁷. Renal PatientView⁴ is an online service developed to provide chronic kidney disease patients with clinical information, individual diagnosis, treatment, latest test results, and copies of correspondence enhancing the patient experience and empowering the patient with up to date information regarding their treatment.

People using telehealth to self-monitor their disease report high satisfaction when supported by health professionals. It enables them to better identify changes in their health status which enhances their accountability, self-efficacy, and motivation to change health behaviour²,⁵. There are a range of mobile applications to facilitate and guide patient self-management and monitoring of CKD which includes: medication adherence apps⁸, MyKidneyCare app⁹, KidneyDietApp¹⁰, and My-Kidney-Insight¹¹, a web-based lifestyle self-management tool (see chapter 4). Patients can monitor their own health and with some programmes compare their data with the general population which is attractive for some patients⁵. More importantly, this collective knowledge of the CKD community provides population level data that informs the development of professional decision tools for improving the referral and management of CKD patients¹². There are even apps for junior clinicians (Acute Kidney Injury app¹³) and non-renal specialists to enable them to effectively manage acute kidney injury patients.

Even though the delivery of self-management education programs has evolved, they are now accessible to patients living in rural and remote areas using telehealth programmes
which have been shown to improve patient self-efficacy in managing their condition and promote positive health behaviours\textsuperscript{14}. The advantage of this method, over standard delivering of internet-based self-management interventions, is that it is not reliant on the individual’s ability to read\textsuperscript{15, 16} thus widening access and patient participation in self-management.

### Remote Monitoring and Care Delivery

Studies have shown that remote monitoring via mobile technology reduces the cost of chronic illness through improved communication between patients and health professionals, improved health outcomes, and increased coherence with medical regimes\textsuperscript{17, 18}. For example, monitoring of medication adherence and physiological signs of rejection using a mobile phone app has the potential to improve long-term graft survival, without being intrusive or expensive, as many kidney transplant patients already own and use smart mobile phones\textsuperscript{19}. ePrescription has been widely adopted in Denmark: primary care providers routinely prescribe drugs electronically with ePrescribing and implementation rates close to 100% making access to replacement medication easier\textsuperscript{20}. Peritoneal teledialysis (telePD) is a modem-based communication link between the patients’ cyclers and a computer in the dialysis unit. The feedback of automated peritoneal dialysis (APD) treatment data is proving useful in detecting and solving the clinical and technical problems of APD\textsuperscript{21}.

Virtual clinics, or web-based consultations, particularly for non-complex cases have been shown to be cost effective compared to traditional care and offer a rapid referral mechanism when combined with a specialist’s advice\textsuperscript{22, 23} with no increase in workload for staff\textsuperscript{24}. CKD patients (stage 3 and 4) followed up for 18 months using telemedicine clinics were overwhelmingly positive that the service should continue, to such extent that some patients indicated they would stop attending if they had to travel to the main centre to see the doctor\textsuperscript{24}. Video-
conferencing equipment installed in PD patients homes allows the effective evaluation of oedema, exit site assessment, and modification of treatment in 80% of teleconsultations providing safe and feasible patient follow up using less staff time\(^{25}\) \(\text{(see also chapter 6, Telecare in PD)}\). No longer do health professional and patient encounters need to be face to face, secure internet portals allow the opportunity for on-line eVisits. They are often more convenient for patients who have longer distances to travel to a clinic\(^{26, 27}\). Indeed maintaining contact with patients in between clinic visits has the potential to improve the quality of care and increase patient reassurance\(^5\).

Similar initiatives have already existed for some time involving remote monitoring of HD patients using simple telephone wires connected to feedback machine measurements\(^{28}\). However, as telehealth progresses, the use of smart sensors, in something as small as a wrist watch, they can generate postural and kinetic measurements and monitor an individual’s clinical parameters\(^{29}\). This is more than traditional care can achieve and further enhances the individuals’ ability to self-manage their illness.

One of the promises of e-Health is to make patient care more equitable and increase access\(^{30}\). Whether CKD patients are e-Health ready and whether e-health inequalities exist to prevent uptake and adoption of telehealth, can be measured using a specially designed instrument\(^{31}\). As health professionals, we need to be aware of e-Health inequalities\(^{30}\) and to ensure that those people who do not have money, skills, or access to technology are not excluded as they would actually benefit most from access to health information. \(\text{(see chapter 2, ethical issues)}\).

**Increased Access to Information and Peer Support**

Patient education, knowledge and understanding are pivotal to CKD self-management. Web 2.0 systems have great
potential to enhance health information and open new ways for patients and practitioners to communicate. Technology that has embedded information filters and decision support (for example option grids) will enable patients to retrieve appropriate information, based on their own preferences and priorities. How patients use health information in their daily lives and what meaning this has on their perceptions of health and illness is still unknown despite copious studies on health and the Internet. Professionals do in fact worry about the quality of health information available online to patients as well as patients’ health literacy and their ability to understand this information (see chapter 2, ethical issues). e-Health literacy includes basic reading and writing skills, knowledge on how to use technology (computers), understanding of science and the social context of how information is produced, transmitted, and received. Patients’ require good levels of health literacy and the ability to understand the information for it to influence the quality of their decision making. Certainly, e-Health literacy is a key issue in increasing the access equity connected to age, education, poverty, and culture. Increased patient knowledge allows the doctor more time to refine the patients’ understanding rather than providing only a basic level of information. Health professional relationships with patients could be improved if they assist patients in the information-gathering process by recommending appropriate sites.

The growing increase in the use of Web 2.0 technologies, especially amongst racial and ethnic minorities, provides potential opportunities to engage people in health related issues and to connect them with others who have similar interests. Peer support and participation in online support groups can make a valuable contribution to the empowerment of patients. Patients are able to share their experiences, measure and monitor their own health against others, and seek or share with similar patients within Facebook groups such as the Renal Patient Support Group (see chapter 4 Renal Patient Support Group). Some patients who are
dissatisfied with medical providers turn to online peer-to-peer communities to obtain advice\textsuperscript{5}.

**Summary**

What e-Health offers to CKD patients is the extension and increased scope of health care beyond conventional geographical boundaries, the potential to access simple advice, different products, medications, and health services from on-line global providers\textsuperscript{30}. It poses new challenges and threats to ethical issues of online healthcare, but it has the potential to encourage a more collaborative patient-health professional relationship\textsuperscript{39}. Technological interventions must be tailored to the preferred needs of the individual\textsuperscript{5}, easy to use and entertaining\textsuperscript{30} whilst combining different approaches such as personal health records, home monitoring devices, and social networking sites to provide information and peer support.
References


11. My-Kidney-Insight: add reference from chapter


doi:10.2196/jmir.2284

doi:10.2196/jmir.2284


