Support Services for the Management and Utilization of Monitoring and Assessment of the EIP - MAFEIP Tool

A pilot study on dialysis patient treatment with CDK Integrated Care

(Puglia Case Study)

Executive Summary

Authors:
Roberto Corciulo, Loreto Gesualdo, Marco Di Ciano, Gaetano Grasso, Frans Folkvord, Clara Fauli, Francisco Lupiáñez-Villanueva

led by OPEN EVIDENCE
in partnership with empirica
funded by

Description of the intervention **3**

Reference scenario **3**

Model input **5**
Defining the health states and the transition probabilities 5
Computing the costs 5
Utility 5

Model output **6**
Cost-effectiveness, Healthcare perspective 6

Description of the intervention

The objective of this executive summary is to present some of the results achieved by means of the MAFEIP instrument while assessing the cost-effectiveness of a system for reducing the dialysis patient stress in hospital, allowing integrated care patient empowerment and dialysis treatment at home.

The intervention aims to demonstrate how the home treatment can be carried out in strict compliance with all the protocols applied within the healthcare facilities, prevent acute adverse events and consequent hospitalizations, be more advantageous for health organization, also in terms of costs, be more suited to the well-being of the patient in terms of quality of life. The Health Telemonitoring system consists of:

- an horizontal software component of social networking and empowerment;
- a vertical software component in the nephrology field
- all the related hardware components, servers and medical devices, useful for monitoring patient parameters at home

The hospital provides to patients all the devices to support the monitoring functions, both for the intended use at the patient's home and those allocated centrally at the Control Room of nephrological telemonitoring located for test purposes at the Department of Emergency and Transplant of Organs – Nephrology Section of the University of Bari. The monitoring system is the result of the integration of several components, and consists of a single point data aggregation (Smart Dial Box HUB) which ensures:

- interconnection with the specific hemodialysis device or with the specific peritoneal dialysis equipment.
- interconnection with the POCT analytical devices (Point of Care Testing), which allow the execution of specific blood tests, used for the first time in the case of chronic patients.

The intervention involves a prospective, multicenter observational study with two parallel groups of patients they will be telemonitored from their home. The first group, consisting of a number of patients on short daily hemodialysis: 5 or 6 treatments per week of about 3 hours (from 2 to 4 hours) each, performed at home, using specific equipment in use at the Operative Unit of University Nephrology at the Bari Polyclinic AOU. The second group will consist of a defined number of patients in automated dialysis peritoneum using specific equipment.

Reference scenario

Public health management (PHM) is an approach in which healthcare organizations seek to “effectively manage the health of their total population, not just the patients who seek care” . It is recognized as potentially effective for chronic disease prevention and care, but effective PHM faces multiple challenges, including a shortfall of healthcare resources. Chronic disease management is expensive, with a patient with 0, 1, or 2 chronic conditions. Despite these high costs, patients have relatively little access to providers, with patients with 0, 1, or 2 chronic conditions making only 2.8, 3.7, or 4.9 annual clinician visits, respectively. So few interactions

with healthcare providers seem inadequate when recognizing the profound impact of daily health behaviours on chronic disease risk and management. Another challenge in managing population health is its overall lack of customization, since recommendations are developed for entire populations and may not be customized before being given to individual patients. Further customization could consider intra-patient variations on a daily or even minute-to-minute basis, with specialized counselling for situations such as when patients need encouragement to exercise, a reminder to measure blood glucose, or a suggestion for a healthy nutrition.

This kind of intensive, personalized healthcare may seem unattainable with a traditional healthcare model because of costs and logistics such as paying medical professionals and scheduling appointments, but cost and logistical barriers can be lowered using technology.

In particular, in this case study, we focalize on CKD and related Hemodialysis incidence for MAFEIP application to Home Haemodialysis evaluation respect to Hospital Hemodialysis procedures and protocols.

Home dialysis (including peritoneal dialysis and home haemodialysis) offers a variety of benefits over in- centres haemodialysis. Studies show evidence of benefits for both peritoneal dialysis (PD) and home haemodialysis (HHD) patients related to survival, quality of life, transportation costs, increased patient autonomy, and clinical benefits including enhanced blood pressure and phosphorus control. Home dialysis is particularly advantageous in the paediatric population, given the greater schedule flexibility for school and play, the importance of psychosocial aspects, and the limited geographic distribution of paediatric dialysis centres. Furthermore, the cost of delivery of care of home modalities in most countries is less than that of in- centres haemodialysis. Despite these major advantages, patients on home dialysis represent a small percentage of the total end-stage kidney disease population worldwide, with only a few exceptions. Dialysis reimbursement policy seems to be responsible for low uptake in many parts of the world. Other notable barriers include patient concerns regarding their ability to learn how to perform home dialysis; a perception that they may receive substandard care and/or have poor outcomes; a feeling of providing self-care in isolation without adequate medical oversight; socioeconomic status; and the fear that home dialysis will burden their family. The burden of daily medical responsibility in home dialysis lies with the patients/caregivers, putting the onus on them to know when is the “right” time to contact their health care providers. Physicians may underutilize home dialysis due to a concern that patients may not know when to, or simply will not, contact the health care provider when difficulties do arise. Furthermore, physicians may fear the inability to determine patient adherence with dialysis. Overcoming these barriers could be a large step toward increasing patient uptake of home modalities. Remote patient management (RPM) may provide a means to overcome some of the aforementioned barriers. RPM is a framework for monitoring patients at home by digital wireless technology and extends the interactive contact of conventional clinical settings to include the patient’s home

The hope is that these technologies would improve clinical outcomes through earlier recognition and correction of problems. Although few studies on telehealth in the dialysis population exist, studies do support its technical feasibility, that patient acceptance of this technology is very high, and that RPM may be able to improve outcomes in other comorbid states shared by the end-stage kidney disease population. However, there is still uncertainty

about the role of RPM for home dialysis. Furthermore, nephrology has been slow to accept telehealth technology into its practice, in part due to regulations surrounding telehealth implementation, including information security considerations and reimbursement policies.

Model input

Defining the health states and the transition probabilities

It is estimated that in Puglia there are about 250,000 people suffering from chronic kidney disease. Considering the five stages of the CKD, for the MAFEIP application we will focalize on the last 2 stages, i.e. the more severe levels of the diseases before the dialysis stage, in order to define the baseline state in terms of number of patients to be referred to the impairment state of dialysis stage with 4000 patients up today in Puglia. The application scenario is represented through a tree-state Markov model, including a Baseline state (mild CDK), a Disease/Impairment state (severe CDK), and a Dead state.

40.000 is the value of the patient target group. One third of this potential risk patient could be treated at home. Thus we have to consider about 27.000 control group and 13.000 intervention group. We know that 170 patient per million of inhabitant enter each year in dialysis treatment (severe CDK). We have an impairment group of 4000 patients (prevalent) treated with dialysis (HD) in hospital, while we know that 240 (prevalent) receive home dialysis (HHD+PD) treatment.

Computing the costs

Cost computing has been developed starting from Public National Health System rate table. At National level and considering hospital treatments, the dialysis cost average is 33k€/patient (from 27k€ for PD up to 39k€ for HD). In Puglia Region the dialysis cost per patient with specific characteristics is expected to be reduced with an increase in terms of effectiveness in Home treatment also due to the cost saving in transportation.

Utility

To estimate the impact of the intervention in terms of health outcomes, utility weights associated with baseline and disease/impairment states are provided. Following the common practice of MAFEIP, the tool identifies measures of preference-based Health Related Quality of Life (HRQoL) and life expectancy as preferred categories of health outcome on intervention level. The HRQoL as expressed through a quality-of-life weight (utility) represents a particular health outcome. The utility measures summarize both positive and negative effects of an intervention into one value between 0 (indicating death) and 1 (which is equal to perfect health condition) so that the higher the value, the higher the quality-of-life associated with that health outcome.

The HRQoL QALY-weight is assumed to be equal in Control group and in Intervention at the baseline state, while the utility of disease/impairment state is estimated to increase moving from Control to Intervention Groups.

Model output

Cost-effectiveness, Healthcare perspective

Figure 1 represents the difference in costs (Y axis) and effects (X) per patient. It represents the average for the population (weighted by age-gender distribution). The ICER (blue dot) is the ratio between incremental costs and incremental effects). In this case, the ICER is placed in the lower-right quadrant, meaning that the intervention is cheaper and more effective than current care. That's why we say that the intervention is 'dominant'. This result implies that they intervention is clearly better than current care and that its implementation is desirable.

Figure 1. Cost-effectiveness, Healthcare perspective

Incremental cost and HRQoL effects	
Incremental cost (Healthcare)	-27907.11
Incremental effects	0.378
Incremental cost-effectiveness ratio (Healthcare)	Dominant