ARCBITE

Brokering Innovation Through Evidence

TITLE: PERMIT (Personalised Renal Monitoring via Information Technology)

Aim of Study

The aim of this project was to create a method of predicting renal function decline in primary care adult patients with heart failure. In so doing this would help standardise monitoring frequency practices for these patients who are at risk of end-stage renal failure over time.

How did we involve people?

To support the PERMIT project, we developed a patient involvement group which consisted of several patients with cardiovascular and renal conditions. The group would meet regularly throughout the project and contributed to the outputs of each study. In particular they had a major role involving the interpretation of the systematic review into remote care interventions, as well as the design and distribution of the survey used in the discrete choice experiment.

Background

A literature review of current international renal function monitoring guidelines for heart failure patients showed they are based largely on clinician judgement, and lack consistency outside of monitoring medical therapy.

The danger for this is that large numbers of patients with heart failure are at risk of irreversible renal decline due to a combination of the effects of cardio-renal syndrome as well as medications used to treat heart failure such as diuretics.

A more standardised approach of monitoring these patients based on risk of renal decline would allow clinicians to intervene earlier and prevent renal failure, improving their quality of life, and reducing risk of hospital admission.

What did we do?

To address this, we obtained historic GP records from SIR (Salford Integrated Records), which included renal function over time linked to various other measures of cardiovascular and renal health, dating back to 2008. The data was analysed using longitudinal clustering, a form of machine learning algorithm, to create a predictive model of patient creatinine over time. This resulted in 7 clusters or 'risk profiles' that patients could fall into that could predict their risk of future renal decline.

To pave the way for frequent remote renal monitoring in the community, a systematic literature review was also conducted on the factors which affect engagement with remote care in the management of heart failure. This revealed five core characteristics of engaging remote care devices and interventions: 'Communication', 'Education', 'Clinical Care', 'Ease of use' and 'Convenience'. These characteristics were then put forward to heart failure patients in a discrete choice survey, and results analysed using mixed logit modelling.

This revealed the ranking of the above factors which promote engagement in heart failure patients from most to least were: Clinical Care, Education, Convenience, Ease of use and Communication. This provides valuable insight into the design of future remote care interventions, as well as the behavioural elements of heart failure patient self-management.

What next?

The University of Liverpool has recently been awarded an NIHR programme grant to explore the potential of a predictive renal function algorithm within a clinical care setting.

This will involve using the predictive model to create a clinical guideline for the optimal renal monitoring frequency for heart failure patients.

A clinical trial will then be used to assess the feasibility and efficacy of the clinical guideline on long-term renal and cardiovascular outcomes in the community.

This can lead to the integration of a machine learning algorithm in established clinical care within the NHS.

ARC North West Coast?

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