UNIVERSITY OF BIRMINGHAM

Birmingham Environment for Academic Research
www.birmingham.ac.uk/bear

Development and validation of an electronic frailty index (the eFI) using routine primary care electronic health record data

Background

Frailty is an especially problematic expression of population ageing. It is a condition characterised by loss of biological reserves across multiple organ systems and vulnerability to physiological decompensation after a stressor event. Older people with frailty are at increased risk of adverse outcomes including disability, hospitalisation, nursing home admission and mortality.

There is evidence that frailty may be modifiable and it is considered to have greater reversibility than disability. UK and international consensus guidance has recommended identification of frailty as part of routine clinical encounters, or wider population screening, to facilitate the planning and delivery of services for older people. However, there are several current obstacles to these recommendations, including additional clinical resource required and inaccuracy of simple tools.

Primary care electronic health record (EHR) systems in the UK use Read codes to categorise and log multiple patient characteristics, including symptoms, signs, laboratory test results, diseases, disabilities and information about social circumstances. Similar coding schemes (IPCP and ICD-10) are used in primary care EHR systems in other countries. EHR systems therefore provide a potentially simple yet powerful mechanism for identifying cumulative deficits to recognise and grade the severity of frailty as part of routine care.

Objectives

To develop and validate an electronic frailty index (eFI) that is automatically populated from routinely collected data contained within the primary care EHR.

Study design and data sources

This was a retrospective cohort study. The development and internal validation cohorts were established using the ResearchOne primary care database. The external validation cohort used a second large primary care database at the University of Birmingham, The Health Improvement Network (THIN) database, together with linked Hospital Episode Statistics (HES) data. The model validation analyses were carried out at the University of Birmingham using Stata on BlueBEAR.

Impact of project

- The original paper arising from the project was published in 2016. [1]

- This frailty index tool has been recommended for use by recent NICE guidelines on multimorbidity. [2]

- The index has been incorporated natively into all major UK GP software systems.

- The team won a Royal College of Physicians 2017 Excellence in Patient Care Award for the development, validation and implementation of the frailty index. [3,4]
- The development and implementation of the index also won an industry award for best healthcare IT innovation. [5]

- Identification and management of frailty now in 2017 General Medical Services Contract for England. All general practices are required to use a tool like the eFI to identify patients with moderate to severe frailty. [6,7]

- The index is also being used in other ways to improve service delivery in England. [8]

References

1. Clegg A, Bates C, Young J, Ryan R, Nichols L, Teale EA, Mohammed MA, Parry J, Marshall T. Development and validation of an electronic frailty index using routine primary care electronic health record data. Age and Ageing 2016 May;45 (3):353-60. doi: 10.1093/ageing/afw039. Epub 2016 Mar 3.

2. Multimorbidity: clinical assessment and management (NG56). [https://www.nice.org.uk/guidance/ng56]

3. Royal College of Physicians Excellence in Patient Care Awards 2016. [https://www.rcplondon.ac.uk/news/rcp-excellence-patient-care-awards-2017-winners-announced]

4. IAHR web page announcement. [http://www.birmingham.ac.uk/university/colleges/mds/news/2017/03/rcp-innovation-award.aspx]

5. EHI awards 2016. [http://www.ehilive.co.uk/ehi-awards/]

6. Toolkit for general practice in supporting older people living with frailty. [https://www.england.nhs.uk/wp-content/uploads/2017/03/toolkit-general-practice-frailty.pdf]

7. Supporting routine frailty identification and frailty through the GP Contract 2017/2018. https://www.england.nhs.uk/wp-content/uploads/2017/03/toolkit-general-practice-frailty.pdf

8. Yorkshire and Humber AHSN Improvement Academy. Impact Case Studies: Electronic Frailty Index (eFI) Tool [http://www.improvement-academy.co.uk/our-impact/impact-case-studies]

Case study

Client Profile

Dr Ronan Ryan
Research Fellow
Institute of Applied Health Research
College of Medical and Dental Sciences
University of Birmingham
B15 2TT

Contact Detail

R.P.Ryan@bham.ac.uk

Funding

This study was funded by:

(i) The National Institute for Health Research Collaboration for Leadership in Applied Health Research and Care Yorkshire and Humber (NIHR CLAHRC YH)

(ii) One of the authors was also partly funded by the NIHR through the West Midlands CLAHRC programme

(iii) University of Birmingham Institute of Applied Health Research central funding.

Product Used

Primary care electronic health record (EHR) systems

Contributors

Andrew Clegg, Chris Bates, John Young
Dr Ronan Ryan, Linda Nichols
Elizabeth Ann Teale
Dr Mohammed A. Mohammed, John Parry
Prof Tom Marshall

Submitted: May 2017

IT Services