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Translating Frailty Assessment Methodologies and Research-based Evidence to Clinical Education and Practice

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ABSTRACT

Frailty is a common clinical syndrome that predisposes older adults to an increased risk of adverse health outcomes. With population aging, this will become an increasing challenge for the healthcare services; therefore, different models of healthcare training and provision are required to address these increasing demands. In Ireland, the National Clinical Programme for Older People (NCPOP) has partnered with The Irish Longitudinal Study on Ageing (TILDA) to deliver the National Frailty Education Programme. This demonstrates an innovative way in which evidence-based longitudinal research can be translated into clinical education and practice to improve patient care, following a Knowledge to Action (KTA) process. To the authors' knowledge, it is the first time that a longitudinal research study such as TILDA has employed such methods of translation and therefore, this collaboration could serve as an international model of translation and implementation for frailty and other areas of clinical priority.

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frailty; education

Introduction

Population aging is a global phenomenon with the number of people aged 60 years and older growing by approximately 3% per year (United Nations, 2017). An aging population with multiple chronic conditions has distinct healthcare requirements; therefore, the models of healthcare delivery and healthcare workforce training must be adapted to provide effective and

efficient care as needed (Rowe et al., 2016). To date, the majority of healthcare in Ireland has been hospital centric, reactive and episodic. The Sláintecare report published in 2017 presents the 10-year vision and strategic plan for the future of health and social care services in Ireland. The key priorities include promoting the health of the population to prevent illness; providing the majority of care at home or closer to home; creating a timely system where care is provided on the basis of need not the ability to pay; and creating an integrated system of care, with healthcare professionals working closely together (Committee on the Future of Healthcare, 2017).

Frailty is defined as a “clinically recognisable state of increased vulnerability resulting from aging-associated decline in reserve and function across multiple physiological systems such that the ability to cope with everyday or acute stressors is compromised” (Xue, 2011). In general, frailty can be conceptualized as physical and biological frailty, e.g., the Fried frailty model (Fried et al., 2001) or as an accumulation of deficits affecting the physical, psychological and social domains, e.g., the Frailty Index (Mitnitski et al., 2001); individuals are typically categorized as robust, pre-frail or frail where pre-frailty indicates a high risk of progressing to frailty (Xue, 2011).

A recent systematic review reported that the prevalence of frailty in community-dwelling adults aged 65 years and older varies from 4.2% to 59.1% depending on which definition is used (Collard et al., 2012). When using physical frailty phenotypes, the overall weighted prevalence of frailty and pre-frailty was 9.9% and 44.2%, respectively (Collard et al., 2012). Regardless of how it has been defined, frailty is associated with an increased risk of adverse outcomes such as falls, fractures, hospitalization, care home admission, disability and death (Bandeem-Roche et al., 2006; Ensrud et al., 2008; Fried et al., 2001; Rockwood et al., 2004).

However, frailty is not an inevitable consequence of aging and while it is more common to transition to an increasing level of frailty (Clegg et al., 2013), the condition can be avoided or delayed in some cases depending on the underlying cause. Comprehensive geriatric assessment (CGA) carried out by a multidisciplinary team is the gold standard approach to detect frailty (Clegg et al., 2013) and the potential underlying causes of frailty. While it requires considerable time and expertise, it is associated with improved outcomes after emergency admission to hospital in adults aged 65 and older (Ellis et al., 2011) and when carried out in the emergency department, can in some cases, reduce admission rates among older patients (Jay et al., 2017).

It is clear that healthcare policies to promote early detection, prevention and management of frailty are important in both community and hospital settings but there are a number of challenges:

- (i) the concept of frailty is not well understood or commonly recognized by the general population and within some medical societies (Sacha

- et al., 2017) although this is changing with an increasing interest in frailty in clinical specialties outside of gerontology (Cesari et al., 2016);
- (ii) there is a lack of consensus about operational definitions of frailty with a recent systematic review identifying 67 instruments for assessing frailty (Buta et al., 2016), making it difficult to identify and manage the condition in clinical practice; and
 - (iii) in Ireland, healthcare professionals are typically trained in professional “silos” even though the World Health Organization (WHO) has recommended an interdisciplinary approach as the most effective way to optimize healthcare systems and improve patient outcomes (World Health Organisation, 2013, 2010).

Sacha et al. (2017) propose the use of public awareness campaigns to provide information about frailty and healthy aging, e.g., health monitoring, diet, exercise, lifestyle, as a means to prevent or delay the onset of age-related frailty and pre-frailty. In an otherwise healthy individual, the physical signs of pre-frailty may be confused with age-related decline, thereby missing an opportunity to intervene. Early detection of declines in any functional ability is important if interventions to maintain biological, psychological and social status are to be implemented with the greatest levels of success (Sacha et al., 2017). This suggests that physicians, nurses and other healthcare professionals who are in regular and/or non-urgent contact with older adults should be trained to identify pre-frailty and frailty and apply the appropriate evidence-based interventions for prevention and management. This supports a proposed model whereby all providers attain specific competency in older adult care (i.e., little “g” geriatrics) while geriatricians (i.e., the big “G”) provide specialist care for frail elderly with complex needs (Callahan et al., 2017).

In a systematic review, Windhaber et al. (2018) found no publications addressing the effectiveness of education programmes on frailty prevention or management for healthcare professionals although they did acknowledge the lead shown by Ireland in developing the National Frailty Education Programme to prepare the healthcare workforce to deal with frailty in older adults (Lang et al., 2017). The Irish Longitudinal Study on Ageing (TILDA) plays an integral role in the programme through its Knowledge to Action (KTA) process (Graham et al., 2006) by incorporating methodologies and evidence-based research (knowledge synthesis), translating these to develop materials (knowledge tools), and delivering a bespoke educational day to the National Frailty Facilitators, who deliver the National Frailty Education Programme at a local level. In this paper, we describe what TILDA provides to the National Programme and how this collaboration was developed. We also discuss the implications that this has for healthcare policy and practice in Ireland. To our knowledge, this is the first time that a longitudinal research study such as TILDA has employed such methods of translation and therefore,

it could serve as an international model of translation for frailty and other areas of clinical priority.

Translation process

Design of TILDA

TILDA is a prospective cohort study of 8,172 community-dwelling adults aged 50 years and older (and 329 partners aged less than 50 years) resident in Ireland. The first wave of data collection took place between Oct 2009 and Feb 2011 with subsequent waves taking place at two-year intervals. At each study wave, participants complete an interview and a self-completion questionnaire, providing detailed information about their physical, mental and behavioral health, working history and wealth, activities of daily living, social participation and social relationships. At Wave 1 and every 2–3 waves thereafter, participants are invited to have a comprehensive health assessment delivered by research nurses in a dedicated health center or a modified assessment delivered in the participant's home. Health assessment tests cover neuro-psychological function, cardiovascular function, mobility, bone health, sensory function, oral health and anthropometry, while blood samples, hair samples, accelerometer and brain MRI are also obtained. Further details of the health assessment tests are published elsewhere (Cronin et al., 2013; Donoghue et al., 2018).

This objective assessment of health is a unique component of TILDA and has since been replicated in many other studies that make up the Health and Retirement Survey (HRS) family of longitudinal studies on aging. To date, TILDA has trained 40 registered nurses to carry out almost 12,000 health assessments using standardized TILDA health assessment methodologies and protocols. As part of this process, all nurses underwent rigorous quality control of these standard operating procedures to ensure consistency in the delivery of all health assessment tests across waves and thus to maintain the quality and comparability of these longitudinal data. These tests and the other, mainly neuropsychological and social scales included in the interview and questionnaire provide insights into the key cognitive, psychological, cardiovascular and physical functions that characterize frailty and the roles that physical activity, nutrition and social engagement play in preventing and reversing frailty.

Development of the TILDA frailty education day

In autumn 2015, TILDA identified a unique opportunity to promote outreach and translation of these methodologies and evidence-based research to inform

healthcare education and practice. TILDA employed two highly experienced Research Nurses to develop the proposed education day, with guidance provided by the TILDA Principal Investigator and Project Manager. The development of the education day used three distinct approaches within the KTA process – acquiring knowledge through analysis; assessing this knowledge through review synthesis and other existing data; and then synthesizing this knowledge to inform the education day. We drew on TILDA research about frailty and health outcomes to provide evidence (King-Kallimanis et al., 2014; O’Connell et al., 2015, 2018; Peklar et al., 2015; Robertson & Kenny, 2016; Robertson et al., 2013; Roe et al., 2017; Savva et al., 2013; Theou et al., 2015; Wong et al., 2018), and then combined this with existing research evidence about frailty. We summarized this research and delivered it as part of the education day to ensure that care providers are aware of and use current research evidence to inform health and healthcare decision-making. When developing the education day, we focused on measures that are included in the TILDA health assessment but that are also easily demonstrated and used in clinical practice. This helped to optimize the use of TILDA research evidence. The education day was then reviewed and adapted to ensure it was appropriate for local context before delivering it to multidisciplinary groups of health professionals.

A number of meetings and discussions took place with healthcare professionals and managers informing about the education day and its potential value to healthcare education and practice.

In July 2016, TILDA sent a proposal to the NCPOP, outlining the content of a one-day course entitled *Recognizing Frailty: Insights from TILDA* to be delivered by the TILDA Research Nurse and other team members at the TILDA Health Assessment Center at Trinity College Dublin. The overall aim of the education day is to provide healthcare professionals with an enhanced understanding of frailty and the best-practice protocols for performing frailty assessments, thereby ensuring earlier recognition of pre-frailty and frailty, improved healthcare management, and better health outcomes for these vulnerable adults.

Content for the *Recognizing frailty: Insights from TILDA* education day is divided into three sections:

- (i) “Understanding & Recognising Frailty” which includes an overview of the theoretical models underpinning frailty, interventions and prevention. There is a focus on the Fried Frailty Model and the Frailty Index, however other validated frailty assessment tools used in clinical practice such as the Clinical Frailty Scale (Rockwood et al., 2005), Edmonton Frailty Scale (Rolfson et al., 2006) and Prisma 7 Questionnaire (Raïche et al., 2005) are also introduced. The transitional nature of frailty is emphasized with

reference to a number of interventions including physical exercise, medication reviews, nutrition, social engagement and connectedness.

- (ii) An overview of the TILDA study design, data collection, key research findings relevant to frailty and a demonstration of the health center assessment where objective health measures are collected.
- (iii) An interactive workshop on key frailty assessment tools using standardized best-practice protocols for performing frailty tests, focussing specifically on neuropsychological tests (e.g., Montreal Cognitive Assessment) and physical function tests (e.g., Timed Up-and-Go and grip strength) that are included in the TILDA health assessment.

Each education day is limited to 10 attendees to ensure hands-on experience for everyone. Learning outcomes upon successful completion of the course include the ability to:

- Synthesize the research on frailty from TILDA and other studies;
- Identify clinical models underpinning frailty;
- Perform specific frailty assessment tests using standardized best-practice protocols;
- Recognize patients who are frail or at high risk of becoming frail and who would benefit from intervention to improve health outcomes.

The NCPOP were in the process of developing a National Frailty Education Programme and it was envisaged that a bespoke education day at TILDA would provide a robust foundation on the concept of frailty for all healthcare professionals nominated to roll out the National Programme *Fundamentals of Frailty*. A collaboration and partnership with TILDA would provide enormous value and assist in translating research to practice.

The education day, *Recognizing Frailty: Insights from TILDA* was piloted in October 2016 with seven senior nurses including the Director of Nursing and Service Planner from the NCPOP, Clinical Nurse Specialists (CNSp in Gerontology), managers and practice development officers from a variety of healthcare settings. It was critically important that these key influencers were present and the education day was evaluated using the Kirkpatrick model (Kurt, 1967). Participants described the day as a positive learning experience and recommended it as a suitable course for educating clinical staff on the subject of frailty.

Delivery of the TILDA frailty education day

TILDA was initially commissioned to deliver the education day to 100 nurses as part of a proof of concept design between February and July 2017. Following

the success of this pilot, TILDA was commissioned to deliver the education day to multidisciplinary teams. In order to ensure the programme was fit for purpose, a group of multidisciplinary health professionals evaluated the content. *Recognizing Frailty: Insights from TILDA* was awarded Category 1 approval with 5 continuing education units (CEUs) by the Nursing & Midwifery Board of Ireland (NMBI). Health and social care professionals are awarded continuing professional development (CPD) credits on the basis that one hour of learning is equal to one CPD credit as per their governing body. Subsequent to the initial delivery of commissioned training, further education days are being delivered as the National Frailty Education Programme is being rolled out across the country.

By May 2019, 356 healthcare professionals had attended the education day. Healthcare professionals have come from across the spectrum of specialties, representing medicine, nursing, physiotherapy, social work, dietetics, occupational therapy, speech & language therapy, pharmacy and administration, and from both the acute and community services including residential, intellectual disability services and centers of nursing education (see Table 1). Of particular note was the request from undergraduate nursing lecturers from higher education institutes to attend the education day. They reported that attendance enhanced the richness of their teaching in relation to frailty and the importance of frailty assessment and management.

All attendees at the *Recognizing Frailty: Insights from TILDA* education day were provided with an evaluation form (data available for 339/349 attendees). The seven attendees at the pilot education day conducted a separate review and therefore did not complete this evaluation form. Feedback from attendees

Table 1. Number of Healthcare Professionals Who Attended *Recognizing Frailty: Insights from TILDA* Between October 2016 and May 2019 (Including Pilot Days), by Discipline.

Healthcare professionals	N (%)
Nurses ^a	181 (51)
Physiotherapists	53 (15)
Occupational Therapists	47 (13)
Dietitians	13 (4)
Medical Social Workers	14 (4)
Speech & Language Therapists	11 (3)
Pharmacists	9 (2)
Doctors	7 (2)
Other Healthcare Professionals ^b	14 (4)
Higher Education Institutes Lecturers	7 (2)
Total	356

^aIncludes Directors of Nursing, Assistant Directors of Nursing, Clinical Nurse Managers, Advanced Nurse Practitioners, Clinical Nurse Specialists, Public Health Nurses and Staff Nurses, from acute and community services and Centers for Nursing & Midwifery Education.

^bIncludes HSE Managers and Clinical "Leads", Services Managers, Administrative staff, Psychologists.

Table 2. Evaluation of *Recognizing Frailty: Insights from TILDA Education Day* (n = 339).

	%
Overall (excellent/very good)	94
Presentations (excellent/very good)	96
Relevance to clinical practice (excellent/very good)	94
Recommend to colleague (yes)	94

was very positive with 94% rating the education day as excellent/very good and stating that they would recommend the course to a colleague (see Table 2).

Between February 2017 and September 2018, the NCPOP also conducted a survey both before and after attendees completed the education day (n = 141). After the education day, 74% rated their knowledge of frailty as greatly improved, 73% indicated that they could now easily define frailty and what frailty means, 75% rated their knowledge of frailty assessment and assessment tools as greatly improved and 53% rated their knowledge of CGA as greatly improved.

Where the TILDA frailty education day fits within the healthcare sector

In 2016, the NCPOP designed the National Frailty Education Programme in collaboration with the National Emergency Medicine Programme and the National Acute Medicine Programme in Ireland. The aim of the programme is to provide healthcare professionals with an enhanced understanding of frailty thereby promoting earlier recognition of frailty, improved healthcare management, and better health outcomes for frail older adults. It supports a system-wide approach to monitor and manage frailty and also aims to promote and encourage evidence-based practice, as illustrated by its unique partnership with TILDA.

The National Frailty Education Programme, *Fundamentals of Frailty*, is rolled out locally across hospitals and their Community Healthcare Organizations by National Frailty Facilitators. A National Frailty Facilitator is defined as a healthcare professional nominated by their manager to facilitate the delivery of the National Frailty Education Programme. A key criterion for all facilitators is that they attend the *Recognizing Frailty: Insights from TILDA* education day. This provides a standardized background to frailty definitions, frailty assessment tools and current research in frailty. The frailty facilitators subsequently attended a workshop devised and delivered by the NCPOP. This workshop helped attendees to co-design a locally adapted methodology to roll out the National Frailty Education Programme to healthcare professionals and staff in their local hospital and community healthcare organizations in an integrated/interprofessional manner. Of the 356 attendees at the TILDA education day by May 2019, 269 completed the frailty facilitators programme (i.e., TILDA education day &

NCPOP workshop) and are actively delivering the National Frailty Education Programme, *Fundamentals of Frailty*. To date, 2000 multidisciplinary healthcare professionals and staff in 14 frailty facilitator networks around Ireland have attended the National Frailty Education Programme (Figure 1).

Discussion

The partnership between the NCPOP and TILDA to deliver the National Frailty Education Programme demonstrates an innovative way in which evidence-based longitudinal research can be translated into clinical education and practice. Feedback from the attendees was extremely positive, highlighting the knowledge and benefit that healthcare professionals gained from their attendance at the TILDA education day. In addition to providing clarity around frailty definitions, potential assessment tools and their place within a CGA, the education days were also a very effective way to publicize and promote the use and availability of research evidence from TILDA to the healthcare community.

The system-wide approach taken by the National Frailty Education Programme has helped to develop a critical mass of facilitators from a range of backgrounds including nursing, physiotherapy, occupational therapy, dietetics, speech and language therapy, pharmacy, social work, education, psychology and medicine, all of whom have a shared understanding and ability to recognize frailty and how it can be modified and managed. The inter-

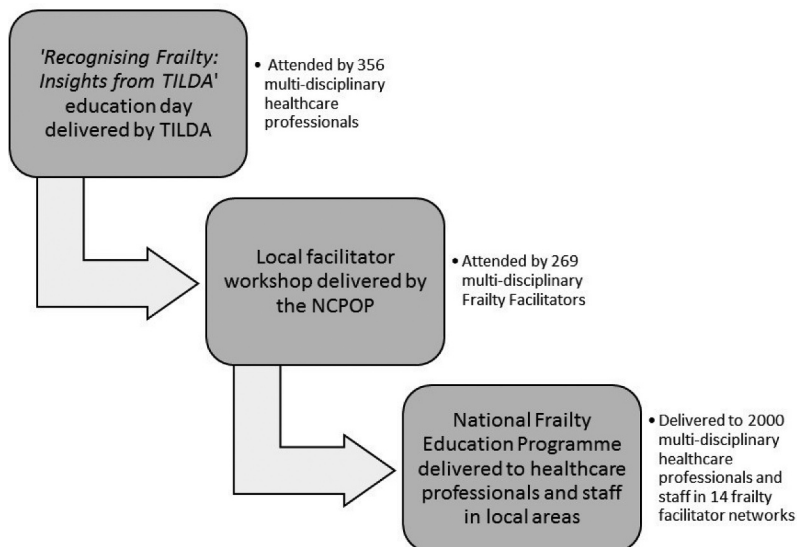


Figure 1. The components of the National Frailty Education Programme delivered from October 2016 to May 2019 (including pilot days).

professional approach to the programme delivery meets the WHO recommendation that interdisciplinary education is key to optimizing healthcare and improving patient outcomes (World Health Organisation, 2013, 2010). The development of integrated multidisciplinary facilitator networks also ensures that the facilitators can deliver the National Frailty Education Programme to multidisciplinary teams from across acute, primary and community care services in a credible and meaningful way; sharing their own professional experiences and their learning and insights from TILDA.

The programme will be rolled out to all hospitals and their Community Healthcare Organizations by the end of 2019, with the establishment of 30 facilitator networks. This supports the vision outlined in the Sláintecare report and addresses the key priorities of the report, namely promoting the health of the population to prevent illness; creating a timely system where care is provided to those who need it; and creating an integrated system of care where healthcare professionals work closely together (Committee on the Future of Healthcare, 2017).

While it is currently too early to assess the impact of this programme on the detection and management of frailty in the relevant hospital and community settings and overall patient care, there have been examples of how the programme has impacted upon patient care. These include the introduction of delirium screening, early mobilization programmes (Get Up, Get Dressed, Get Moving) in a number of acute hospitals and the introduction of heel bone ultrasound screening in residential services for people with an intellectual disability in Donegal. This also highlights the cyclical nature of this work whereby TILDA participants provide the evidence base that is used to inform and improve healthcare services, which they themselves may access in the future.

This programme was developed as a proof of concept; however, its success nationally has resulted in further and ongoing collaboration between TILDA and the NCPOP/Health Service Executive. Discussions are underway to support the development of new facilitators across facilitator networks and to provide current facilitators access to latest research. The NCPOP plan to undertake robust research on the impact of the education programme on practice in 2020. This type of analysis will assist the programme to evolve to meet the needs of healthcare policy and practice in Ireland.

Finally, there are some limitations to the current process. The education programme provided by TILDA and the NCPOP does not include any competency-based training, as the initial programme was to increase awareness of frailty and frailty assessments. However, each education day was limited to 10 attendees to maximize individual attention and opportunity to experience and practice delivery of the health assessment tests. Exposure to screening tools provides healthcare professionals with a knowledge of the tool's existence, where this had been previously lacking, and thus provides the awareness that specific training can be sought. Future collaborations will allow the

development of programmes that could include a competency-based assessment and certification process.

Conclusion

With population aging, the increasing prevalence of frailty will present an increasing challenge for the healthcare services. In Ireland, the partnership between the NCPOP and TILDA to deliver the National Frailty Education Programme demonstrates an innovative way in which evidence-based longitudinal research can be translated into clinical education and practice. The next stage of the process should assess the impact on the detection and management of frailty in the relevant hospital and community settings and overall patient care to inform the continued evolution of the programme to meet the needs of healthcare policy and practice.

Further information

For further information about TILDA, please visit www.tilda.ie or e-mail tilda@tcd.ie.

Researchers can apply to access TILDA data through the Irish Social Science Data Archive (ISSDA) at University College Dublin (<https://www.ucd.ie/issda/data/tilda/>) and the Inter-university Consortium for Political and Social Research (ICPSR) at the University of Michigan (<http://www.icpsr.umich.edu/icpsrweb/ICPSR/studies/34315>). Some variables have been removed or top coded to maintain the anonymity of TILDA participants.

For further information about the National Frailty Education programme, please contact deirdre.lang@hse.ie; Director of Nursing/National Lead Older Persons Services, Clinical & Integrated Programmes.

Key points

- The National Frailty Education Programme is being delivered in Ireland.
- Provides model of translating evidence-based longitudinal research into clinical education and practice.
- Promotes earlier recognition of frailty, improved healthcare management, and better health outcomes.
- 269 frailty facilitators delivered programme to 2000 multidisciplinary healthcare professionals.

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Recognising Frailty: Insights from TILDA was delivered by Ms Mary O'Shea.

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