Predictors and Outcomes of Older Persons Attending the Emergency Department

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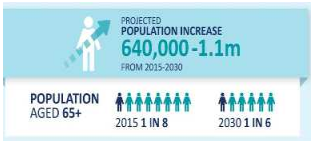
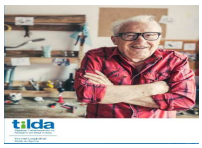
Overview

- Introduction
- Methodology – study design and setting
- Results – data analyses and findings
- Discussion and conclusion
- Limitations & future directions

Background





Findings from Wave 3 of TILDA recommend implementation of admission avoidance services and dedicated tailored care of the oldest old in emergency settings [1]

HOME FIRsT

Effectiveness of early assessment and intervention by interdisciplinary teams including HSCPs in the ED: protocol for a systematic review [2]

1 McGarrigle C, Donoghue O, Scarlett S, Kenny RA ,(Eds.). Health and wellbeing: active ageing for older adults in Ireland. Dublin: The Irish Longitudinal Study on Aging; 2017
2 Cassarino M, et al. Effectiveness of early assessment and intervention by interdisciplinary teams including health and social care professionals in the emergency department: protocol for a systematic review. *BMJ Open* 2018; 8:e023464

Aim & objectives

The overall aim of the study is to examine the **impact of a dedicated interdisciplinary team** (Occupational Therapist, Physiotherapist, Medical Social Worker and candidate Advanced Nurse Practitioner) on the quality, safety and cost-effectiveness of **care of older persons in the Emergency Department**

The objectives of this study are;

1. To profile patient demographics and outcomes post ED index visit
2. To stratify frailty risk in patients seen by Home FIRsT
3. To evaluate the predictive properties of two frailty screening tools (CFS & Think Frailty), on patient outcomes
4. To identify predictors of a 30-day ED unscheduled revisit

Methods

Study design and selection

- Prospective cohort study of persons aged ≥70 presenting to SJH ED (April – September 2018)
- Inclusion criteria;
  - Core working hours (Mon- Fri, 08:00-18:00)
  - Aged ≥70 years
  - Manchester Triage System score of 3-5
  - Identified and screened by a Home FIRsT member
- Ethical approval granted by SJH/TUH REC

Setting

Total attendances to ED in 2017	49,503
Total attendances to ED in 2017 over 65	12,612 (25.5% of total)
Total attendances to ED in 2017 over 65 requiring admission	6,629 (13.4% of total) (52.5% of the >65)
Total attendances to ED in 2017 over 65 requiring more than one admission	1,149
Total deaths over 65 in 2017	64

Statistical analyses

- Appropriate **descriptive statistics** were used to describe the baseline **demographics** of study population
- Using STATA version 15, a **logistic regression** analysis was performed to identify **factors most predictive** of a patient's admission post ED index visit and unscheduled revisit for those discharged
- **Predictive validity** of frailty instruments used were completed using **Receiver Operating Characteristic** (ROC) curve analyses

Baseline characteristics of the study population

CHARACTERSISTIC	VALUE
Sex, n (%)	
Male	473 (41%)
Female	683 (59%)
Age, median (IQR)	80 (75-85)
Residential status, n (%)	
Living alone	486 (42%)
Living with family	619 (54%)
Nursing home resident	31 (3%)
Other	13 (1%)
Manchester triage system urgency, n (%)	
2 – Very urgent	55 (5%)
3 – Urgent	849 (73%)
4 – Standard	242 (21%)
5 – Non urgent	9 (1%)
Top 5 principal presenting problems, n (%)	
Limb problems	277 (24%)
Unwell adult	133 (11%)
Falls	114 (10%)
Shortness of breath	109 (9%)
Abdominal pain	93 (8%)
Disposition, n (%)	
Admission	391 (34%)
Discharge	765 (66%)

Baseline characteristics by admission/discharge decision*

	Discharged (n=712)	Admitted (n=360)	Statistical Test
Age (Years), Mean (95% CI)	79.5 (79.0 – 79.9)	81.2 (80.5 – 81.9)	t = -4.17; p < 0.001
Females, % (n)	60.1 (428/712)	58.1 (209/360)	X^2=0.42; p = 0.517
Manchester Triage Score, % (n):			
-MTS 3	69.9 (498/712)	91.4 (329/360)	X^2=62.96; p < 0.001
-MTS 4	28.9 (206/712)	8.6 (31/360)	
-MTS 5	1.1 (8/712)	0.0 (0/360)	
4AT Score, % (n):			
- 4AT=0	75.2 (536/712)	54.7 (197/360)	X^2=73.89; p < 0.001
-4AT=1-3	22.2 (158/712)	30.8 (111/360)	
- 4AT 24	2.5 (18/712)	14.4 (52/360)	
Clinical Frailty Scale, % (n):			
- CFS 1-2	19.8 (141/712)	9.2 (33/360)	X^2=42.05; p < 0.001
- CFS 3-4	48.7 (347/712)	40.8 (147/360)	
- CFS 5-6	27.7 (197/712)	43.1 (155/360)	
- CFS 7-8	3.8 (27/712)	6.9 (25/360)	
Clinical Frailty Scale, Mean (95% CI)	3.76 (3.65 – 3.86)	4.45 (4.31 – 4.60)	t = -7.63; p < 0.001
Think Frail Scale, % (n):			
- TFS = 0	18.4 (131/712)	10.6 (38/360)	X^2=58.17; p < 0.001
- TFS = 1	28.5 (203/712)	18.9 (68/360)	
- TFS = 2	25.6 (182/712)	23.3 (84/360)	
- TFS = 3	21.4 (152/712)	31.7 (114/360)	
- TFS = 4	4.6 (33/712)	14.4 (52/360)	
- TFS = 5	1.5 (11/712)	1.1 (4/360)	
Think Frailty Score, Mean (95% CI)	1.70 (1.61 – 1.79)	2.24 (2.11 – 2.37)	t = -6.81; p < 0.001

Notes: Student's t-test used for continuous variables; Chi-square test used for categorical variables.

Abbreviations: CI = confidence interval; MTS = Manchester Triage Score; CFS = Clinical Frailty Scale; TFS = Think Frail Scale.

* Complete data set i.e frailty scales & 4AT available on 1,072 patients

Outcomes

Admit MedEL 14%

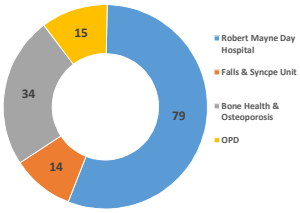
Discharge Community 9%

Admit Medical 20%

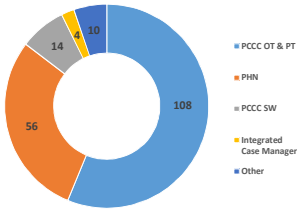
Discharge GP 45%

Discharge MedEL 12%

18.3% of patients discharged home were referred to Medicine for Older Persons ambulatory care



15% of patients discharged home were referred to primary care agencies (n= 192 referrals sent)

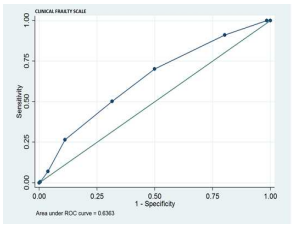


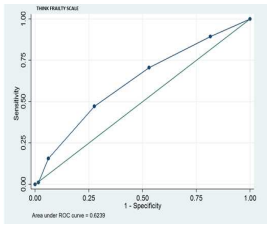
Logistic regression models with “admission” as the dependent variable

MODEL 1: USING CLINICAL FRAILTY SCALE	Odds Ratio (95% CI)	z	p
Age Category (Ref: 70-75 years)			
- 76-85 years	0.97 (0.69 – 1.35)	-0.20	0.838
- 86-90 years	1.24 (0.79 – 1.93)	0.94	0.348
- >90 years	0.99 (0.55 – 1.79)	-0.03	0.975
Male sex	1.13 (0.85 – 1.49)	0.84	0.401
Manchester Triage Score (Ref: MTS=3)			
- MTS =4	0.28 (0.18 – 0.42)	-6.08	<0.001
4AT Score (Ref: 4AT=0)			
- 4AT 1-3	1.62 (1.16 – 2.27)	2.84	0.005
- 4AT ≥4	5.87 (3.17 – 10.88)	5.62	< 0.001
Clinical Frailty Scale (Ref: CFS 1-2)			
- CFS 3-4	1.48 (0.95 – 2.32)	1.71	0.087
- CFS 5-6	1.83 (1.11 – 3.04)	2.35	0.019
- CFS 7-8	1.25 (0.56 – 2.78)	0.55	0.585
MODEL 2: USING THINK FRAILTY SCALE	**Odds Ratio (95% CI)**	**z**	**p**
Age Category (Ref: 70-75 years)			
- 76-85 years	0.96 (0.69 – 1.35)	-0.23	0.820
- 86-90 years	1.27 (0.81 – 1.98)	1.06	0.291
- >90 years	0.92 (0.51 – 1.66)	-0.29	0.769
Male sex	1.14 (0.86 – 1.51)	0.94	0.348
Manchester Triage Score (Ref: MTS=3)			
- MTS =4	0.28 (0.18 – 0.42)	-6.12	<0.001
4AT Score (Ref: 4AT=0)			
- 4AT 1-3	1.49 (1.06 – 2.11)	2.28	0.022
- 4AT ≥4	5.47 (2.90 – 10.32)	5.24	< 0.001
Think Frail Score (Ref: TFS=0)			
- TFS =1	1.07 (0.67 – 1.71)	0.27	0.784
- TFS =2	1.28 (0.79 – 2.07)	1.00	0.316
- TFS =3	1.75 (1.07 – 2.85)	2.24	0.025
- TFS =4	2.32 (1.16 – 4.63)	2.39	0.017
- TFS =5	0.36 (0.09 – 1.35)	-1.52	0.130

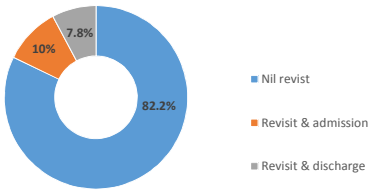
Notes: Abbreviations: CI = confidence interval; MTS = Manchester Triage Score; CFS = Clinical Frailty Scale; TFS = Think Frail Scale

Receiver Operating Characteristic (ROC) Curves for frailty scales as predictors of hospital admission





Unscheduled ED revisits

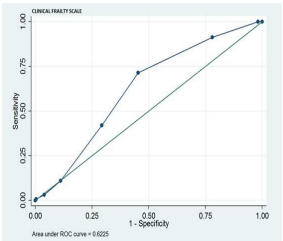


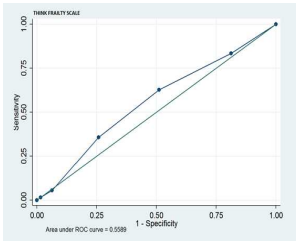
- Of the 136 **(17.8%) returning patients**, including 66 (8.6%) within the first 7 days, **77 (10%) were admitted.**
- Median LOS 7 days; mean 16.36 days.
- 30 patients **(22%) had ≥2 revisits** over a 30 day period (range 2-9 revisits)

Logistic regression models with “unscheduled ED revisit” as the dependent variable

MODEL 1: USING CLINICAL FRAILTY SCALE	Odds Ratio (95% CI)	z	p
Age Category (Ref: 70-75 years)			
- 76-85 years	0.87 (0.54 – 1.39)	-0.58	0.561
- 86-90 years	0.90 (0.47 – 1.74)	-0.30	0.764
- >90 years	0.78 (0.31 – 1.95)	-0.54	0.590
Male sex	1.45 (0.98 – 2.17)	1.84	0.065
Manchester Triage Score (Ref: MTS=3)			
- MTS =4	0.71 (0.44 – 1.15)	-1.39	0.165
- MTS =5	1.30 (0.25 – 6.73)	0.31	0.753
4AT Score (Ref: 4AT=0)			
- 4AT 1-3	1.07 (0.66 – 1.73)	0.26	0.797
- 4AT ≥4	1.01 (0.30 – 3.44)	0.02	0.988
Clinical Frailty Scale (Ref: CFS 1-2)			
- CFS 3-4	2.52 (1.27 – 5.03)	2.63	0.009
- CFS 5-6	3.84 (1.78 – 8.33)	3.42	0.001
- CFS 7-8	2.03 (0.54 – 7.69)	1.05	0.295
MODEL 2: USING THINK FRAIL SCALE	**Odds Ratio (95% CI)**	**z**	**p**
Age Category (Ref: 70-75 years)			
- 76-85 years	0.99 (0.61 – 1.59)	-0.04	0.966
- 86-90 years	1.21 (0.63 – 2.31)	0.57	0.568
- >90 years	0.93 (0.37 – 2.33)	-0.15	0.881
Male sex	1.41 (0.95 – 2.09)	1.68	0.092
Manchester Triage Score (Ref: MTS=3)			
- MTS =4	0.65 (0.40 – 1.04)	-1.81	0.070
- MTS =5	1.32 (0.25 – 6.95)	0.33	0.743
4AT Score (Ref: 4AT=0)			
- 4AT 1-3	1.34 (0.82 – 2.21)	1.16	0.244
- 4AT ≥4	1.16 (0.35 – 3.88)	0.24	0.807
Think Frailty Score (Ref: TFS=0)			
- TFS =1	0.73 (0.39 – 1.38)	-0.97	0.333
- TFS =2	1.03 (0.54 – 1.96)	0.08	0.939
- TFS =3	1.50 (0.78 – 2.88)	1.22	0.222
- TFS =4	0.67 (0.20 – 2.18)	-0.67	0.502
- TFS =5	0.78 (0.14 – 4.31)	-0.28	0.778

Receiver Operating Characteristic (ROC) Curves for frailty scales as predictors of unscheduled ED revisit





Discussion & conclusion

- With Home FIRsT in situ approximately 1-2 admissions are avoided on a daily basis (Monday-Friday); CGA begins in the ED
- Home FIRsT have operationalsied the screening and assessment of frailty and delirium in the ED
- Cognitive impairment (4AT1-3) and delirium (4AT >4) are strong predicators of admission post index visit, more so than frailty status
- Older persons have a high rate of 30 day unscheduled ED revisit
- It is difficult to produce models with patient information available during the ED evaluation that can reliably predict unscheduled revisits

Limitations

- Our work is centred in one study site, which may constrain the generalizability of the research findings
- Our cohort is not representative of the total older emergency population, rather a subgroup of patients
- Functional status was not routinely evaluated and recorded using a validated tool

Future Directions

- Capture mortality rate 90 days after the index visit
- Categorise MTS presenting problems using ICD 10 code and complete logistic regression analysis
- Consider replacing Think Frail with Identification of Seniors at Risk (ISAR)

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