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Review Article

Avoiding Admissions To Emergency Departments From Long Term Care Facilities Using Nurse Led Decision Making Algorithm

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Abstract

The global population of those aged 80 and above is expected to triple by 2050 leading to an increased demand for care in a Residential Care Facility (RCF). This population are at increased risk of developing multiple conditions, frailty, and cognitive impairment. This increase in acuity leads to transfers from the residential setting to the emergency department. **Aim:** The aim of this quality initiative was to trial the NaRT tool in conjunction with the Stop and Watch tool to aid staff with clinical decision making in the management of a deteriorating patient, thus ensuring care pathway appropriateness, reduction in inappropriate presentations to the emergency department and enhanced person-centred care. **Methods:** Mixed methods were employed. An evidence review was undertaken to identify studies relating to the use of a nurse led decision making algorithm for long-term care facilities. Focus group interviews were also undertaken. Following analysis an outreach model was introduced in two nursing homes within an integrated care framework, thus allowing for enhanced clinical communication between the RCF and the acute hospitals. **Data collection**: A suite of metrics was collated monthly to track trends. **RCF sample size:** Residential Care Facility (RCF) A is a 102-bed residential care facility and RCF B has 89 beds, both based within the Hospitals Integrated Care Framework. **Interventions:** The Stop and Watch tool was first used to allow for early intervention and prevention of further resident deterioration. The Nursing and Residential Triage tool (NaRT), designed for use within the residential setting, is based on the Manchester triage system and contains two presentational charts: injury and illness. Staff were asked to complete the NaRT tool pre decision to transfer residents to the

emergency department. **Results:** Data were compiled and analysed quantitatively (January to December 2023). Findings indicate that the NaRT tool was used by *RCF A* 148 times and by *RCF B* 121 times and that 49 (33%) of residents in RCF A and 18 (15%) in RCF B were transferred to emergency department. Findings also indicate that 99 (67%) in RCF A and 103 (85%) in RCF B were managed via alternate pathways. **Conclusion:** This quality initiative showed encouraging results with the use of the NaRT tool in this setting and that the process of training and education for the NaRT tool implementation was positive. Improved integration and collaboration between the RCF and the staff in the emergency department was beneficial in gaining understanding of the transfer process and resident condition. **Implications for practice**: The Stop and Watch Early Warning tool and the NaRT tool allows for early detection of deterioration and supports clinical decision making regarding the most appropriate pathway for residents showing signs of deterioration in residential settings.

Keywords: Nurse led decision making algorithm; Long-term facilities within an integrated team; Care framework; Avoidance of emergency department presentations; Alternative care pathways.

Introduction

Due to longevity, it is expected that by 2030, 24% of the European population will be over 65 years [1]. The global population of those aged 80 and above is expected to triple by 2050 and this will lead to an increased demand for care in a residential care facility (RCF) [2-3]. Aapproximately 5% of all older people need residential or nursing home care in Ireland [4]. Residential care can be used when a patient is ready to leave hospital but is not well enough to manage at home. It can also be the most appropriate option when an older person is unable to live alone, through illness or disability [4]. Demand in medical care can be expected, as this population are at increased risk of developing multiple conditions, frailty, and cognitive impairment [1]. Compared with the population who live in the community, residents in RCFs (Residential Care Facilities) are more likely to have multi-morbidities and increased risk of frailty [5]. Medical care can be provided to RCF residents via a variety of pathways including General Practice, Hospital Outreach, National Ambulance Service and Emergency Departments [1]. Patients with pre-existing co-morbidities can be managed by community-based specialist teams rather than acute hospital admission.

Transfers to emergency departments

Transfers are usually associated with falls, respiratory tract infections, urinary tract infections, cardiac conditions and altered cognitive states [6]. Renom-Guiteras et al. [6], estimated 30 transfers per 100 RCF bed days annually. Emergency department transfers can be avoided by 55% with appropriate, alternative care [3]. It is also estimated that 13-40% of transfers are inappropriate [7]. Transfers are associated with adverse outcomes for residents transferred. Transfer is also associated with longer lengths of stays in the emergency department and an estimated 1-5% of these residents dying there [5]. Transfers to the emergency department, while often appropriate can cause a serious breach in the regular care of the resident leading to increased risk of distress, falls, confusion and adverse medical outcomes [6,8,9].

Lack of care planning and clinical management is associated with increased risk of patient transfer to emergency department [5,10]. A transfer to the emergency department is dependent on several factors including the perceived urgency of the patients' condition, access to primary services, staffing levels, and clinical decision making [7].

When it comes to clinical decision making via pathways of care nurses have a pivotal role. A key component of an admission avoidance programme is decision support for nurses [11]. Relevant protocols and prompt clinical decision-making can aid the nurse in identifying deterioration. Improving nursing skills to recognise and manage deterioration is also crucial to successful resident care outcomes [12]. However, the ability of nursing and care staff to identify a deteriorating resident prior to transfer is limited [7,8,13]. To aid decision-making the Stop and Watch Early Warning Tool was used in this study.

Stop and Watch Tool

This is a decision-making tool which identifies the soft signs of early deterioration and allows for early intervention and prevention of further deterioration. The RCF's involved in this quality initiative used the Stop and Watch tool developed by the North Cumbria Commissioning Group [14]. All staff may use this tool. Healthcare assistants can identify early deterioration *via* changes in function and behaviour up to 5 days before this deterioration is identified by change in vital signs [15]. Care staff can then report these changes to the registered nurse who reviews the resident from a clinical perspective and mitigates further deterioration. See Table 1 and Appendix 1 for Stop and Watch Early Warning Tool.

Stop and Watch Early Warning Tool

This process was used by care staff. Care staff were asked to observe for the following *soft s*ymptoms (Table 1).

S - seems different to normal
T- talks or communicates less
O- overall requires more assistance
P- pain/participation; appears in pain or is participating less than normal
A- appetite reduced
N- no bowel movement in last 3 days or new diarrhoea
D - drank less
W - weight change- does the resident appear to have lost or gained weight unexpectedly?
A- agitation, restlessness, confusion
T- tired, weak or drowsy
C- change in skin colour or condition
H-help with walking or transferring.

Table 1: Stop and Watch Tool.

The addition of an algorithm was also used to reduce the numbers of residents transferring to emergency departments.

Algorithm use

Residential care facilities may be enhanced by use of an algorithm such as the Nursing and Residential Triage (NaRT) tool. Providing a system of partnership that involves working and sharing of information with key stakeholders is important in residential care. This tool reduces the number of high intensity residents being admitted to inpatient care and supports RCF staff to make accurate and appropriate decisions thus reducing the numbers of residents transferring to emergency departments [16,17].

The NaRT tool was developed by two paramedics in collaboration with Manchester Triage Group and Advanced Life Support Group and is based on the Manchester Triage Group's Manchester Triage System (MTS) [16]. MTS is an internationally used system for triaging patients or residents and is based on patient presentation rather than on their diagnosis. NaRT enables staff to make an informed time-based decision for a clinical assessment to take place and supports improved quality of care and outcomes. Appropriate care is supported by an e-learning package but is not a replacement for the use of routine general practitioner appointments for residents.

Intervention: Nursing and Residential Triage Tool (NaRT)

The Nursing and Residential Triage Tool (NaRT) was designed for use within the residential care setting. Based on the Manchester triage system it was developed using a reductive methodology to identify life threatening conditions primarily. Compared to the Manchester triage system which has 52 presentational charts the NaRT tool has two presentational charts: injury and illness. The tool prompts staff to work through the list of presenting symptoms and to follow the outcome prompted [16].

To avail of the NaRT tool the RCF must purchase a licence, sign a memorandum of understanding agreeing to a minimum of two of their staff becoming NaRT champions by receiving training and proceeding to train remaining staff and agreeing to partake in an audit.

See appendix 2: Nursing and residential triage tool.

Rationale

The rationale for this Quality Initiative was to test a tool to assess its efficacy in preventing presentations to emergency departments, deemed by the residential care facility to be inappropriate, and to allow for alternative pathways of care to residents in the RCF setting.

Aims

The aim of this quality initiative was to trial the NaRT tool, in conjunction with the Stop and Watch tool, to aid staff with clinical decision making in the management of a deteriorating resident, to ensure that the appropriate pathway of care is followed and to reduce presentations to the emergency department. The Stop and Watch tool was first used to inform resident condition.

Preparation for Implementation of NaRT

The four step quality improvement cycle incorporating Plan, Do, Study−and Act (PDSA) was utilised. The cycle was originally developed by Schewhart [18] and developed further by Demin (1991). The PDSA process has had success in the healthcare arena, with the process lending itself to change in this setting [19]. In preparation for the introduction of the NaRT tool the following steps were taken:

Plan-

- In response to the high rate of emergency department admissions from the RCF environment the assistant director of nursing for the Integrated Care Framework scoped out the potential for a triage tool to aid staff in decision making, with the aim of reducing emergency department presentations.

- The NaRT tool was identified as a potential tool. A meeting was organised between the assistant director of nursing, community paramedic, clinical nurse manager and the developers of the NaRT tool to gather information and assess its suitability.
- Once suitability was decided the assistant director of nursing met with the four RCF directors of nursing within the ICF (Integrated Care Framework) to discuss the potential use of the tool in their facilities.
- Three of the four RCFs purchased the license, and a training programme was devised.
- The Manchester triage team arranged a training programme for the assistant director of nursing, clinical nurse manager 3 and the community paramedic which involved an e-module training programme.
- These staff then provided training to nursing management in a 'train the trainer' fashion in the RCFs.
- This enabled the nurse management team to progress the training throughout their facility. This process started in late November/December 2022 with an aim for provisional rollout in December.

Do

Following training the use of NaRT commenced in December in two of the RCFs in the ICF. One of the RCFs deferred training and one did not proceed at this time. The trial in the RCF's took place in January (the tool was used 6 times: 3 transfers to hospital and the remaining 3 remained in the RCF).

Study

Nursing staff felt more confident and supported in their role in making a clinical decision regarding appropriate pathways for the deteriorating resident in the residential setting, however the NaRT tool needed some adaption regarding alternative pathways available in the Republic of Ireland. Further training was given and increased communication between the RCFs and the ICF assistant director of nursing took place.

Act

The tool was implemented in January 2023 in RCF 1 and in February in RCF 2. Each RCF devised a tool to collate data on the use of the NaRT tool. The NaRT tool is completed prior to transfer to determine correct care pathway. This was recorded subsequently. This tool was monitored by the director of nursing and management team.

Methods and Discussion

This quality initiative was carried out in two nursing homes within an integrated care framework [20]. The integrated care framework was established initially as a response to the Covid 19 pandemic to identify needs and provide support to RCFs within the geographical catchment area of each Royal College of Surgeons in Ireland hospital. This outreach model was further developed to support an integrated model of care to allow enhanced clinical communication between the RCFs and the acute hospitals. The aims of the ICF are to develop and support a structured framework to ensure quality of care for RCF residents and to minimise the necessity for transfer to the emergency department. The ICF works in close collaboration with the RCFs and offers support within four dimensions; leadership, quality assurance with regards to patient safety, upskilling and training staff and staff provision. National standards for older people in Ireland are set by the Health Information and Quality Authority [21,22].

Data Collection: A suite of metrics was developed which were collated monthly. Teams met monthly to review the previous month's performance, discuss emerging trend and any quality improvement initiatives still active. This allowed trends to be tracked and quality improvement plans to be implemented where necessary. The ICF was led by the Chief Director of Nursing and Midwifery of the group. Each of the four main hospitals within the group has an assistant director of nursing in position, in an outreach role, which led on monitoring the NaRT tool intervention.

Sample: RCFs were chosen based on size, admission rates and previous levels of admission to emergency departments. Residential Care Facility (RCF) A with 102 beds and RCF B with 89 beds were chosen. Both are based in the North East of Ireland Integrated Care Framework. The Standards for Quality Improvement Reporting Excellence (SQUIRE 2.0) document was used [23]. Roll out of NaRT was proposed to 16 RCF's within the Hospital/RCF hubs. Two are now using the NaRT tool and a third is in the process of commencing.

Data Analysis

Data were analysed quantitatively. Data from the previous years' admission to the RCFs were also used as a comparison to draw inferences on this tool's success.

Results

Data from two RCFs in the hospital group were compared to draw inferences on the success of this intervention. Findings demonstrate that the NaRT tool was used by *RCF A* 148 times and by *RCF B* 121 times. Findings also demonstrate that 49 (33%) residents in RCF A and 18 (15%) in RCF B were transferred to emergency department. From January to December 2023, the NaRT tool was used by *RCF A* staff 148 times. Of these 49 (33%) residents were transferred to emergency department and 99 residents (67%) were managed *via* alternative pathways.

From January to December 2023 the NaRT tool was used 121 times in RCF B. Of these 18 (15%) residents were transferred to emergency department and 103 (85%) residents were managed via alternative pathways. Findings also demonstrate that 99 (67%) residents in RCF A and 103 (85%) residents in RCF B were managed via alternate pathways, for example general practitioner, paramedic, and observation by healthcare professionals. The total number of residents assessed by NaRT was 269 (Tables 2 and 3).

Findings also indicate that 2/3 of admissions from the residential care facilities to the emergency department took place during the out-of-hours period from 6pm to 06 am Monday to Friday and at weekends. Decision to transfer was made by the Doctor-on-Call based on information received from nurses. From 1 Jan 2022 to 3 Dec 2022 there were 32 Hospital transfers from Hub B, of which 8 were respiratory issues, 3 vascular, 5 related to falls, 5 to urinary issues; 2 to seizure activity, 8 to cardiac and 1 to nosebleed.

Analyses of data indicates a discrepancy between the number of residents transferred to emergency department using the NaRT tool and the number of patients transferred to emergency department in RCF B. RCF B reported 18 transfers using the NaRT tool compared with 36 actual transfers from February to December 2023. This confounding factor can be explained by the rate of turnover of staff who had not yet received education in the NaRT tool, and residents transferred to emergency department following review by the paramedic or general practitioner. It was also noted when comparing admission rates that the RCF's within the hubs all vary in size and they also vary in accessibility to primary care. For example, in one ICF there is an outreach team, which is gerontologist led who see the RCF cohort of residents while other RCFs do not have any similar structure in place. Missing data in Table 3 in January is from RCF's that did not present any data to the ICF re admissions (Table 2).

NaRT uses in RCF A and RCF B in 2023												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
RCF A	6	20	12	4	4	16	22	12	7	15	14	16
RCF B	0	12	14	10	12	12	10	10	16	11	7	7

Table 2: NaRT usage in RCF A and RCF B in 2023.

NaRT management pathways used in 2023			
	Total number of times used	**Total no. of residents transferred to ED**	**Total no. of residents managed via alternative pathways**
RCF A	148	49	99
RCF B	121	18	103

Table 3: NaRT pathways used in 2023.

The use of the NaRT tool in conjunction with the Stop and Watch tool indicates that the use of a decision-making algorithm supports and encourages staff to use clinical judgement to assess their residents' needs accurately and to choose the most appropriate route of care. The NaRT algorithm reduced the number of presentations to the emergency department and assisted in identifying alternative pathways.

Evaluation of NaRT Outcomes: Focus Group Interviews

Evaluation took place through focus group interviews. Two focus groups were undertaken in March/April 2024 with 7 and 6 nurses respectively to evaluate NaRT outcomes. Those nurses were originally involved in the application of the NaRT tool in the hospital/ICF hub. One key area of interest formed the research question. This was:

What benefits and challenges were found by staff in the implementation of the NaRT tool in clinical practice?

The focus group methodology adopted is based on content analysis as defined by Krippendorff [24]. Themes were identified, analysed, and added to the knowledge gained. Discussions were transcribed verbatim by one of the authors (MC) [25]. The topic guide was designed to address the research question as previously set out. The following themes were identified.

Q1 What type of patient was transferred?

Theme 1 Resident Transfer

One respondent replied:

Because of the reduced number of residents being transferred to emergency department's staff felt a sense of pride and motivation to enhance the care they provided to their residents. Of the 32 residents transferred to the emergency department eight had respiratory issues and eight had cardiac issues, five related to falls, five to urinary issues, three to vascular issues, two to seizure activity, and one had a nose bleed (DM).

Q 2 *What advantages, if any, resulted from use of the NaRT Tool*?

Several advantages were identified.

Theme 2 Education and Training in preparation for use of NaRT

As a result of the use of the NaRT tool alternative pathways of care delivery were identified. Responses made:

This was possible due to the education provided to staff prior to use of the NaRT tool which aided the diagnosis and analytic capability of staff members. As a result, we were able to prevent transfer of some residents to the emergency department (DM).

And

Staff were able to recognise frailty in residents faster than before due to the new specialist training provided and this resulted in earlier diagnosis. This came about from preparation, training and education sourced for staff prior to and during the implementation of NaRT (EM, PD).

And

Responses identified nurses being able to diagnose COPD earlier than previously in residents with breathing difficulties and as a result there were earlier treatment and medication reduced admission to emergency departments (DM, PD).

Theme 3: Prevention of Infection

Several respondents identified improvements in managing residents with urinary tract infections following the introduction of NaRT. Comments included:

We improved our catheterisation policy because of the specialist training we provided to nurses on catheterisation of residents. As a result of this training and education we were able to reduce the number of residents with UTI having to transfer to emergency department (RG). Other respondents agreed saying:

With this new catheterisation initiative, we were able to reduce the complexity of catheterisation in the minds of nurses and reduce the anxiety that this procedure could cause, this change also resulted in improved staff confidence in care delivery (RG, PD).

Theme 4: Medication management

This theme was identified as forming an important education process that was provided by an education nurse specialist prior to and during NaRT implementation.

Theme 5 Integration and communication effects of NaRT

All respondents agreed that the process of training and education for NaRT implementation was positive. Responses included:

We had improved integration between the RCF and the emergency department in relation to care needed by our resident and improved collaboration with ED staff was beneficial in gaining understanding of the transfer process and resident condition. Also, improvement and greater collaboration with paramedics, who had been involved in the training for NaRT introduction was appreciated by the nurses involved (DM).

We were able to identify other pathways to manage a particular situation. This often included communicating with resident families by telling them there were other alternative care pathways available rather than transfer to the emergency department. We also told family members about the NaRT tool we were using and about the stop and watch process (RG PD).

Theme 6: Challenges to use of NaRT

The main challenges identified by focus group respondents were centred on the NaRT usage and visibility, perceived difficulty in usage and confidence and motivation to use the tool. Challenges were overcome or minimised by education and training. Comments included**:**

Our first difficulty was in getting nurses to use NaRT. We had to help nurses to gain their confidence to use the tool and to feel confident to do so. We did this with education on the tool contents and implementation process (DM, RG).

Theme 7: Successes to use of NaRT

Respondents agreed that

Online training about the tool was positive. The process was viewed by most nurses as not being complex and nurses identified better outcomes for residents because of using the tool. Participants commented:

Using the NaRT tool was a positive experience for the ill resident as they were happy not to have to be transferred to emergency department and the residents' family were also happy not to have a transfer once they understood what we were doing and why. So, communication was particularly important to families (DM, EM).

Conclusions

This quality initiative showed encouraging results with the use of the NaRT tool in this setting. Results indicated that the process of training and education for the NaRT tool implementation was positive. Improved integration and collaboration between the RCF and the staff in the emergency department was beneficial in gaining understanding of the transfer process and resident condition. Increased improvement and greater collaboration with paramedics who had been involved in the training for the NaRT tool introduction was noted and appreciated by the nurses involved. Ability to identify other pathways to manage a particular situation included communicating with resident families by informing them of alternative care pathways rather than transfer to emergency department, thereby reducing their concerns.

The use of the NaRT tool in conjunction with the Stop and Watch tool indicates that the use of a decision-making algorithm supports and encourages staff to use clinical judgement to assess their residents' needs accurately and to choose the most appropriate route of care. The NaRT algorithm reduced the number of presentations to the emergency department. Residents in RCF's often have challenging multi-morbidities. Their need for acute care is increasingly placing a strain on an already overwhelmed service. This can lead to poor outcomes for the resident and increased strain and cost on the system. The residential setting can be challenging, with reduced numbers of nurses and high turnover rates.

The focus groups featured in this study allowed participants to discuss the most key areas that were emphasised during the introduction of NaRT in this context. Focus group participants identified seven key themes that were important and representative of the realty of the delivery of using the NaRT tool in the prevention of transferring seriously ill RCF residents to emergency department. ‑They also identified positive outcomes they believed to have occurred as a direct result of the training and education provided prior to and during the introduction of the NaRT tool. Alternative pathways included general practitioners, mobile X-Ray services and community paramedics. The insights gained from these focus groups built on the outcomes identified from NaRT implementation.

Implications for staff

The Stop and Watch tool and the NaRT tool support nurses and healthcare staff in the residential care setting to allow for early detection of resident deterioration and to support clinical decision making regarding the most appropriate pathway for residents displaying signs of deterioration. This quality initiative demonstrated encouraging results with the use of the NaRT tool in this residential care setting study.

Limitation

This study was limited in size as just two nursing homes took part. The tools used to collate the use of the NaRT tool were not always reliable as there could be occasions when this tool was used and data not captured. Due to turnover of staff not all staff were always competent in using the tool, leading to the tool not being used on a cohort of residents in RCF 2. More research is required in a larger setting to affirm these results.

Ethical considerations

This quality initiative did not present any ethical concerns for consideration. No conflicts of interest were detected.

Funding

No external funding was obtained. The licence to use the NaRT tool was purchased from the Manchester Triage by the RCFs.

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Participants gave generously of their time and considerable expertise and experience and there is no doubt that the valuable contributions made by those participating in the focus groups and in the implementation of the NaRT tool have helped identify the most important areas that need to be presented or emphasised when introducing the NaRT tool in residential care facilities in Ireland. ‑These contributions can only enhance the review of the tool now underway in other facilities in this hub and the outcomes for residents in this context.

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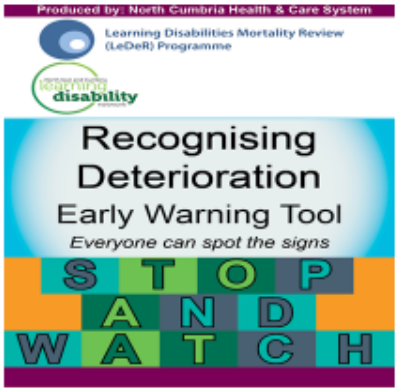
Appendix 1

Stop and Watch tool

STOP AND WATCH



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Appendix 2 Nursing and Residential Triage (NaRT) tool