A falls early response service in Aotearoa New Zealand: a scoping review

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ABSTRACT

AIM: To understand the extent and type of evidence available on a joint service between occupational therapy and paramedics in a community falls early response service (FERS).

METHOD: Three databases and Google Scholar were searched for published and grey material that combined occupational therapy and paramedicine community FERS. Two independent reviewers screened citations and then assessed articles for selection. Data extraction was performed by a third researcher and verified by the two reviewers.

RESULTS: Fourteen sources were included from the initial 6,432 screened, and 128 were subsequently assessed. The 14 sources were published between 2010 and 2023, with over 50% published after 2019. The number of participants in the studies ranged from 23 to over 35,000, with a variety of combinations of healthcare professionals.

CONCLUSIONS: This review suggests that a combined occupational therapy and paramedicine FERS would benefit people who fall, the ambulance service and hospital care providers from a cost and resource point of view. A pilot study to further evaluate the cost and benefits of this kind of service is being explored based on the results of this scoping review.

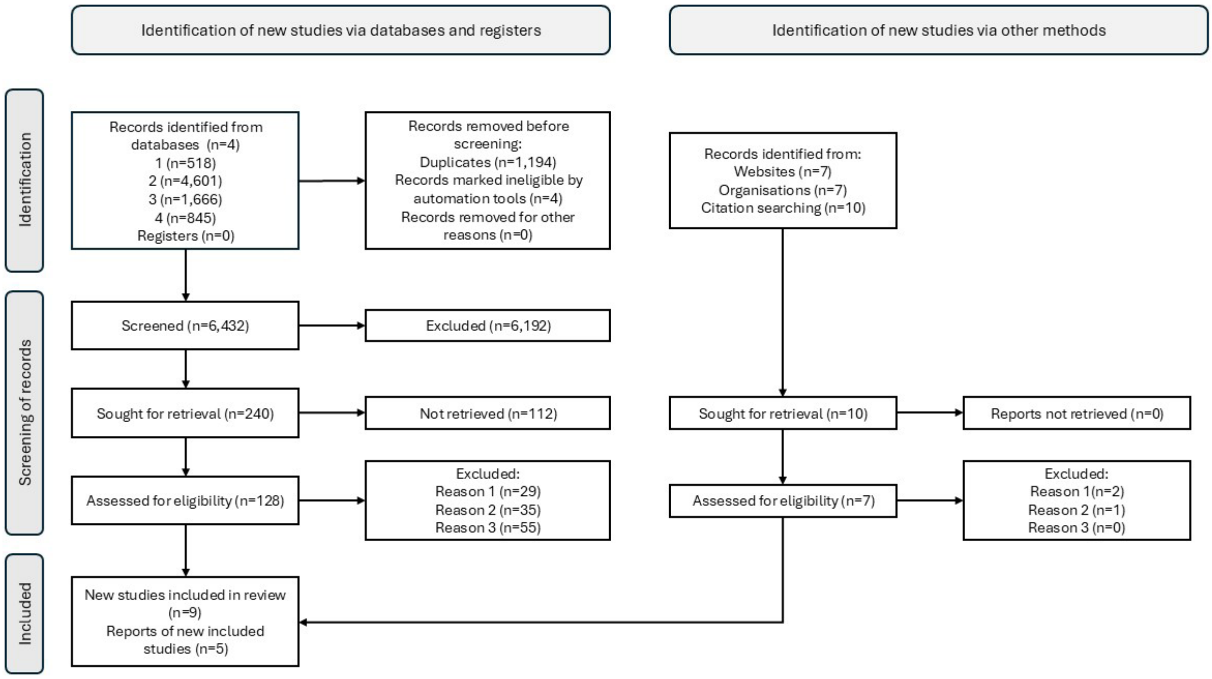
In Aotearoa New Zealand, the ageing population is experiencing increasing health needs, leading to a rise in urgent and emergency care demands. Many individuals, especially older adults, call emergency services when they have fallen, which can strain ambulance resources.[1] Data from Hato Hone St John (HHSJ) suggests many callouts and presentations to hospitals are related to falls, imposing substantial economic and personal costs.[2] Research from other countries, including Australia, highlights the potential benefits of a falls early response service (FERS), especially for vulnerable populations.[3–6]

In addition to an ambulance response, occupational therapists (OTs) also help with the community management of falls. They work across both physical and mental healthcare settings and are well placed to meet health and social care demands. OTs visit older adults at home to conduct cognitive, physical and occupational performance assessments. They recommend modifications and equipment to enhance safety, aiming to reduce falls and support independent living for as long as possible.[7] An OT service could complement that of the paramedic, which assesses and treats people ascertaining their clinical condition and potential risk for deterioration, before making an informed decision about the best outcome for the person who has fallen.[8] Paramedics complete advanced patient assessments[9] and look for both intrinsic, extrinsic and situational causes of a fall.[10] The aim of their assessment is to rule out sinister causes, and assess a person for further risk of falls, before determining if transport to hospital or referral to community health services is required.[11]

It is proposed the integration of OTs into a FERS with paramedics could improve access to timely interventions and prevent hospital admissions. This joint response could benefit healthcare services and the person who has fallen. A further aim of a FERS is to reduce ambulance responses for low acuity calls to falls, emergency department attendance by those who have fallen and, ultimately, unnecessary hospital admissions.[1,12–16] A report produced in 2015 by The Royal College of Occupational Therapists (RCOT) suggested significant cost savings and reduced hospital bed occupancy for people who had fallen in the community when using collaborative OT and paramedic interventions.[17]

Despite the evident need and potential benefits, there is a lack of understanding about what a combined OT and paramedic FERS could achieve. This scoping review examined the evidence and effectiveness of a combined OT and

Figure 1: PRISMA 2020 flow diagram.[18]



paramedic FERS for adults living at home in the community. The review specifically focussed on:

- What services currently exist that combine both occupational therapy and paramedicine in a call-out response service?
- Does a FERS combining occupational therapy and paramedicine benefit the person and/or health outcomes?

It is hoped that this review may inform future research and healthcare pathways in Aotearoa New Zealand and help address falls-related experiences in the ageing population.

Methods

A systematic literature review was conducted using the Joanna Briggs Institute (JBI) Framework for scoping reviews. The search explored the extent and type of evidence available on a joint service between OT and paramedics responding to falls in the community. The inclusion criteria were expanded to include paramedic services combined with other professionals to discover what practices were being undertaken internationally. The search strategy reviewed Medline, CINAHL and Scopus databases. These databases were searched for English articles using the predetermined key terms such as (fall* OR slip* OR trip*) AND ("occupational therap*" OR "emergency medical technician" OR paramed* OR ambulance or pre-hospital OR prehospital OR EMS OR "emergency medical services" OR paramedic OR "medical service" OR EMT).

The date range was kept broad due to the relative novelty of this topic. A copy of the detailed search protocol is available on request from the authors. The primary outcomes investigated were reduced acute secondary healthcare utilisation, decreased extensive individual healthcare funding and improved longevity of living in place.

Results

The Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) flow diagram in Figure 1 shows the process of literature searching and the inclusion and exclusion of sources for further appraisal. A total of 128 sources were assessed for eligibility after their full-text articles were retrieved. Of the 119 reports excluded, 29 were focussed on the wrong or a single discipline, 35 were purely fall prevention or intervention focussed and 55 were not relevant to the topic.

There were notable challenges in identifying evidence that related to only occupational therapy and paramedicine. As such, criteria were broadened slightly to incorporate any literature that included the ambulance service, or transportation to emergency departments for elderly fallers, and any combination with other health professionals. In total, 14 sources were included for review, consisting of both qualitative and quantitative studies. The number of participants in the studies ranged from 23 to 35,000. Two studies included people aged over 60 years, two studies included people aged 65 years and above and the other five studies reported on people of all ages who had fallen. Because of the variance in the objectives, design and results of the selected sources, strong conclusions cannot be drawn through this scoping review.

Signposts suggesting the presence of grey literature were evident in many references in the articles. For example, the National Health Service (NHS) review suggested that integrating fall prevention practitioners with ambulance services could either prevent the need for hospital-based assessments or speed up the process.[19] Grey literature was subsequently pursued to investigate this evidence. Table 1 below provides a synopsis of each of the sources included for review. The randomised control trial protocol by Mikolaizak et al.[20] has been excluded from the table, as has one of the RCOT[21] pieces, as it is incomplete in its publication.

The articles that clearly combined occupational therapy and paramedicine were produced by Van Dam et al.,[22] Charlton et al.[23] and Dean et al.[19] The selected articles offering the most valuable information allowed us to consider if occupational therapy is the best profession to enter this kind of service. Furthermore, most of the included articles offered services in different formats, e.g., post-ambulance assessment referral and joint visitation, or there were differences in the types of intervention provided. There is a paucity of Aotearoa New Zealand-focussed research investigating alternative approaches to reducing transportation to hospital for people who fall and do not have a clinical indication for review in the emergency department. Although there were fragments in each piece of evidence that would lend itself to aspects of our query, few sources had a singular focus on an occupational therapy and paramedicine combination. This is why we extended our reach to include the reports produced by the RCOT, as described above.[19,22,23]

Discussion

Our primary interest was to investigate if a combined OT and paramedic FERS would be beneficial in addressing the increasing number of falls experienced by older adults living in the community, with the view of informing future research opportunities. The key themes present in the literature were:

- assessment and intervention
- care coordination and monitoring
- home and environmental safety
- patient education and support

Assessment and intervention

Comprehensive assessment by a multidisciplinary team with immediate intervention was seen to be an effective strategy, identified in seven of the sources. Charlton et al.[23] investigated the clinical effectiveness of an OT rapid response service and found it to be clinically effective when compared to a standard ambulance response. The OT assessment focussed on environmental, personal/intrinsic and behavioural/activity domains. A similar observation was made by Kanne et al.,[24] detailing that most falls risk factors identified can be addressed by an OT. These include alcohol use, cognition, equipment, home safety concerns, sleep hygiene and habit formation around activities of daily living. Notably only two of the 13 risk factors identified would be suitable for physiotherapy input (footwear, gait/balance), but these can also be assessed by an OT. Two of the reviewed studies adopted interventions combined with nurse practitioner or physiotherapy services.[20,24]

A multispecialty approach to envisioning the future of acute medical care was discussed by Dean et al., who explored potential future scenarios within the NHS. The integration of fall practitioners with ambulance services emerged as a proactive strategy, potentially preventing hospitalisation and fostering efficient assessment. As an alternative to an interdisciplinary service (allied health/paramedic), the use of the Support and Assessment for Fall Emergency Referrals (SAFER) 2 protocol by paramedics addressed a gap in evidence for older fallers not requiring hospital care.[11] This study reflected a comprehensive paramedic-delivered evaluation model, which offered valuable insights into the impact and cost-effectiveness of falls prevention initiatives. Therefore, a new pathway may be introduced by ambulance services at modest costs without further harm and a reduction in further emergency calls.[25] It is worthwhile to note that for the NHS there was no clear evidence that it improved health outcomes or reductions in emergency department workload.[25]

Table 1: Data extraction table.

Citation	Objectives	Interventions	Design	Location	Outcomes measures	Results
Charlton et al., 2023	Evaluated clinical effectiveness of falls rapid response service	Paramedic and OT responded between 7 am–7 pm, 7 days/week	Cross-sectional study	England	Proportion of patients conveyed to hospital compared to those not conveyed versus standard ambulance crews	Falls rapid response service is clinically effective compared to care delivered by standard ambulance crews
College of Occupational Therapists, 2015	Deliver key information on OT contributions to primary care, A&E, critical care and other specialist settings	Year-long data gathering on effectiveness of OT in settings, including rapid response service	Report	England	Cost–benefit analysis	Reduction in pressure on GP services, reduce risk of admission and readmission, cost reductions in urgent care due to such things as falls
College of Occupational Therapists, 2016	How occupational therapy can reduce unnecessary transfers into A&E departments and admissions, and ease the patient's journey to timely and safe discharge home	Year-long data gathering on admission to hospital and discharge to home	Report	England	Patient outcomes (health experience, QoL), hospital flow, cost–benefit analysis	Reduction in hospital admissions and time in hospital, success on transition and discharge
Dean et al., 2022	Observations drawn from NHS Getting It Right First Time programme	Integrating fall practi-tioners with ambulance services may prevent or accelerate hospital-based assessment	Process and systems review	England	None	Acute frailty service for 7-day provision with community–ambulance collaboration was seen as plausible design option
Kanne et al., 2022	A quality improvement project evaluation of a new falls reduction clinic	A nurse practitioner– and physical therapist–led assessment process Participants received a 6-week phone call and a 12-week follow-up visit	Descriptive, single group	USA	30-second chair stands, timed pp and go, 4-item Dynamic Gait Index, Activities-specific Balance Confidence Scale, end of engage-ment surveys	Participants reported making behavioural changes to reduce falls risk and intentions to continue with exercise programmes A multidisciplinary approach com-bined with personalised strategies and ongoing monitoring can lead to reduced falls risk

Table 1 (continued): Data extraction table.

Citation	Objectives	Interventions	Design	Location	Outcomes measures	Results
Logan et al., 2010	Evaluation of a community falls prevention service for older people who call an ambulance but are not taken to the hospital	Referral to community fall prevention services or standard medical and social care (OT, physiotherapists, nurses) Strength training, home hazards assessment, medication review, and 12 2-hour, twice-weekly group programme sessions	RCT	England	Rate of falls over 12 months, Barthel Index, Nottingham Extended Activities of Daily Living Scale and Falls Efficacy Scale scores at baseline and by postal questionnaire at 12 months	A community-based service to prevent falls reduced the number of falls over a year in older people (>60 years) who had called an emergency ambulance owing to a fall but not been taken to hospital The service also led to increased levels of activities of daily living and reduced fear of falling
Mikolaizak et al., 2017	Evaluated tailored interventions for older community-dwellers who did not need ED transportation after a fall	Intervention group received post-acute services from physiotherapy, OT, optometry, pharmacist, specialist medical review through outpatient clinic Control group received written advice to address fall risk factors and to speak to healthcare provider	Single blind parallel group RCT	Australia	Rates of falls and injurious falls Ambulance re-attendance, ED presentations, hospitalisations, and QoL over 12 months, level of uptake to recommendations, health service use	The multidisciplinary intervention did not effectively prevent falls in older adults who received paramedic care but were not transported to the ED; this could be due to exercise fatigue and increased falls risk Nevertheless, the intervention proved to be effective in reducing falls among participants who adhered to the recommended interventions

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Table 1 (continued): Data extraction table.

Citation	Objectives	Interventions	Design	Location	Outcomes measures	Results
Paul et al., 2021	Described the reach of a fall prevention programme among community-dwelling adults aged ≥65 years and assessed fall-related ambulance use and hospitalisations	A multifactorial group-based fall prevention programme incorporating behaviour change and exercise through seven weekly sessions	Observational stepped-wedge study	Australia	Fall-related ambulance usage and hospital admissions were compared within statistical local areas before and after the implementation programme	The study did not show a reduced rate of fall-related ambulance use or hospital admissions across the entire sample of older adults. However, there was a potential reduction in fall-related ambulance callouts for individuals aged 75–84 years following the programme
Quatman-Yates et al., 2022	Optimised fall prevention within community paramedic operations and assessed its impact on emergency service utilisation rates	Implementation science framework and quality improvement methods used to design and optimise the fall prevention model of care Interrupted time series analysis used to evaluate relative risk reduction from a 12-month baseline period to a 12-month post-implementation period	Quality improvement initiative	USA	Relative risk reduction in the number of community-level, fall-related 911 calls and fall-related hospital transports	Community paramedic home visits increased significantly over the study period, showing an increase in the number of households benefiting from the programme Findings suggest that this programme offers a powerful mechanism for community paramedics to reduce fall-related 911 calls and transports to hospitals
Snooks et al., 2012	Evaluating the SAFER 2 protocol allowing paramedics to assess and refer older fallers to community-based falls services	Paramedic application of SAFER 2 protocol with control group receiving care as usual	Pragmatic cluster randomised trial	England	Number of further falls, health-related quality of life, fear of falling, patient satisfaction, and quality and pathways of care at the index incident	No evidence of improved health outcomes or reductions in overall NHS emergency workload

Table 1 (continued): Data extraction table.

Citation	Objectives	Interventions	Design	Location	Outcomes measures	Results
Van Dam et al., 2022	Evaluated OT outreach role providing rapid response service to high-risk individuals	12-month trial of 7-day rapid response service offering short-term OT interventions with additional competency training in nutrition and mobility assessment Interventions provided: home modifications, equipment/aides, falls education, occupation changes, person-related changes, cognition, pressure injury, mobility, nutritional, access to services, onward referrals	Convergent, parallel mixed methods	Australia	Risk of falls, malnutrition, pressure injuries, number of falls in last 12 months, socio-economic status	There is a need for the care provided by this service, and the service has made a positive impact on the lives of clients and their carers. The interventions have contributed to possible hospital avoidance, benefiting clients and healthcare organisations
Watson et al., 2021	Examined the impact of rapid response services with telecare services for clients with complex needs in social housing	Semi-structured qualitative interviews with service users, commissioners, service providers, adult social care and family carers via telehealth	A descriptive qualitative model	England	Thematic analysis The quality of life for service users and carers, including their ability to remain independent for longer, and the resource benefits for health and social care providers	The rapid response team reduced the number of ambulance requests resulting from falls Those with electronic monitoring/ telecare support were able to stay in their homes longer, reducing the need for residential funding by the local authority Positive outcomes for both elder and carers

OT = occupational therapist; A&E = accident and emergency; GP = general practitioner; QoL = quality of life; NHS = National Health Service; USA = United States of America; RCT = randomised control trial; ED = emergency department.

Similarly, the reports produced in collaboration with the RCOT[17,21,26] exploring the value of occupational therapy in the NHS collectively emphasised its role in addressing urgent care needs and reducing pressure on hospitals. For example, more than 75% of people were able to remain at home after a joint OT and paramedic assessment.[26] Currently, in Aotearoa New Zealand, access to community/home healthcare services is through general practitioner (GP) referral or self-referral. Community OT waitlists are prolonged in some centres (for a low priority referral) with wait times ranging from 3 to 7 months[27] and, anecdotally, up to 2 years in certain regions.[27] An older adult at risk of falls will generally only know their risk after a fall, resulting in a call to ambulance or a visit to hospital, or through a routine visit to their GP. This highlights the necessity of care coordination and monitoring.

Care coordination and monitoring

Studies by Van Dam et al.[22] and Watson et al.[28] demonstrated that most people seen by OTs were able to stay home with better quality of life compared with those who were conveyed to hospital. These studies had different approaches in their service delivery (e.g., referral from other services for an OT to assess a person in their home and via telecare services respectively), but both resulted in participants feeling safer and more confident through the tailored and focussed care provided. Kanne et al.[24] and Logan et al.[29] emphasise the positive impact of tailored interventions in reducing falls and improving clinical outcomes. Additionally, the integration of rapid response services with telecare presents a promising model for enhancing safety and wellbeing among vulnerable clients.[27] The combined approach not only reduced ambulance requests but also allowed individuals to remain in their homes longer, alleviating the burden on healthcare resources. The effectiveness of some interventions, as demonstrated by Mikolaizak, Lord et al., [30] may hinge on participant compliance, emphasising the importance of individualised and sustained approaches. The drawback of the research in this scoping review is that all studies used varied approaches to the provision of care and data sharing across healthcare professions, which makes it hard to determine which model has the most benefit for the patient and health system.

Patient education and support

A lesser theme present in the literature was the use of falls prevention programmes as an adjunct to a FERS. The Stepping On Programme by Paul et al.[31] did not show an overall reduction in fall-related ambulance use or hospital admissions, but revealed a potential age-specific benefit (see Table 1 above). Quatman-Yates et al.[1] found that incorporating a community-level perspective, in this case the Community-FIT falls prevention programme, achieved a significant reduction in fall-related callouts and transports. Insights from Paul et al.[31] highlight the necessity of considering demographic variations and tailoring interventions to specific age groups.

Conclusion

The 14 sources reviewed collectively advocate for a holistic and collaborative approach to falls prevention, encompassing clinical, community and telehealth dimensions. While tailored interventions demonstrate positive outcomes, especially when delivered by an OT, there is a need for more research to refine and optimise the intervention strategies used. An emphasis on participant compliance, demographic considerations and community-level interventions is important.

Falls by elderly in the community continue to be a health concern for multiple disciplines. The findings from this scoping review present a possible interprofessional solution to what appears to be an increasing issue. A joint response between OTs and paramedics in a FERS can provide valuable benefits. Occupational therapy assessments can help prioritise resources by providing a comprehensive and broad understanding of individuals' needs, focussing on factors contributing to a person's falls risk. Collaborating with paramedics, OTs can provide immediate on-scene interventions, reducing the likelihood of recurrent falls and mitigating further injury. OTs can assess a person's home environment and performance factors while paramedics conduct an advanced patient assessment to determine if the clinical presentation requires transport to the hospital. Utilising this model could improve patient outcomes, reduce fall-related healthcare utilisation and improve quality of life for individuals at risk of falling. A joint service could ensure seamless coordination of care, with OTs providing post-fall support and paramedics facilitating referrals to ongoing support and documentation that could enable tracking of fall incidents, informing tailored interventions and ongoing research.

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COMPETING INTERESTS
There are no competing interests to declare.
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