

1 Title: Feasibility of implementing an innovative manual handling risk
2 assessment training program for staff working in long-term care

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4 Running Head: Manual handling risk assessment training in long-term care
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41 Abstract

42 **Background:** The Risk Assessment for moving Individuals Safely (RAISE) program is a
43 hospital-based manual handling nursing training program. RAISE involves upskilling on
44 continual risk assessment during patient-assisted movements. RAISE aims to optimise staff
45 and patient safety while providing the patient with movement and rehabilitation
46 opportunities. Implementation of RAISE in the hospital setting has been established. The
47 aim of this study was to explore the feasibility of implementing RAISE in the long-term care
48 setting.

49 **Methods:** We examined three feasibility domains: acceptability, practicality, and limited
50 efficacy (observed nursing behaviour change which has the potential to reduce nursing
51 injuries), using a prospective pilot pre-post design in the long-term care setting. Staff
52 completed a 4-hour training session on RAISE delivered by two physiotherapists, followed
53 by 8 hours of supported behaviour change in the workplace. Staff acceptability and
54 practicality of incorporating risk assessment strategies into manual handling approaches
55 were explored through pre- and post-training staff surveys and a semi-structured interview.
56 Resident acceptability of manual handling practices was explored via survey data collected
57 after the RAISE training. Pre to post-training changes in staff knowledge and behaviour were
58 examined through the pre- and post-training staff survey, and observation of staff assisting
59 resident movement.

60 **Results:** Two enrolled nurses and five residents participated. Staff reported the RAISE
61 program was acceptable and practical to implement in the long-term care setting. There
62 were no adverse events or safety concerns. Staff reported the RAISE program provided
63 guidance and enhanced staff empowerment to make decisions during assisted resident

64 movement. There were 26 observed resident-staff manual handling interactions recorded,
65 with 13 pre-training and 13 post-training. Post-training, RAISE skills had improved and were
66 completed 100% of the time, except for completing a physical risk assessment which
67 improved from 46% to 85%, demonstrating limited efficacy. Residents reported it's
68 important for staff to be trained on how to assist them to mobilise and they found the
69 concept of the RAISE program acceptable.

70 **Conclusions:** This pilot study supports the feasibility of long-term care facilities participating
71 in future studies testing the effectiveness and cost-effectiveness of the Risk Assessment for
72 moving Individuals SafEly (RAISE) patient and resident manual handling program.

73

74 **Keywords:** Manual handling; Risk assessment; Feasibility; Qualitative research; Nurses;
75 Long-term care; Occupational health.

76

77 **Ethics approval:** This study was approved by the Eastern Health Human Research Ethics
78 Committee (reference number LR22-022-86171).

79

80 Main text

81 **Background**

82 Assisting patients to move in a hospital, or residents to move in a long-term care setting
83 comes with risk to both the staff and the patient/resident (1-3). Staff are at risk of
84 musculoskeletal injuries while physically assisting movement (2, 3), and patients are at risk
85 of falling during the movement (4), or conversely becoming deconditioned if they do not
86 participate in movement (4). This raises interdependent priorities; the need to promote and
87 preserve mobility in patients and residents, while concurrently preventing falls and ensuring
88 staff safety during assisted movement (4, 5). It is of concern that multiple international
89 systematic reviews have demonstrated that current manual handling training programs
90 have not been able to reduce nursing staff musculoskeletal injuries (6-8), and that this
91 comes at a great cost (9).

92

93 Support for these interdependent priorities are embedded into the recent Royal
94 Commission into Aged Care Quality and Safety in Australia, which has recommended that
95 ‘...care and supports should, as far as possible, emphasise restoration and rehabilitation,
96 with the aim of maintaining or improving older people’s physical and cognitive capabilities,
97 and supporting their self-determination’ (10 p206). To support resident care and staff
98 safety, the Royal Commission also recommended setting minimum staffing levels and
99 minimum qualifications for staff providing care. Over recent years there has been a change
100 in personnel who provide direct care in long-term care facilities in Australia, with reducing
101 numbers of Registered and Enrolled Nurses, and less qualified Personal Care Assistants now
102 accounting for about 70% of the direct care workforce (10).

103

104 The Risk Assessment for moving Individuals Safely (RAISE) is a new manual handling training
105 based on continual risk assessment during patient-assisted movements, to optimise safety
106 aspects of the task being performed. Based on previous work, an expert multidisciplinary
107 working-party (including nurses, allied health clinicians, and work health and safety staff)
108 created the RAISE manual handling training program, using Kolb's Experiential Learning
109 Theory to inform the process (11, 12). A previous RAISE feasibility study was conducted in
110 the acute and sub-acute hospital settings, and yielded positive results, indicating that the
111 RAISE program taught nurses to better identify factors associated with risk to themselves
112 and their patients, and gave them improved skills to assist patients to move (13).
113 Furthermore, these skills were immediately incorporated safely into clinical practice and
114 maintained at six months post-training. In addition, it was concluded that this risk
115 assessment manual handling training improved confidence and empowered nurses to
116 change their practice and provide safe mobility-related care (12). To date, RAISE pilot work
117 has not included long-term care facilities, despite the high frequency of nursing injuries in
118 this setting (14).

119

120 This feasibility study aimed to explore staff and resident acceptability, practicality, and
121 limited efficacy of the RAISE training program when implemented in the long-term care
122 setting. It was hypothesised that implementing RAISE would be acceptable to the staff and
123 residents, and that implementing RAISE would be perceived to be practical and safe by staff.
124 It was also hypothesised that staff in a long-term care setting who participated in RAISE
125 training would demonstrate knowledge gain and positive behaviour change when assisting

126 residents to perform mobility tasks in the workplace, aligned to the RAISE training
127 principles.

128

129 **Methods**

130 **Ethics approval and reporting guidelines**

131 The study protocol was approved by the Eastern Health Human Research Ethics Committee
132 (Project Number: LR22-022-86171). All participants (staff and residents) provided written
133 informed consent prior to data collection. The design and reporting of this feasibility study
134 was informed by the theoretical framework outlined by Sekhon et al., (15), and examined
135 the feasibility domains of acceptability, practicality and limited efficacy (16). Lancaster and
136 Thabane’s guidelines for reporting non-randomised feasibility studies have informed the
137 reporting of this study (17), with the CONSORT checklist for pilot and feasibility studies (18)
138 attached as Appendix 1. There were no major changes to the methods or outcomes after
139 the study commenced.

140

141 **Design, setting and participants**

142 Acceptability was reported from staff and resident perspectives and practicality was
143 reported from the staff perspective. Limited efficacy refers to staff gains in knowledge and
144 positive behaviour change following participation in the RAISE program. We used a
145 prospective pre-post design to evaluate the RAISE program, using the Kirkpatrick Model to
146 provide a system for appraisal (19). To address the aims, there were several components to
147 this feasibility study. The setting was a 30-bed permanent long-term care facility operating
148 within a large public healthcare network (Eastern Health) in Melbourne, Australia. As this

149 was a feasibility study, sample size was not estimated *a priori*, this was a sample of
150 convenience to inform design of a larger study.

151

152 Staff participants: Staff who provided direct care to the residents, involving manual handling
153 tasks, over three consecutive rostered day shifts were eligible to participate in the study.

154

155 Resident participants: For residents to be eligible, they must also have received care by a
156 RAISE-trained staff member during the study period. Consent / proxy consent was not
157 sought for potential study participation from residents who were considered by the facility
158 manager to have a level of cognitive impairment or limited English language proficiency that
159 impeded their ability to give informed consent.

160

161 **Intervention**

162 The RAISE program was designed to teach healthcare workers continual risk assessment
163 before, during and after assisting people to move, using the pillars of Task, Individual, Load,
164 and Environment (TILE). Details of the intervention published previously (13, 20).

165 Training at the long-term care facility involved staff participants attending a 4-hour RAISE
166 training session, incorporating both a theoretical component utilising a program manual
167 (with photographic illustrations outlining bedside risk assessment decision trees) and digital
168 presentation, and a practical component with a competency review. This session was
169 facilitated by two trainers (CG and HK). The trainers were experienced physiotherapists, and
170 they assisted the staff participants to practise new skills via role-playing scenarios to
171 replicate common resident physical and functional presentations encountered in the
172 workplace. An audit of manual handling equipment at the facility was conducted to ensure

173 that the staff had access to required items to support their decision processes for safe
174 manual handling practices.

175

176 The 4-hour RAISE training session was followed by an 8-hour supported behaviour change in
177 the workplace (during the morning shift). One of the trainers (CG) attended a morning
178 nursing shift to provide tuition to the staff participants while they performed their manual
179 handling tasks with residents. This on-site support training session enabled staff participants
180 to receive additional demonstrations, practice, feedback and collaborative assistance, to
181 build on the information that had been conveyed during the 4-hour training session. All
182 staff had previously participated in a compulsory standardised task and technique-based
183 manual handling training program conducted by the healthcare network.

184

185 **Data collection**

186 Staff participants: Staff completed pre- and post-training surveys, to capture staff
187 acceptability, practicality and limited efficacy. The pre- and post-training surveys included
188 closed and open questions, which sought to understand knowledge of incorporating risk
189 assessment into resident manual handling tasks, as well as the practicality and acceptability
190 of integrating risk assessment into manual handling tasks. Surveys were paper-based and
191 were provided by the trainer prior to, and following, the training session.

192

193 Each staff member participated in a semi-structured interview following the training, to
194 capture staff acceptability and practicality. This interview was facilitated online via ZOOM by
195 an experienced researcher (NB) who provided topics and probing questions relating to
196 domains of acceptability of a health care intervention(21), allowing for further exploration

197 of raised contentions. The interview was recorded and transcribed verbatim. Along with the
198 semi-structured interview, pre and post RAISE training surveys also explored the staff's
199 experience of the training program, and the acceptability of incorporating risk assessment
200 (both risk to staff and to the residents) into manual handling tasks when assisting the
201 residents to move around (rated on five levels from 'very low' to 'very high').

202

203 To determine limited efficacy, a researcher observed nursing behaviour while helping the
204 residents to move, pre- and post-training, to report behaviour change which has the
205 potential to reduce nursing injuries and resident falls. These observations reported
206 observable dynamic risk assessment behaviour, which was designed to avoid high-risk
207 assisted movement which could have resulted in a staff injury or a patient fall. That is, if
208 fidelity to the program was achieved. These sessions were conducted for one shift prior to
209 the RAISE training, and then for one shift following the RAISE training. Observations of staff
210 assisting residents to perform mobility activities were compared to the RAISE program
211 competency standards to determine whether the training program resulted in staff
212 behaviour change when assisting residents to perform mobility tasks (12). The researcher
213 did not intervene or amend the participants' clinical practice; however, during the
214 observation sessions, the researcher occasionally asked the staff participant about their
215 chosen actions, reasoning processes, and problem-solving approaches during the manual
216 handling task. Observations were by a researcher who was not aware that the staff had
217 participated in RAISE training between the first and second observation.

218

219 Resident participants: To explore perceptions of residents who received assistance from the
220 staff who participated in the RAISE training program, a short survey was conducted.

221 Qualitative descriptive data were obtained from this convenience sample via a series of
222 questions, framed to review their acceptability of incorporating risk assessment into manual
223 handling when being assisted to move by staff. Example questions included: Do you think
224 that the staff are adequately trained to be able to assist you to move around? Tell me why;
225 The staff ideally want to encourage you to try to do more of the movement for yourself, if
226 you are able. How do you feel about this? Is this acceptable to you? Tell me why; and, The
227 staff have been trained in how to reduce risks. This includes risks to you (such as a fall), and
228 risks to themselves (such as a back injury). Do you think that this is an important part of staff
229 training? Tell me why. The residents were also asked in the survey if they had noted any
230 change to the way staff were helping them to move, over the last few days.

231

232 **Outcomes**

233 ***Acceptability (staff and residents):*** Staff acceptability of incorporating risk assessment
234 strategies into manual handling approaches was explored through pre- and post-training
235 staff survey; and thematic analysis of the staff semi-structured interview data. Residents'
236 acceptability of manual handling practices were explored via survey data collected after the
237 RAISE training.

238

239 ***Practicality (staff):*** Staff perceptions of the practicality of implementing RAISE, including
240 negative impacts or adverse effects, were explored through pre- and post-training staff
241 survey; and thematic analysis of the semi-structured interview data. Practicality was also
242 measured through demonstrated fidelity to the RAISE program. Fidelity was reported in
243 stages; (i) was there a change in practice; (ii) was the behaviours change according to what

244 had been taught in the RAISE training program; (iii) was this for all movements; and (iv);
245 were all moves performed safely?

246

247 **Limited efficacy testing (staff):** Limited efficacy is based on testing an intermediate
248 outcome, rather than a final outcome(16). The construct being tested was competency,
249 based on the assumption that demonstrated competency in the RAISE program may result
250 in injuries avoided by the staff, falls avoided for the resident, and movement opportunities
251 being maximised for the resident. To test competency, pre- to post-training changes in staff
252 knowledge and behaviour were captured through: pre- and post-training staff survey
253 (change in knowledge); and observational sessions which focussed on observing staff
254 assisting residents with movement (change in behaviour). Harms and unintended effects
255 were also reported.

256

257 **Analysis**

258 Quantitative data on manual handling competency from the staff observational sessions are
259 presented as a number and percentage. Qualitative data from the staff interview and
260 resident surveys are presented descriptively. Two researchers (CG and NB) independently
261 read the transcripts and provided an interpretive description (22), which was mapped to the
262 feasibility domains of acceptability, practicality and limited efficacy. Rigour and
263 trustworthiness of qualitative analysis included the following measures: (a) Themes derived
264 from semi-structured interview data were provided to participating staff to see if they
265 reflect their thoughts and to give them an opportunity to add further ideas (member
266 checking); (b) Interpretive description was completed by two researchers independently;
267 and (c) Collection of data was from multiple sources.

268 **Results**

269 Data collection occurred in June 2022. There were no harms or unintended effects.

270

271 **Participants**

272 Staff participants: The study sample included two staff participants; both were female
273 enrolled nurses aged 41-50 years. Both staff members worked full-time, had been employed
274 for over eight years at the long-term care facility, and had worked in healthcare for more
275 than 10 years. Neither staff member had sustained a workplace injury, although one staff
276 participant noted that she experienced intermittent back pain symptoms when performing
277 workplace duties, including resident-assisted movement.

278

279 Resident participants: The staff identified five residents who met the inclusion criteria. All
280 five residents were recruited to the project.

281

282 **Acceptability and practicality of the RAISE program (staff and residents)**

283 Staff participants:

284 Staff indicated in the post-training surveys that they found participation and
285 implementation of the RAISE training program acceptable and practical. They provided
286 positive feedback towards the trainer and the resource materials provided and noted that
287 there was a high likelihood they would implement the learnings from the RAISE program
288 into their working practice. From the semi-structured interview, three themes were
289 identified; two focussed on acceptability and the third on practicality.

290

291 1) *The RAISE program provided practical guidance:* Newly obtained knowledge from the
292 RAISE program improved the staff's understanding and confidence about manual handling,
293 especially what constituted an acceptable lifting load while employing a risk assessment
294 model of manual handling in their everyday practice.

295 *'So, we liked the part where we learnt the seventy-five and twenty-five*
296 *per cent [rule]. Where the residents do at least seventy-five, then we do no more*
297 *than the twenty-five'* (Nurse A)

298
299 The nurses reported that this assisted to form a basis for mapping out risk assessment
300 during mobility tasks with residents. The RAISE program provided guidance about targeted
301 strategies to assist people to move around, which appeared to help to expand the skill set of
302 the staff.

303

304 2) *The RAISE program enhanced staff empowerment to make decisions:* The nurses
305 expressed it was a shift in practice to ask residents to contribute to their transfers, and this
306 had a bearing on the amount of staff-assisted manual handling that needed to be applied.

307 *'We were lifting, we were actually lifting their legs, thinking that they were unable*
308 *to do it. So, in that sense, we now ask them and get them to do a bit more'* (Nurse A)

309 *'You have to talk to them, and then give them time to do it. You just have to tell them what*
310 *you're doing and then get them to do a bit more'* (Nurse B)

311

312 Nurse B reported that she had not experienced any back pain symptoms since RAISE and
313 attributed this to changes in her manual handling techniques, particularly by having the
314 residents contribute more actively to their movements.

315

316 *3) The need to practise the RAISE program:* Throughout the interview, staff reported the
317 need to practise RAISE skills, to consolidate the recently acquired skills, and also embed
318 these into ongoing practice. Staff suggested inclusion of a *buddy system*, a *train the trainer*
319 model and *yearly refresher training* as strategies to support sustainability of the RAISE
320 program in long-term care. The nurses also added that management should provide
321 adequate resources such as dedicated training time and access to equipment, to support
322 the use of RAISE strategies.

323

324 *Resident participants:* Residents indicated that they found staff using the RAISE training
325 program was acceptable. The five residents considered it was important for staff to be
326 trained how to assist people to mobilise, with one resident additionally highlighting that the
327 staff need to know their situations well to provide person centred care.

328 *'They [staff] need to be aware of my individual issues in order to*
329 *provide the right kind of help' (Resident 5).*

330

331 Three of the five residents thought the staff were adequately trained to assist them to move
332 around. When asked how they felt when assisted to move around, most of the residents
333 displayed an awareness and concern regarding their own movement deficits and indicated
334 that they generally had a good level of confidence due to staff presence. Apprehension
335 about falling was reported by all residents. None of the residents showed awareness of
336 potential risks to staff during manual handling tasks, only the possible risks to themselves
337 when being assisted to move around.

338

339 When informed that the staff wanted to encourage them to contribute more to their
340 movement and transfers (as able), the residents' responses indicated varied acceptability
341 based on their individual abilities and preferences.

342 *'Yes, I want to do the most movement that I can'* (Resident 1)

343 *'I just want them to do it for me. That is why I live here'* (Resident 5)

344

345 All residents reported that clear communication with staff was an important aspect when
346 being supported to move around. The residents considered it would be desirable if the staff
347 could spend more time assisting them to move around, identifying that it would increase
348 their overall activity levels, including ability to access outdoor areas. Throughout many of
349 the survey questions, themes about insufficient staffing and inadequate time availability
350 were evident.

351 *'There is not enough staff to spare'* (Resident 3)

352 *'I would like to walk more. I am dependent on them [staff] having the time.'*

353 *'They don't have the time'* (Resident 1)

354

355 Residents generally conveyed that they were satisfied with the care that they received, but
356 consistently discussed that it would be ideal to have greater, and more timely access to the
357 staff members to enable them to be more physically active.

358

359 **Limited efficacy testing of the RAISE program (staff)**

360 Staff participants: There were 26 observed resident-staff manual handling interactions

361 recorded, with 13 pre-training and 13 post-training (Table 1). After training RAISE skills had

362 improved and were completed 100% of the time, except for completing a physical risk
 363 assessment which improved from 46% to 85% (Table 2).
 364
 365 The staff observations also provided evidence of fidelity to the RAISE program. Fidelity was
 366 demonstrated through the observed change in practice, where the behaviour change was
 367 aligned to what had been taught in the RAISE training program. RAISE skills had improved
 368 and were completed, at least in part, for 100% (n=13) of the observations (Table 2). All
 369 observed movement were performed safely and without an adverse event.

370

371 **Table 1** Audit of observations and support training session, n (%)

| | Pre-RAISE training (n=13 episodes of staff assisting resident movement; 23 components of movement) | Post RAISE training (n=13 episodes of staff assisting resident movement; 23 components of movement) |
|---|---|--|
| Transfer components observed* (% is the number of transfer components during the episodes of movement) | | |
| Rolling | 5 (38%) | 5 (38%) |
| Moving up / down in bed | 1 (8%) | 0 (0%) |
| Sitting up in bed | 0 (0%) | 2 (15%) |
| Repositioning in bed | 3 (23%) | 3 (23%) |
| Positioning on edge of bed | 3 (23%) | 2 (15%) |
| Standing up | 2 (15%) | 1 (8%) |
| Stepping and walking | 4 (31%) | 3 (23%) |
| Moving back in chair | 0 (%) | 0 (0%) |
| Transferring legs into bed | 2 (15%) | 2 (15%) |
| Sling hoist | 2 (15%) | 2 (15%) |
| Standing machine | 1 (8%) | 3 (23%) |

372 *Each observation episode may contain several transfer components in sequence.

373 [Facilitation of step transfers or use of Sara Stedy™ or Patslide™ equipment was not observed to occur during
 374 this study, therefore not included as transfer components in the above table]

375 **Table 2** Pre and post training audits of RAISE skills, n (%)

| | Pre training (n=13 episodes of staff assisting resident movement) | Post training (n=13 episodes of staff assisting resident movement) |
|---|--|---|
| Conducts a physical risk assessment movement | | |
| Observed | 6 (46%) | 11 (85%) |
| Observed with prompts | 7 (54%) | 2 (15%) |
| Verbalises RAISE Concepts | | |
| Task Risk Assessment | | |
| Verbalised | 13 (100%) | 13 (100%) |
| Verbalised with prompts | 0 (0%) | 0 (0%) |
| Individual Risk Assessment | | |
| Verbalised | 12 (92%) | 13 (100%) |
| Verbalised with prompts | 1 (8%) | 0 (0%) |
| Load Risk Assessment | | |
| Verbalised | 5 (38%) | 13 (100%) |
| Verbalised with prompts | 8 (62%) | 0 (0%) |
| Environment Risk Assessment | | |
| Verbalised | 12 (92%) | 13 (100%) |
| Verbalised with prompts | 1 (8%) | 0 (0%) |
| Interpretation of Risk Assessment | | |
| Verbalised | 8 (62%) | 13 (100%) |
| Verbalised with prompts | 5 (38%) | 0 (0%) |
| Withdraw from Transfer | | |
| Verbalised | 10 (77%) | 13 (100%) |
| Verbalised with prompts | 3 (23%) | 0 (0%) |
| Demonstrates RAISE Concepts | | |
| Safe Staff Positioning | | |
| Demonstrated | 11 (85%) | 13 (100%) |
| Demonstrated with prompts | 2 (15%) | 0 (0%) |
| Appropriate distance from resident when hands-on manual assistance not required (n=2 episodes) | | |
| Demonstrated | 1 (50%) | 2 (100%) |
| Demonstrated with prompts | 1 (50%) | 0 (0%) |

376

377 **Discussion**

378 This study explored the feasibility of implementing RAISE in the long-term care setting. Staff
379 increased their adherence to raise concepts by up to 39% in observation and by up to 62%
380 when asked about reasoning during lifting and handling activities. Staff reported that the
381 RAISE program was acceptable and practical to implement in the long-term care setting.
382 They noted that the RAISE program provided guidance and enhanced staff empowerment to
383 make decisions during assisted resident movement, and there was a need to practise the
384 RAISE program regularly. Residents reported that the RAISE program was acceptable in the
385 long-term care setting and that it was important for staff to be trained on how to assist
386 people to move around. While residents reported they had concerns about themselves
387 falling, they did not acknowledge the potential risks to staff during assisted movement.

388

389 This study has several limitations, including a small sample due to the nature of a pilot
390 feasibility study. Chronic staff shortages reduced the number of staff who were able to
391 participate in training and research. Also, we only recruited residents with sufficient level of
392 cognitive functional ability to be able to complete the survey. However, the process of risk
393 assessment from the staff perspective would be expected to be similar for residents with
394 cognitive impairment. Generalisability is limited as this long-term care facility employs
395 registered and enrolled nurses to meet the minimum staffing to resident ratios, and the
396 personal care attendants are employed as additional support staff above the minimum
397 ratio. This is important to note since in Australia, many long-term care facilities, particularly
398 not-for-profit and private residential aged care providers, have a workforce that
399 predominantly consists of personal care attendants who may have received limited manual
400 handling training due to the brevity of their courses.

401

402 While there is a paucity of literature reporting on interventions with demonstrated ability to
403 reduce nurses' musculoskeletal injuries in the workplace (6-8), risk assessment has been
404 shown to be vital in determining the resident's needs (14), indicating the need for a new
405 approach. By embedding comprehensive risk assessment during nurse assisted resident
406 movement, the RAISE program ultimately aims to reduce nursing musculoskeletal injuries;
407 prevent patient falls; and provide opportunities for patients to participate in movement
408 maintenance and rehabilitation. Over the past decade systematic reviews have consistently
409 refuted a causal relationship between nursing staff lower back pain and the daily task of
410 assisting patients with movement (23, 24). While the RAISE manual handling program does
411 not assume a causal relationship between nursing staff lower back pain and assisting
412 patients with movement, it does assume that through developing competency in RAISE
413 skills, there are avoidable events which occur while assisting patients with movement, that
414 lead to staff injury. For example, lifting a resident when their knees give way during
415 standing, or catching a resident during a fall. The RAISE program focusses on staff behaviour
416 modification, specifically the inclusion of dynamic risk assessment, to identify and avoid the
417 potential risk the adverse event.

418

419 We are continuing to further this research program to address current unanswered
420 questions. This ongoing research program will aim to determine if the limited efficacy
421 demonstrated in this pilot study (increase in risk assessment during assisted resident
422 movement) translates to a reduction in staff musculoskeletal injuries through the avoidance
423 of an injury event. It will also aim to determine if this limited efficacy translates to a
424 reduction in resident falls through the avoidance of a high-risk transfer. Finally, this ongoing

425 research program will aim to determine if residents being cared for by RAISE-trained staff
426 participate in more daily movement, aligned to the philosophy of resident participation to
427 the best of their ability. Progression from this pilot study to future definitive trial will require
428 adaptations based on the staff and resident feedback, such as the practicality of embedded
429 regular RAISE program training into the annual staff education roster.

430

431 **Conclusion**

432 This feasibility study identified that the RAISE program was practical and acceptable to staff
433 working in long term care, and that the staff were able to safely adapt their resident manual
434 handling tasks to achieve behaviour change via incorporating a dynamic risk assessment into
435 their daily manual handling tasks. The residents indicated their support of manual handling
436 training programs, and generally highlighted their desire to be able to move around more,
437 but that staffing availability potentially limited the opportunity to do so. This pilot study has
438 justified the inclusion of long-term care settings in future fully powered studies testing the
439 effectiveness and cost-effectiveness of the Risk Assessment for moving Individuals SafEly
440 (RAISE) patient manual handling program over time and across care staff and residents of
441 different abilities.

442

443 [List of abbreviations](#)

444 RAISE: Risk Assessment for moving Individuals SafEly

445

446 Declarations

- 447 • Ethics approval and consent to participate: This study was approved by the Eastern
448 Health Human Research Ethics Committee (reference number LR22-022-86171). All
449 participants provided written informed consent.
- 450 • Consent for publication: Not applicable.
- 451 • Availability of data and materials: Not applicable.
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456 original, review and editing, supervision and funding acquisition. CG:
457 conceptualisation, methodology, formal analysis, writing original, review and editing
458 LB: conceptualisation, methodology, writing review and editing HK:
459 conceptualisation, methodology, writing review and editing HD: methodology,
460 writing review and editing. HR: methodology, writing review and editing. LC:
461 methodology, writing review and editing. ST: methodology, writing review and
462 editing. VG: methodology, writing review and editing. AH: methodology, writing
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