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Original Research

What are physical therapists doing to prevent falls in older adults in Brazil? - Findings from a nationwide survey

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ABSTRACT

Background: Understanding how physical therapists (PTs) approach fall prevention in older adults and factors that may influence their clinical practices is essential for designing knowledge translation strategies.
Objectives: To describe PTs' clinical practices and barriers to implementing fall prevention best practices in older adults and to identify professional characteristics associated with implementation of fall prevention best practices.
Methods: A cross-sectional online survey was conducted. Registered PTs providing care to older adults were recruited through social media platforms. A pre-tested questionnaire assessed clinical practice patterns, socio-demographic and professional characteristics, and behavioral factors influencing the implementation of fall prevention best practices. Data were analyzed descriptively, and multinomial regression identified associations between PTs' characteristics and practice frequency. The Theoretical Domains Framework and the Capability, Opportunity, Motivation-Behaviour model guided questionnaire design and interpretation of findings.
Results: Among 454 PTs surveyed, over 65 % reported frequently (often or always) asking patients about falls, identifying and documenting fall risk factors, and implementing fall prevention interventions. Recommended practices such as balance and strength training were commonly implemented. Barriers to fall prevention best practices included patient denial of risk, reluctance to report falls, and adherence challenges. PTs not practicing in geriatrics or those lacking up-to-date fall prevention knowledge were less likely to report consistent use of best practices.
Conclusion: Brazilian PTs frequently integrate fall prevention into older adult care but face patient-related barriers. Addressing the identified barriers through behavior change strategies could enhance the implementation of fall prevention best practices.

Introduction

Falls occur in 30 % of adults aged 65 years or over annually, representing a significant public health concern, contributing to morbidity, mortality, and reduced quality of life.[1] Currently, strong evidence supports the effectiveness of fall prevention strategies.[2] Early identification of fall risk factors is an essential step for providing adequate care,[3] and a variety of assessment tools that evaluate single or multiple risk factors are available.[4–6] Based on a thorough assessment, healthcare professionals may design preventive strategies as a single or

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multifactorial intervention.[2,7] Among preventive interventions, physical exercise is the most commonly studied.[2,8] Exercise programs, primarily including balance training and functional exercises, reduce the rate of falls by 24 %.[9]

Despite the growth of scientific evidence on fall prevention strategies,[9] a gap in the evidence-to-practice translation exists. Barriers to implementing fall prevention best practices into routine clinical practice may be at the individual, organization, or policy level.[10–12] On the individual level, barriers include healthcare professionals not perceiving falls as a clinical priority, lack of confidence and limited time to perform fall risk screening during routine consultations, and skepticism about fall prevention initiatives, particularly exercise interventions.[12] However, the experiences and perceptions of key healthcare professionals involved in fall prevention practices, including physical therapists (PTs), podiatrists, and occupational therapists remain understudied.[12]

The involvement of PTs in fall prevention is essential, as PTs have the expertise to identify risk factors and implement interventions that enhance mobility and balance in older adults.[13] Previous studies with small sample sizes have reported knowledge, frequency of practice, and common interventions implemented by PTs to prevent falls.[14,15] These studies mainly focused on PTs' knowledge about risk factors, or PTs' knowledge and use of the STEADI (Stopping Elderly Accidents, Deaths & Injuries) developed by the Centers for Disease Control and Prevention.[16] According to knowledge translation frameworks,[17–21] knowledge is only one domain influencing the adoption of evidence-based practices. Furthermore, implementation science researchers recognize that the lack of a theory-based approach to interpreting barriers and enablers limits the design of context-specific knowledge translation strategies.[22] To optimize fall prevention best practices, a comprehensive understanding of PTs' clinical practices and the factors influencing their implementation, is essential. While existing research has provided valuable insights into fall prevention best practices, a comprehensive examination of how PTs address fall prevention in clinical settings remains limited. Understanding the factors and barriers influencing PTs' practice patterns on fall prevention is crucial for designing targeted interventions that align with their needs, challenges, and goals, and promote successful behavior change. Thus, we aimed to describe PTs' clinical practices and barriers to implementing fall prevention best practices in older adults, and identify professional characteristics associated with implementation of fall prevention best practices.

Methods

Study design

We conducted a cross-sectional online survey through SurveyMonkey®. The study received ethical approval from the Universidade Cidade de São Paulo (number: 4.931.994). We used the Checklist for Reporting Results of Internet E-Surveys (CHERRIES)[23] and the Strengthening the Reporting of Observational studies in Epidemiology (STROBE)[24] for designing and reporting the study.

Participants

We targeted Brazilian PTs registered with the Regional Council of Physical Therapy and Occupational Therapy, practicing in any area of physical therapy, and providing care to adults aged 60 or older in any practice setting.

Recruitment

We used a convenience and snowball sampling.[25] Advertising material was created and disseminated through social media (i.e., Facebook, LinkedIn, Instagram, Twitter) between August 2021 and May 2022. To reduce selection bias, we advertised that PTs from all practice areas were eligible.[26] We also promoted the study through physical therapy organizations and special interest groups. The survey was accessible via hyperlink, with consent given by selecting an on-screen button. No incentives were offered.

Data collection

Development and testing of the questionnaire

We developed the survey questionnaire using prior questionnaires[14,15,27] and a review on health practitioners' fall prevention perceptions.[12] The Theoretical Domains Framework (TDF)[21] guided the section on practice behaviour. Through an iterative process, we drafted and refined the questionnaire to cover all 14 TDF domains, focus on best practices (e.g., identifying fall risk factors, providing interventions or recommendations to address these factors, and referral), reduce respondent burden, improve clarity, and align wording with study objectives.

We evaluated content and face validity with a panel of seven experts in fall prevention and survey design.[28] After three consultation rounds, we revised the questionnaire wording and response options. We then pre-tested, experience, settings, and regions, assessing comprehensiveness, clarity, and face validity.[28] Based on their feedback, we reduced and reordered questions to improve respondent experience. Lastly, we pilot-tested the questionnaire with nine PTs from diverse specialties, experience levels, settings, and regions to assess flow, acceptability, administrative ease, and completion time. Only minor adjustments were made. The final questionnaire (Supplementary material) included three sections:

Section 1: clinical practice information

Section 1 asked PTs about assessing fall history, identifying and recording risk factors, implementing interventions, and making referrals. It also covered the average number of older patients seen weekly, session length, risk factors assessed, tools used, interventions applied, and knowledge of fall prevention guidelines. Responses included 5-point Likert scales and a mix of open- and close-ended formats. To explore barriers to best practices, we included an open-ended question and a close-ended list of barriers from prior studies.[10,29] PTs also ranked nine information sources (e.g., databases, colleagues, courses) by usage (1 = most used, 9 = least used).

Section 2: sociodemographic, education, and professional information

Section 2 collected data on age, gender, race/skin color according to the Brazilian classification,[30]years of practice, highest qualification, physical therapy area, and practice setting (e.g., hospital, home care, outpatient).

Section 3: influences on behavior (awareness, assessment of risk, and implementation of evidence-based interventions)

Using a 5-point scale, PTs rated their agreement with 37 statements across TDF domains (e.g., knowledge, skills, beliefs, goals, context, social influences).[31] The questionnaire included 66 questions across seven screens, and participants could select "not applicable" or "other" responses.

Before Section 3, participants were asked if they wanted to continue and were shown the estimated time, addressing concerns about length. Due to internet issues reported in testing, multiple entries from the same IP were allowed, but only the last response (based on IP, birthdate, and city) was analyzed. The completion rate is reported as the ratio of participants who completed section 2 by the number of participants completing the first screen.

Sample size

It is estimated that approximately 206,170 PTs are registered in Brazil.[32] The proportion of PTs working with older adults is unknown, making it to define an optimum sample size. Thus, we used convenience

sampling and set a target sample size based on the estimated population of 206,170 PTs. Assuming an expected proportion of 0.50 and a total confidence interval (CI) width of 0.10 at the 95 % confidence level, we estimated a minimum sample size of 384 PTs. This target size is consistent with previous virtual surveys of Brazilian PTs.[33–36]

Statistical methods

We exported data from SurveyMonkey to screen for missing data and duplicate entries from the same IP address, which were excluded. Continuous data were tested for normality and summarized using median and 25th and 75th percentiles (P_{25}, P_{75}). Categorical data were summarized using frequencies and percentages.

To identify professional characteristics associated with the frequency of implementing fall prevention best practices, we conducted a backward stepwise multinomial logistic regression. The dependent variable, i.e., frequency of a specific fall prevention practice, was categorized into three groups: "never/rarely/sometimes," "often," and "always." We combined the "never," "rarely," and "sometimes" categories to address low cell counts. "Always" served as the reference category, reflecting consistent adherence to best practices.

The independent variables, selected based on theoretical relevance and prior literature, included years of practice (≤5 years vs ≥6 years [reference]),[16] physical therapy qualification (bachelor's/specialist vs postgraduate [reference]),[16] time spent per patient (<45 min, 45–60 min vs >1 hour [reference]),[16] area of clinical practice (e.g., not practicing in geriatrics, orthopedics, neurology, or intensive care vs practicing in these areas [reference]), awareness and use of clinical practice guidelines (unaware, aware vs using [reference]), and perceived currency with research evidence (up to date [reference] vs not up to date). All statistical analyses were conducted using IBM SPSS Statistics version 23. Results are presented as odds ratios (ORs) with 95 % confidence intervals (CIs) and Nagelkerke pseudo R^2 values to indicate model fit.

In our study, ORs indicate how likely PTs are (i.e., odds) to report "never/rarely/sometimes" or "often" relative to the reference category "always" (dependent variable), based on their professional characteristics (i.e., each level of the independent variables compared to the reference group) described earlier. An OR >1 indicates higher odds of reporting a frequency of behavior in the comparison category (e.g., "never/rarely/sometimes" or "often") relative to "always," meaning the behavior is more likely than in the reference group. An OR <1 indicates lower odds of reporting a frequency of behavior in the comparison category relative to "always," meaning the behavior is less likely compared to the reference group. Lastly, we used the TDF to interpret and map the findings onto the COM-B (Capability, Opportunity, Motivation–Behaviour) model.[31]

Results

Participants

Fig. 1 illustrates the flow of participants through the study. Between August 2021 and May 2022, the survey received 986 accesses. We excluded 104 (11 %) entries for declining consent or not answering any question. The recruitment rate was 90 %, and the completion rate was 51 %.

Table 1 provides participant demographics and professional characteristics. Most PTs were female (84 %), median age 36 years (P_{25}–P_{75}: 30–43), and 68 % had ≥6 years of experience. Over half had a specialist degree, 68 % were self-employed, and 64 % worked in home care. PTs reported practicing in over 15 specialties, mainly geriatrics (54 %), followed by orthopedics/sports (42 %).

Clinical practices of Brazilian PTs to prevent fall prevention in older adults

Table 2 details practice patterns. PTs reported caring for an average of 10 older patients per week, with 54 % spending 45–60 min per

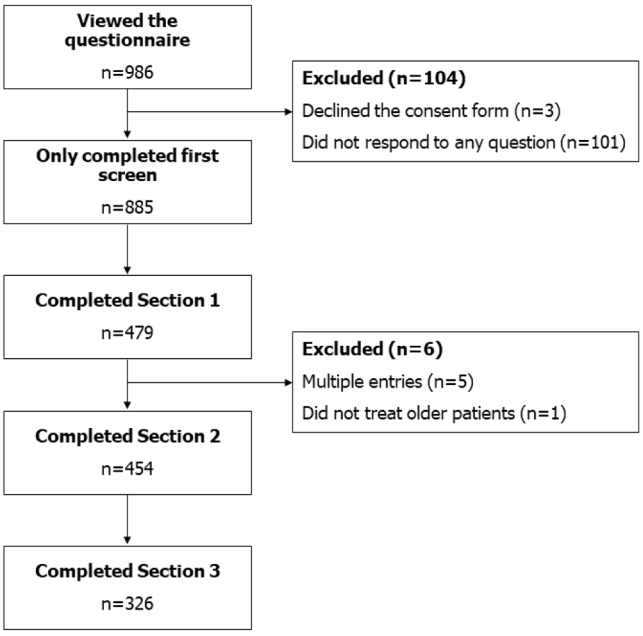

Fig. 1. Flow of participants through the questionnaire.

Table 1
Demographic and professional characteristics of PTs (n = 454).

Variable	n (%)
Age in years, median (P_{25}, P_{75})	36 (30, 43)
Gender	
Female	381 (84)
Male	73 (16)
Non-binary	0
Race/color	
White	307 (68)
Pardo	105 (23)
Black	28 (6)
Yellow	14 (3)
Indigenous	0
Years of experience as a PT	
5 years or less	147 (32)
6 years or more	307 (68)
Highest education	
Bachelor's degree	74 (16)
Specialist	246 (54)
Graduate or Postgraduate (MSc, PhD, or Post-doctorate)	134 (30)
Area of physical therapy*	
Geriatrics	244 (54)
Orthopedics or sports	191 (42)
Neurological	117 (26)
Intensive care or cardiorespiratory	111 (24)
Other†	143 (32)
Employment*	
Self-employed	308 (68)
Private organization or institution	153 (34)
Public organization or institution	133 (29)
Practice setting*	
Home care	291 (64)
Clinic	141 (31)
Hospital	81 (18)
Rehabilitation centre	66 (15)
Outpatient	56 (12)
Long term care facility	53 (12)
Gym or recreational centre	17 (4)
Centro dia (Day care)	8 (2)

* PTs could select more than one option.
† Includes: acupuncture, aquatic therapy, chiropractic, dermato-functional, occupational health, oncology, osteopathy, pain, Pilates, primary care, rheumatology, teaching/supervising, women's heath.

Table 2
Responses to practice pattern ($n = 454$).

Variable	n (%)
Number of older patients seen within a typical working week; median (interquartile range)	10 (10)
Time spent with patients per session	
<45min	136 (30)
45 min to 1h	244 (54)
Over 1 h	74 (16)
Type of sessions	
One on one sessions	408 (90)
Group-based sessions	46 (10)
Provided care to a patient with previous history of fall	
Yes	445 (98)
No	9 (2)
Priority level of fall prevention in clinical practice	
Not a priority	1 (0.2)
Low priority	5 (1)
Medium priority	23 (5)
High priority	112 (25)
Essential	313 (69)
Knowledge about fall prevention clinical practice guidelines	
Unaware	240 (53)
Aware of, but not using them	79 (17)
Aware of, and using them	135 (30)
Fall risk factors assessed*	
Balance disorders	444 (98)
Gait disorders	425 (94)
Muscle weakness	424 (94)
History of previous falls	421 (93)
Use of walking aid (e.g., cane, walkers)	365 (80)
Home environmental hazards	360 (79)
Fear of falling	336 (74)
Dizziness	329 (73)
Foot/footwear problems	320 (70)
Visual acuity	309 (68)
Frequent slips and trips	307 (68)
Sedentary behavior and low levels of physical activity	292 (64)
Multiple medications	287 (63)
Hearing and vestibular deficits	280 (62)
Postural hypotension	255 (56)
Cognitive problems	246 (54)
Using psychoactive or antidepressant medications	229 (50)
Screening for peripheral neuropathy	229 (50)
Chronic pain	215 (47)
Somatosensory impairments	212 (47)
Arthritis	149 (33)
Anxiety and depression symptoms	142 (31)
Urinary incontinence	141 (31)
Sleeping problems	138 (30)
Non-specific low back pain	106 (23)
Tests or scales used for assessing the risk of falling†	
Timed Up and Go Test (TUG)	195 (43)
Berg Balance Scale	121 (27)
Sit to stand (5 times, 30 or 60 s)	50 (11)
Short Physical Performance Battery (SPPB)	45 (10)
Romberg test (or variations)	36 (8)
Falls Efficacy Scale International (FES-I)	35 (8)
Gait speed	24 (5)
Functional reach test	23 (5)
Mini-BESTest (Balance Evaluation Systems Test)	21 (5)
Morse Falls Scale	21 (5)
No tests	154 (34)
Interventions or recommendations implemented*	
Balance training	440 (97)
Strength training targeting lower limbs	439 (97)
Recommendations about mobility aids	397 (87)
Recommendations about footwear	395 (87)
Home assessment and modifications	387 (85)
Functional exercises	367 (81)
Recommendations to perform physical activity practice such as walking	296 (65)
Aerobic exercises	234 (52)
Recommendations to perform physical activity practice such as yoga or tai chi	49 (11)
Up to date with the evidence on falls prevention	
Yes	199 (44)
No	255 (56)
Resources used for professional update (ranked from the most to least used) median (interquartile range) ranking	
Using scientific databases such as Pubmed, PEDro, Cochrane	1 (2)
Using scientific databases, preferably in Portuguese, such as Scielo, Lilacs	2 (3)
Grey literature (e.g., blogs, journals related to area of practice)	3 (6)
Social media of experts in own field of practice (YouTube, Instagram)	4 (3)
Attending conferences, congress, or lectures	4 (3)
Short-term courses (online, weekend)	5 (3)
Discussions with colleagues or experts in the field	5 (4)
Long-term courses (specializations, post-graduation)	5 (5)
Books	6 (5)

* PTs could select more than one option.
† PTs could write up to five tests/scales.

session. Of 454 PTs, 445 (98 %) had treated a patient with a prior fall, and 313 (69 %) viewed fall prevention as a clinical priority.

Fig. 2 shows the frequencies of best practice implementation. Over 73 % of PTs reported always asking about fall history; 48 % and 43 % reported identifying and documenting risk factors, respectively. About 63 % reported always providing interventions or recommendations. Referrals to other healthcare professionals were less common, with 57 % reporting never, rarely, or sometimes making referrals.

Common assessment tools included the Timed Up and Go Test (43 %), Berg Balance Scale (27 %), and Sit-to-Stand (11 %), though 34 % did not mention using any test. The main risk factors identified were balance

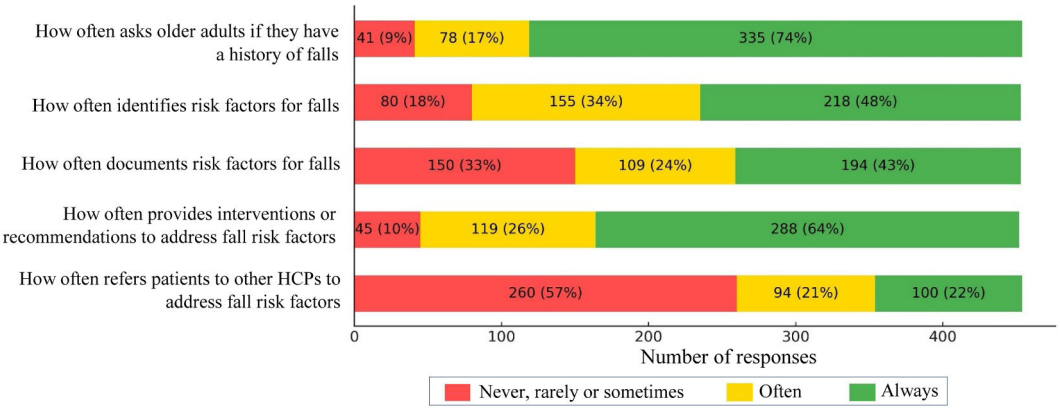

Fig. 2. Frequency of fall prevention practices reported by physical therapists. HCPs, health care professionals.

issues (98 %), gait disorders (94 %), and muscle weakness (93 %). Common interventions were balance training (97 %), lower limb strengthening (97 %), and mobility aid recommendations (87 %) (Table 2).

Fig. 3 and Appendix 1 summarize barriers and behavioral influences mapped to the COM-B model.

Capability domain (Knowledge, skills, behavior regulation, memory attention and decision processes). Over half of PTs (53 %) were unaware of clinical practice guidelines for falls prevention, and 56 % did not consider themselves up to date with the evidence on falls prevention. Of the resources used to keep up to date, PTs reported using primarily scientific databases such as Pubmed, PEDro, and Cochrane.

Opportunity domain (Social influences, environment context and resources). PTs identified key barriers to implementing best practices, primarily patient-related: low adherence to interventions (50 %), denial of fall risk (48 %), reluctance to report falls (34 %), and perceiving falls as unavoidable (31 %) (Fig 3). Nearly 72 % of PTs do not view time constraints as a barrier to discussing fall prevention. Similarly, over 61 % and 68 % disagreed that environmental limitations (e.g., lack of space) or insufficient equipment affect their ability to deliver fall-prevention exercises. About 76 % also disagreed that their workload limits referrals to other healthcare professionals (Appendix 1). Approximately 86 % of PTs disagreed that older adults view falls as a normal part of aging. Over 64 % disagreed that asking about falls undermines trust, 53 % disagreed that older adults have poor adherence to exercise, and 71 % disagreed that missed sessions frequently disrupt treatment plans.

Motivation domain (Social/professional role and identity, beliefs about consequences, beliefs about capability, optimism, intentions, reinforcement, goals; emotions). PTs generally agreed on the importance of assessing fall risk and using balance training, regardless of age, function, or risk level. They strongly disagreed that it's unnecessary to ask high-functioning older adults about falls or to assess only those with a fall history. About 83 % agreed that all patients ≥60 years should be screened, and 88 % rejected the idea that balance exercises are unsuitable for high-risk older adults. Most (53 %) disagreed that fall prevention is less effective in adults ≥80, and 60 % disagreed that they struggle

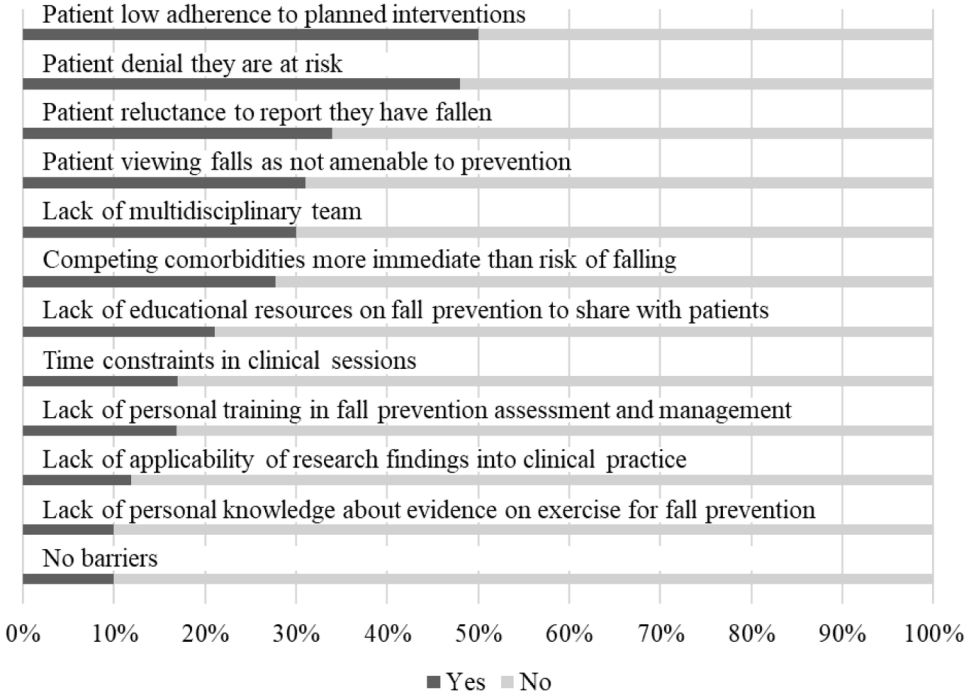

Fig. 3. Barriers for implementation of fall prevention practices reported by physical therapists.

to motivate older adults to exercise (Appendix 1).

PTs generally expressed confidence in their fall management skills, optimism about intervention outcomes, and a strong belief in the PT's role on fall prevention teams. Most (92 %) agreed that discussing falls increases patients' risk awareness, while 83 % disagreed it fosters frailty, fear, or loss of independence. About 75 % disagreed that assessing fall risk is overwhelming. Over 81 % felt capable of using behavior change strategies, and 78 % were not afraid to implement balance exercises for frail or high-risk patients. Half disagreed that they felt frustrated if a patient experiences a fall despite treatment. Nearly all (99 %) viewed PTs as essential on fall prevention teams, 90 % believed failing to address fall risk was negligent, 72 % viewed referrals as an ethical duty, and 56 % reported feeling powerless within a slow, bureaucratic referral system.

PTs' professional characteristics associated with the implementation of fall prevention best practices

Appendix 2 presents the results of the multinomial logistic regression examining factors associated with the frequency of implementing fall prevention best practices. Two factors, area of physical therapy practice and self-perceived currency with the literature, consistently distinguished between higher and lower frequencies of fall prevention best practices across all five behaviors. PTs not practicing in geriatrics had higher odds of reporting "never/rarely/sometimes" or "often" relative to "always" when asking about falls (OR: 4.07; 95 % CI: 1.85, 8.92), identifying (OR: 2.69; 95 % CI: 1.53, 4.72), documenting fall risk factors (OR: 2.44; 95 % CI: 1.52, 3.91), and providing interventions or recommendations (OR: 2.27; 95 % CI: 1.13, 4.56). Similarly, PTs who did not perceive themselves as up to date with the literature had higher odds of reporting "never/rarely/sometimes" or "often" relative to "always" when asking about falls (OR: 6.35; 95 % CI: 2.34, 17.25), identifying (OR: 2.73; 95 % CI: 1.40, 5.31), documenting fall risk factors (OR: 2.12; 95 % CI: 1.26, 3.56), providing interventions (OR: 5.41; 95 % CI: 2.38, 12.31), and referring to other healthcare professionals (OR: 2.13; 95 % CI: 1.30, 3.49). Time spent with patients also influenced practices: PTs spending <45 min had higher odds of reporting "never/rarely/sometimes" or "often" relative to "always" in providing interventions (OR: 3.35; 95 % CI: 1.04, 10.78) and referring patients (OR: 1.98; 95 % CI: 1.06, 3.70). Notably, PTs not practicing in orthopedics had lower odds of reporting "never/rarely/sometimes" or "often" relative to "always" when asking about falls (OR: 0.40; 95 % CI: 0.20, 0.83) and identifying fall risk factors (OR: 0.55; 95 % CI: 0.32, 0.97), suggesting that PTs in orthopedics are more likely to report suboptimal fall prevention practices.

Discussion

We described the clinical practices and barriers to implementing fall prevention best practices among 454 PTs in Brazil and identified professional characteristics influencing their use. Most PTs reported routinely asking patients about prior falls, identifying and documenting risk factors, and implementing targeted interventions. PTs commonly used recommended tools like the Timed Up and Go Test and Berg Balance Scale, along with evidence-supported interventions such as balance and strength training, consistent with prior studies.[14,15,37] PTs working in geriatrics with older people were more likely to frequently apply best practices, while those outside geriatrics had higher odds of infrequent implementation across several practices, including asking about falls, identifying risk factors, and providing interventions. PTs who did not feel up to date with fall prevention research were also more likely to report lower engagement in best practices. Additionally, PTs in orthopedics were more likely to report suboptimal practices for screening and identifying fall risk factors. Spending under 45 min with patients was linked to lower implementation of interventions and referrals. These findings highlight the importance of geriatricspecialization in geriatrics and gerontology, ongoing professional development, and sufficient time for effective fall prevention.

Overall, PTs in our study align with best practices in managing patients' fall risk.[38] However, some findings are worth noting. Although anxiety, depression, and urinary incontinence are linked to increased fall risk,[39,40] they are not commonly assessed by PTs. Similarly, less than half reported assessing chronic pain. In our prior study,[41] older adults identified pain as a key barrier to participating in fall prevention programs. Routinely assessing and managing pain may help PTs address both fall risk and treatment adherence. Over 68 % reported assessing home hazards and visual acuity, though it was unclear how they do so in practice. Lastly, there appears to be a misunderstanding of walking as a fall prevention strategy. About 65 % recommended walking to prevent falls, and over 76 % agreed it helps reduce fall risk by keeping older adults active. However, current evidence raises uncertainty about the effectiveness of walking programs as a standalone intervention for reducing falls.[9]

Compared with previous studies of PTs in Nigeria[14] and in the USA,[15] Brazilian PTs more often report asking patients about falls, identifying risk factors, and implementing interventions to address fall risk. However, USA PTs document fall risk factors more frequently than Brazilian PTs. In all three countries, referring patients to other HCPs remains the least performed strategy, with 43 % in Brazil, 20 % in Nigeria, and only 6 % in the USA reporting always or often doing so. In contrast to a previous study,[12] PTs in our study did not view time constraints or lack of environmental resources as barriers to managing falls. Interestingly, we found conflicting responses regarding older adults' behavior and its influence on PT practice. Although PTs cited patient adherence and perceptions about falls as key barriers, they largely disagreed that older patients fail to adhere to exercise or that missed sessions limit their work.

Our findings highlight that the role of PTs requires a wide range of competences and skills. Consistent with a previous qualitative study,[42] PTs recognize the need for skills in motivation and behavior change support, alongside their expertise in balance training. PTs also emphasized the importance of being active listeners and communicators, building trust and strong relationships with older patients to achieve success.[42] However, a previous systematic review[43] showed that PTs often apply only a limited number of behavior change techniques when promoting physical activity. One such technique is health coaching, shown to effectively increase physical activity in older adults.[44] Health coaching involves providers (i.e., PTs) applying knowledge and skills (including physical therapy, gerontology, and coaching expertise; interpersonal skills; patient-directed goals; and engagement strategies) to help individuals change lifestyle-related behaviors, mobilizing internal strengths and external resources for sustainable improvements in health and quality of life.[45] Although evidence on health coaching effects delivered by PTs is still unclear,[46] older adults have reported positive experiences with health coaching for promoting physical activity and preventing falls,[47] suggesting it may strengthen the PT–patient relationship and serve as both an engagement and maintenance strategy.[47]

Strength and limitations

The main strength of this study lies in the use of recommended online survey procedures and strong theory-based development. To our knowledge, this is the first rigorous, theory-informed survey investigating clinical practices and factors influencing the implementation of fall prevention best practices by PTs in Brazil. Additionally, our study achieved a relatively large sample compared to similar previous research. However, some limitations should be noted. As with virtual survey-based studies using convenience sampling, there is a risk of selection and response biases, potentially overrepresenting PTs more engaged or interested in fall prevention. Although we aimed to mitigate this by recruiting from various professional backgrounds, our sample was primarily composed of PTs working in geriatrics and home care

settings. Therefore, the findings may reflect the practices of this specialist subpopulation and may not fully generalize to the broader population of PTs working with older adults in other settings.

Conclusions

Overall, PTs in Brazil report practices aligned with fall prevention best practices in older adults. PTs who do not practice in geriatrics or who do not perceive themselves as up to date with the evidence were less likely to consistently ask about falls, identify and document risk factors, or implement interventions. Barriers to implementation were often related to older adults' reluctance to report falls or adhere to interventions. Using the TDF, our study lays a foundation for addressing evidence-to-practice gaps among PTs. To strengthen fall prevention strategies, future efforts should focus on improving access to continuing education, integrating behavioral strategies like health coaching, and developing system-level supports to enhance adherence to evidence-based care. Future research should assess whether these strategies effectively help PTs implement fall prevention practices more consistently across settings.

Declaration of competing interest

The authors declare no conflicts of interest.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.bjpt.2025.101252.

Appendix 1. Influences on the behaviour of physical therapists (PTs) to implement fall prevention best practices into clinical practice

COM-B domain	Statement	Level of agreement, n (%)				
		Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
Capability	Age increases the risk of falling, and for this reason, fall prevention is less effective in people aged 80 years or over.	116 (36)	141 (43)	22 (7)	34 (11)	12 (4)
Capability	Exercises that challenge the balance are not indicated for older adults with a high risk of falling	129 (40)	157 (48)	23 (7)	14 (4)	3 (1)
Capability	Walking is a recommended exercise to reduce the risk of falling as it makes older adults more active and less sedentary	4 (1)	30 (9)	43 (13)	178 (55)	71 (22)
Capability	I know how to evaluate the influence of cognitive factors on the risk of falling in my patients	6 (2)	41 (13)	88 (27)	156 (48)	35 (11)
Capability	I have difficulties motivating older adults to regularly perform exercises to address falls	57 (18)	137 (42)	56 (17)	71 (22)	4 (1)
Capability	If the older adult has a good functional status, I don't think it is very necessary to ask about their history of fall	189 (58)	119 (37)	8 (3)	9 (3)	1 (0.3)
Capability	I will not assess the risk of fall if I believe there are more important things	163 (50)	28 (39)	19 (6)	14 (4)	2 (1)
Capability	I only conduct a falls assessment for patients with a history of previous fall	164 (50)	124 (38)	26 (8)	11 (3)	1 (0.3)
Capability	I ask about the occurrence of falls for every older patient, regardless of the reason of the consultation	5 (2)	27 (8)	14 (4)	112 (35)	166 (51)
Capability	Every patient aged 60 years or over should undergo a standardized falls risk assessment	0 (0)	15 (5)	30 (9)	127 (39)	153 (47)
Motivation	I feel capable of using behavior change strategies to change risky behaviors of my older patients (e.g., use of appropriate footwear, climbing on chairs to access out of reach places)	4 (1)	19 (6)	36 (11)	173 (53)	94 (29)
Motivation	I believe I am capable of planning an ideal exercise program that reduces my patients' risk of falling	2 (1)	25 (8)	35 (11)	196 (60)	68 (21)
Motivation	When I identify risk factors that are the responsibility of other professionals, I feel comfortable, capable, and confident in referring my patient to other healthcare professionals	0 (0)	12 (4)	27 (8)	177 (54)	110 (34)
Motivation	Discussing about falls in a consultation helps older adults to perceive their risk of falling	0 (0)	5 (1)	23 (7)	177 (55)	120 (37)
Motivation	Discussing about falls will reinforce frailty, fear of falling, or loss of independence in my patients	124 (38)	146 (45)	31 (10)	18 (6)	7 (2)
Motivation	I make sure I give correct information to my patients about how to safely exercise, and perform daily and recreational activities considering the risk of falling	1 (0.3)	5 (2)	8 (3)	153 (47)	158 (49)
Motivation	I would like to learn how to use the recommended tests and scales to assess the risk of falling with my patients	1 (0.3)	10 (3)	43 (13)	154 (47)	118 (36)
Motivation	I am very optimistic about reducing the risk of falling of my older patients. I think my treatment outcomes are always positive	2 (1)	37 (11)	104 (32)	153 (47)	30 (9)
Motivation	When a patient report having a fall, conducting a detailed assessment and implementing interventions becomes a priority to me	2 (1)	11 (3)	41 (13)	161 (50)	110 (34)
Motivation	If my patient suffers a fall, I feel frustrated as if my work is not being effective	36 (11)	133 (41)	79 (24)	64 (20)	13 (4)

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COM-B domain	Statement	Level of agreement, n (%)				
		Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
Motivation	I would be overwhelmed in my work schedule if having to conduct an additional assessment like the risk of falling	98 (30)	146 (45)	42 (13)	32 (10)	8 (3)
Motivation	I am afraid of implementing balance exercises for frail patients or patients with high risk of falling	83 (30)	171 (53)	36 (11)	34 (10)	2 (1)
Motivation	I get frustrated and feel powerless because the referring system in the healthcare system is slow and bureaucratic	9 (3)	34 (11)	102 (31)	126 (39)	54 (17)
Motivation	When I identify some risk factor for fall in my patients, I make sure they understand it could result in a fall in the future	2 (1)	5 (2)	15 (5)	164 (51)	139 (43)
Motivation	In a fall prevention team, it is essential to have a physical therapist	0 (0)	1 (0.3)	2 (1)	52 (16)	268 (83)
Motivation	A physical therapist would be negligent if not targeting the risk of falling	2 (1)	5 (2)	23 (7)	129 (40)	167 (51)
Motivation	In patients with a previous history of falls, it is an ethical responsibility referring patients to other HCPs to manage their risk	3 (1)	17 (5)	70 (22)	159 (49)	77 (24)
Opportunity	In my area of professional specialization, there are other health conditions more urgent than falls	76 (23)	130 (40)	86 (26)	29 (9)	5 (2)
Opportunity	In my workplace, the sessions have a pre-defined duration and I have to prioritize interventions, not leaving enough time to discuss about falls	104 (32)	129 (40)	56 (17)	27 (8)	9 (3)
Opportunity	In my workplace, the physical environment makes it difficult to conduct tests to assess the risk of falling	82 (25)	116 (36)	49 (15)	59 (18)	17 (5)
Opportunity	In my workplace, performing appropriate exercises to prevent falls it is difficult given the lack of materials, equipment, and time.	108 (33)	114 (35)	39 (12)	54 (17)	11 (3)
Opportunity	My workload makes it difficult to refer my patients to other HCPs due to my lack of time for discussing the cases or providing reports	86 (26)	161 (49)	49 (15)	24 (7)	6 (2)
Opportunity	It is no use conducting a falls risk assessment as I can not refer them to other HCPs	118 (36)	163 (50)	31 (10)	12 (4)	1 (0.3)
Opportunity	My older patients perceive falls as a normal part of aging	24 (7)	97 (30)	63 (19)	125 (38)	17 (5)
Opportunity	Older adults feel monitored when asked if they have fallen making it difficult to establish a trustworthy connection	51 (16)	159 (49)	66 (20)	44 (14)	6 (2)
Opportunity	My patients follow my recommendations for home modifications (e.g., increasing the lighting, taking off mats/rugs, installing safety bars and handrails)	2 (1)	42 (13)	123 (38)	141 (43)	17 (5)
Opportunity	Older adults do not adhere to exercises	30 (9)	143 (44)	103 (32)	48 (15)	1 (0.3)
Opportunity	Older adults miss a lot of sessions which limits my work	63 (19)	169 (52)	63 (19)	28 (9)	1 (0.3)

Appendix 2. Multinomial logistic regression identifying the relationship between frequency of fall prevention best practices and qualification, time spent with patients, area of physical therapy, knowledge about clinical practice guidelines, and perceived up to date with evidence

	R^2	Never, rarely, or sometimes vs always [ref.] (OR [95 %CI])	Often vs always [ref.] (OR [95 %CI])
Ask older adults if they have a history of falls	.225		
Bachelor's degree vs postgraduate (ref.)		1.12 (0.38, 3.27)	**5.56 (2.26, 13.64)**
Specialist vs postgraduate (ref.)		0.68 (0.30, 1.55)	**2.70 (1.24, −5.86)**
Not practicing in geriatrics vs practicing (ref.)		**4.07 (1.85, 8.92)**	**2.82 (1.65, 4.83)**
Not practicing in orthopedics vs practicing (ref.)		**0.40 (0.20, 0.83)**	0.68 (0.40, 1.16)
Not practicing in neurological vs practicing (ref.)		**3.03 (1.11, 8.30)**	1.35 (0.73, 2.50)
Not considered up to date vs up to date (ref.)		**6.35 (2.34, 17.25)**	1.48 (0.85, 2.59)
Identify risk factors for falls	.148		
Not practicing in geriatrics vs practicing (ref.)		**2.69 (1.53, 4.72)**	**1.90 (1.23, 2.93)**
Not practicing in orthopedics vs practicing (ref.)		**0.55 (0.32, 0.97)**	0.67 (0.43, 1.03)
Unaware of guidelines vs using guidelines (ref.)		**2.50 (1.15, 5.42)**	1.62 (0.95, 2.76)
Knowledge about guidelines vs using guidelines (ref.)		1.14 (0.42, 3.07)	1.26 (0.67, 2.36)
Not considered up to date vs up to date (ref.)		**2.73 (1.40, 5.31)**	1.14 (0.71, 1.81)
Document risks factors for falls	.200		
Not practicing in geriatrics vs practicing (ref.)		**2.44 (1.52, 3.91)**	0.72 (0.44, 1.21)
Unaware of guidelines vs using guidelines (ref.)		**3.50 (1.91, 6.40)**	**1.91 (1.05, 3.47)**
Knowledge about guidelines vs using guidelines (ref.)		1.33 (0.60, 2.94)	**2.40 (1.23, 4.67)**
Not considered up to date vs up to date (ref.)		**2.12 (1.26, 3.56)**	1.21 (0.72, 2.03)
Provide interventions or recommendations	.217		
Time spent with patient			
<45 min vs over 1 h (ref.)		**3.35 (1.04, 10.78)**	1.44 (0.72, 2.88)
Between 45 min and 1 h vs over 1 h (ref.)		1.33 (0.41, 4.24)	0.86 (0.45, 1.64)
Not practicing in geriatrics vs practicing (ref.)		**2.27 (1.13, 4.56)**	**1.71 (1.07, 2.71)**
Not practicing in neurological vs practicing (ref.)		**3.95 (1.45, 10.71)**	1.56 (0.92, 2.64)
Not considered up to date vs up to date (ref.)		**5.41 (2.38, 12.31)**	**4.33 (2.61, 7.18)**
Refer to other healthcare professionals	.103		
Time spent with patient			
<45 min vs over 1 h (ref.)		1.67 (0.81, 3.44)	**3.01 (1.26, 7.17)**
Between 45 min and 1 h vs over 1 h (ref.)		**1.98 (1.06, 3.70)**	1.24 (0.56, 2.70)

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	R^2	Never, rarely, or sometimes vs always [ref.] (OR [95 %CI])	Often vs always [ref.] (OR [95 %CI])
Not practicing in geriatrics vs practicing (ref.)		0.97 (0.60, 1.57)	**0.54 (0.29, 0.98)**
Not practicing in intensive care, cardiorespiratory vs practicing (ref.)		1.52 (0.85, 2.70)	**2.60 (1.22, 5.51)**
Not considered up to date vs up to date (ref.)		**2.13 (1.30, 3.49)**	0.90 (0.49, 1.65)

Abbreviations: ref. reference.

References

1. James SL, et al. The global burden of falls: global, regional and national estimates of morbidity and mortality from the Global burden of disease study 2017. *Inj Prev*. 2020;26:i3–i11.
2. Hopewell S, et al. Multifactorial and multiple component interventions for preventing falls in older people living in the community. *Cochrane Database Syst Rev*. 2018;7, CD012221.
3. World Health Organization. WHO global report on falls prevention in older age. Comm Health (2007).
4. Park SH. Tools for assessing fall risk in the elderly: a systematic review and meta-analysis. *Aging Clin Exp Res*. 2018. https://doi.org/10.1007/s40520-017-0749-0. Preprint at.
5. Wang-Hsu E. *Outcome Measure Toolkit For Geriatric Fall/Balance Assessment*. Apta; 2019.
6. Beck Jepsen D, et al. Predicting falls in older adults: an umbrella review of instruments assessing gait, balance, and functional mobility. *BMC Geriatr*. 2022;22:615.
7. Montero-Odasso M, et al. World guidelines for falls prevention and management for older adults: a global initiative. *Age Ageing*. 2022;51:afac205.
8. Ld, G. et al. Interventions for preventing falls in older people living in the community (Review). (2012).
9. Sherrington C, et al. Exercise for preventing falls in older people living in the community. *Cochrane Database Syst Rev*. 2019;1, CD012424.
10. Lord SR, Sherrington C, Cameron ID, Close JCT. Implementing falls prevention research into policy and practice in Australia: past, present and future. *J Saf Res*. 2011. https://doi.org/10.1016/j.jsr.2010.11.008.
11. Lovarini M, Clemson L, Dean C. Sustainability of community-based fall prevention programs: a systematic review. *J Saf Res*. 2013. https://doi.org/10.1016/j.jsr.2013.08.004.
12. van Rhyn B, Barwick A. Health practitioners' Perceptions of falls and fall prevention in older people: a metasynthesis. *Qual Health Res*. 2019;29.
13. Martin JT, et al. The effectiveness of physical therapist-administered group-based exercise on fall prevention: a systematic review of randomized controlled trials. *J Geriatr Phys Ther*. 2013;36.
14. Kalu ME, Vlachantoni A, Norman KE. Knowledge about risk factors for falls and practice about fall prevention in older adults among physiotherapists in Nigeria. *Physiother Res Int*. 2019. https://doi.org/10.1002/pri.1742.
15. Peel C, Brown CJ, Lane A, Milliken E, Patel K. A survey of fall prevention knowledge and practice patterns in home health physical therapists. *J Geriatr Phys Ther*. 2008. https://doi.org/10.1519/00139143-200831020-00005.
16. Vincenzo JL, et al. Physical therapists as partners for community fall risk screenings and referrals to community programs. *Front Public Health*. 2021;9.
17. Damschroder LJ, et al. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implement Sci*. 2009;4:50.
18. Rycroft-Malone J, et al. Getting evidence into practice: ingredients for change. *Nurs Stand R Coll Nurs G B 1987*. 2002;16:38–43.
19. Rycroft-Malone J. The PARIHS Framework—A framework for guiding the implementation of evidence-based practice. *J Nurs Care Qual*. 2004;19:297.
20. Atkins L, et al. A guide to using the Theoretical Domains Framework of behaviour change to investigate implementation problems. *Implement Sci*. 2017;12:77.
21. Cane J, O'Connor D, Michie S. Validation of the theoretical domains framework for use in behaviour change and implementation research. *Implement Sci*. 2012. https://doi.org/10.1186/1748-5908-7-37.
22. Michie S, Johnston M, Francis J, Hardeman W, Eccles M. From theory to intervention: mapping theoretically derived behavioural determinants to behaviour change techniques. *Appl Psychol*. 2008. https://doi.org/10.1111/j.1464-0597.2008.00341.x.
23. Eysenbach G. Correction: improving the quality of web surveys: the checklist for reporting results of internet E-surveys (CHERRIES). *J Med Internet Res*. 2012. https://doi.org/10.2196/jmir.2042.
24. Vandenbroucke JP, Poole C, Schlesselman JJ, Egger M. Strengthening the reporting of observational studies in epidemiology (STROBE): explanation and elaboration. *PLoS Med*. 2007;4.
25. Biernacki P, Waldorf D. Snowball sampling: problems and techniques of chain referral sampling. *Sociol Methods Res*. 1981. https://doi.org/10.1177/004912418101000205.
26. Eysenbach G, Wyatt J. Using the internet for surveys and health research. *J Med Internet Res*. 2002;4. https://doi.org/10.2196/jmir.4.2.e13. Preprint at.
27. Jaafar MH, Mat S, MacKenzie L, Tan MP. Perceptions of Family physicians about fall risk screening, fall risk assessment, and referral practices for fall prevention in Malaysia. *Top Geriatr Rehabil*. 2020;36. https://doi.org/10.1097/TGR.0000000000000252. Preprint at.
28. Burns KEA, et al. A guide for the design and conduct of self-administered surveys of clinicians. *CMAJ*. 2008. https://doi.org/10.1503/cmaj.080372. Preprint at.
29. Farag I, Howard K, Ferreira ML, Sherrington C. Economic modelling of a public health programme for fall prevention. *Age Ageing*. 2015. https://doi.org/10.1093/ageing/afu195.
30. Pochmann, M., Santos, F.V., Pereira, C.A., Stenner, C. & Mazoni, M.V.F. Instituto Brasileiro de Geografia e Estatística - Ibge.
31. Atkins L, et al. A guide to using the Theoretical Domains Framework of behaviour change to investigate implementation problems. *Implement Sci*. 2017. https://doi.org/10.1186/s13012-017-0605-9.
32. Matsumura ESDS, et al. Distribuição territorial dos profissionais fisioterapeutas no Brasil. *Fisioter Pesqui*. 2018;25:309–314.
33. Aquino CF, et al. Current clinical practice and return-to-sport criteria after anterior cruciate ligament reconstruction: a survey of Brazilian physical therapists. *Braz J Phys Ther*. 2021;25:242–250.
34. Claudino R, de Pietro Simoes N, da Silva T. Evidence-based practice: a survey of Brazilian physical therapists from the dermatology subdiscipline. *Braz J Phys Ther*. 2019;23:395–401.
35. Mazuquin B, Trede RG, Camargo PR. An online survey of clinical practice of Brazilian physical therapists on rehabilitation following rotator cuff repair. *J Clin Orthop Trauma*. 2021;17:143–148.
36. Xavier de Araujo F, Schell Maurício Scholl, Rosa Carolina Gomes, Ribeiro Daniel Cury, Silva MF. Knowledge and use of extrinsic feedback characteristics: a survey of current practice among Brazilian physical therapists. *Physiother Theory Pr*. 2023;39:384–394.
37. Asiri F, et al. Fall prevention knowledge and practice patterns among home healthcare professionals in southern Saudi Arabia: an observational study. *J Int Med Res*. 2018;46.
38. Montero-Odasso MM, et al. Evaluation of clinical practice guidelines on fall prevention and management for older adults a systematic review msc; for the task force on global guidelines for falls in older adults + supplemental content. *JAMA Netw Open*. 2021;4, 2138911.
39. Payette, M.-C., Bélanger, C., Léveillé, V. & Grenier, S. Fall-related psychological concerns and anxiety among community-dwelling older adults: systematic review and meta-analysis. (2016) doi:10.1371/journal.pone.0152848.
40. Moon, S. et al. The impact of urinary incontinence on falls: a systematic review and meta-analysis. (2021) doi:10.1371/journal.pone.0251711.
41. dos Santos RB, et al. Older adults' views on barriers and facilitators to participate in a multifactorial falls prevention program: results from Prevquedas Brasil. *Arch Gerontol Geriatr*. 2021. https://doi.org/10.1016/j.archger.2020.104287.
42. Cerderbom S, Bjerk M, Bergland A. The tensions between micro-, meso- and macro-levels: physiotherapists' views of their role towards fall prevention in the community - a qualitative study. *BMC Health v Res*. 2020;20.
43. Kunstler BE, et al. Physiotherapists use a small number of behaviour change techniques when promoting physical activity: a systematic review comparing experimental and observational studies. *J Sci Med Sport*. 2018;21:609–615.
44. Oliveira JS, Sherrington C, Amorim AB, Dario AB, Tiedemann A. What is the effect of health coaching on physical activity participation in people aged 60 years and over? A systematic review of randomised controlled trials. *Br J Sports Med*. 2017;51:1425–1432.
45. A systematic review of the literature on health and wellness coaching: defining a key behavioral intervention in healthcare. https://journals.sagepub.com/doi/epdf/10.7453/gahmj.2013.042?src=getftr.
46. Rethorn ZD, Pettitt CD. What is the effect of health coaching delivered by physical therapists? A systematic review of randomized controlled trials. *Phys Ther*. 2019;99:1354–1370.
47. Haynes A, et al. Someone's got my back": older People's experience of the Coaching for healthy ageing program for promoting physical activity and preventing falls. *J Aging Phys Act*. 2020;29:296–307.