


RESEARCH ARTICLE

Knowledge about foot-specific foot falls risk factors and exercise among physiotherapists in the UK and Portugal: A cross-sectional survey

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Abstract

Background and purpose: Foot-related falls risk factors and specific foot and ankle exercise interventions are within the scope of Physiotherapy, yet little is known about United Kingdom (UK) and Portugal-based (PT) physiotherapists' self-perceived knowledge, confidence and practice of such interventions, or perceptions of patients' falls prevention knowledge. The purpose of this study was to assess levels of self-reported knowledge, confidence, and practices surrounding foot-specific falls risk and exercise for fall prevention in physiotherapists working in the UK and in Portugal. It also aimed to explore physiotherapists' views about their participants' falls prevention knowledge.

Methods: A self-report online survey was developed, and pilot tested in both nations. Registered Physiotherapists were invited to participate through their professional associations, social media and snowballing. Mann-Whitney tests were used to compare mean ranks of ordinal variables between nations and Chi-square test to assess the independency between pairs of variables. Spearman's correlation coefficient (r_s) was used to measure the association between pairs of variables ($p < 0.05$).

Results: 682 physiotherapists participated in the survey [UK $n = 229$ (mean (SD) age = 43(10) years, 86.9% female); PT $n = 453$ (mean (SD) age = 33(9) years, 78.3% female)]. Among physiotherapists with a caseload of $\geq 70\%$ older adults, more PT-based physiotherapists held postgraduate qualifications ($p = 0.01$). Most physiotherapists correctly identified generic and foot-specific risk factors ($\geq 70\%$ of participants for each item). More UK-based physiotherapists reported always prescribing ankle and foot exercises (42.6% vs. 33%, $p = < 0.001$) and displayed higher levels of self-reported confidence surrounding exercise-based interventions.

Discussion: Our sample of UK and Portugal-based physiotherapists are aware of the contribution of foot-specific risk factors and exercise to falls prevention, with the former group being more confident in exercise-based interventions. Both groups of physiotherapists perceived that their older patients had little knowledge about

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these topics, with UK older adults having slightly better knowledge on generic falls risk factors at first contact. Future studies and strategies for knowledge translation and education in foot health and foot function screening and management for physiotherapists, within a falls prevention scope, may be informed by this study.

KEYWORDS

exercise, falls, foot, older adults, physiotherapy

1 | INTRODUCTION

Falls are a serious health condition faced by older adults in the United Kingdom (UK) (Craig et al., 2013; Public Health England, 2017) and Portugal (Roth et al., 2018). Foot-related falls risk factors such as hallux valgus, lesser toe deformity and foot pain, may increase falls risk (Menz et al., 2018). Lower limb, ankle and foot exercise programmes appear beneficial to older people at risk of falling (Schwenk et al., 2013), with evidence supporting a reduction in the number of falls when integrated into multifaceted podiatry interventions (Wylie et al., 2019).

Physiotherapy practice should be informed by the best available evidence (Scurlock-Evans et al., 2014). Assessment of falls risk factors and delivery of exercise interventions are within the scope of physiotherapy with ageing populations (Sherrington & Tiedemann, 2015). This field is very well established in the UK, with British guidance (Goodwin & Briggs, 2012; Public Health England, 2017), and practice serving as a reference to Portugal and other nations. Despite having a very different professional scope landscape, Portugal has published an action plan for Physiotherapy in falls prevention in primary care settings (Barbosa et al., 2020). Nevertheless, it is important to determine to what extent these initiatives are successful in informing practice. Physiotherapists' knowledge of risk factors for falls or falls prevention strategies in Portugal remains uncertain. Moreover, little is known about the knowledge and views of foot-related risk factors and exercise interventions for falls prevention of physiotherapists working in the UK or Portugal.

Since UK guidance and practice informed the Portuguese falls action plan (Barbosa et al., 2020) and a qualitative study pointed that British and Portuguese older adults' knowledge and preventive behaviours regarding these topics were influenced by healthcare professionals' messages (including physiotherapists) (Conde et al., 2020), comparing physiotherapists from both nations seems relevant and timely. Hence, the main aim of this study was to compare self-reported knowledge, confidence, and practice surrounding general and foot-specific falls risk, exercise for falls prevention among physiotherapists working in the UK and in Portugal. Perceived factors relating to the patient's presentation may be seen as a barrier to effective patient education by physiotherapists (Forbes et al., 2017). Therefore, a secondary aim was to compare physiotherapists' views of the knowledge of the older people they work with regarding those aspects.

2 | METHODS

2.1 | Design

A cross-sectional online survey was undertaken in the UK and in Portugal. Ethical approval was received from the School of Health and Life Sciences Research Ethics Committee of Glasgow Caledonian University (HLS/PSWAHP/17/147). Submission of an anonymous survey was considered informed consent.

2.2 | Participants

A non-randomized, purposive convenience sampling strategy was implemented, as only members of the specific population of interest were invited to take part (Fink, 2015). Registered physiotherapists working in either the UK or Portugal were invited to undertake this survey. Physiotherapy students, physiotherapy assistants and other professionals were excluded.

2.3 | Recruitment

Recruitment strategies varied between nations due to contextual differences (e.g., organisation of the professional associations). Invitations were posted on Facebook Groups and twitter. Portugal physiotherapists were very engaged with Facebook groups, while Twitter was predominately used by UK physiotherapists and organisations. Snowballing and word of mouth also happened in both nations.

Memberships of professional associations are suitable sampling frame for studies whenever participants are members of professional groups (Denscombe, 2010). Therefore, we have primarily recruited participants through the physiotherapy associations of each nation.

2.3.1 | United Kingdom

All members of the Chartered Society of Physiotherapy (CSP) specialist section for physiotherapists working with older adults (AGILE) (1058 email addresses) and of the Association of Foot & Ankle Physiotherapists (831 email addresses) were invited by email and through twitter. Invitations were also posted at the Interactive

CSP (ICSP) online forum of the website of the CSP, which acts as the professional, educational and trade union body for physiotherapists, students and therapy support workers in the UK.

2.3.2 | Portugal

All members of the Portuguese Association of Physiotherapists (APFISIO), the only association representing physiotherapists in Portugal at the time of the study, were invited by email (1000 email addresses). There were no specific special interest groups for those working with older adults that were active at the time of data collection.

2.4 | Survey development

The survey was developed considering the latest evidence related to foot risk factors and exercise for falls prevention in community-dwelling older adults, and was informed by two previous surveys (Kalu et al., 2018; Peel et al., 2008). A total of 28 questions were included. Most questions were closed-ended and were designed to obtain information that focused on knowledge, views and self-reported practice behaviour of physiotherapists and their views of their older patients' knowledge. The first section collected demographic information (seven questions), including age, academic qualifications and caseload of older adults. The second section referred to physiotherapist's knowledge about foot health and foot function risk factors for falls; general risk factors for falls; effective physical exercise interventions for falls prevention, and their current practice (17 questions). Finally, the third section sought the views of the physiotherapists about their patients' knowledge on foot health and falls prevention (four questions) (Supplementary data).

Closed-ended questions were employed as these permit uniform communication of analogous meanings by using the same sets of answers, and are less time-consuming for respondents (de Vaus, 2014; Fink, 2015). Horizontal semantic differential scales were adopted to elicit responses (de Vaus, 2014). All these features are desirable when conducting the same survey in two nations with different idioms.

The first English version was developed by the researcher with inputs from two other researchers, both experienced in survey development. The consensus version was then peer-reviewed by three UK physiotherapists to check for face validity and ease of use. A small number of changes to wording and one additional question was added based on their feedback. This final version was then translated to European Portuguese by the researcher and proofread by a professional translator. This was then back translated and compared to the English version. Peer review by three Portuguese physiotherapists was undertaken to ascertain cultural adequateness and ease of use. The inclusion of a glossary of technical terms was added to improve reliability of collected data.

The final versions of the survey were transferred to Research Electronic Data Capture (REDCap™) electronic data capture tool for pilot testing by four physiotherapists in each nation. Any issues with online survey procedures or/and dissemination routes were corrected accordingly.

2.5 | Data collection

Data were collected and managed with REDCap™ secure, web-based application hosted at University (Harris et al., 2009, 2019). Surveys were open for 5 weeks (June-August 2019). No sample size was pre-specified.

2.6 | Data analyses

Surveys with $\geq 50\%$ of missing data were excluded. Data was exported from REDCap™ to SPSS IBM® software version 25.0 for Windows (SPSS Inc., Chicago, IL). Descriptive analyses provided an overview of the survey responses. Mann-Whitney tests were used to compare mean ranks of ordinal variables between nations and Chi-square test to assess the independency between pairs of variables. Spearman's correlation coefficient (r_s) was used to measure the association between pairs of variables. Independent *t*-tests were also applied to compare age and years since qualification between nations. A Bonferroni correction was applied to all statistically significant results of the comparison of the variables related to the identification of falls risk factors and self-reported knowledge, confidence and practice. The significance level was set at $p < 0.05$. A sub-group analysis of physiotherapists with a caseload of $\geq 70\%$ of older adults was performed (Item 6 on the survey). This was pre-specified as it might be expected that those with a caseload that was predominantly older adults would have more experience and understanding about risk factors for falls and the impact of falls on an older population. Within the UK we were able to target recruitment at those physiotherapists who did have this older adult caseload but within Portugal it was not possible to target recruitment and it was therefore important to know if knowledge and awareness differed in those that did or did not work mainly with older adults. Categories were created from all open text replies on followed policy/guidance on falls prevention (question 17).

3 | RESULTS

690 surveys were submitted. After quality check, eight surveys (seven in Portugal and 1 in the UK) with $\geq 50\%$ of missing data were excluded. Therefore, a total of 682 physiotherapists participated in the survey, 229 respondents in the United Kingdom and 453 respondents in Portugal. It was not possible to calculate a response rate as the request to complete the survey went out via a number of recruitment routes. However, as a percentage of UK based

physiotherapists who received a specific email to contribute, the response was 12.1% (229/1889), and in Portugal it was 45.3% (453/1000).

3.1 | Characterization of the participants

The Portugal-based sample had a larger proportion of male physiotherapists (Table 1). UK-based physiotherapists were older, had been practising physiotherapy for longer and worked with a greater percentage of older patients. The Portugal group of physiotherapists working with a caseload of $\geq 70\%$ older adults had significantly higher academic qualifications than their UK counterparts.

Most respondents identified gait and balance impairment, lower limb muscle weakness, reduced ankle range of movement (ROM), toe flexor weakness and disabling foot pain as significant risk factors for falls, in both nations (Table 2). A greater proportion of UK-based physiotherapists identified hallux valgus as a risk factor ($p = 0.01$ and $p = 0.03$ respectively) (Table 2).

Most UK and Portugal-based physiotherapists felt that foot health (UK 73.5% vs. PT 62.8%) and foot function (UK 73% vs. PT 75.4%) were 'very important' falls risk factors, but UK-based physiotherapists were more likely to perceive foot health as a risk factor for falls ($p = 0.01$) (Table 3).

Only a minority of physiotherapists reported adopting the inquired footcare practices regularly. UK-based physiotherapists reported inspecting their older patients' feet ('always or almost always' UK 36.5% vs. PT 23.5%) and providing footwear advice in relation to

falls risk ('always or almost always' UK 51.3% vs. PT 44.2%) more often (Table 3). There was a statistically significant difference in perceived confidence to screen for foot health (confident or very confident UK 49.6% vs. Portugal 38%, $p = < 0.001$) (Table 3). No differences were seen when considering physiotherapists with a caseload $\geq 70\%$ of older adults (Table 3).

UK-based physiotherapists were more likely to refer older patients with foot problems to a podiatrist ($p = < 0.001$), an orthotist ($p = < 0.001$) or other health professional ($p = 0.003$). In Portugal, physiotherapists described being more likely to refer to medical doctor ($p = < 0.001$) or another (specialist) physiotherapist ($p = < 0.001$) (Table 3). No differences on the referral to podiatrists and other health professionals were shown by caseload consideration (Table 3).

The two national groups generally considered that their entry-level physiotherapy qualification provided them with some knowledge on interventions for falls prevention; with significantly more physiotherapists in Portugal considering it had provided them with enough knowledge (very knowledgeable 32% PT vs. 5% UK, $p = < 0.001$) for both the full sample, and the caseload sub analysis ($p = < 0.001$) (Table 3). Conversely, UK-based physiotherapists had a significantly better perceived knowledge of evidence-based interventions for falls prevention (very knowledgeable 40.9% vs. 12.4%, $p = < 0.001$). No differences were shown for caseload of $\geq 70\%$ (Table 3). Finally, in response to the open question about policy and guidance, most UK-based physiotherapists reported (72.6%) following policy/guidance on falls prevention, whereas most Portugal-based physiotherapists (80.1%) admitted not following specific guidance (Supplementary data Table S1).

TABLE 1 Characteristics of respondents in both nations

		Full sample			Caseload $\geq 70\%$ of older adults		
		Portugal	UK	<i>p</i>	Portugal	UK	<i>p</i>
Age (years)	Mean (SD)	33 (9) [<i>n</i> = 452]	43 (10) [<i>n</i> = 226]	<0.001*	32.97 (8.3) [<i>n</i> = 229]	43.48 (9.7) [<i>n</i> = 166]	<0.001*
Sex							
Female	<i>n</i> (%)	354 (78.3)	199 (86.9)	0.01**	190 (83)	151 (91.0)	0.03**
Male	<i>n</i> (%)	98 (21.7)	30 (13.1)		39 (17)	15 (9.0)	
Years since entry-level qualification	Mean (SD)	10 (8) [<i>n</i> = 452]	19 (10) [<i>n</i> = 230]	< 0.001*	10.11 (8.08) [<i>n</i> = 229]	19.54 (10.42) [<i>n</i> = 166]	< 0.001*
Highest academic qualification		[<i>n</i> = 452]	[<i>n</i> = 229]		[<i>n</i> = 229]	[<i>n</i> = 165]	
Diploma	<i>n</i> (%)	13 (2.9)	27 (11.8)	0.31***	7 (3.1)	22 (13.3)	0.01***
Bachelors	<i>n</i> (%)	261 (57.7)	115 (50.2)		125 (54.6)	89 (53.6)	
Postgraduate certificate/diploma	<i>n</i> (%)	84 (18.6)	28 (12.2)		46 (20.1)	19 (11.4)	
Masters degree	<i>n</i> (%)	87 (19.2)	52 (22.7)		48 (21.0)	30 (18.1)	
PhD/Professional doctorate	<i>n</i> (%)	7 (1.5)	7 (3.1)		3 (1.3)	5 (3.0)	
Physiotherapy practice with older adults (%)	Mean (SD)	70 (25) [<i>n</i> = 452]	86 (25) [<i>n</i> = 230]	< 0.001*	81 (9.0) [<i>n</i> = 229]	90 (9.0) [<i>n</i> = 166]	< 0.001*

Note: * Independent samples' *t*-test. **Fisher exact test. *** Mann-Whitney's test. The numbers within square brackets represent the number of respondents for each question/item.

TABLE 2 Falls risk factors identified by physiotherapists

		Full sample			Caseload ≥70% of older adults		
		PT	UK	<i>p</i>	UK ^a	PT ^a	<i>p</i> ^a
Number of risk factors identified	Mean (SD)	9 (1) [n = 435]	9 (1) [n = 216]	0.930 *	9 (0.1) [n = 157]	9 (0.97) [n = 219]	0.724 *
Risk factors (*)							
Hallux valgus	<i>n</i> (%)	337 (74.7) [n = 451]	191 (83.4) [n = 229]	0.110** ^b	141 (85.5) [n = 165]	175 (76.4) [n = 229]	0.330** ^b
Lesser toe deformities	<i>n</i> (%)	367 (81.7) [n = 449]	173 (76.5) [n = 226]	0.130 **	127 (77.9) [n = 165]	185 (81.5) [n = 227]	0.440 **
Pes planus/flat feet	<i>n</i> (%)	345 (76.5) [n = 451]	160 (70.2) [n = 228]	0.080 **	123 (74.5) [n = 165]	183 (79.9) [n = 229]	0.220 **
Disabling foot pain	<i>n</i> (%)	444 (98.4) [n = 451]	228 (99.6) [n = 229]	0.280 **	164 (99.4) [n = 165]	226 (98.7) [n = 229]	0.640 **
Reduced ankle ROM	<i>n</i> (%)	444 (98.7) [n = 450]	227 (98.7) [n = 230]	1.000 **	164 (98.8) [n = 166]	227 (99.1) [n = 229]	1.000 **
Lower limb muscle weakness	<i>n</i> (%)	450 (99.8) [n = 451]	229 (100.0) [n = 229]	1.000 **	166 (100.0) [n = 166]	229 (100) [n = 229]	1.000 **
Ankle muscle weakness	<i>n</i> (%)	447 (99.8) [n = 448]	229 (100.0) [n = 229]	1.000 **	166 (100.0) [n = 166]	227 (99.8) [n = 227]	1.000 **
Toes flexors weakness	<i>n</i> (%)	430 (96.6) [n = 445]	213 (94.2) [n = 226]	0.160 **	155 (95.1) [n = 163]	217 (96.4) [n = 225]	0.510 **
Gait impairment	<i>n</i> (%)	447 (99.3) [n = 450]	229 (100.0) [n = 229]	0.560 **	166 (100.0) [n = 166]	227 (99.1) [n = 229]	0.510 **
Balance impairment	<i>n</i> (%)	447 (99.8) [n = 448]	229 (100.0) [n = 229]	1.000 **	165 (100.0) [n = 165]	225 (99.6) [n = 226]	1.000 **

Note: PT, Portugal. ^asubgroup analysis of participants with a caseload of ≥70% of older adults; (*) Selected as “Potential falls risk factor” or “Falls risk factor”; *T-independent; ** Fisher test; ^bResult after Bonferroni Correction. The numbers in square brackets represent the number of respondents in each question/item.

UK-based physiotherapists were significantly more likely to pursue further education on falls prevention ($p < 0.001$), including when caseload was considered ($p \leq 0.05$) (Supplementary Table S2). Self-learning (21% Portugal vs. 83% UK) was the most frequent educational strategy in the two nations (Supplementary data Table S2).

UK-based physiotherapists more frequently reported implementing evidence-based exercise programs (“always” 48% UK vs. 20% PT, $p < 0.001$); including lower limb (“always” % UK vs. 52.9% PT, $p = 0.014$) and foot and ankle exercises in their interventions (“always” 42.6% UK vs. 33% PT, $p < 0.001$) and recommending home-based exercises to their older clients (“always” 69% UK vs. 51% PT, $p < 0.001$) (Table 4). No differences were seen for including foot and ankle exercises for those with a caseload of ≥70% of older adults (Table 4). UK-based physiotherapists reported being very confident in adjusting (delivering, tailoring and progressing - all around 50%) exercise-based interventions for falls prevention, whereas Portugal-based physiotherapists demonstrated being less confident about these aspects (Table 4). Finally, approximately half of physiotherapists strongly agreed that home-based exercise interventions were effective (UK 53.9% vs. 46.9% PT), complementary to their intervention (UK 48.7% vs. PT 51.5%) and were willing to recommend a foot and ankle program to older fallers (UK 49.1% vs. PT 55.3%) (Table 4).

Overall, physiotherapists from both nations perceived that their older clients had little knowledge about these topics (Table 5). UK-based physiotherapists reported that clients were slightly more

knowledgeable about falls risk factors in the subgroup with a caseload of ≥70% of older adults (“somewhat knowledgeable” 45.2% vs. 37.1%, $p = 0.03$).

4 | DISCUSSION

This is the first published study on self-reported knowledge and practice about foot specific falls risks and exercise for falls prevention in UK-based and Portugal-based physiotherapists, and to compare the two groups. No previous studies were available with which to directly compare our findings. In the UK, a series of key policy documents and guidelines define and support the role of physiotherapy in falls prevention (e.g., Public Health England, 2017). Additionally, Physiotherapists are integral to most interdisciplinary teams in Frailty and Falls services and pathways within the NHS. Despite not having the same services available in the NHS, Portugal has published an action plan for physiotherapy in falls prevention in primary care settings (Barbosa et al., 2020). These documents were highly influenced by existing guidelines and practice in the United Kingdom, which were followed as a model to inform the Portuguese plan. Cultural adequateness is a key aspect by which to ensure appropriate care to older adults. Comparing the two national groups can be an important first step to understand and help in identifying specific areas which may benefit of cultural adequate knowledge mobilization and educational strategies. This study offers some first inputs regarding these aspects.

TABLE 3 Comparison between self-reported knowledge, confidence levels for foot health, foot function screening and likeness of referral to other health professionals

Self-reported knowledge, confidence and practice (0–5)	Full sample									Sub-sample of caseload of $\geq 70\%$ older adults								
	Portugal				United Kingdom					Portugal				United Kingdom				
	n	Median	Q1	Q3	n	Median	Q1	Q3	p*	n	Median	Q1	Q3	n	Median	Q1	Q3	p*
Importance of foot health as RF for falls	452	5	5	5	230	5**	4	4	0.140°	229	5	4	5	166	5**	5	5	0.084°
Importance of foot function as RF for falls	452	5	5	5	229	5	4	5	0.420°	229	5	5	5	165	5	5	5	0.780
Frequency of inspection of feet of older adults	450	3	3	4	230	4**	4	5	0.014°	228	4	3	4	166	4**	3	5	0.014°
Frequency of footwear advice to older adults	451	4	4	5	228	5	4	5	0.280°	229	5	4	5	164	5	4	5	0.300
Perceived knowledge on exercise-based interventions for FP	451	4	3	4	229	4**	4	5	0.014°	229	4	3	4	166	4**	4	5	0.014°
Entry-level qualification provided enough FP knowledge	452	3	2	4	230	2	1	3	0.014°	229	3	2	3	166	2	1	3	0.014°
Confidence for foot health screening in older patients	452	4	3	4	228	4**	3	4	0.014°	229	3	3	4	164	4	3	4	0.080
Confidence foot function screening in older patients	452	4	3	4	228	4	3	4	0.420°	229	4	3	4	164	4	3	4	0.660
Likeliness of referral																		
Podiatrist	452	4	4	4	230	5	4	5	< 0.001°	229	4	4	5	166	5	4	5	0.080
Nurse	452	2	1	4	230	2	1	3	0.830	229	3	1	4	166	3	1	4	0.440
Medical doctor	452	4	3	5	230	3	2	4	< 0.001°	229	4	3	5	166	3	2	4	< 0.001°
Orthotist	452	2	1	4	230	4	3	5	< 0.001°	229	3	1	4	166	4	3	5	< 0.001°
Physiotherapist	452	4	3	5	230	3	1	4	< 0.001°	229	4	3	5	166	3	1	4	< 0.001°
Other	70	2	1	1	45	1**	1	4	< 0.001°	35	1	1	1	32	1**	1	4	0.050

Note: * Mann-Whitney test, $p \leq 0.005$; ** Higher mean ranks.

Abbreviations: FP, falls prevention; RF-Risk factor.

A total of 682 physiotherapists participated in this study, 226 in the UK and 452 in Portugal. We cannot give a definite response rate as recruitment emails were sent to a total of 2889 email addresses in the UK and Portugal but also highlighted through other routes of recruitment (website and social media). As a percentage of specific emails sent then we had good response rates of 12.1% and 45.3% in UK and Portugal. There were, however, an estimated 56,037 physiotherapists in the UK (World Confederation for Physical Therapy, 2019b), so this sample corresponds to approximately 0.41% of the total Physiotherapist population. This is in keeping with other published surveys of UK physiotherapists' practice (Bury & Littlewood, 2018; Hagen et al., 2016). In Portugal, the physiotherapy

population was estimated to be 12,891 (World Confederation for Physical Therapy, 2019a), so this sample is approximately 3.51% of the total estimated population. Also keeping with published studies regarding physiotherapists in Portugal (Jácome et al., 2021). Although these small sample sizes have allowed us to explore the survey tool and relationships between variables, we should be cautious that the results of this study are preliminary, focussed on those that had a specific interest in falls and an ageing population, and cannot be generalised to the wider physiotherapy population in each country. Future studies should adopt random probabilistic sampling strategies if they wish to know the knowledge base across the whole of the profession.

TABLE 4 Comparison between self-reported confidence in exercise-based interventions

Self-reported confidence and practice in exercise-based interventions (0–5)	Full sample									Sub-sample of caseload of ≥70% older adults									
	Portugal				United Kingdom					p*	Portugal				United Kingdom				
	n	Median	Q1	Q3	n	Median	Q1	Q3	n		Median	Q1	Q3	n	Median	Q1	Q3	p*	
Frequency																			
Implementing EBP exercise programs	452	4	3	5	225	4	4	5	< 0.001 ^a	229	4	3	4	163	5	4	5	< 0.001	
Including lower limb exercises in PT intervention	450	5	4	5	226	5**	4	5	< 0.001 ^a	228	5	4	5	165	5**	4	5		
Include specific foot and ankle exercises in PT intervention	449	4	4	5	226	4**	4	5		226	4	4	5	165	4	4	5	0.055	
Recommend home-based exercise to older patients	451	5	4	5	226	5**	4	5	< 0.001 ^a	229	5	4	5	164	5**	4	5		
Level of confidence																			
Delivering exercise-based interventions for FP	451	4	3	4	230	5	4	5	< 0.001 ^a	229	4	4	5	166	5	4	5	< 0.001	
Tailoring exercise-based interventions for FP	450	4	4	5	229	4**	4	5	< 0.001 ^a	227	4	4	5	165	5	4	5	< 0.001	
Progressing exercise-based interventions for FP	449	4	3	5	230	4**	4	5	< 0.001 ^a	227	4	3	5	166	5	4	5	< 0.001 ^a	
Level of agreement																			
Home-based exercise interventions are effective in FP	451	5	4	5	229	5**	4	5	0.300 ^a	229	5	4	5	166	5	4	5	0.240	
Home-based foot and ankle exercise can be a good complement to my intervention	451	4	4	5	225	4	4	5	0.530	228	5	4	5	163	5	4	5	0.350	
Recommend a foot and ankle home-based exercise program to older fallers, if resources available	449	5	4	5	217	5	4	5	0.270	226	5	4	5	158	5	4	5	0.170	

Note: *Mann-Whitney test; $p \leq 0.005$ **higher mean ranks; ^a Result after Bonferroni Correction. Abbreviations: FP- Falls prevention; PT- Physiotherapy; RF-Risk factor.

TABLE 5 Comparison of Level of perceived knowledge of older patients by physiotherapists in the United Kingdom and in Portugal

Physioherapists 'perceived knowledge of older patients (0–5)	Full sample									Sub-sample of caseload of ≥70% older adults									
	Portugal				United Kingdom					p*	Portugal				United Kingdom				
	n	Median	Q1	Q3	n	Median	Q1	Q3	n		Median	Q1	Q3	n	Median	Q1	Q3	p*	
Falls risk factors	451	2	2	3	230	2	1	2	0.190	229	2	2	3	166	3	2	3	0.030	
Foot-specific falls risk factors	451	2	1	2	230	2	1	2	0.720	229	2	1	2	166	2	1	2	0.270	
Benefits of exercise interventions for FP	450	2	2	3	230	2	2	3	0.130	228	2	2	3	166	2	2	3	0.170	
Interventions to improve/maintain foot health and foot function	449	2	1	3	230	2	1	2	0.370	228	2	1	3	166	2	1	2	0.940	

Note: FP, falls prevention. *Mann-Whitney U test. Results after Bonferroni Correction; $p \leq 0.050$. The numbers in square brackets represent the number of respondents in each question/item.

Overall similar findings were found between the sub-group whose physiotherapy caseload constituted $\geq 70\%$ older adults and the full sample analyses, which may suggest the results in Portugal are also comprised from a sample of Portugal-based physiotherapists with a special interest in ageing.

Foot health and foot function were considered very important falls risk factors by most respondents, although more UK physiotherapists considered foot health as important (UK 73.5% vs. PT 62.8%). Almost every respondent correctly identified the general falls risk factors (Ambrose et al., 2013; Masud & Morris, 2001), concurring with previous survey studies in Nigeria and in the USA (Kalu et al., 2018; Peel et al., 2008). Many also correctly identified foot-specific falls risk factors (Menz et al., 2018). Such similarities between the UK and Portugal could potentially indicate a uniformity of standards of physiotherapy education and practice across different European settings, as has been strongly recommended by the European Region of World Physiotherapy (World Confederation for Physical Therapy, 2011). However, some statistically significant differences were found between the two national groups regarding their self-reported levels of knowledge and practice. UK physiotherapists inspected their older patients' feet more frequently, also being more confident in screening for foot health (when considering the full sample). Foot health and footcare recommendations are commonly included in British falls prevention guidance (American Geriatrics Society & British Geriatrics Society, 2010), which may explain why a greater proportion of UK-based physiotherapists scored higher on these self-reported items of the survey. Both national groups displayed lower levels of confidence in screening for foot health than foot function, potentially indicating that these competences could also be strengthened among the samples of physiotherapists in the two nations.

Variation between nations in referral patterns of foot problems to other health professionals may be due to local referral culture (Kalu et al., 2018) and structural differences in pathways of referral for physiotherapists in the two national health systems. Proportionally, more physiotherapists in Portugal felt that their entry-level physiotherapy education had provided them with sufficient knowledge of exercise-based interventions for falls prevention ('very knowledgeable' 32% PT vs. 5% UK). Although only a minority of physiotherapists completely agreed with this across both nations. As the UK-based physiotherapists were generally older and had more experience, they may have qualified before falls prevention reached more prominence in the health agenda and educational curriculum, which may explain these results. Future research could potentially crosscheck these assumptions with syllabuses of physiotherapy programs and determine any potential areas for development.

A greater proportion of UK-based physiotherapists had obtained further education on falls prevention. Falls prevention has been on the British public health agenda since first being included in National Institute of Clinical Excellence (NICE) guidelines in 2004. Physiotherapists who trained before 2004 may have had access to less

information on this topic during their undergraduate studies. Additionally, more years of practice also tends to correspond to an increased need to pursue further education for updates and specialization. Although most physiotherapists (21% Portugal vs. 83% UK) admitted using self-learning as their main strategy for continuous education in this field, there are considerable differences in the availability of and access to continuous education opportunities in the two nations.

Despite most physiotherapists (cumulative $\geq 60\%$) scoring highly in the exercise related items, there were significant differences between nations. UK-based physiotherapists displayed more self-perceived knowledge, confidence and frequency of practice with regards to evidence-based exercise interventions for falls prevention, including lower limb, foot and ankle exercises and home-based programs. Organisational culture influences evidence-based practice by physiotherapists (Scurlock-Evans et al., 2014), as do economic factors, time and cultural setting (Child et al., 2012), therefore these cross-national variations could be related to contextual differences. For instance, depending on the context of practice, physiotherapists in Portugal may often not be permitted to make any recommendations outside the plan of care prescribed by a physiatrist. Additionally, the uptake of the evidence-based practice approach has been inconsistent within physiotherapy (Scurlock-Evans et al., 2014). Ackerman et al. (2020) reported that Australian physiotherapists would not always take evidence-informed approaches when conducting falls risk assessment and falls prevention to patients with osteoarthritis (Ackerman et al., 2020). Such aspects could be further explored among Portugal and UK-based physiotherapists.

Most UK respondents (72.6%) reported following policy/guidance on falls prevention, whereas most Portugal-based physiotherapists (80.1%) admitted not doing so. This may partly arise from differences in Public Health policies. A nationwide falls management strategy is yet to be developed and implemented in Portugal, but such guidance is widespread and predominant across the UK (Gentry et al., 2017). Moreover, many provided imprecise answers regarding which guidance they followed, mentioning systematic reviews or falls prevention exercise programs. This may indicate a lack of theoretical background knowledge of the concept of clinical guidelines and should be explored further in future work. The provision of definitions for "guidance/policy", together with practical examples, might have increased the validity of the responses. Although it would not been suitable for both nations and could prompt social desirability bias. Respondents may have also lacked the necessary motivation, or even the time, to write out their answers during data collection (Snibsøer et al., 2018). Nonetheless, these findings potentially point to an opportunity to recommend the implementation of falls management physiotherapy practice guidelines in Portugal. Particularly considering that many Portugal physiotherapists are aware of international guidance. Evidence-based practice uptake by physiotherapists could be improved locally by an adapted knowledge translation educational plan (Stander et al., 2018), building on the existing action plan

(Barbosa et al., 2020). A future survey with nationally representative samples should further explore these findings across the whole profession.

It was important to ascertain physiotherapists' views about their older patients' knowledge in their nation as a qualitative study found that British and Portuguese older adults consider that health professional's (including physiotherapists) messages to them about foot health, footcare, exercise and falls prevention are of the utmost importance for informing their knowledge and preventive behaviours (Conde et al., 2020). Both the UK-based and Portugal-based physiotherapists perceived that their older clients had little knowledge about footcare, foot-specific fall risk factors, or foot and ankle exercise interventions. UK-based physiotherapists considered that their patients had slightly better knowledge on generic falls risk factors at first contact (cumulative UK 53.4% vs. PT 41.1%). However, physiotherapists were asked to consider their average older client. There will be a broad range of patient knowledge profiles. Nonetheless, this information regarding physiotherapists' perceptions of clients' knowledge is important considering that it may deeply influence the therapeutic experience (Forbes et al., 2017). Perceived factors relating to the patient's presentation may be seen as a barrier to effective client education, particularly in novice physiotherapists (Forbes et al., 2017). It is therefore important that physiotherapists develop skills or insight to cope with this barrier (Forbes et al., 2017), and adopt the best education strategies for foot health and falls prevention within their work context. These preliminary aspects should be developed in future research and practice.

This preliminary study has focused on the general population of older adults. However, certain health conditions, such as Diabetes Mellitus or Rheumatoid Arthritis, can have a large impact on both foot health and foot function, such as loss of proprioceptive function, contributing to a greater risk of falling. Therefore, future studies could also ascertain self-reported knowledge and practice of physiotherapists regarding specific foot-risk factors for falling in older adults with specific conditions.

4.1 | Limitations

A pragmatic approach was followed to guarantee optimal outreach of prospective participants, which led to not being able to obtain response rates. Nonetheless, our sample size is within the average number of physiotherapists of UK (Bury & Littlewood, 2018; Hagen et al., 2016; Hanchard et al., 2011) and Portugal studies (Machado et al., 2016; Seixas et al., 2019). These findings will inform future surveys with representative samples across the whole profession.

The possibility of selection, response and non-response biases need to be considered in surveys. Respondents could be more interested in these topics, and social desirability bias may have also influenced positive findings (Althubaiti, 2016). Reference bias could also influence self-assessment of knowledge and practice (Zell & Krizan, 2014).

4.2 | Implications on physiotherapy practice

Most UK and Portugal-based physiotherapists were aware of the contribution of foot-specific factors to falls risk, and of exercise-based interventions to falls risk management. Physiotherapists' confidence in screening for foot health and foot function can be improved, particularly in our sample in Portugal. Educational strategies aiming at increasing physiotherapists' competences in such topics, as well their ability to educate of their patients, could be promoted.

Our sample of UK-based physiotherapists reported more confidence in all key aspects of the effective implementation of falls prevention exercise interventions than their Portugal-based colleagues. Reinforcing training for physiotherapists in Portugal seems relevant. The adoption of falls guidance by Portugal-based physiotherapists should also be encouraged by the professional body.

AUTHOR CONTRIBUTION

Monserrat Conde conceptualized the study and methodology, collected all data, performed data analysis, was responsible for all aspects of the project administration and funding acquisition, also wrote the original draft and the subsequent. Gordon J Hendry and Dawn A Skelton supervised, contributed to the conceptualization and methodology, provided feedback on questionnaire, disseminated the call for participants, supervised data analysis and discussion, and reviewed and edited the manuscript. Jim Woodburn supervised, provided support with the research resources, provided feedback on data analysis and discussion, reviewed, and edited the manuscript. All authors read and approved the final manuscript.

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CONFLICT OF INTEREST

MC is a Cascade Trainer in the Otago Home Exercise Program, being certified to train physiotherapists in exercise delivery for falls prevention. MC is also the chair of the special interest group of Physiotherapy in Ageing of the Portuguese Association of Physiotherapists. GJH and JW declare no conflicts of interest. DAS is a Director of Later Life Training, a not-for-profit training organisation delivering exercise training to health and fitness professionals in the UK and Europe.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

This study was approved by the School of Health and Life Sciences Research Ethics Committee of Glasgow Caledonian University (HLS/PSWAHP/17/147).

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