Podiatric Involvement in Multidisciplinary Falls-Prevention Clinics in Australia

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Background: Falls in older people are a major public health problem, and there is increasing evidence that foot problems and inappropriate footwear increase the risk of falls. Several multidisciplinary prevention clinics have been established to address the problem of falls; however, the role of podiatry in these clinics has not been clearly defined. The aims of this study were to determine the level of podiatric involvement in multidisciplinary falls clinics in Australia and to describe the assessments undertaken and interventions provided by podiatrists in these settings.

Methods: A database of falls clinics was developed through consultation with departments of health in each state and territory. Clinic managers were contacted and surveyed as to whether the clinic incorporated podiatry services. If so, the podiatrists were contacted and asked to complete a brief questionnaire regarding their level of involvement and the assessment procedures and interventions offered.

Results: Of the 36 clinics contacted, 25 completed the survey. Only four of these clinics reported direct podiatric involvement. Despite the limited involvement of podiatry in these clinics, all of the clinic managers stated that they considered podiatry to have an important role to play in falls prevention. Podiatry service provision in falls clinics varied considerably in relation to eligibility criteria, assessments undertaken, and interventions provided.

Conclusions: Despite the recognition that foot problems and inappropriate footwear are risk factors for falls, podiatry currently has a relatively minor and poorly defined role in multidisciplinary falls-prevention clinics in Australia. (J Am Podiatr Med Assoc 97(5): 377-384, 2007)

Falls in older people are an increasing public health problem. One in three people older than 65 years fall in any given year,[1-4] and this rate increases to 50% in people 85 years and older.[5] Falls are the leading cause of injury-related hospitalization in older people and account for 14% of emergency department admissions.[6] Half of all falls result in some degree of injury, with 10% to 15% resulting in serious injury, such as hip and wrist fractures.[7] Several studies have confirmed that falls result from a multitude of physiologic risk factors, including impaired vision, reduced muscle strength, diminished peripheral sensation, and slow reaction time.[8]

The multifactorial nature of the risk of falls and the multifaceted interventions required to prevent them has led to the development of specialist "falls clinics" in the United States,[9, 10] the United Kingdom,[6] and Australia.[11-13] Staffing of these clinics most commonly includes a physiotherapist, a geriatrician, and an occupational therapist; however, a few clinics have reported podiatric involvement.[9, 10, 12] Falls are of direct relevance to the podiatric profession not only because of the large number of older people who access podiatric services but also because of the mounting evidence that foot problems[14-16] and inappropriate footwear[17-19] impair balance and increase the risk of falls. In response to these findings, falls-prevention guides commonly recommend that older people have their feet and footwear examined by a podiatrist.[20]

Despite the recognition that podiatry has a significant role to play in falls prevention, very little is known about the number of podiatrists involved in falls clinics. In the United Kingdom, Hughes[21] report-

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ed that of the 105 National Health Service Trusts in London currently undertaking falls-prevention activities, formal podiatric involvement was reported in only one organization. Similarly, a survey[12] of 13 falls clinics in Australia in 2001 reported that only two employed podiatrists. Neither study evaluated the assessment or intervention activities undertaken by podiatrists in these settings. To our knowledge, the only published literature pertaining to treatment practices of podiatrists in relation to falls prevention is a brief report outlining the approach taken by an individual private practitioner in the United Kingdom.[22] Therefore, the aims of this study were to determine the level of podiatric involvement in multidisciplinary falls clinics currently operating in Australia and to describe the assessments undertaken and the interventions provided by podiatrists in these settings. In doing so, the objectives were to inform future planning of multidisciplinary clinics and to stimulate efforts to standardize these activities.

Methods

Development of a National List of Falls Clinics

Initially, the departments of health in each of the six states and two territories of Australia were contacted and asked to provide details of currently active falls clinics in their state. Inclusion was restricted to publicly funded clinics in community health centers, hospitals, and universities. This resulted in a list of 45 clinics. Representatives from each of these clinics were then contacted and invited to take part in the study. Six clinics could not be contacted, two were not falls clinics, and one was no longer operational, reducing the number of clinics to 36; of these, 25 responded to the survey (a response rate of 69%).

Questionnaire

A structured questionnaire was developed and distributed by e-mail. The questionnaire consisted of two components. The first component was completed by clinics that did not employ a podiatrist, and it simply requested information regarding the personnel employed in the clinic and whether the clinic manager thought that podiatry had an important role to play in falls prevention. The second component was completed by falls clinic podiatrists. This component requested information regarding the number of podiatrists employed in the falls clinic; the number of podiatry hours per week devoted to the falls clinic; foot and footwear assessment procedures regularly undertaken in the clinic; interventions commonly offered to falls clinic patients, including foot orthoses (classified according to the Australian Podiatry Council guidelines[23]); the clinicians' perceptions of compliance with these interventions (rated as high, moderate, or low); and the clinicians' perceptions of the relative importance of a range of foot and footwear risk factors (rated on a 5-point scale from "very important" to "unimportant"). The study protocol was approved by the Faculty Human Ethics Committee of La Trobe University (FHEC04/204), and all of the participants provided informed consent.

Statistical Analysis

Frequencies for each variable were analyzed using SPSS, version 13 for Windows (SPSS Inc, Chicago, Illinois). Owing to the small sample size, clinicians' perceptions of the relative importance of foot and footwear risk factors are expressed as medians. No inferential statistics were applied.

Results

Falls Clinics by State and Territory

The representative from the department of health in the Northern Territory reported that there were no falls clinics currently operating in the territory. Of the 45 clinics that were initially identified, 24 were based in Victoria, 9 in Western Australia, 4 in New South Wales, 3 in South Australia, 2 in the Australian Capital Territory, 2 in Tasmania, and 1 in Queensland.

Health Professional Staffing of Falls Clinics

The staffing details of the 25 clinics that responded to the survey are shown in Figure 1. The most commonly employed health professional was a physiotherapist (22 clinics), followed by a geriatrician (21 clinics) and an occupational therapist (19 clinics). Only four clinics employed a podiatrist, although four additional clinics stated that they referred appropriate clients to podiatry services in their region. All of the falls clinic representatives stated that they considered podiatry to have an important role to play in falls prevention.

Podiatry's Role in Falls Clinics

Podiatry service provision characteristics of the four clinics identified are given in Table 1. Staffing for each clinic involved a single podiatric clinician employed for 1 to 4 hours per week. Eligibility criteria and method of follow-up were unique to each falls

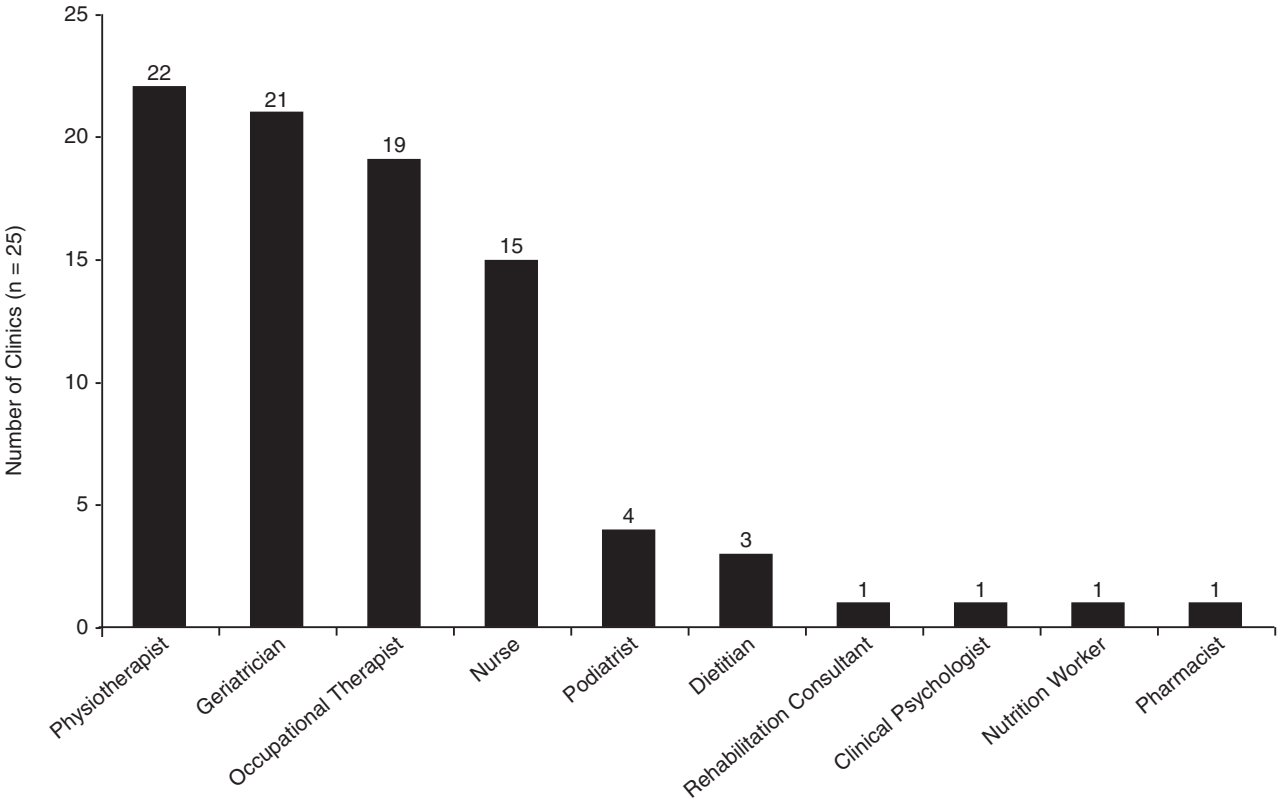


Figure 1. Health professional staffing of falls-prevention clinics.

Table 1. Podiatric Service Provision Characteristics of Falls Clinics

	Clinic 1	Clinic 2	Clinic 3	Clinic 4
Podiatrists (No.)	1	1	1	1
Other staff	Geriatrician Physiotherapist Occupational therapist Nurse Clinical psychologist	Physiotherapist Occupational therapist Dietitian Pharmacist	Geriatrician Physiotherapist Occupational therapist Nurse	Geriatrician Physiotherapist Occupational therapist Nurse Dietitian
Podiatry hours per week	4	2	1	1
Eligibility criteria	Falls clinic patients referred to podiatrist by geriatrician or physiotherapist	All patients referred to falls clinic see the podiatrist	Patients with diabetes, foot pain, or peripheral vascular disease	Patients who attend the falls clinic with a foot problem who do not currently receive podiatric care
Time taken for assessment (min)	45	45	5	30
Follow-up	2, 3, and 6 mo	3, 6, and 12 mo	Patients are referred to a community health center podiatrist for follow-up	Patients are followed up at 1 mo, then referred to a community podiatrist

clinic, and the time taken for the podiatry assessment ranged from 5 to 45 min.

Assessments routinely undertaken in each of the four clinics are given in Table 2. There was a high degree of variability in the assessments undertaken, particularly in relation to musculoskeletal assessment. Consistency across the four clinics was observed only for monofilament testing, ankle joint range of motion, hallux valgus, some components of footwear assessment, and visual gait analysis.

Podiatric interventions provided by the four clinics are given in Table 3. All of the clinics provided lesion debridement, footwear advice, and foot-care advice. The provision of foot orthoses was variable, and no clinics provided customized (kinetic) orthoses to falls clinic patients.

Podiatry Clinicians' Perceptions of Compliance with Interventions

Intervention compliance is given in Table 4. The highest compliance was observed with footwear recommendations and the lowest with stretching exercises.

Podiatry Clinicians' Perceptions of the Importance of Foot and Footwear Risk Factors

Podiatry clinicians' perceptions of the relative importance of foot and ankle risk factors for falls are shown in Figure 2. The risk factors with the highest median scores were limited joint range of motion, ankle dorsiflexion weakness, and impaired peripheral sensation. Podiatry clinicians' perceptions of the relative importance of footwear risk factors for falls are shown in Figure 3. The risk factors with the highest median scores were heel height and sole slip resistance.

Discussion

The objectives of this study were to determine the level of podiatric involvement in multidisciplinary falls clinics currently operating in Australia and to describe the assessment and intervention activities provided by podiatrists in these settings. Before discussing the findings in detail, it is worth considering the limitations of the study design. First, because there is currently no up-to-date database of falls clinics in Australia, developing a list for this study required contacting individual departments of health in each state and territory. The accuracy of these databases cannot be ascertained. Indeed, there was evidence of some inaccuracy in that some clinics were no longer operational, could not be contacted using available contact information, or did not actually

Table 2. Routine Assessments Performed by Podiatrists in Falls Clinics

	Clinic 1	Clinic 2	Clinic 3	Clinic 4
Neurologic				
Monofilaments	■	■	■	■
Lower-limb reflexes	■	■	■	❑
Vibration sense	■	■	■	❑
Reaction time	❑	❑	■	❑
Vascular				
Ankle-brachial index	■	■	❑	❑
Musculoskeletal				
Muscle strength				
Quadriceps	❑	❑	■	❑
Ankle dorsiflexion	■	■	■	❑
Ankle plantarflexion	■	■	■	❑
Peroneal	❑	■	❑	❑
Tibialis anterior	❑	❑	■	❑
Tibialis posterior	❑	❑	■	❑
Intrinsic muscles	❑	■	■	■
Range of motion				
Ankle joint	■	■	■	■
First metatarsophalangeal joint	■	■	❑	■
Subtalar joint	■	■	❑	■
Midtarsal joint	■	❑	❑	■
Foot posture				
Neutral calcaneal stance position	■	❑	❑	❑
Resting calcaneal stance position	■	❑	❑	❑
Navicular height	❑	■	❑	❑
Foot posture index	❑	■	■	❑
Foot deformity				
Hallux valgus	■	■	■	■
Lesser-toe deformity	■	❑	■	❑
Footwear				
Heel height	■	■	■	■
Method of fixation	■	❑	❑	■
Sole hardness	■	■	■	■
Sole thickness	■	■	■	■
Sole flexion point	❑	■	❑	■
Heel counter height	❑	■	■	■
Heel counter rigidity	■	❑	■	■
Shoe fit	■	■	■	■
Sole slip resistance	■	■	■	■
Gait and balance				
Visual gait analysis	■	■	■	■
Video gait analysis	❑	■	❑	❑
Balance tests	❑	■	■	❑
Other				
Review of medications	■	■	■	❑
Vision tests	❑	■	■	❑

Note: Black box indicates that the assessment is performed; white box, assessment is not performed.

Table 3. Interventions Offered to Podiatry Patients in Falls Clinics

	Clinic 1	Clinic 2	Clinic 3	Clinic 4
Lesion debridement	■	■	■	■
Nail care	■	■	❑	❑
Foot orthoses				
Cushioning orthoses	❑	❑	❑	❑
Pressure-relief orthoses	❑	■	❑	❑
Prefabricated orthoses	■	■	❑	■
Molded noncast orthoses	❑	❑	❑	❑
Molded cast orthoses (no posting)	■	❑	❑	❑
Functional (customized kinetic) orthoses	❑	❑	❑	❑
Other[a]	❑	❑	■	❑
Footwear advice	■	■	■	■
Foot-care advice	■	■	■	■
Stretching exercises	■	■	■	❑
Strengthening exercises	❑	■	■	❑

Note: Black box indicates that the intervention is offered; white box, intervention is not offered.

[a] Referral to an orthotist.

function as multidisciplinary falls clinics. A second limitation was that despite numerous attempts at follow-up, the response rate was somewhat disappointing (69%). Despite these limitations, we believe that the results are of value and provide some useful insights into the role of podiatry in falls clinics.

Of the 25 clinics that responded to the survey, only four had regular podiatric involvement, with an additional four providing podiatry services on a referral basis. This result is similar to that of Hill et al,[12] who reported that 2 of 15 falls clinics in Australia in 2001 employed podiatrists. Despite this low level of involvement, all of the clinic managers stated that they considered podiatry to have an important role to play in falls prevention. Owing to the paucity of published information in this area, it is difficult to compare these results with those from other countries, although a recent report[21] from the United Kingdom found that of the 105 London National Health Service Trusts involved in falls prevention, only one employed a podiatrist. Clearly, there is a degree of disconnect between the widespread recognition of foot problems and footwear as risk factors for falls and the funding of podiatry services to address these issues. However, determining the appropriate level of podiatric involvement is difficult in the absence of accurate data on the prevalence of foot-related risk factors.

Podiatry service provision in the four clinics identified was highly variable in relation to eligibility criteria, frequency of follow-up, assessments undertaken, and interventions offered. This is perhaps not surprising given that falls clinics have been developed largely in an *ad hoc* manner,[12] and no clinical guidelines have been published in relation to the role of podiatry in these clinics. All of the falls clinic podiatrists assessed footwear, but none reported using a standard approach (such as the Footwear Assessment Form[24]) to do so. Nevertheless, it is encouraging that some of the lower-limb assessments undertaken by falls clinic podiatrists (such as monofilament testing and ankle joint range of motion) are consistent with the published literature regarding foot and ankle risk factors for falls.[16, 25] It is also promising that podiatrists are involved in broader aspects of falls risk assessment, such as reviewing medications and evaluating balance.

The range of interventions provided by falls clinic podiatrists was also highly variable. Although all of the clinics offered debridement of hyperkeratotic lesions, footwear advice, and foot-care advice, the type of foot orthoses provided was inconsistent, and only two clinics recommended strengthening exercises for the foot and ankle. Given that there is currently no evidence that foot orthoses improve balance and prevent falls in older people, it is perhaps surprising that all of the clinics offered this service in some form. However, it is possible that falls clinic podiatrists provide foot orthoses to older people to address foot pain and problems with hyperkeratotic lesions rather than as a falls-prevention intervention per se. It is also possible that lower-limb strengthening is ade-

Table 4. Perceived Patient Compliance with Recommendations

	Clinic 1	Clinic 2	Clinic 3	Clinic 4
Footwear advice	High	Moderate	High	High
Stretching exercises	Low	Low	Moderate	—
Foot-care advice	Moderate	Moderate	Moderate	Moderate
Strengthening exercises	—	Moderate	Moderate	—

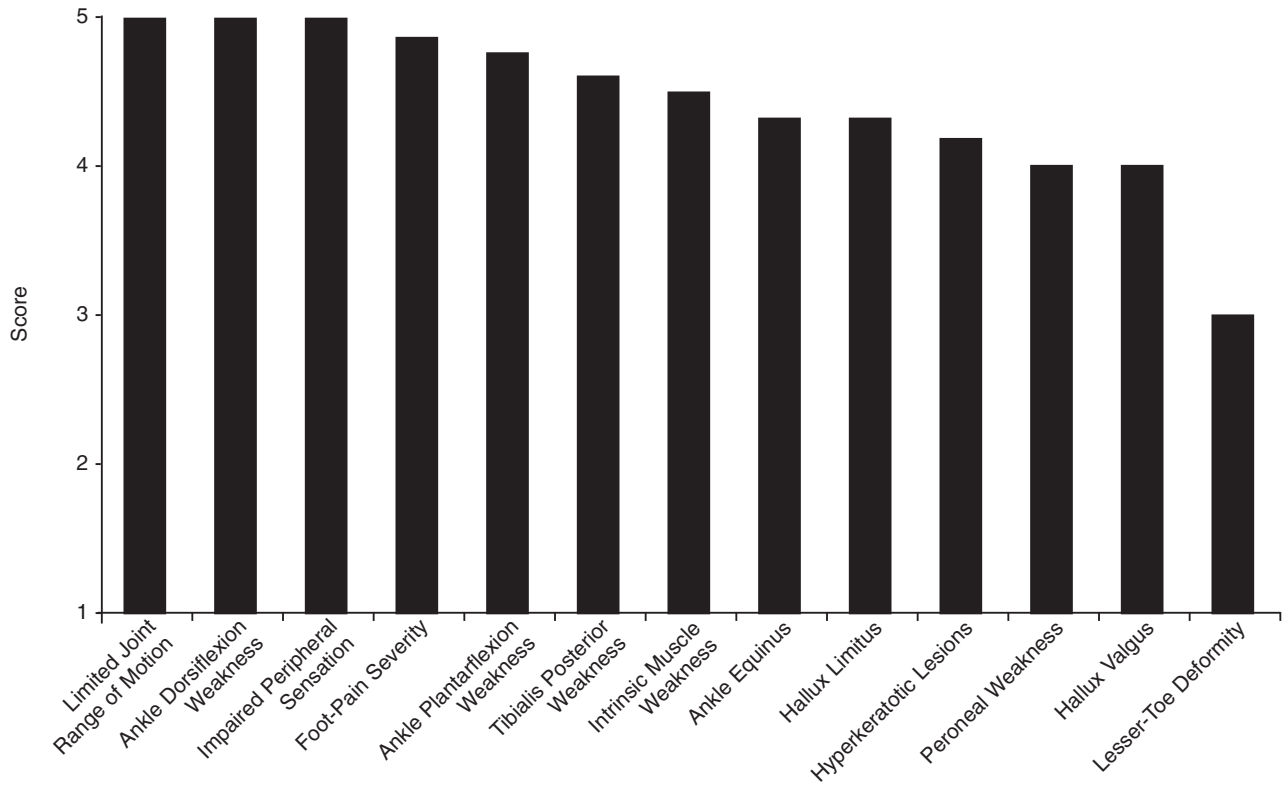


Figure 2. Podiatry clinicians' perceptions of the relative importance of various foot and ankle risk factors for falls. Scores range from 1 (unimportant) to 5 (very important). Median scores across the four clinicians are shown.

quately addressed by other members of the falls clinic team and so there is no need for podiatrists to initiate this intervention with their patients.

Clinicians' perceptions of older patients' compliance with footwear recommendations was somewhat surprising, with three clinicians reporting this as "high" and one as "moderate." This is inconsistent with findings from Cumming et al,[26] who found that only 48% of older people who were advised to change their footwear by an occupational therapist had done so 1 year later, and from Fortinsky et al,[27] who reported that emergency department physicians considered older people's compliance with footwear recommendations to be poor owing to "stubbornness and vanity." However, the results are similar to those of Hill and Black,[28] who conducted a 6-month follow-up of falls clinic patients and reported that 85% had partly or fully complied with footwear advice and that 82% had partly or fully complied with foot-care recommendations. Although in the present study the accuracy of the falls clinic podiatrists' perceptions of compliance could not be evaluated, it is possible that older people who have chosen to attend a falls clinic are aware of their risk of future falls and are, therefore, more likely to adhere to clinicians' recommendations regarding footwear and foot care.

Clinicians' perceptions regarding the relative importance of foot and ankle risk factors were generally consistent with evidence from the published literature,[16, 25] with the four most important risk factors reported by the clinicians being limited joint range of motion, ankle dorsiflexion weakness, impaired peripheral sensation, and foot pain. A recent prospective study[16] confirmed that each of these factors, in addition to hallux valgus and toe plantar flexor weakness, were significant independent risk factors for falls. The most important footwear risk factors rated by the podiatrists were heel height and sole slip resistance. Although the available evidence regarding footwear as a risk factor for falls is not as strong,[29] a significant decrement in balance has been demonstrated in older people when wearing high heels[30] or shoes with thick, soft midsoles.[31] In addition, an association between inadequate fixation and trip-related hip fractures has been reported.[17]

Overall, the findings from this study indicate that

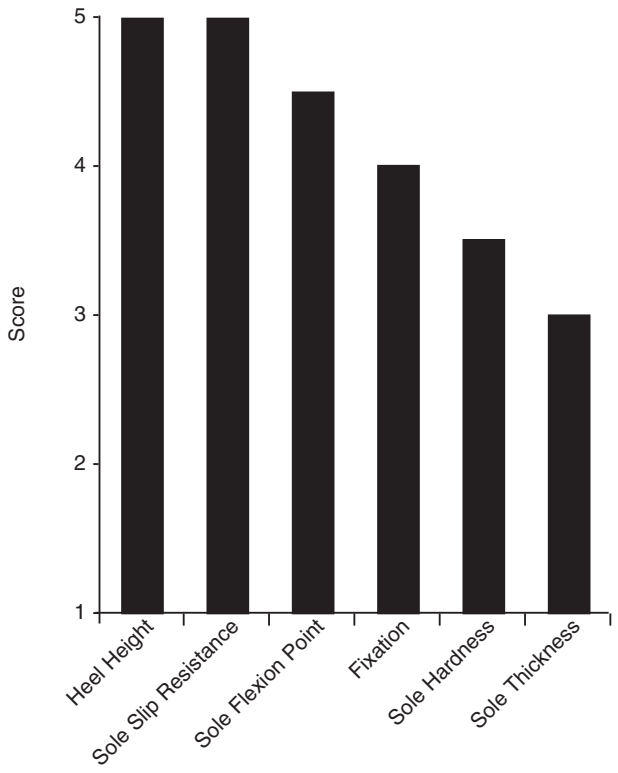


Figure 3. Podiatry clinicians' perceptions of the relative importance of various footwear risk factors for falls. Scores range from 1 (unimportant) to 5 (very important). Median scores across the four physicians are shown.

despite the growing recognition of the importance of foot and footwear problems in increasing the risk of falls, podiatric involvement in multidisciplinary falls clinics is limited and poorly defined. Although it is likely that this is due to funding constraints limiting clinic personnel to those providing interventions of known benefit (such as exercises prescribed by physiotherapists[32]), it is also possible that there is a general lack of awareness that podiatry may have something to offer. Further studies are required to develop a standard approach to foot and footwear screening of older people attending falls clinics and to determine the efficacy of podiatric interventions using falls as an outcome measure.

Conclusion

Only four multidisciplinary falls-prevention clinics in Australia directly involve podiatry, and the service provision in these clinics varies considerably in relation to eligibility criteria, assessments undertaken, and interventions provided. These findings indicate that podiatry currently has a relatively minor and poorly defined role in multidisciplinary falls-prevention clinics in Australia.

Financial Disclosures: Dr. Menz is currently a National Health and Medical Research Council Fellow (Clinical Career Development Award, ID: 433049).
Conflict of Interest: None reported.

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