FALL RISK PROFILE AND QUALITY-OF-LIFE STATUS OF OLDER CHIROPRACTIC PATIENTS

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ABSTRACT

Objectives: The primary aim of this study was to estimate the prevalence of fall risk factors in older chiropractic patients. The secondary aim was to investigate the quality-of-life status of older chiropractic patients and to see whether a history of falling was related to quality-of-life status.

Methods: A cross-sectional study was conducted at 12 chiropractic practices throughout Auckland, New Zealand, and Melbourne, Australia. The study involved gaining a profile of health status, fall history, and fall risk from active chiropractic patients who were 65 years or older.

Results: One hundred ten older chiropractic patients were approached, and 101 agreed to participate in this study (response rate, 91.8%). Thirty-five percent of participants had experienced at least 1 fall in the previous 12 months. Of those that had fallen, 80% had at least a minor injury, with 37% of fallers requiring medical attention and 6% suffering a serious injury. The prevalence of most fall risk factors was consistent with published data for community-dwelling older adults. Quality of life of older chiropractic patients appeared to be good, but fallers reported a lower physical component summary score compared with nonfallers ($P = .04$).

Conclusions: A portion of the older chiropractic patients sampled in this study had a substantial risk of falling. This risk could be assessed on a regular basis for the presence of modifiable fall risk factors, and appropriate advice, given when fall risks are identified. (J Manipulative Physiol Ther 2011;34:78-87)

Key Indexing Terms: *Chiropractic; Accidental Falls; Aged; Risk Factors; Postural Balance; Quality of Life*

Falls are a major health concern for older adults. They are a significant cause of death, injury, and loss of quality of life.[1] Falls account for over 80% of injury-related hospital admissions in people older than 65 years, and falls are the leading cause of injury-related death in older adults.[2,3] The health care costs associated with falls are substantial and will rise as the baby boom generation start to reach their senior years over the coming decades.[4,5] In the United States, fall-related health care costs exceeded US $20 billion per annum by 1994 and were estimated to reach over US $32 billion (in 1994 US dollars) by 2020.[6,7] In Australia, the estimate of health care costs associated with falls ranges from AU $500 million to AU $4.5 billion per year.[1,4] These costs are projected to increase exponentially over the next 50 years, as the proportion of Australians over the age of 65 years more than doubles.[4,5] In New Zealand, the cost of hospital care for fall-related injuries was over NZ $386 million between 2000 and 2003. This made up over half of all injury-related hospital costs across the entire population.[3]

Each year approximately one third of community-dwelling adults older than 65 years has at least 1 fall.[8,9] It is estimated that half of all falls result in an injury and that 5% to 10% of falls result in a fracture.[10,11] From 1992 to 2001, there were nearly 2300 fall-related deaths in New

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Zealand, which account for 21% of all unintentional injury–related fatalities.[12] In Australia, there are over 1000 deaths per year directly related to falls.[13] In the United States, the rate of fall-related fatalities in older people increased by 42% between 2000 and 2006 with over 16 000 deaths from falls occurring in 2006.[14] Physical consequences of falls range from bruises to fracture, brain injury, or death.[2] Fear of future falls may result in a less active lifestyle, leading to reduced strength, flexibility and mobility, and a loss of independence.[15] This may be of greater concern to an older individual than the fear of pain and suffering. A history of falling has also been found to contribute to an overall loss in quality of life.[1,16]

Many studies have identified risk factors for falling.[8,10,11] In older adults, some of the more common risk factors for falls include previous history of falling, psychotropic drug use, polypharmacy, environmental hazards, poor vision, depression, osteoarthritis, diabetes mellitus, Parkinson disease, lower extremity impairments, and balance/gait impairments.[8-10,17]

As primary care practitioners, chiropractors are expected to engage in health promotion activities as a part of clinical practice.[18] Identification of fall risks is of major importance as most patients with an increased risk of falling have no symptoms that would alert them or their health care provider to this increased risk.[19] If chiropractors identify these risk factors and counsel their patients on appropriate strategies to address them, they may reduce their future risk of falling, which may have a great impact on their future quality of life.[9,20,21]

The chiropractic profession has recently begun to investigate the role it may play in reducing the risk of falls in their older patients.[22-26] Balance impairment and fall risk should be areas of particular importance to chiropractors because of the nature of the conditions that bring patients into their offices such as neck pain, other chronic musculoskeletal pain, muscle weakness, and degenerative conditions of the spine and lower extremities. These conditions have the potential to increase the risk of falling.[9,20,21,27] Worldwide, 16% to 27% of chiropractic patients have a presenting complaint of neck pain.[28-31] Maintenance of balance is dependent on integration of sensory inputs from the vestibular, visual, and somatosensory systems and the ability to make appropriate motor movements to compensate for changes in center of gravity.[32,33] The cervical spine provides vital proprioceptive input to postural stability and balance systems.[33] Cervical disorders may result in alterations to somatosensory input, leading to disturbances in sensorimotor control, thus increasing the risk of falling.[27] Several studies have shown that balance and postural control are compromised in people with neck pain, cervical osteoarthritis, and neck muscle fatigue and in those that had whiplash injuries to the neck.[34-40] In the general older population, the 1-month prevalence of neck pain is around 20%.[41] If the prevalence of neck pain is greater in older chiropractic patients, then they may be even more susceptible to future falls than the general older population. The same may be true if older chiropractic patients have an increased prevalence of other known conditions that contribute to an increased fall risk such as lower extremity problems and osteoarthritis.[9,20,21,27]

The primary aim of this study was to gain an indication of the prevalence of previous falls, risk factors for falls, and assessment of balance in older chiropractic patients. Where possible, these prevalence estimates have been compared with reported population rates. The secondary aim was to investigate the quality-of-life status of older chiropractic patients and to see whether a history of falling was related to quality-of-life status.

To our knowledge, this is the first study to assess fall risk in older chiropractic patients. It is, therefore, unknown if older chiropractic patients are representative of the wider community or if they are at an even greater risk for falling. It is hoped that, by better understanding the risk of falls in their older patients, this study will help to encourage chiropractors to play a primary role in detection of fall risks and engage in fall prevention strategies.

Methods

Design and Study Population

This was a cross-sectional study. Twelve chiropractors in Auckland and Melbourne were contacted by the investigators and invited to participate in the study. Chiropractors were selected based on convenience from the 858 practices listed as being located in either Auckland or Melbourne in the chiropractic registers of New Zealand and Australia.[42,43] All 12 chiropractors who were approached agreed to participate and were subsequently provided with information about the study to pass onto their older patients. Older patients were approached by the chiropractor or one of their assistants during an office visit or else they were contacted by letter and/or telephone and invited to participate in the study. Any older patients who were interested in taking part in the study were provided with a study information sheet that described the study and the expectations of them if they decided to participate in the study. All participants were required to complete an informed consent form before being included in the study.

Inclusion Criteria

Participants were 65 years and older and active chiropractic patients. *An active chiropractic patient* was defined as a patient who had presented for chiropractic care within the past 6 weeks. Volunteers who were ambulatory (including the use of walking aids) and were willing to sign an informed consent form were eligible.

Exclusion Criteria

Participants were excluded if they were wheelchair bound or unable to remain standing with eyes open and unassisted for a minimum of 1 minute. These patients were excluded as they would have been unable to complete the balance assessments included in the study.

Outcome Measures and Data Collection

Each participant underwent a structured interview after informed consent to collect information relating to demographic characteristics, fall history, fall risks, quality of life, and health history. Postural sway was then measured.

Analysis

Descriptive statistics were calculated for each of the fall risk factors, and *t* tests were performed to compare quality-of-life summary scores between fallers and nonfallers. Statistical analysis was performed using SAS version 9.1 (SAS Institute, www.sas.com).

Equipment and Instruments

Information was collected using a variety of instruments and equipment. Demographic information (age and sex), chiropractic care history, fall history, fall risk, and health history information were collected using a structured interview format. Fall risks were identified using a modified version of the Falls Risk for Older People in the Community screening tool, which has a relatively good capacity to predict falls and identify people with fall risks that may require further assessment or management.[44] Fall risk was also assessed using the Berg Balance Scale (BBS), which involves 14 functional tasks that are common in everyday life. The maximum possible score in the BBS is 56, with a score of 45 or less, considered to be the cutoff to indicate a greater risk of falling.[45] Balance confidence was assessed using the Activities-Specific Balance Confidence Scale (ABC), which is a 16-item questionnaire that asks participants to rate their confidence that they will lose their balance or become unsteady while performing activities of daily living. Scores for the ABC range from 0% to 100%, with 0 being no confidence and 100 being full confidence. A cutoff point of 85% has been suggested to indicate an excessive fear of falling.[46] Posturographic sway was measured using a CAPS Lite computerized posturography system (Vestibular Technologies, Cheyenne, WY). This static balance platform measures the vertical force and the center of pressure of an individual quietly standing on a perturbing foam cushion (to reduce proprioceptive information) with their eyes closed (to remove visual clues) for 20 seconds. This obliges the individual to rely mostly on the vestibular system to maintain balance. The effectiveness of the CAPS protocol has been validated by several studies that showed that the CAPS eyes closed on a perturbed surface posturographic test was a sensitive test for identifying patients who have fallen.[47-50] The CAPS provides several numerical results based on the statistical analysis of the center of pressure. In this study, we used the participant's stability level, which is calculated by comparing the amount of the participant's sway throughout the duration of the test with age-matched norms. Health-related quality of life was measured using a Short Form Health Survey (SF-36 version 1). The SF-36 results were aggregated into 2 higher order summary scores: the physical component summary and mental component summary, which were calculated using the orthogonal extraction and rotation method described by Tucker et al[51] using the Australian Bureau of Statistics 1995 National Health Survey mean values and SDs to calculate factor score coefficients.[52] Back pain–related disability was measured using the revised Oswestry Disability Index (ODI), which is composed of 10 brief sections, each of which focuses on an activity of daily living. Neck pain–related disability was measured using the Neck Disability Index questionnaire, which was modeled after the ODI.[53] Only participants that reported the presence of back pain or neck pain were asked to complete the ODI or Neck Disability Index.

Ethical Considerations

This study received ethical approval from the New Zealand Northern Regional Y Ethics Committee (Ref NTY/06/12/131), and in Australia, ethics approval was obtained from the Bellberry Human Ethics Committee (Ref 66/07).

Results

One hundred ten older chiropractic patients were approached to participate in this study. Eight of those patients approached declined to participate because of overseas travel, disinterest once the study had been explained to them, or other time commitments. One patient was excluded because he could not remain standing unassisted for 1 minute. One hundred and one patients were, therefore, included in the study, which represents 91.8% of all patients invited to participate. Sixty-two percent of participants were women, and the average age was 72 years (SD, 5.9 years). The age range was 65 to 92 years. A breakdown of participant age is shown in Figure 1. Fifty-three percent of participants were from Auckland, New Zealand, and the remainder were from Melbourne, Australia.

Chiropractic Care History

Table 1 describes the characteristics of participants with respect to length of time under care, number of visits in the past 12 months, and the nature of care they sought. More than 90% of participants had been under chiropractic care

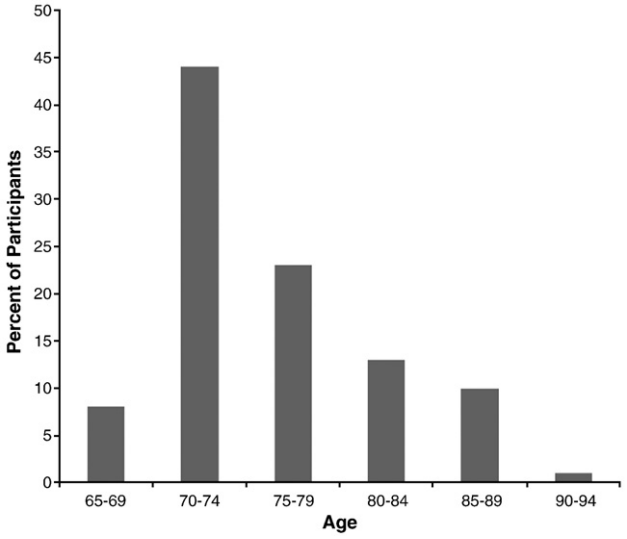

Fig 1. *Age of participants.*

Table 1. *Description of chiropractic care*

	n	%
Length of time under chiropractic care		
New (<4 wk)	3	3.0
1-12 mo	7	6.9
>12 mo	91	90.1
Nature of care		
New to chiropractic	4	4.0
Regular (maintenance or wellness)	20	19.8
Intermittent (occasional acute care or pain management)	77	76.2
No. of visits in last 12 mo		
0-5	17	16.8
6-11	22	21.8
12-23	37	36.6
24+	25	24.8
Overall mean no. of chiropractic visits in last 12 mo	17.3 (SD, 15.3)	
Overall median no. of chiropractic visits in last 12 mo	13	

Table 2. *Fall risk, fall history, and neck and back pain in older chiropractic patients with results of comparable studies of normal community-dwelling older people*

	Chiropractic patients		Comparable samples
	n	%	%
No. of falls in past 12 mo			
None	66	65.4	
1	23	22.8	12-25[54,55]
≥2	12	11.9	10-18[55-57]
Any falls	35	34.6	22-40[8,9,57]
Injury-related fall in last 12 mo			
None	73	72.3	–
Minor, no medical	15	14.9	–
Minor, medical	11	10.9	–
Severe	2	2.0	–
Any injury-related falls	28	27.7	10-30[55,58]
Polypharmacy (≥4 medications)	42	41.6	53-73[55,59,60]
Psychotropic medication use	21	20.8	15-16[59,60]
Vestibular disorder/dizziness	17	16.8	22[54]
Osteoarthritis	59	58.4	25-48[56,61]
Depression (currently treated)	10	9.9	10[60]
Problems with continence	22	21.8	15-30[54,60]
Use of an assistive device (walking aid)	16	15.8	13-17[55,60]
Osteoporosis	15	14.9	12-26[56,62]
Neck pain present	39	38.6	20-22[41]
Neck Disability Index, mean (n = 39)	18.8% (SD, 15.2)		–
Neck Disability Index, median	16%		–
Neck Disability Index, range	2%-62%		
Back pain present	54	53.5	25[41]
Oswestry Low Back Pain Disability Questionnaire, mean (n = 54)	22.4% (SD, 16.1)		–
Oswestry Low Back Pain Disability Questionnaire, median	18%		–
Oswestry Low Back Pain Disability Questionnaire, range	0%-66%		–

for over 12 months, and 76% described the nature of their chiropractic care as "intermittent for occasional acute care or pain management." The average number of chiropractic visits that participants had made over the previous 12 months was 17.3, and the median number of visits was 13.

Fall Risk Profile

Table 2 describes the fall risks identified in the structured interview process including the fall history of the patient sample. Where possible, results from other studies investigating community-dwelling older adults are given so general comparisons can be made. Over the previous 12 months, 34.6% of the sample reported suffering at least 1 fall. The most common fall risk factors present were the presence of osteoarthritis (58.4%) and polypharmacy (41.6%).

Balance, Balance Confidence, and Postural Sway

Results from the BBS, ABC, and CAPS eyes closed on a perturbed surface posturographic test are presented in Table 3. In general, participants performed well on the BBS (mean, 51.9), and on average, they rated their balance confidence as being high (87.3%) on the ABC. The CAPS eyes closed on a perturbed surface posturographic test revealed that when participants were challenged to rely mostly on their vestibular system to maintain balance, they struggled. Almost 60% of participants were either unable to complete the test (included in the profound category) or

Table 3. *Balance, balance confidence, and postural sway of older chiropractic patients with results of comparable studies of normal community-dwelling older people*

Test	Chiropractic patients	Comparable samples
BBS, mean (of 56)	51.9 (SD, 5.9)	46.5-54.1[46,55,62]
BBS, median (of 56)	55	–
BBS, range (of 56)	22-56	–
BBS, score of <45	10.9% (n = 11)	18%-32%[62,63]
ABC scale, mean	87.3% (SD, 14.2)	79%-92%[46,62]
ABC scale, median	93%	–
ABC scale, range	36-100%	–
ABC, score of <85%	25.7% (n = 26)	–
Poor postural sway (severe or profound CAPS stability level when standing with eyes closed on a foam cushion)	59.4% (n = 60)	61.7%[a,64]

[a] This comparison study used the eyes closed on a perturbed surface posturographic test but did not use the CAPS system. A pass/fail system was used based on whether participants could complete the test while remaining stable.

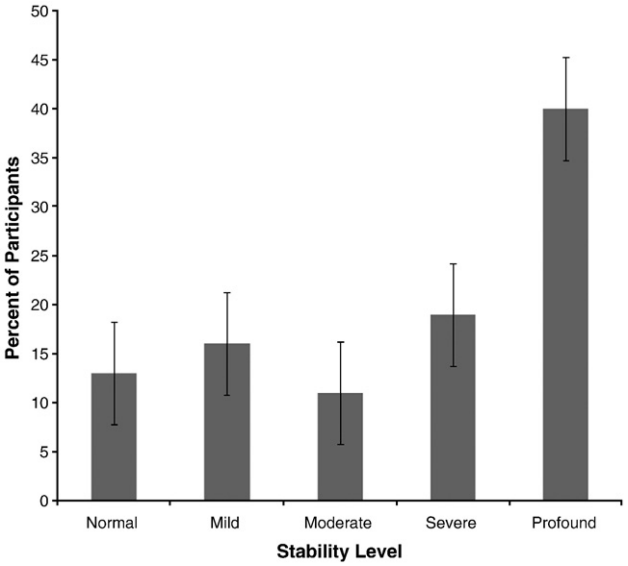

Fig 2. *CAPS eyes closed on a perturbed surface stability level.*

they exhibited postural sway that was deemed to be severely or profoundly impaired (Fig 2).

Quality of Life

Quality-of-life domains and summary scores of the participants generally compared favorably with average scores from the Australian Bureau of Statistics 1995 National Health Survey.[51] The mean physical component summary of chiropractic patients was 44.4 (SD, 10.9), and the mean mental component summary of chiropractic patients was 54.0 (SD, 8.2). These results are summarized in Table 4. Figure 3 compares the quality of life of participants who reported a fall during the last 12 months with those that had not fallen. The SF-36 physical component summary of the fallers (mean, 41.4; SD, 11.4) was significantly less than the nonfallers (mean, 46.0; SD, 10.3) ($P = .04$). The SF-36 mental component summary was also slightly less for the fallers (mean, 52.6; SD, 9.4) compared to the nonfallers (mean, 54.8; SD, 7.4), but the difference was not statistically significant ($P = .2$).

Neck and Back Pain

Neck pain was present in 38.6% of participants (n = 39), with the majority (72%, n = 28) of those considered to have a minimal disability due to neck pain. Back pain was present in 53.5% of participants (n = 54), with most considered to have either a minimal (54%, n = 29) or moderate (31%, n = 17) disability due to back pain.

Medication Use

Medication use is summarized in Table 5. Polypharmacy and a variety of medications have been linked to an increased risk of falling.[65] Of the medications linked to an increased fall risk, the most common ones to be taken in this sample were type 1 antiarrhythmics (13.9%), diuretics (11.9%), and antidepressants (9.9%).

Discussion

The older chiropractic patients sampled in this study displayed significant fall risk factors, and they were as likely to have experienced a fall in the previous 12 months as the general older population. Ninety percent of the participants had been under chiropractic care for at least 12 months. This suggests that chiropractors should regularly assess their older patients for fall risk factors even when they have been under long-term care, as many of the fall risk factors identified are modifiable and the risk of falling may be reduced if appropriate recommendations are made and followed.[9,20,21]

One of the most important risk factors for falling is having a history of falls (odds ratio, 3.0).[9] In this study, 35% of the older chiropractic patients had at least 1 fall in the previous 12 months. This is consistent with the expected rate of falls within the general older population, as approximately one third of community-dwelling older adults has at least 1 fall each year.[8,9] In the current study, of those participants that had experienced a fall, 80% reported that they had at least a minor injury, with 37% of fallers requiring medical attention for their fall-related injury. Of the 35 patients who had fallen over the previous 12 months, 6% (n = 2) had severe injuries. This rate of severe injury related to falling lies within the expected range of 5% to 10% reported in previous studies.[21] Chiropractors should be cognizant of the fact that their long-term older patients may have had a fall-related injury

Table 4. *Quality of life of older chiropractic patients with results of comparable studies of normal community-dwelling older people*

SF-36 entire chiropractic sample (n = 101)	Chiropractic sample score, mean (SD)	Comparable sample
Physical functioning	72.9 (26.2)	–
Role physical	74.1 (36.0)	–
Bodily pain	63.5 (23.8)	–
General health	74.1 (20.3)	–
Vitality	61.2 (20.9)	–
Social functioning	89.5 (19.8)	–
Role emotional	86.6 (28.9)	–
Mental health	81.0 (13.4)	–
Physical component summary	44.4 (10.9)	–
Mental component summary	54.0 (8.2)	–
SF-36 chiropractic patients aged 70+ (n = 55)[a]	**Chiropractic sample score mean (SD)**	**Comparable sample (n = 488)[51]**
Physical functioning	70.3 (26.4)	64.7
Role physical	73.2 (38.5)	63.8
Bodily pain	62.6 (23.6)	71.0
General health	75.6 (19.9)	64.7
Vitality	59.6 (21.6)	58.9
Social functioning	88.3 (22.7)	84.0
Role emotional	85.1 (30.5)	86.5
Mental health	82.7 (14.1)	81.6
Physical component summary	43.63 (10.6)	41.8
Mental component summary	54.33 (8.9)	53.8

[a] Chiropractic patients 70 years and older were analyzed separately to make more appropriate comparisons with the Australian Bureau of Statistics 1995 National Health Survey.

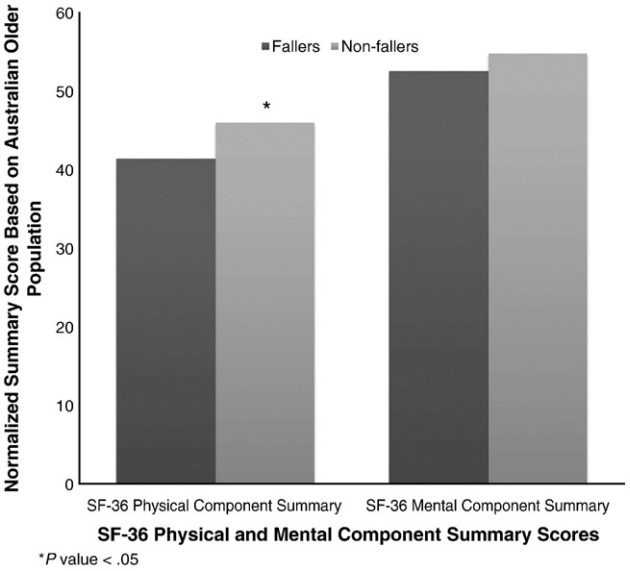

Fig 3. *Comparison of SF-36 physical and mental component summary scores of fallers and nonfallers.*

Table 5. *Medication use*

	n	%
No. of medications		
0	18	17.8
1	11	10.9
2	18	17.8
3	12	11.9
4+	42	41.6
Mean	3.2	(SD, 2.9)
Median	3	
Range	0-20	
Categories of medication taken		
Sedatives	3	3.0
Antidepressants	10	9.9
Neuroleptics	9	8.9
Centrally acting analgesics	3	3.0
Digoxin	2	2.0
Diuretics	12	11.9
Type 1 antiarrhythmics	14	13.9
Vestibular suppressants	2	2.0
Any psychotropic medication	21	20.8

between visits, which could potentially alter patient management strategies.

Besides a history of falling, other fall risk factors assessed in this study included polypharmacy, use of psychotropic medications, presence of a balance disorder, use of assistive device, osteoarthritis, depression, and problems with continence.[9,20,21,27] The prevalence of these risk factors in the chiropractic patients sampled is listed in Table 2. Most of these prevalence rates are consistent with published data for community-dwelling older adults.[8,9,27,54-62,66,67] When making comparisons with other published data, it should be noted that population characteristics may have differed between studies and that the use of different classification systems for conditions such as osteoporosis or osteoarthritis mean comparisons should be viewed with some caution.

The use of 4 or more medications or any use of psychotropic medications results in a significant increase in the risk of falling.[9,65] Little is known about the medication use of older chiropractic patients. As users of a complementary care provider, it is possible that they are less inclined to use pharmacologic treatments than the general older population. It is possible that this is the case, as the percentage of participants taking 4 or more medications (41.6% vs 53%) and the median number of medications used (3 vs 4) appeared slightly lower than similar Australian samples and the percentage of participants taking no medications (17.8% vs 3.2%-5.5%) appeared higher in the chiropractic sample.[59,68] To accurately compare medication use between chiropractic patients and general community-dwelling older people requires an alternative study design; so again, these comparisons need to be viewed with caution. It must be emphasized that almost half of the chiropractic patients in this sample were taking 4 or more medications, which increases their risk of falling or having an adverse drug interaction.[9,59]

In this study, older chiropractic patients had a higher prevalence of neck pain (38.6%, n = 39) compared with the general older population (20%).[41] This is of potential concern to chiropractors due to the disturbances that may be caused in balance and sensorimotor control due to neck-related disorders.[27,34-40] Considering the growing body of evidence that supports the role of chiropractic care in influencing sensorimotor function,[69] it would be of interest for future studies to investigate whether chiropractic care has a positive impact on sensorimotor function associated with postural control in the older patient.

Computerized posturographic testing revealed that 59.4% (n = 60) of participants had severe to profound problems with maintaining their balance when required to stand with their eyes closed on a perturbing foam surface. This result is comparable to the general older population and is of concern, as poor performance on this test has been shown to be related to a significant increase in falls, even when no history of dizziness exists.[64] Most participants performed well on the BBS, with only 10.9% (n = 11) of participants scoring below the suggested cutoff mark of 45, which corresponds to an increased risk of falling.[45] Just over one quarter (25.7%, n = 26) of participants had an excessive fear of falling according to the ABC. Excessive fear of falling can result in self-imposed activity restrictions, functional decline and depression, feelings of helplessness, and social isolation.[21] Chiropractors should be mindful of the potential negative consequences of a fear of falling in their older patients and, if possible, identify and address the reason for the fear.

Quality-of-life scores of participants compared favorably to age-matched norms across most domains and summary scores in the SF-36 survey.[51] Chiropractic patients scored their "bodily pain" lower than age-matched norms and their "role limitation because of emotional problems" as slightly lower also. All other domains and summary scores were higher than the population norms. This is in contrast to a previous study, which reported that chiropractic patients scored lower than age/sex-matched norms across the domains of the SF-36.[31] When comparing the quality of life of fallers vs nonfallers, the fallers reported a significantly lower physical component summary score. The mental component summary score was also lower for fallers, but the difference was not significant. This is congruent with previous research that has suggested that falls have a negative impact on quality of life.[16]

Chiropractors could consider implementing assessment and outcome measures aimed at identifying and tracking fall risks in their older patients. Fall risks can be identified in a variety of ways including structured interviews or questionnaires, home assessment, functional balance tests, and computerized posturographic analysis. Many of the fall risk assessment procedures used in this study and other assessment protocols that have been recommended for use in clinical practice are time consuming and required trained assistants to complete.[17,27] The usefulness of these tests in a chiropractic office setting may need to be explored in future studies.

When fall risks are identified, chiropractors should provide counsel or consider referring their patients for appropriate interventions. A thorough discussion of appropriate interventions is beyond the scope of this study, but recommendations have been published elsewhere.[9,20,21,26] These recommendations may include medication review in the case of psychotropic drug use or polypharmacy, exercise interventions to improve muscle weakness or balance problems, vision assessment for uncorrected vision problems, vitamin D supplementation for osteoporosis, or various multifactorial interventions when a variety of fall risk factors are present. The chiropractic profession has begun to produce fall prevention information specific to chiropractic practice, and fall prevention educational material is now available from chiropractic organizations.[26,70-79] Chiropractors should ensure that they are familiar with this information and consider using fall prevention strategies in their practices. Although most of the patients included in this study had been receiving chiropractic care for some time, it is possible that their fall risk would reduce if appropriate interventions were recommended. Further research is required to better understand the role chiropractors can play in reducing fall risk in their older patients or whether they can play a role in an integrated fall prevention program.

Limitations

In this study, a cross-sectional sampling frame was used across 12 chiropractic practices. Chiropractic practices were selected based on convenience from the 848 practices identified as being located in Auckland or Melbourne.[42,43] The 12 practices selected may not accurately reflect chiropractic practices across the 2 cities or the region in general. This limits the generalizability of findings. Future cross-sectional chiropractic studies should consider using a random sampling frame to select practices for inclusion. It should be noted that, from the participating practices, the overwhelming response from patients was positive (91.8%) when asked to participate in the study, which reduces the likelihood of nonresponse bias.

The sample size of 101 is small for a study that aims to estimate prevalence. If the prevalence of risk factors is low, then a small sample size will result in a SE that is too large to make accurate prevalence estimates. To gain more generalizable estimates for prevalence of fall risk factors of older chiropractic patients, a larger sample size and more rigorous sampling method should be used.

One of the exclusion criteria in this study was being unable to remain standing unassisted for 1 minute, as these patients would have been unable to complete the included assessment procedures. Although only 1 patient was excluded based on

this criterion in the present study, future prevalence studies should consider eliminating this criterion, as it may result in errors in estimating fall risk prevalence.

Comparison statistics have been provided for many of the risk factors and other data collected in this study. As has already been mentioned, the design of this study does not allow for accurate comparisons to be made with norms for community-dwelling older adults. Comparisons have been made to provide some context for readers and to stimulate further research if deemed to be appropriate.

Estimates of the prevalence of diseases such as osteoarthritis and osteoporosis vary based on the criteria for a diagnosis to be present or the disease definition used. In this study, participants were asked if they were aware that they had a variety of conditions, but strict disease definitions or diagnostic criteria were not used. This should be considered when interpreting the results of this study.

Three research assistants were involved in data collection during this study, which increases the risk of observer bias. Consensus training of research assistants took place, but no comparisons were made to test for interobserver variability. In addition, it should be noted that the research assistants employed in this study were all chiropractic students, which may have resulted in a response bias.

The design of this study does not allow inferences to be made about the role that chiropractic care plays in reducing fall risk factors or the effect it may have on quality of life or the other outcomes evaluated in this study. Participants in this study may not have been representative of the wider community when they initiated chiropractic care. An experimental design is required to test hypotheses that investigate the effect of chiropractic care on these risk factors and other outcomes.

Conclusions

The older chiropractic patients sampled in this study had, in general, been under long-term chiropractic care, yet they displayed substantial risk factors for falls and they were as likely to have experienced a fall in the past 12 months as the general older population. Chiropractors, as primary care practitioners focusing on spinal health, general wellness, and illness prevention, are ideally placed to identify risks and ultimately intervene with patients at risk for falling. They should be aware that their older patients are at risk for falling despite the length of time they have been receiving chiropractic care. Further research is required to establish whether chiropractors can play a positive role in reducing fall risk in their older patients.

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Practical Applications

- Older chiropractic patients are at risk of falling despite the length of time they have been receiving chiropractic care.
- Chiropractors are ideally placed to identify risks and ultimately intervene with patients at risk of falling.
- Further research is required to establish whether chiropractors can play a positive role in reducing falls risk in their older patients.

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No conflicts of interest were reported for this study.

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