ORIGINAL ARTICLE

Prevalence and Impact of Chronic Musculoskeletal Ankle Disorders in the Community

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ABSTRACT. Hiller CE, Nightingale EJ, Raymond J, Kilbreath SL, Burns J, Black DA, Refshauge KM. Prevalence and impact of chronic musculoskeletal ankle disorders in the community. Arch Phys Med Rehabil 2012;93:1801-7.

Objective: To determine the point prevalence of chronic musculoskeletal ankle disorders in the community.

Design: Cross-sectional stratified (metropolitan vs regional) random sample.

Setting: General community.

Participants: Population-based computer-aided telephone survey of people (N=2078) aged 18 to 65 years in New South Wales, Australia. Of those contacted, 751 participants provided data.

Interventions: Not applicable.

Main Outcome Measures: Point prevalence for no history of ankle injury or chronic ankle problems (no ankle problems), history of ankle injury without residual problems, and chronic ankle disorders. Chronic musculoskeletal ankle disorders due to ankle sprain, fracture, arthritis, or other disorder compared by chi-square test for the presence of pain, weakness, giving way, swelling and instability, activity limitation, and health care use in the past year.

Results: There were 231 (30.8%) participants with no ankle problems, 342 (45.5%) with a history of ankle injury but no chronic problems, and 178 (23.7%) with chronic ankle disorders. The major component of chronic ankle disorders was musculoskeletal disorders (n=147, 19.6% of the total sample), most of which were due to ankle injury (n=117, 15.6% of the total). There was no difference among the arthritis, fracture, sprain, and other groups in the prevalence of the specific complaints, or health care use. Significantly more participants with arthritis had to limit activity than in the sprain group (Chi-square test, $P=.035$).

Conclusions: Chronic musculoskeletal ankle disorders affected almost 20% of the Australian community. The majority were due to a previous ankle injury, and most people had to limit or change their physical activity because of the ankle disorder.

Key Words: Ankle injuries; Chronic limitation of activity; Joint instability; Joint pain; Prevalence; Rehabilitation.

CHRONIC MUSCULOSKELETAL conditions constitute a global health problem that is likely to increase as the average life span increases. The contribution of chronic ankle disorders to this global problem is unknown. Chronic ankle conditions may be linked to the high incidence of ankle injury such as ankle sprain and fracture, injuries that are often thought to fully recover. The ankle was the most common site of injury in 24 of 70 sports, and ankle sprain was the major specific injury in 33 of 43 sports reviewed.[1] Furthermore, 22% of all sports injuries presenting to a hospital emergency department were ankle injuries, with a ratio of 8 ankle sprains for each ankle fracture.[2] From the general community, presentations to hospital emergency were between 2.2[3] and 7[4,5] ankle sprains per year per 1000 population and 1.1/1000 person-years for ankle fracture.[6] Because most people do not seek hospital treatment for ankle sprain, the true incidence is likely to be higher.[7-9]

Long-term consequences of ankle injury are varied. Residual problems after ankle fracture include pain, decreased range of motion, and impaired function.[10] Approximately 25% of people have poor to fair self-reported outcomes at 2,[11] 5,[10] and 14[12] years postfracture. Following ankle sprain, a systematic review reported that 15% to 64% of the people had not recovered in 3 years.[13] Residual problems included pain, chronic ankle instability, and recurrent sprain.[13] Daily life is appreciably impacted; for example, 15% of the people with instability after ankle sprain returned to work with some impairment, 6% were unable to maintain any occupational activity,[14] while 72% of the people were unable to maintain their previous activity level.[15] The longer-term consequence of ankle fracture, sprain, osteochondrosis, and cartilage damage is posttraumatic ankle osteoarthritis.[16] Ankle osteoarthritis can result in very poor quality of life.[17] Among patients presenting for surgery for end-stage ankle osteoarthritis, 70% to 85% of the cases were posttraumatic.[16,18-20]

While we have some information on ankle injury incidence, the prevalence of ongoing problems following injury is unknown in the general community. Follow-up studies have been undertaken only in either specific sporting groups[1] or in people presenting to a medical facility.[3,4] Anecdotal evidence suggests that these ongoing problems are self-managed and these disorders are therefore not included in health care statistics.

Taken together, these observations suggest a high prevalence of chronic ankle disorders that potentially have a significant, adverse impact on health and quality of life. We, therefore, aimed to determine the point prevalence of chronic musculoskeletal ankle disorders in the general community and investigate the impact of these disorders and health care use.

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METHODS

Sampling

The sample was drawn from eligible residents in a defined population that was broadly representative of the Australian community. Data were collected by computer-assisted telephone interviews from a random sample of known landline telephone numbers of residents in New South Wales—the state with the largest population (7.1 million, 2009) in Australia. We chose to stratify according to domicile, that is, metropolitan versus regional. We did not stratify for sex or age because there is no evidence for differences between sexes or for age younger than 65 years. Our findings support this decision.

Metropolitan was defined as the Sydney, Wollongong, and Newcastle areas as determined by the sample postcode.

Participants

Eligible participants were aged 18 to 64 years and could speak English. Age was restricted to distinguish between the primary effects of aging and the secondary effects from injury or other disease on ankle status. The person who answered the telephone was invited to participate in the study. If they did not fit the age criteria they were asked whether there was another household member who did. Only 1 participant was interviewed from each contact number. Once a participant agreed to be interviewed, he/she was read a comprehensive information statement and verbal consent was obtained and recorded. Ethics approval for the study was obtained from the University of Sydney Human Research Ethics Committee. Interviews were conducted in July and August 2009.

Interview

The interview, modified from a pilot version, consisted of a series of structured questions with a mix of closed and open-ended items. After the participant characteristics were established (age and sex), participants were asked "Do you have any long-term problems with your ankles, lasting or expected to last more than 6 months?" Participants who answered "yes" continued to the main survey. Participants who answered "no" were asked whether they had ever injured their ankles and about the type of injury, medical attention sought, time since injury, and activity that caused the injury. At the end of the survey, participants were asked to confirm whether they had any problems now because of the injury and if they answered "yes" were redirected to the main survey (appendix 1).

Participants who indicated that they had chronic ankle problems were asked whether the problem was due to an injury, arthritis, or other condition. Participants who indicated an injury were asked about the type of injury, length of time since the injury, and medical attention sought at the time of injury. Participants who indicated arthritis were asked about the type of arthritis and whether a doctor had diagnosed the arthritis. Participants who reported that the chronic problem was not caused by injury or arthritis were asked the cause. If the cause was not musculoskeletal in origin, such as ankle swelling from cardiovascular disease, the interview concluded at this point.

Participants completing the remainder of the survey were asked questions including the presence of any of the following in or around the ankle: pain, weakness, swelling, feeling of their ankle giving way, feeling of ankle instability, and any other problem. Participants who included pain as a problem were asked about its frequency and severity. Participants were questioned about the duration of the chronic problem. Two activity questions were asked; what activity they had to limit because of their ankle problem, and what activity they most wanted to undertake but were unable to because of their ankle problem. Final questions included health care use for the ankle problem in the past year.

Analysis

Assuming a prevalence of 15%[21] and a margin of error of .03 with 95% confidence intervals, a minimum sample size of 545 was required. We assumed that 4 calls would be required to achieve 1 completed interview; that is, approximately 2180 calls would be required to yield 545 responses.

Descriptive statistics on the prevalence rates, impact, and use of health care were calculated. The total sample was classified into 4 subgroups: participants with no history of ankle injury and no chronic disorders, participants with a history of ankle injury but no chronic disorders, participants with ankle problems of nonmusculoskeletal origin, and participants with chronic musculoskeletal ankle disorders. Comparison between these 4 groups was conducted using analysis of variance with post hoc Tukey's alpha for age distribution and chi-square test for sex frequency. The total sample and the chronic musculoskeletal ankle disorder group were divided into age bands for comparison with the Australian Bureau of Statistics 10-year age bands. The exception was the 18 to 24 years band.

The group with chronic musculoskeletal ankle disorders was further classified into specific diagnostic groupings for additional analysis. These groupings included arthritis, fracture, sprain, and "other" musculoskeletal disorders. Chi-square or Fisher exact test was used to compare activity level and health care use among these specific groups. Responses for the activity questions were collated into categories; for example, all specifically named sports were placed under the umbrella term "sport." All statistics were analyzed using SPSS version 17.0.[a]

RESULTS

Sample

We contacted 2078 residences resulting in 751 responses. The response rate of 36.1% was consistent with current telephone survey trends.[22] Age was 46.0±12.5 years (mean ± SD), but the sample was skewed toward the older age groups (Australian Bureau of Statistics [2009] mean for same age range=40.2y). The median age was 48 years (interquartile range 37–57y). Most participants resided in metropolitan areas (73%), reflecting the New South Wales distribution (2009: 73.9%). There were more women (n=504) than men (n=247). Sex proportions for the total sample did not differ significantly from the chronic musculoskeletal disorders group, or within each age band. However, there was a higher proportion of men with a history of ankle injury but without chronic disorders (140 men [41%] and 202 women [59%], $\chi^2=6.31$, df=1, $P=.012$) and a lower proportion of men who had no history of ankle injury and had no chronic ankle disorders (55 men [24%] and 176 women [76%]: $\chi^2=6.42$, df=1, $P=.011$).

Prevalence of Chronic Ankle Disorders

The overall prevalence of chronic ankle disorders was 23.7% (n=178) (table 1). Of these, the majority were due to musculoskeletal disorders (n=147). Injury was the cause of most musculoskeletal disorders (n=121) followed by arthritis (n=30). Nonmusculoskeletal ankle problems (n=31) included swelling due to cardiovascular or systemic disease, foot problems, and referred pain.

History of Ankle Injury

A history of ankle injury was reported by 459 participants (61.1% of the total sample), with ankle sprain being the most