Health Care Resource Utilization after Acute Ankle Sprains

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Abstract

Ankle sprains are common soft-tissue injuries that are often treated in emergency departments. These injuries can have significant consequences for the patient, including long-term morbidity and loss of productivity. The objective of this study was to examine the direct and indirect health resource utilization associated with ankle sprains. 296 adult patients with acute ankle sprains participated in the study in Kingston, Ontario, Canada. Data were collected using a one-month productivity questionnaire. Overall, 11% (95% CI, 8–15%) of the participants visited a physician following the initial emergency department visit. Almost all (95%; 95% CI, 92–97%) of the participants used medications or supportive treatments and 55% (95% CI, 50–61%) reported taking time off from work, school, or housework. The use of unpaid assistance was indicated by 56% of the participants (95% CI, 50–62%). Findings from this analysis highlight the significant patient-related and health care system burden of acute ankle sprains.

Key words: ankle sprains, Canada, health resources, productivity loss

Introduction

Ankle sprains are soft-tissue injuries caused by damage to one or more of the ligaments of the ankle joint [1]. These injuries affect 206 to 215 per 100,000 people per year [2, 3], and make up 3% to 5% of all emergency room visits annually in the United Kingdom [4]. Recovery time from ankle sprains can be affected by numerous factors including age, body mass index, and the characteristics of the sprain including its type, severity, and number of ligaments involved [5, 6]. Acute ankle sprains can have significant and long-term consequences for the affected individual, both clinically and economically. Up to three-quarters of participants with soft-tissue injuries to the ankle report long-term morbidity and pain affecting their mobility up to 18 months following the sprain [7, 8]. The physical consequences of acute ankle sprains may remain for six weeks and even for up to four months after the initial injury, leading to chronic problems [9, 10]. The most commonly reported problems after the injury include ankle weakness, loss of quality of life, and absenteeism from work, school or sports [7, 8, 11, 12].

Medical and physiotherapy treatments for ankle sprains are costly [12–14]. Studies conducted in the United Kingdom, Belgium, and the United States show that the costs of ankle sprain diagnosis and treatment for individual cases range from $490 to $4,662 (2012 Canadian dollars), depending on the severity of the sprain, the need for immobilization or invasive procedures, and time lost from work [4, 13, 15, 16]. Ankle sprains can particularly affect amateur and professional elite athletes if they inhibit their return to work [17, 18].

To date, a limited number of studies have investigated the health resource utilization of individuals with ankle sprains. Cooke et al. conducted a randomized controlled trial of three types of mechanical ankle support treatments among 584 individuals with grade 3 ankle sprains in the United Kingdom [4]. The authors collected information on consultations, imaging, inpatient episodes, prescribed and purchased medications, and sick leave. Another study done by Audenaert et al. included 200
individuals with occupational accidents resulting in ankle sprains that were captured in an insurance database in Belgium [15]. The authors presented information on days missed from work and resource utilization during the initial medical visit for the sprain but did not include resource utilization following this visit. Neither study presented health resource utilization data for less severe ankle sprains (grades 1 and 2).

Data on the burden of acute ankle sprains are limited and a better understanding of the health care utilization and productivity loss is required to determine the impact of these injuries on both the health care system and the participant. These data are needed in order to address resource allocation and determine how patients can prepare for their recovery from such injuries. Therefore, the purpose of this paper is to assess the participant-related resource utilization associated with ankle sprains in terms of health care professional visits, use of medications and other treatments, productivity loss post-injury, and the use of paid or unpaid assistance following the sprain.

Methods

This study is based on a sub-sample of adult participants with acute ankle sprains who participated in an ongoing randomized controlled trial investigating the clinical utility and cost-effectiveness of a therapeutic management program involving physiotherapy in Kingston, Ontario, Canada, of which the authors are the principal investigators (R.B. and B.B.) and co-investigators (W.P. and A.J.). The participants included individuals who were 16 years of age and older and presented with a grade 1 or 2 ankle sprain (stretched ligament of the ankle joint or partially torn ligament, respectively [19, 20]) to one of two emergency departments in Kingston between the years of 2009 and 2012. Individuals with grade 3 ankle sprains (completely ruptured ligaments [19]), ankle fractures, injuries requiring immobilization, multiple injuries that could have impacted the recovery from the ankle sprain, prior ankle sprain in the preceding six months, or mobility limiting conditions such as arthritis or neurological diseases were excluded. The randomized controlled trial received ethics approval from the Queen’s University Health Sciences Research Ethics Board (approval #EMED-114-09).

Self-reported data were collected prospectively by trained research assistants using a telephone-based interviewer-administered productivity questionnaire completed one month after the initial emergency department visit for the ankle sprain. Estimates included health care utilization of services covered by the provincial government of Ontario through the Ministry of Health and Long-Term Care such as outpatient family physician and specialist physician visits, subsequent emergency department visits, and imaging ordered outside of the initial emergency department visit. Services paid for out-of-pocket by the participant or covered through the participant’s private insurance company including prescription and over-the-counter drugs, supportive treatments, and travel time and distances during the past month were also estimated. In addition, data on yearly income and productivity loss from work, school, or housework, disability payments collected, and the duration of paid and unpaid assistance for self-care, child or elder care, or domestic help were collected. Information on physiotherapy received was not included in the analysis as it was part of the therapeutic management program in the randomized controlled trial. Percentages and median travel times and distances along with their interquartile ranges were calculated for a sub-sample of the study population who had data available at the time of analysis. Study data were collected and managed using REDCap – electronic data capture tools hosted at Queen’s University [21].

Results

Overall, 296 participants had completed the one-month productivity questionnaire at the time of data analysis. The mean age of the participants was 31 years with a range of 16 to 71 years of age. Ankle sprain grade was available among 202 participants with 34 (17%; 95% Confidence Interval [CI], 12–23%) having grade 1 ankle sprains and 168 (83%; 95% CI, 77–88%) having grade 2 ankle sprains. Study data were collected and managed using REDCap electronic data capture tools hosted at Queen’s University [21].

<table>
<thead>
<tr>
<th>Health Care Provider</th>
<th>Participants n = 296 (%; 95% CI)</th>
<th>Number of Visits</th>
<th>Median (IQR*) Travel Time (minutes)</th>
<th>Median (IQR*) Travel Distance (kilometres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Physician or Specialist Visit</td>
<td>33 (11.1%; 8.1–15.2%)</td>
<td>37</td>
<td>16 (10–30)</td>
<td>12 (8–25)</td>
</tr>
<tr>
<td>Emergency Department Revisit</td>
<td>11 (3.7%; 2.1–6.5%)</td>
<td>14</td>
<td>13 (6–25)</td>
<td>10 (5–18)</td>
</tr>
<tr>
<td>Imaging Post Emergency Department Visit</td>
<td>17 (57% 3.6–9.0%)</td>
<td>18</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Table 1. Health Care Professional Visits after Initial Presentation to Emergency Department.

* IQR = interquartile range; n/a = not available.

† Includes x-ray, computed tomography, magnetic resonance imaging done after initial emergency department visit.