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ORIGINAL RESEARCH

Injuries and Illnesses Occurring on a Recreational Bicycle Tour: The Great Ohio Bicycle Adventure

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Objective.—Recreational multiday cycling events have grown popular in the United States; however, little has been published regarding the injuries and illnesses that occur during these events. The objective of this study was to describe injuries and illnesses that occur in the Great Ohio Bicycle Adventure (GOBA) and to examine associated risk factors.

Methods.—Injury and illness data collected from an on-site medical clinic during the 2013 and 2014 GOBA tours were merged with rider registration data for analysis. Diagnoses were classified as acute injury, overuse injury, or medical illness. The odds ratios of sustaining at least 1 injury/illness, as well as sustaining an acute injury, were assessed adjusting for riders' demographics.

Results.—A total of 4005 (2172 in 2013 and 1833 in 2014) cyclists participated in GOBA, with an an age of 50.7±17.6 (2–86) years (mean±SD [range]), of whom 59.8% were male. During the tours, 143 (3.6%) riders reported at least 1 injury/illness, which resulted in 220 clinical diagnoses, including 114 (51.8%) acute injuries, 27 (12.3 %) overuse injuries, and 79 (35.9%) medical illnesses. The lower extremities were the most commonly injured body site (n=71, 50.4%)."Superficial/Abrasions/Contusions" was the most common injury/illness type (n=68, 30.9%). Riders who had no previous tour experience or who were at least 50 years old had a greater risk of injury/illness than their counterparts.

Conclusions.—The prevalence of injury and illness is relatively low in multiday recreational cycling events. Our findings provide important data for planning and preparing for medical coverage at mass recreational cycling events.

Keywords: bicycling, athletic injuries, epidemiology

Introduction

Organized recreational bicycle touring continues to grow in popularity in the United States, yet bicycle safety remains a concern.[1–3] The injury rates and severity of injuries seen during recreational bicycle tours are relatively low.[4–10] Speed, specialized equipment, riding surface, weather conditions, and human factors contribute to a wide variety of traumatic and nontraumatic injuries documented among recreational touring cyclists at all experience levels.[11–18] The Great Ohio Bicycle Adventure (GOBA) is a multiday recreational cycling event held annually in mid-June for 1 week. During the event, approximately 2000 cyclists ride an average of 50 miles per day for 7 days and camp overnight.[19]

GOBA, unlike many multiday recreational cycling events, provides a daily, on-site, no-fee medical clinic. The clinic, staffed by 25 volunteer board-certified primary care and sports medicine physicians, registered nurses, and medics, was housed out of a recreational vehicle or within a fixed building space where the riders were based for the day. The clinic provided care for

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basic illnesses and injuries, including advanced wound care ("road rash"), laceration repair, and oral or intravenous hydration for stable patients. More serious conditions seen in the medical clinic were transported to local emergency facilities by a dedicated on-site emergency medical services (EMS) unit.

Care was provided along the route by a privately contracted company that supplied 3 EMS units and 6 certified medics. Communication between the contracted EMS units and GOBA communication staff was achieved by placing an amateur radio operator ("ham") in the medic units. Riders also sought care en route by activating the local EMS/911 systems, from Good Samaritans, and through self-care.

Due to the large number of riders with a wide range of ages, cycling experience, and personal medical histories, it can be challenging to provide proper medical care with the limited resources available at an on-site medical clinic. Existing studies demonstrate that collection and analysis of clinic data on injury and illness at cycling events are an important part of careful planning for rider safety and mass event medical coverage.[5–7, 9,15,20] A paucity of published data over the last 35 years describing injuries and illnesses that occur during recreational bicycling events calls for more research in injury prevention.[4–10,15] The purpose of this study was to 1) describe the injuries and illnesses that occurred during 2 consecutive years of a multiday bicycle tour using medical clinic visit and registration data, and 2) examine risk factors associated with increased likelihood of injury or illness.

Methods

PARTICIPANTS AND DATA SET

Two datasets were merged by rider identification (ID) for analysis in this study: 1) 2013 and 2014 GOBA electronic demographic registration data (eg, rider ID, sex, age, place of residence, and previous rider experience) and 2) GOBA medical clinic visit data (paper records) maintained for all patients seen during the 2013 and 2014 tours, including rider ID, date of clinic visit, date of illness/injury, characteristics of injuries and illness sustained during the tour, and treatment received from the clinic. This study was approved by the institutional review board of the authors' institution.

VARIABLES AND MEASURES

Injury or illness was defined as occurring during GOBA and receiving initial medical attention in the GOBA medical clinic. Clinic physicians recorded each diagnosis during the clinic visit using diagnosis codes from the International Classification of Diseases, Ninth Revision. For this study, diagnoses were classified as "acute injury," "overuse injury," or "illness" by 2 of the authors (board certified sports medicine physicians) who were part of the GOBA medical team. For patients who presented at the GOBA medical clinic with multiple diagnoses of injury and/or illness, each diagnosis was recorded as 1 observation in the analysis. Clinic physicians also recorded the following characteristics of each injury/illness during the clinic visit: date of clinic visit, date of injury, type of injury/illness, injured body site, and treatment received. Only new visits were included in this study. Any follow-up visits related to a rider's initial visit were not included.

Treatment was defined as any intervention dispensed by the GOBA medical clinic, including instructions for rest or follow-up care. Treatment variables included rest, ice, compression, and/or elevation; changes in medication; wound care; and recommendations for follow-up and/or missing at least 1 day of the bicycle tour. Demographic variables included in this study were study year, age, sex, place of residence, and previous GOBA tour experience.

DATA ANALYSIS

Descriptive statistics were used to summarize riders' demographics and the characteristics of injury and illness. To facilitate a better understanding of the injury and illness patterns, analysis was conducted at multiple levels—rider, visit, diagnosis, and treatment—where each rider could have multiple visits and each visit could have multiple diagnoses and/or treatments. χ^2 tests or independent t tests were used to compare the differences across subgroups, where appropriate. Adjusted logistic regressions were used to model 1) the odds of sustaining at least 1 injury or illness versus no injury or illness and 2) the odds of sustaining an acute injury versus an overuse injury or illness, with 95% confidence intervals. Both adjusted models included 5 mutually adjusted independent variables (study year, sex, age group, place of residence, and previous tour experience). Individuals who participated in both years were counted as 2 separate riders, 1 for each year. All data analyses were conducted using SAS 9.3 (SAS Institute, Cary NC), and statistical significance was set at $\alpha = .05$.

Results

DEMOGRAPHIC CHARACTERISTICS OF THE RIDERS

A total of 4005 riders who registered for the 2013 and 2014 GOBA were included in this study, including 2172