WILDERNESS & ENVIRONMENTAL MEDICINE, **27,** 468–475 (2016)

ORIGINAL RESEARCH

Medical Pathologies and Hut Guardians' Ability to Provide First Aid in Mountain Huts: A Prospective Observational Study

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Objective.—To describe the resources for medical condition management in mountain huts and the epidemiology of such events.

Methods.—We conducted a 3-step study from April 2013 to August 2014 in French mountain huts. The first step consisted of collecting data regarding the first aid equipment available in mountain huts. The second step consisted of a qualitative evaluation of the mountain hut guardian's role in medical situations through semistructured interviews. Finally, a prospective observational study was conducted in the summer season to collect all medical events (MEs) that occurred during that period.

Results.—Out of 164 hut guardians, 141 (86%) had a basic life support diploma. An automatic external defibrillator was available in 41 (26%) huts, and 148 huts (98%) were equipped with a first aid kit. According to semistructured interviews, hut guardians played a valuable role in first aid assistance. Regarding the observational study, 306 people requested the hut guardian's help for medical reasons in 87 of the 126 huts included. A total of 501 MEs for approximately 56,000 hikers (0.85%) were reported, with 280 MEs (56%) involving medical pathologies and 221 (44%) MEs involving trauma-related injuries.

Conclusions.—MEs had low prevalence, but the hut guardian played a valuable role as a first aid responder.

Key words: mountain hut, hut guardian, wilderness medicine, mountain emergency medicine, first aid

Introduction

In European countries, hikers, climbers, and alpinists use huts for accommodation in remote mountainous areas. Hut guardians assist people with food and accommodation and may provide advice. When a medical situation occurs close to a hut, hut guardians are often considered the first resource for providing initial assistance, which may consist of contacting mountain rescue services to manage a helicopter evacuation.

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Submitted for publication April 2016.

Accepted for publication August 2016.

However, first aid assistance to mountaineers is not standardized in mountain huts. Twenty years ago, the International Commission for Alpine Rescue (ICAR) detailed the content of a hut's first aid kit.[1] More recently, this commission also recommended the implementation of an automated external defibrillator (AED) in mountain huts.[2] In France, the association Pharefuge assisted more than 90 mountain huts with first aid training and kits for hut guardians, but a precise inventory of these resources is not available. Moreover, the exact epidemiology of medical events (MEs) occurring in mountain huts remains unknown; improving our knowledge on this topic would help in adjusting the information and contents of first aid kits. The aims of this study were 1) to describe the actual first

aid resources available in French mountain huts; 2) to define hut guardians' role according to professionals involved in hut keeping and mountain rescue; and 3) to establish the epidemiology of medical pathologies occurring in the vicinity of mountain huts.

Methods

We conducted a 3-step study from April 2013 to August 2014 in the 236 French mountain huts. The first step consisted of collecting data regarding the actual first aid equipment in mountain huts through a dedicated questionnaire from April to June 2013. The second step consisted of a qualitative evaluation of the mountain hut guardian's role in medical situations through semistructured interviews of hut guardians and healthcare professionals (June–September 2013). Finally, a prospective observational study was conducted from July 2014 to August 2014 to collect all MEs that occurred within this period and were declared using a dedicated document.

This study was approved by the Research Ethics Board of the French Society of Anesthesiology and Intensive Care (IRB No. 010254) and was also declared to the French National Committee for the protection of public liberties.

Before study completion, we performed a literature search using PubMed, Cochrane, Google Scholar, Medline, and EM Premium databases. The following MeSH terms were used: "mountain huts," "hut keepers," "hut guardian," "mountain rescue," "first aid kit," "acute mountain sickness," "mountaineering," "hiking," "rock climbing," "cardiovascular risk," "mountain wilderness," "alpinism," "first aid knowledge," and "mountain medicine."

INITIAL SURVEY

All French hut guardians were identified and contacted by phone to explain the purpose of the survey. They received a personalized email, which enabled them to access the survey and complete the online questionnaire. A paper-based questionnaire was mailed to all nonrespondents with a postage-paid return envelope. It consisted of 42 questions divided into 4 domains: 1) characteristics of the mountain hut (location, altitude, specific mountain activities, number of beds); 2) characteristics of the hut guardian (age, gender, experience in hut keeping, and first aid diploma); 3) access to first aid kit; and 4) AED availability.

SEMISTRUCTURED INTERVIEWS

Two different investigators led individual semistructured interviews of a panel of hut guardians and attendant rescuers and emergency physicians (see online supplementary file 1). The panel was chosen to be representative of different locations, altitudes, and hut management across the Northern French Alps. All participants were recruited by phone, and face-to-face interviews were conducted locally in the mountain hut for hut guardians. Interviews were recorded in full and transcribed anonymously. Transcripts were coded separately using thematic analysis by the 2 investigators. Interviews stopped when no new concept or new idea appeared in 2 successive interviews, corresponding to "data saturation" as defined by Guest et al.[3] Following the recommendations for explicit and comprehensive report of qualitative studies, the 32-item checklist for interviews and focus groups was used. All items of the Consolidated Criteria for Reporting Qualitative Research (COREQ) list were completed, except for repeat interviews (item no. 18), transcripts returned (item no. 23), and participant checking reporting (item no. 28) due to practical considerations.

PROSPECTIVE OBSERVATIONAL STUDY OF MEDICAL EVENTS IN MOUNTAIN HUTS

All hut guardians from the survey were contacted to participate in the study. One month before the study period, 30 medical questionnaires were sent to each hut guardian (see online supplemental file 2). Questionnaires were strictly anonymous. Any ME requiring medical assistance by a hut guardian within the study period was included. Hut guardians were responsible for filling out the dedicated document. This document was divided into 5 parts: 1) general considerations (hut's location and activities in the surrounding area); 2) medical symptoms; 3) trauma symptoms (including pain assessment); 4) medical management (basic management, medical care by telemedicine or physician-staffed mountain rescue operation); and 5) evacuation process (if applicable). Questionnaires were returned to the investigators by postage-paid return envelope.

STATISTICAL ANALYSIS

Descriptive statistics included frequencies and percentages for categorical variables and the mean ± SD for continuous variables. Independent factors associated with AED availability were provided using a stepwise regression model (Stata version 12.0 software; Statacorp, College Station, TX). Interactions between altitude and huts' attendance were tested. Categories for huts' attendance were divided as follows: <900 overnight occupants per hut per year, between 900 and 1499 overnight occupants per hut per year, between 1500 and 2379 overnight occupants per hut per year, and >2380