BRIEF REPORT

Morbidity Among Athletes Presenting for Medical Care During 3 Iterations of an Ultratrail Race in the Himalayas

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Introduction—Although ultratrail races are increasing in popularity, there is a dearth of data regarding illnesses and medical care at these events. Data about injuries and illnesses for races taking place in the Himalayas, where the nearest medical facility can be hundreds of miles away, are even harder to find. This study aimed to describe the injuries and illnesses befalling the participants of a 7-stage 212 km (132 mi) trail race at high altitude.

Methods—Ethical approval was obtained from Nepal Research Health Council. A retrospective study of the record of medical encounters among the 100 participants competing in the Manaslu trail race in Nepal from 2014 to 2016 was performed. Diagnoses were classified into various categories. Informed consent was taken from all participants.

Results—Acute diarrhea was the most common ailment reported among the participants (18%), followed closely by musculoskeletal problems (17%). Altitude illness made up 6% of care provided. Approximately 35% of the athletes were using acetazolamide as prophylaxis for high altitude illnesses. The 1 case needing evacuation in the 3 iterations was high altitude pulmonary edema.

Conclusions—Ultratrail races at high altitude pose a challenge in terms of provision of medical care in a remote setting with limited resources. However, most of the illnesses are minor in nature and easily managed by the race doctor. Knowledge of common illnesses among travelers to the area can help aid in preparation and provision of proper care, especially in remote settings with limited resources.

Keywords: high altitude, trail running, athletic injuries, Nepal

Introduction

According to World Athletics, trail running is a sport run in a natural environment (mountain, desert, forest) with minimal possible paved or asphalt road, which ideally should not exceed 20% of the total course. The terrain can vary from dirt road to forest trail to mountain paths, and the route must be properly marked (Rule 251, Book C2.1 <https://www.worldathletics.org/about-iaaf/documents/book-of-rules>).

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The Himalayas have been a hotbed of adventure tourism throughout history, with trekking, whitewater rafting, mountaineering, and now trail running becoming popular with tourists and athletes. Trail races involve participants running multistage courses designed to be close to nature, but usually far from established healthcare. Although these events are common in Europe and the Americas, there has been a recent increase in interest in these races in the Nepalese Himalayas. One of the races held in Nepal, the Manaslu trail race (Manaslu mountain trail), is an annual event that started in 2012 and is held in November. The race route follows the majority of the Manaslu circuit trek route in the Gorkha district in the western region of Nepal, partly circumnavigating Manaslu, the eighth highest mountain in the world at 8163 m (26,781 ft). The race itself is a 7-stage, 212 km (132 mi) event encompassing an additional 2 d of noncompetitive hikes with the altitude ranging from 730 to 5160 m (2395–16929 ft).

There are limited studies on ultradistance events and even fewer on these events at high altitude. Few data are available on multistage races, their medical coverage, and medical attendances.¹⁻³

These ultratrail races at high altitude pose unique challenges to the race physician in terms of providing medical care. Apart from the usual plethora of general medical problems, specific injuries, and illnesses related to endurance events, doctors need to account for illnesses pertaining to remote travel and altitude.⁴ The Manaslu trail race has a race doctor run or hike along with the participants, providing medical care en route. It is a challenge to the organizers and the race doctor to be prepared for a variety of illnesses to be encountered during these events and to be equipped with a medical kit that is lightweight but well stocked to deal with the majority of major illnesses and injuries. The consecutive days of distances at moderate to high altitude poses considerable challenges both in terms of sporting activity and training for athletes from various countries around the globe. The remote nature of the location, with no road access or healthcare facilities en route and reliance on helicopters for medical evacuations, adds to the challenge. This study was designed to record injuries and health problems faced by trail runners during 3 iterations of the race.

Methods

The study received ethical approval from the Nepal Health Research Council (reg no: 464/2018). The study was a retrospective descriptive epidemiologic study that looked into 3 iterations of the Manaslu trail race from 2014 to 2016. A pre-race medical briefing that included information about altitude illness and other common ailments was held on arrival to Kathmandu. Each race had 1 race doctor (except 2014, which had 2 doctors) who accompanied the runners on foot during each stage of the race. The doctors had MBBS degrees with experience in high altitude and expedition medicine. The doctor was responsible for the medical care of the participants during the race, daily clinics at the campsite, and overnight care. All clinical encounters from the start of the first stage of the race to the end of the race were documented by the race doctor using a standardized format. Only discrete medical encounters were included. Follow-up visits for the same medical problem were not recorded. Injuries and illnesses were reported as percentage and rate of injury/illness per 1000 athletes, per 1000 km run, and per 1000 h run.^{5,6} To calculate this, the race distance was multiplied by the number of athletes and then calculated injuries per 1000 km run. We used the average finish time across the 3 years and multiplied it by number of athletes and then multiplied by 1000 to get injuries per 1000 h run. All race participants gave informed consent to

Table 1. Medical problems encountered during the Manaslu Trail Race, 2014 to 2016

<i>Illness</i>	<i>Treated (n)</i>
Acute diarrhea	18
Musculoskeletal (sprain/strain)	17
Trauma (abrasions/laceration)	12
Blisters	8
Acute mountain sickness	7
Insomnia	6
Gynecological	3
Exacerbation of preexisting conditions (asthma)	2
Respiratory infections	2
Urinary tract infections	2
Acid peptic disease	1
Allergies/Rash	1
Epistaxis	1
High altitude pulmonary edema	1
Sunburn	1
Total	82

use of the data collected for research. The data were analyzed with Microsoft Excel.

Results

A total of 100 athletes participated in the race over the 3 iterations: 34 athletes in 2014, 26 in 2015, and 40 in 2016. There was a male preponderance (60%) in the number of participants. A total of 99 out of the 100 athletes completed the race, with only 1 athlete needing evacuation as a result of high altitude pulmonary edema (HAPE). Average time taken by athletes to complete the race was 27 h. There were 82 discrete medical consultations carried out by the race doctors during this period, with an injury/illness rate of 820 per 1000 athletes. This amounted to 5.6 injuries/illnesses per 1000 km run and 30.7 per 1000 h of running. Acute diarrhea was the most common ailment reported among the participants (18%) (Table 1). Gastrointestinal illness, including acute diarrhea, accounted for 190 cases per 1000 athletes, 1.3 cases per 1000 km run, and 7.1 cases per 1000 h run. Musculoskeletal problems were the second most common (17%), with 170 cases per 1000 athletes, or 1.2 cases per 1000 km run. The most common musculoskeletal problem was ankle sprain, with most being managed with bandaging and pain medication. In 1 instance, a subluxated distal phalanx of a finger could only be reduced at the finishing point, hours after the incident. Abrasions or lacerations were seen in 12%, with 2 lacerations requiring suturing; friction blisters accounted for 8% of cases. Altitude illness made up 8% of care provided, which was 0.5

cases per 1000 km run and 2.9 cases per 1000 h run. Except for the 1 case of HAPE, other cases were mild acute mountain sickness (AMS), which improved with overnight stay. Acetazolamide prophylaxis for altitude illnesses was used by 35% of the athletes. Among those, 60% commenced the drug before the race and the remainder started the drug during the race before reaching an altitude of 3000 m. Many athletes reported high altitude headache not meeting the Lake Louise criteria for AMS.⁷

Discussion

The injury rate seen in this study (820 per 1000 athletes) was lower than in 2 other studies, which had injury rates of 3868 per 1000 athletes⁵ and 1886 per 1000 athletes.⁶ The injury rate per 1000 h, which was 30.7 in this study, is lower than in a study of a multiday race (65 per 1000 h)⁵ but higher than in study of a single-day 65 km race (13.1 per 1000 h),⁶ suggesting longer time spent running results in more injuries and illnesses.

Despite the high altitude and remote nature of the location, there was only 1 evacuation in the 3 y (for HAPE), which corresponds to other studies in which most injuries and illnesses were minor in nature. Whereas skin, soft tissue, and musculoskeletal injuries have been reported as most frequent in similar multistaged races,^{1,5,6} acute diarrhea was the most common ailment in this setting (18%) (Table 1). However, this reflects the general trend in the population of travelers to Nepal, where the most common health problem in travelers is acute diarrhea.⁸ This might also be because of increased instances of gastrointestinal illnesses in endurance athletes.⁹

Although the trauma cases that presented were minor in nature, attending to many soft tissue and musculoskeletal injuries immediately as they happened on route was a challenge to the race physician, who would mostly be toward the back of the race. Blisters, which formed the most common diagnosis in other studies,^{1,5,6} ranked lower in our study (Table 1), suggesting more self-managed and under-reported cases. Despite the race being held at high altitude, there were only 8 cases of altitude illnesses, with 7 of 8 diagnosed as AMS. Although exercise has been shown to exacerbate AMS at simulated altitude,¹⁰ good ascent profile and use of acetazolamide as prophylaxis may have resulted in a lower incidence and severity of AMS.¹¹ Although the race was not governed under the rule at the time, the use of acetazolamide is banned both in and out of competition by the World Anti-Doping Agency, and the participants had to be informed about this if they chose to use the drug.¹²

Our study had some limitations. The data were from self-reported problems by the athletes. There were many instances of friction blisters that were self-managed

by the athletes and remained unreported. There may also have been other unreported illnesses including headaches, which means the overall rate of injury or illness might have been higher. Other useful information for better description of the participants, such as age, preexisting medical conditions, home altitude, previous experience at high altitude, and level of training, was not available.

Conclusions

Trail races at altitude present unique challenges in terms of provision of medical care. Along with the musculoskeletal injuries that are expected in a long distance multiday race, the race doctor must be prepared to provide primary care for illnesses ranging from high altitude illnesses to other diseases common at the geographical location of the race. With proper prior planning for medical care on site as well as possible evacuation to medical facilities, such events can be conducted safely and smoothly even in remote and harsh environments.

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