NSAID and other analgesic use by endurance runners during training, competition and recovery

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Background. An increasing popularity of ultra-endurance events coupled with excessive or inappropriate non-steroidal anti-inflammatory drug (NSAID) use during such events could pose considerable potential risks to runners’ health.

Objective. To evaluate the incidence of NSAID and other analgesic use in distance runners during training, competition and recovery.

Methods. We performed an observational cross-sectional study at the Desert Race Across the Sand race (Colorado to Utah, USA) in June 2011 and the Empire State Marathon half-marathon, and relay races in Syracuse, NY, October 2011. A total of 27 ultramarathon runners and 46 marathon, half-marathon and marathon relay runners participated in the study. Surveys were distributed to runners during race registration. Self-reported use of common analgesic medications during training, racing and recovery was assessed.

Results. Among all runners at all stages, NSAIDs were the most commonly used analgesic medication. NSAID use by ultramarathon runners compared with all other runners was similar during training (59% and 63%, respectively; $\chi^2=0.008; p=0.93$) and recovery (59% and 61%, respectively; $\chi^2=0.007; p=0.93$). However, ultramarathon runners were more likely than all other runners to use NSAIDs during the race (70% and 26%, respectively; $\chi^2=11.76; p=0.0006$).

Conclusion. Despite undesirable side-effects associated with the use of NSAIDs, there was a high prevalence of use in all runners, particularly during training and recovery. NSAID use during the race was significantly greater in ultramarathon runners. Medical staff at endurance events need to be aware of, and prepared for potential complications related to the high use of NSAIDs in runners. Future efforts should focus on teaching runners about the undesirable effects of medication and emphasising alternatives to pain medication.

were surveyed to evaluate their patterns of NSAID and analgesic use during training for an event, during a competition, and during recovery following an event. The Desert RATS is a 148-mile ultra-endurance run, performed over six days in individual stages of 9 - 50 miles per stage, across mountainous and desert terrain in Colorado and Utah, USA. In contrast, the ESM is a more typical endurance event with runners participating in a full-marathon, half-marathon, and relays of 6 - 7 miles per runner. The ESM is held in central New York State annually. To the authors’ knowledge, no respondent participated in both events.

**Data collection**

Data were collected via an anonymous and voluntary survey reviewed and deemed exempt by the institutional internal review board (239319-1). The survey (Table 1) was distributed to runners during race registration at both endurance events.

**Statistical analysis**

Using MedCalc (version 11.6.1), data were analysed for differences of proportions between runners’ use of analgesia during training, competition and recovery, between those participating in the Desert RATS and ESM races.

**Results**

Seventy-three runners participated in the study: 27 ultramarathon runners from the Desert RATS and 46 marathon, half-marathon and relay runners from the ESM.

NSAIDs were the most commonly reported analgesics used at both races. Fig. 1 shows a comparison of NSAID use delineated by reported habits of using the recommended or greater-than-recommended dose. Runners in the ESM were more likely than those in the Desert RATS race (70% v. 26%, respectively) to use NSAIDs during a competition (χ²=11.76; p<0.001). There were no statistical differences in use of NSAIDs between runners participating in the Desert RATS race when compared with those participating in the ESM, during training and recovery.

In both races, acetaminophen was the next most commonly reported analgesic used, followed by topical diclofenac. The percentages of runners utilising these methods of analgesia for both race groups are shown in Table 2. Aspirin was not used by any participant who ran in the Desert RATS race, but was used by one participant who ran in the ESM. Narcotic-based medication was reportedly used by only runner of each race group and only during their respective recoveries.

**Discussion**

When comparing the prevalence of NSAID use between ultradistance runners and marathon runners, participants reported comparable usage during training (59% v.
the kidney, decreasing the glomerular filtration rate and afferent hyponatraemia (EAH). NSAIDs reduce prostaglandin synthesis in particular the former group at an elevated risk for adverse events.

The difference between the two cohorts: the elevated number of NSAID consumption during a race by the ultradistance cohort v. the marathon cohort is concerning, and may significantly higher rate of NSAID consumption during a race by the finishers. However, in this study where 59% of ultramarathon runners and 63% of marathon runners reported using NSAIDs during three months preceding the event, with 59% of Ironman Brazil triathletes reporting consumption in the period during training (31% v. 14%), a race (21% v. 25%) and recovery (19% v. 25%), respectively. These results do not suggest that ultra-distance runners are at an increased risk from taking NSAIDs above the recommended dose, but only as compared with marathon runners. A potential future study could look to determine and compare the amount by which each cohort exceeds the recommended dose.

As attested to by its common use reported in this survey, acetaminophen may be a better alternative to NSAIDs for minor pain reduction, due to its milder effect on the GI tract, kidneys, and tissue regeneration. Acetaminophen’s main adverse effects come from overdose-induced hepatic toxicity, and some evidence suggests that its pain-relieving properties may be comparable to those of NSAIDs. Topical agents (such as diclofenac) are another group of analgesics used by athletes, albeit in reduced numbers (19% of ultramarathon runners during training in this study). The subcutaneous delivery to a localised site of injury makes these agents effective at treating minor acute musculoskeletal pain, while avoiding many of the severe adverse reactions that NSAIDs carry.

Encouragingly, an unpublished survey by one co-author found that 59% of athletes surveyed would modify the frequency of their NSAID use if they were better educated on their potentially harmful effects. This represents an opportunity for medical providers involved in this sport’s industry to improve the health and safety of endurance race participants. One particular opportunity for education, at least popular in ultramarathon events, is the pre-race medical briefing, where medical directors and race staff have the ability to provide evidence-based guidelines to runners before the event commences.

**Conclusion**

Despite the well-documented, undesirable side-effects associated with NSAID use, there was a high incidence of use in our cohort of runners, particularly during a race in the ultramarathon group. More effort should be made to inform runners about the potential hazards of NSAID misuse and to offer alternatives to oral NSAIDs for minor pain relief. If necessary, NSAID use should be limited to a short-term regimen, taken after the injury, and for the intended purposes only.

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References


