

## Letter to the Editor

**Cite this article:** Niu S, Tian S, Zhang J (2022) Marathon and disaster: Lessons from the 2021 Gansu marathon. *Disaster Med Public Health Prep* 16: 1741–1742. doi: <https://doi.org/10.1017/dmp.2021.320>.

First published online: 5 November 2021

**Keywords:** marathon; disasters; hypothermia

**Corresponding author:** Jinjun Zhang, Email: [zhang92560@163.com](mailto:zhang92560@163.com).

On Saturday, May 22, 2021, 21 runners were confirmed dead as a result of extreme weather during a 100-km, cross-country mountain marathon race in Baiyin City, Gansu Province, northwest China. They died owing to a sudden drop in air temperature with hail, freezing rain, and gales. The race was divided into 3 groups: healthy running, 21-kilometer cross-country race, and 100-kilometer cross-country mountain marathon race. Nearly 10 000 runners participated, according to the information released by the organizer, and 172 competitors participated in the mountain marathon race. The accident occurred from 20 km to 31 km (CP2 to CP3) in the mountain marathon race (Figure).<sup>1</sup> About 2 hours after the accident, the local governments initiated an emergency response and organized rescue forces, including local villagers and firefighters, to search on foot for the missing runners. The rescued runners were given clothes or quilts to keep warm and rapid-transferred to hospitals. The remaining 151 competitors were successfully rescued, and no rescuer died. It was one of the worst marathon disasters ever. It is necessary to identify the lessons that can be learned from it.

Marathon running is very popular around the world. In China, it is more than a simple sport; a whole “marathon economy” has emerged. In 2019, 1828 marathon races were held, attracting over 7.2 million participants.<sup>2</sup> It is necessary to remember that the first “marathon runner,” Pheidippides, is said to have collapsed and died after delivering news of a battle victory. Although death has been an infrequent occurrence in modern marathons,<sup>3</sup> a mountain marathon, which is different from a classic marathon, is more dangerous and places greater requirements on organizers and participants.<sup>4</sup> Both organizers and participants need to be aware of the dangers. When extreme weather strikes, it is better for organizers to terminate a race, and runners should abandon the race.

In marathons, more attention tends to be paid to hyperthermia, and the problem of hypothermia is often ignored. Hypothermia occurs if a runner’s body temperature falls under 36°C, and, with associated mental status changes in severe cases, it can lead to death.<sup>5</sup> Most runners with hypothermia collapse in early stage with the inability to stand or walk as the result of



CP	1	2	3	4	5	6	7	8	9	Terminal
ASL (m)	1589	1347	2230	1932	1852	1679	1861	1886	1596	1358

CP: card point; ASL: above sea level

**Figure 1.** The circuit diagram of the Gansu mountain marathon race.

lightheadedness, faintness, dizziness, or syncope, and then develop severe hypothermia, leading to death or cardiopulmonary failure. Many factors predispose a runner to hypothermia, such as cool weather, wind and wet conditions, and rain would make the situation much worse. Thus, participants should prepare with sufficient warm clothing and waterproofed equipment for a mountain marathon.

The success of holding a marathon is largely due to preparation, teamwork, execution, and especially weather forecasts on the day of the race. Organizers should contact the meteorological office and obtain real-time weather forecasts during the race. It is difficult for any official to take responsibility for terminating, canceling, or deferring a marathon; however, if predictions are not in accordance with the demands of the race, it must be terminated, canceled, or deferred. We believe that the best course involves contemplating the worst-case scenario; this should be a basic principle in preparing for a big event. We all should revere life and learn from the 2021 Gansu marathon.

**Conflict(s) of interest.** We declare no competing interests.

## References

1. Death Toll Rises to 21 in Gansu Mountain Marathon. China Daily. Published May 23, 2021. Accessed May 25, 2021. <https://www.chinadailyhk.com/article/169046#Death-toll-rises-to-21-in-Gansu-mountain-marathon>
2. Feature: Will China's "Marathon Fever" Continue? XinhuaNet. Published January 7, 2020. Accessed May 25, 2021. [http://www.xinhuanet.com/english/2020-01/07/c\\_138685244.htm](http://www.xinhuanet.com/english/2020-01/07/c_138685244.htm)
3. Jaworski CA. Medical concerns of marathons. *Curr Sports Med Rep.* 2005;4(3):137-143.
4. Garbisu-Hualde A, Santos-Concejero J. What are the limiting factors during an ultra-marathon? A systematic review of the scientific literature. *J Hum Kinet.* 2020;72:129-139.
5. Porter AM. Marathon running and adverse weather conditions: a miscellany. *Br J Sports Med.* 1984;18(4):261-264.