

Peer Review Report

Overall Evaluation

This manuscript is a comprehensive, methodologically rigorous, and graphically rich synthesis of physiological and epidemiological data concerning the paradoxes of extreme endurance sports. It stands out for its blend of biochemical depth, epidemiological modeling, and data visualisation. Its breadth is rare in average-level periodicals but remains digestible and grounded for non-specialist medical or sports science audiences.

Scientific Merit

The article addresses a highly pertinent and under-communicated aspect of modern sports science: the potential harm of chronic ultra-endurance training. The manuscript handles the subject with nuance and balance.

Data Presentation & Visualisation

The six figures included are scientifically accurate and well-labeled, supported by reproducible Python code. Figures 1 and 6 are particularly impactful. The visuals aid in conveying threshold effects and fibrotic risks.

Structure and Writing

The manuscript is clearly structured and well-written. Use of subheadings and sections facilitates reading. Recommendations include clarifying research objectives and possibly adding a comparative biomarker table.

Methodological Review

The manuscript employs rigorous analytical methods including Cox regression, Kaplan-Meier estimation, dose-response modeling, and Michaelis-Menten kinetics. All are appropriately contextualised and clearly explained.

References and Citations

Citations are thorough, well-formatted, and drawn from high-impact journals. Sources support the manuscript's claims and enhance its credibility.

Ethical and Philosophical Reflection

The section on societal considerations adds rare philosophical value, exploring autonomy, risk, and the value of extreme endurance. This enriches the article's interdisciplinary relevance.

Recommendations for Minor Revisions

1. Include a summary table comparing biomarker thresholds.
2. Briefly address potential sex differences in physiological response.
3. Add a data availability statement for clarity.

Final Verdict

This article is well above the average threshold for acceptance and demonstrates exceptional command of both physiological science and academic communication. It should be accepted with

minor revisions.