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Slowing Down: Dehydration in Desert

I Morley*, S Petherbridge, P Chua and M Khan

Guy's and St Thomas' NHS Foundation Trust, USA

***Corresponding Author:** I Morley, Guy's and St Thomas' NHS Foundation Trust, USA,
E-mail: morley@hotmail.com

ABSTRACT

Introduction: Desert endurance racing risks dehydration but little is known about effects dehydration has in extreme racing conditions. We aimed to study the correlation between dehydration, assessed by urine concentration, and reaction times in desert endurance drivers. New findings highlight that dehydration is associated with reduced reaction speed; new insights into predicting sports personnel at risk of injury and incident due to dehydration; Urine colour can be used in remote medicine to assess dehydration.

Objective: We aim to study the relationship between driver dehydration, assessed by urine colour, heart rate and blood pressure, and reaction time in extreme desert race conditions. We aim to test the null hypothesis that there is no correlation between dehydration and reaction time in desert racing.

Methods: This research was done without patient involvement. Participants in the research were consulted with regards to how best to conduct the research without affecting their race times. Participants were invited to comment on the study design but were not invited to interpret results or contribute to the writing or editing of this document for readability or accuracy. We collected urine samples, observations and medical history from drivers and immediately tested reaction times using an application. Graph Pad was used to assess for correlation, and its significance. We used GraphPad to perform linear regression analysis to examine the relationship between urine colour, heart rate and reaction time including assessing statistical significance, taken at $p < 0.05$.

Results: We found a statistically significant correlation between urine colour and reaction time ($p < 0.0001$) and urine colour with heart rate ($p = 0.0042$). There was no correlation between blood pressure and reaction time or urine colour. Solo riders had more concentrated urine and longer reaction times than drivers and co-drivers.

Conclusion: This is the first study to use urine colour as a proxy of hydration status in desert endurance drivers. We conclude the greater the degree of dehydration, the slower the reaction time. Urine colour can be used as a proxy for dehydration in extreme environments, allowing self-assessment of hydration and ensure adequate hydration when racing in order to maximize performance. This result shows adequate hydration may enhance performance; reducing race times and reducing the risk of dehydration in desert endurance driving.