

CHANGES IN HYDRATION STATUS, COGNITION AND MOVEMENT TIME IN MALE CRICKET PLAYERS DURING THREE CONSECUTIVE DAYS OF MATCH PLAY

Unpublished research

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What is the problem and what is known about it so far?

Cricket, from a physiological perspective, is a prolonged, variable-intensity team sport. Players experience short bursts of sprinting, to brief periods of low-intensity activity whether they are batting, bowling and/or fielding.

Focusing specifically on fielding, players are required to stand for prolonged periods of time in an open field incorporating several skills such as stopping, retrieving and throwing the ball, in combination with maintaining focus and concentration on the game, and in a series of one day matches are expected to repeat performances and maintain concentration for up to 3.5 hours. However, in three day, four day (provincial matches) or five day matches (international test matches), fielders may spend as much as eight hours of fielding and bowling per day. To combine this and many other factors including the type of protective uniform a cricketer has to wear, which are frequently composed of materials less than appropriate for effective sweat evaporation; all these parameters may lead to high thermal stresses when these sports are played in hot environments (i.e. > 25°C, 60% relative humidity), such as those commonly experienced in South Africa.

The international rules of cricket only allow for an official drink break every 70 min (ICC, 2014) but it does not take into account the differing playing conditions each game may have and the current laws of cricket are believed to not allow for adequate fluid replacement in hot conditions in which sweat rates are high. This can significantly increase core temperature, heart rate and ratings of perceived exertion (RPE) at the same absolute and relative exercise intensities compared with a euhydrated state. Sweat loss can range from 2-4 L/day in cool climates and 8-16 L/day in very hot climates such as those which are traditionally played in South Africa, India and/or Australia, where several international cricket tournaments are held. Despite this concern, many athletes only replace around 50% of sweat loss and voluntarily hypohydrate during exercise.

Hypohydration has been seen to have a detrimental effect on cricketer's cognitive abilities; decrements in psychomotor tests for cognitive function, with body-fluid losses of greater than 2% body weight after prolonged exercise in the heat. In unpredictable (open-loop) games such as cricket, decision making regarding optimal ball delivery and responding to scoring opportunities are frequently required. This means inadequate hydration could have a potential adverse effect on tactical choices and player effectiveness during a tournament or a game.

Why did the researchers do this particular study?

Playing matches over consecutive days adds another dimension to the possible effects on hydration levels as well as its effect on the cricketer's cognitive abilities and performance. There is currently very little literature on hydration status in cricketers over consecutive days and how this may possibly affect their performance over this duration.

Who was studied?

Twenty two male academy level cricketers (Age 18-20 years) participated in this study.

How was the study done?

During a three day format cricket match, various hydration status measures were recorded from all players. Measurements were collected in the morning of Day 1, Day 2 and Day 3, prior to breakfast, (baseline) and both at the start and the end of each players fielding innings (pre- and post-innings) over three consecutive days of play. The measurements included body mass (BM) corrected for fluid loss/intake, subjective thirst rating (TR) and urine osmolality (U_{osm}) to measure hydration. Cognition (via the Letter Digit Substitution Test) and audio and visual reaction timing were also examined as performance tests to examine if low hydration scores had trends with poor performance of cognitive function and reaction to stimuli.

What did the researchers find?

Daily baseline measures were inconsistent for all measurements across the three days of play. However mean decrements in BM when not adjusted for fluid and food intake ranged from 1.8 to 3.7% of BW which is quite substantial, however once adjusted the net decreases were minimal 0.36-0.78%. Increased TR and decreased U_{osm} trends associated with decreases in BM were also noted. The written cognition test and audio-visual reaction timing indicated no changes across the five innings' studied.

What are the implications of the study?

The potential for dehydration (>2% decrease in body mass, U_{osm} >900mOsm/L and high TR) during the fielding innings is a reasonable viable concern. However, in this study fluid and food consumption practices were sufficient to limit any potentially deleterious effects of dehydration on cognition and movement timing. One major concern is that the adjusted BW losses still shown a loss of up to approximately 1% and this was in cooler climate of between 14.7 and 23.5 degrees; What would happen in extreme hot and humid conditions which our cricket players travel to play in?



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