

EFFECT OF EUHYDRATION AND HYPOHYDRATION ON HEART RATE RECOVERY IN YOUNG UNIVERSITY ATHLETE

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Abstract: Aims and Objectives: To compare the effect of euhydration and hypo hydration on young University athletes Study Design: Experimental Study. Participants: Total of 60 subjects was included based on the inclusion and exclusion criteria through convenient sampling and . Before exercise all the subjects were measured for urine specific gravity subjects falling under euhydrated level were taken basal heart rate and then asked to follow the protocol same was done for hypohydrated state Outcome measure: Heart Rate. Results: The results of the study show that there is a significant faster heart rate recovery ($p=0.000$) between the groups for Hypohydration Group . Conclusion: We conclude that during hypohydration the heart rate is much more stable than in euhydrated state .which promotes better cardio vacular endurance.

INTRODUCTION

Water is the largest single component of the human body, accounting for about 50–60% of total body mass. For a healthy lean young male with a body mass of 70 kg, total body water will be about 42 lit. The turnover rate of water exceeds that of most other body components. For the sedentary individual living in a temperate climate, daily water turnover is about 2–3 lit. In other words, about 5–10% of the total body water content is renewed every day.

Water is lost from the body in varying amounts via a number of different routes the main avenues of water loss are urine (about 1400 ml), feces (200 ml), insensible losses from the lungs (400 ml) and loss via the skin (500 ml). The total daily water loss is therefore about 2500 ml, but this varies greatly between individuals and depends on the environmental conditions.

Water is the medium of circulatory function, biochemical reactions, metabolism, and substrate transport across cellular membranes, temperature regulation, and numerous other physiological processes. Fluid-electrolyte turnover and whole-body water balance change constantly because water is lost from the lungs, skin, and kidneys, and because water is gained in food and fluids. Therefore,

accurate and precise laboratory and field techniques are needed to evaluate human hydration status.

water to reach the intracellular compartment. The cells imbibe, drinking is inhibited and the kidneys excrete more water.

Methodology

Design

This is an experimental study. All the subjects were recruited from the various colleges and sports center from of Dehradun.

Sampling :

Total of 60 subjects were chosen as per the inclusion and exclusion criteria, and informed consent was obtained from all the subjects after the procedure was explained to them

Procedure :

Euhydrated and Hypohydrated states. 1st day the subject were studied for Euhydrated state. And for this he/she was asked to consume normal required water the specific gravity was checked by myself. If it came under the specified limit that is 0.010 they were made to follow the protocol or else follow the above procedure. Temperature was set at 25°C. A pre exercise data was recorded of their basal heart rate. Then the Euhydrated subjects had to follow

their prescribed exercise protocol which is as follows:

- 5 min warm up at speed of 2m/sec inclination 0 degree
- 20 min running at 7 m/sec speed on treadmill at inclination 1 degree
- Then the time taken for recovery heart rate was measured

Throughout this the heart rate was recorded in the last 10 sec of a min.

The same subjects were then studied for hypohydrated state on next day.

Results:

TABLE : INTER GROUP COMPARISON OF HEART RATE RECOVERY TIME BETWEEN GROUP A AND B

VARIABLES	MEAN		SD		T	P
	GROUP A	GROUP B	GROUP A	GROUP B		
HEART RATE RECOVERY TIME	11	8.75	2.16286	1.81915	6.167	.000

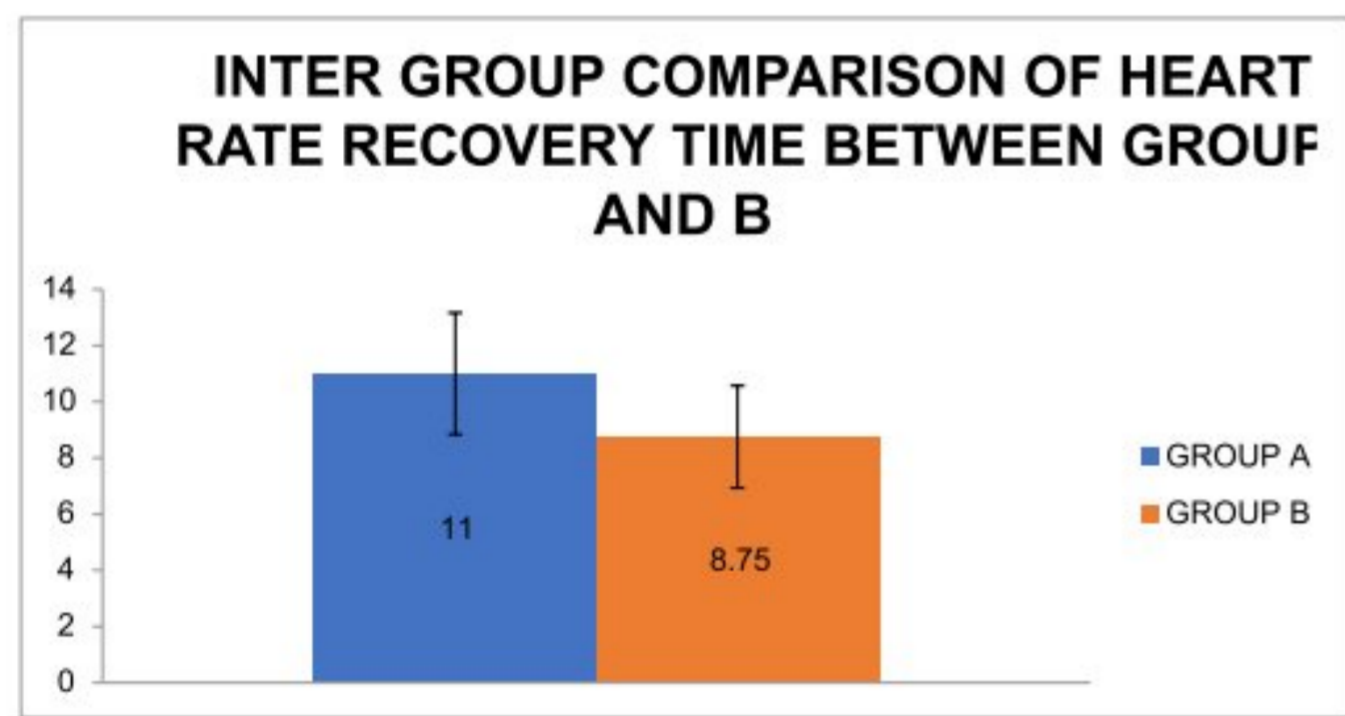


FIG 10: Shows significant difference in heart rate recovery time in group A and B

DISCUSSION

Hypohydration group showed significant early recovery after the exercise protocol. This could be explained by the reason that hypohydration causes decrease in blood volume. As result the arterial blood pressure falls leading to and there is decrease in blood volume level in the body which lead to increase incidence of orthostatic hypotension and

syncope. As defense mechanism the body produces sympathoexcitation and increase in volume regulatory hormones like Angiotensin II. This increases blood volume in the body. So when there is increase in blood volume the heart rate does not increase this causes decrease in heart rate. This could be the possible mechanism of faster heart rate recovery in hypohydrated group.²⁸

Adrenaline is a stimulator of heart rate, it increases the heart rate through sympathetic activity and thus increases heart rate but a physiological mechanism also says that when there is too much irritation by adrenaline it may causes decrease in the heart rate known as ADRENALINE BRADYCARDIA.²⁵

In favor of present study it has been proved that during the period of dehydration there is an increase in concentration of epinephrine, norepinephrine and cortisol also cytokine along with adrenaline are precursor of sympathetic activity and shows that IL-6 component of cytokine is released 30 min after the exercise. So it suggest that for the first 30 min there is increased concentration of adrenaline which may cause adrenaline bradycardia, thus decreasing the heart rate³

In previous studies it was seen that when an athlete is made to exercise in a heat stress in a dehydrated state the heart rate recovery was faster in euhydrated subjects than dehydrated group but as per study done by me the heart rate of hypohydration group increased less which shows a contradictory results^{36, 37} and a need for future research.

Conclusion :

As per previous studies, euhydration and hypohydration both help in heart rate recovery but as per this study, hypohydration group showed an early recovery in a short period of time at 25°C. This means that if we make an athlete enter a short term sport with moderate intensity in hypohydrated state, it can be beneficial for him/her as there will be early heart rate recovery which shows a better cardiovascular endurance in them. Thus, it will be beneficial for improving their performance at sport.

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