Inter-season Dehydration Prevalence in Soccer Players that Rehydrate During Trainings Drinking Ad Libitum

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ABSTRACT:

PURPOSE: To compare the training dehydration prevalence in two different seasons in major and minor soccer players that drink ad libitum.

METHODS: 106 male soccer players were evaluated during a habitual training in summer and autumn. They were divided by age as major (>15 years old, n=47) and minor (11 to 15 years old, n=59), they trained at morning (8:00-10:00) and evening (15:00-17:00), respectively at a 1570 m over sea level height. Dehydration was evaluated as the weight loss percentage and classified as low dehydration (>0% to <1% weight loss) and mild dehydration (≥1% weight loss). Subjects were allowed to drink any fluid ad libitum during trainings. These sessions had similar duration and intensity in both evaluations. The results are presented as the total prevalence of dehydration and type and compared for time (summer vs autumn) by Cochran's Q test for proportions and for age (major vs minor) by two samples t-test.

RESULTS: There was a higher dehydration prevalence in autumn than summer in the major group, by an increase in low dehydration prevalence, but without statistical significance (p>0.05). In the minor group, the dehydration prevalence was lower in autumn than summer, by a decrease in mild dehydration prevalence (p<0.05). There was a lower dehydration prevalence in the minor group than the major group in autumn (p<0.05) by a lower prevalence in low dehydration (p<0.05).

CONCLUSIONS: These results suggest that drinking ad libitum is not enough for maintaining adequate hydration in both major and minor soccer players, neither in summer nor autumn. However, this situation was lower in minor players.

INTRODUCTION

It is well stablished that hydration is an important factor during exercise due to its many contributions to the body, including maintaining optimal body temperature and exercise performance [1,2]. The hydration requirements will vary depending on the athlete, the type, and duration of exercise, and the temperature of the environment [2]. On the other hand, it is also known that dehydration affects cognition and motor-skill performance during sport; multiple studies have shown that a dehydration >2% of body mass is related to a decreased performance during skill-based sports [3].

Studies suggest that dehydration in soccer players is typically 1-2% of body mass; in addition, it has been identified that a great amount of soccer players start matches or trainings in a hypo-hydrated state [4]. On soccer players, studies have found decreased endurance and performance on soccer-skill tasks when dehydration is >2.4% of body mass [5]. Therefore, the purpose of this study was to compare prevalence of dehydration in trainings in two different seasons in major and minor soccer players drinking *ad libitum*.

METHODS

Subjects

We evaluated a cohort of 106 male soccer players belonging to the "Leones Negros" official reserve teams. They were divided into two groups according to their age as major (>15 years old, n=47) or minor (11 to 15 years old, n=59). Their habitual training time was at 8:00-10:00 and 15:00-17:00, respectively.

Environmental conditions

The temperature and relative humidity for both groups were recorded according to the local weather report in both seasons. Local altitude was about 1570 m over sea level.

Dehydration assessment

We determined the dehydration status as the calculated weight loss percentage. To do so, subjects were weighted with minimal and dry clothing before and after training. Dehydration was classified as low (>0% to <1% weight loss) and mild (≥1% weight loss). Subjects were allowed to drink any type of fluid *ad libitum* during trainings. Subjects were evaluated in two different seasons (summer and autumn) in their respective habitual training time. These sessions had similar duration (≈2 h) and intensity in both evaluations.

Statistical analysis

The prevalence for dehydration and dehydration type are reported and compered between groups (major vs minor, t-test for independent proportions) and between seasons (summer vs autumn, Cochan's Q test for proportions), all with a significance level at p<0.05.

RESULTS

For the whole sample, general dehydration prevalence was slightly lower in autumn; similarly, there was a decrease in mild dehydration but an increase in low dehydration in the same season (all p>0.05). Analyzing each group we found there was a higher dehydration prevalence in autumn than summer in the major group, by an increase in low dehydration prevalence, but none reached statistical significance (p>0.05). For the minor group, the dehydration prevalence was lower in autumn than summer (p>0.05), by a decrease in mild dehydration (p<0.05). Comparing between groups we found that the minor group had slightly higher general dehydration prevalence than the major group in summer (p>0.05), and there was a trend for a higher mild dehydration in the minor group (p=0.07). Conversely, there was a lower general dehydration prevalence in the minor group than the major group in autumn (p=0.002) by a lower prevalence in low dehydration (p=0.04). The temperature and relative humidity for the major group during summer and autumn, were 20 °C / 76% and 19° /74 % respectively. For the minor group it was 25°C / 49% during summer and 22°C / 65% during autumn.

Table 1. Dehydration prevalence in two seasons by age group.

Age group	n	Summer			Autumn		
		General Dehydration (%)	Low Dehydration (%)	Mild Dehydration (%)	General Dehydration (%)	Low Dehydration (%)	Mild Dehydration (%)
Major	47	76.6	51.1	25.5	91.5	66.0	25.5
Minor	59	88.1	45.8	42.3	64.4 a	45.8 a	18.6 b
Total	106	83.0	48.1	34.9	76.4	54.7	21.7

a Significant difference vs major group (p<0.05); b Significant difference vs Summer (p<0.05)

CONCLUSIONS

More than 70% of subjects presented dehydration mainly for low dehydration (>45%) for both groups and seasons. These results suggest that drinking *ad libitum* is not enough for maintaining adequate hydration in both major and minor soccer players, neither in summer nor autumn.

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