

# Hydration Status, Knowledge, and Habits of Collegiate Cross Country Runners

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## Introduction

- Dehydration exceeding 2% loss of body mass can cause decreased cognitive and physical performance in endurance athletes<sup>1</sup>
- Only 20% of runners monitor their hydration status<sup>2</sup>
- Many runners carry water bottles, but do not know fluid recommendations or their sweat rate<sup>2</sup>

## Purpose

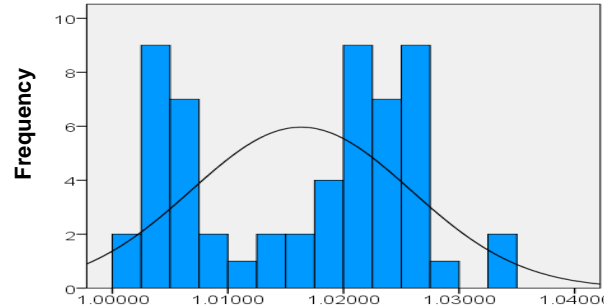
To assess hydration status, habits, and knowledge of collegiate cross country runners

## Methods

- IRB approval was obtained and subjects completed informed consent
- 33 female and 25 male Division III cross country runners participated
- Specific gravity of urine samples before a race, recovery run, and workout run assessed hydration status
- Participants completed questionnaires on hydration knowledge and habits
- Sweat rates were calculated for each participant
- Water bottles were swabbed with a 3M quick swabs around the lid and areas that touch the mouth and cultured on 3M aerobic petrifilms
- Data analyzed for significance using T-tests and ANOVA with SPSS



Frequencies of Urine Specific Gravity Before Race

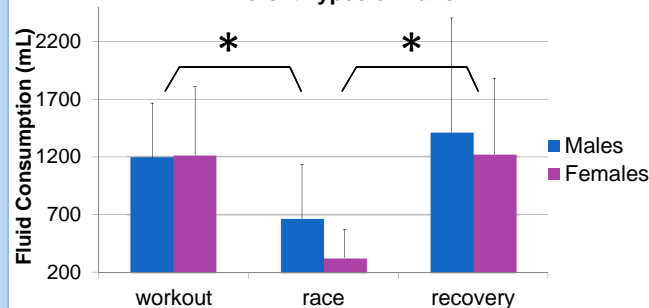


## Results

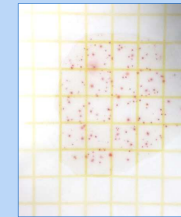
- Sweat rates were higher in males (Males: 1377.6 ± 335.1 mL/hr, Females: 1128.6 ± 320.7 mL/h; p=0.005) and males ran more miles per week (males: 65.77 ± 12.6, females: 47.64 ± 10.17; p=0.00)
- Average knowledge score was 58% for males and 61% for females
- 64.9% of water bottles cultured had bacteria too numerous to count (TNTC)

	Race	Workout	Recovery
<b>Males</b>	57%	42%	46%
<b>Females</b>	45%	32%	24%
<b>Total</b>	50%	36%	33%

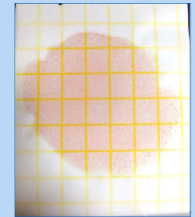
Fluid Consumption of Males and Females Before Different Types of Runs



## Total Aerobic Plate Counts



380cfu/mL



TNTC

\*\*\*Recommended > 500cfu/mL

## Conclusion

- 21% of all participants (8 males, 4 females) were severely dehydrated (USG>1.025) prior to competition
- 50% of participants started the race dehydrated and there is a major concern for the number of participants ending the race dehydrated
- Sweat rates (mL/hr) of males were 18% higher, and males ran 18 more miles per week, yet consumed approximately the same amount of fluid as females before the recovery and workout runs
- Water bottle cleanliness should be addressed by runners
- Aerobic plate count does not distinguish type of bacteria and future research is needed to determine whether the bacteria is pathogenic

## Acknowledgements

- Thank you Emily Heying, PhD, and Richard Wielkiewicz, PhD for helping with statistics
- Thank you coaches Robin Balder-Lanoué and Tim Miles for supporting the study.

1. Thomas, D.T., Erdman, K.A., & Burke, L.M. (2016). Position of the Academy of Nutrition and Dietetics, Dietitians of Canada, and the American College of Sports Medicine: Nutrition and Athletic Performance. *Journal of the Academy of Nutrition and Dietetics*, 116(3), 501-28. doi: 10.1016/j.jand.2015.12.006.  
2. O'Neal, E.K., Wingo, J.E., Richardson, M.T., Leeper, J.D., Neggers, Y.H., & Bishop, P.A. (2011). Half-marathon and full-marathon runners' hydration practices and perceptions. *Journal of Athletic Training*, 46(6), 581-91.