TACSM Abstract

Sex Differences in The Accuracy of WUT (Weight, Urine Color, Thirst) Diagrams Assessing Hydration Status

[1]JAN-JOSEPH S. ROLLOQUE, [1]MARCOS S. KEEFE, [2]NIGEL C. JIWAN, [2]CASEY R. APPELL, [1]MADISON M. POMROY, [2]HUI YING LUK, [1]YASUKI SEKIGUCHI

[1]Sports Performance Laboratory; Department of Kinesiology and Sport Management, Texas Tech University; Lubbock, Texas;
[2]Applied Physiology Laboratory, Department of Kinesiology and Sport Management, Texas Tech University, Lubbock, Texas

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Advisor / Mentor: Sekiguchi, Yasuki (Yasuki.Sekiguchi@ttu.edu)

ABSTRACT

The WUT (Weight, Urine Color, Thirst) Venn diagram is a practical method to assess hydration status using percent body mass loss (%BML), urine color (U_{COL}), and thirst perception (TP). However, sex differences and the accuracy of WUT diagrams between males and females has not yet been investigated. **PURPOSE**: To observe sex differences in the accuracy of WUT diagrams assessing hydration status. **METHODS**: 8 males [M] (age: 21 ± 3; mass: 76.3 ± 15.6 kg) and 5 females [F] (age: 22 ± 2; mass: 60.5 ± 13.6) visited the laboratory twice a day (morning (7:00am-9:00am) and afternoon (2:00pm-4:00pm)) for six days as free-living for the first three consecutive days and euhydrated (urine specific gravity (USG) < 1.020) for the last three consecutive days. During each visit, TP, body mass (BM), USG, U_{OSM}, U_{COL}, and plasma osmolality (P_{OSM}) were collected. Values of USG $\geq$1.020, U_{OSM} $\geq$700, and P_{OSM} $\geq$290 indicated dehydration status. TP $\geq$5, U_{COL} >5, and %BML >1% values were used as dehydration thresholds for WUT scores. Total WUT score (0-3) was determined by the total amount of respective dehydration markers identified. One-way ANOVA was used to analyze differences in P_{OSM}, U_{OSM}, and USG between the different WUT scores for both sexes. Receiver operating characteristics analysis was used to calculate sensitivity (SENS) and specificity (SPEC) identifying dehydration or euhydration with WUT scores. **RESULTS**: For P_{OSM}, WUT3 (M: 291 ± 5; F: 286 ± 0 mOsmol), WUT2 (289 ± 6; 286 ± 7), WUT1 (286 ± 5; 286 ± 6), and WUT0 (289 ± 5; 285 ± 7) were not different between sexes ($p > .05$). For USG, WUT3 (1.022 ± .004; 1.020 ± .000), WUT2 (1.019 ± .008; 1.020 ± .007), WUT1 (1.015 ± .006; 1.010 ± .005), and WUT0 (1.010 ± .006; 1.008 ± .006) were not different between sexes ($p > .05$). For U_{OSM}, WUT3 (819 ± 147; 744 ± .000 mOsmol), WUT2 (679 ± 244; 788 ± 261), WUT1 (521 ± 266; 461 ± 212), and WUT0 (383 ± 212; 322 ± 203) were not different between sexes ($p > .05$). For P_{OSM}, $WUT2_{SPEC}$ was higher in M ($WUT2_{Mspec}$, .860) than F ($WUT2_{Fsepc}$, .786) while WUT3, WUT1, and WUT0 were similar between sexes ($WUT3_{Mspec}$, .965; $WUT3_{Fspec}$, .976; $WUT1_{Mspec}$, .526; $WUT1_{Fspec}$, .380). For USG, $WUT2_{SENS}$ was higher in F ($WUT2_{Fsens}$, .889) than M ($WUT2_{Msens}$, .571) while WUT3, WUT1, and WUT0 were similar between sexes ($WUT3_{Msens}$, .238; $WUT3_{Fsens}$, .111; $WUT1_{Msens}$, .905; $WUT1_{Fsens}$, .889). For U_{OSM}, SPEC and SENS were similar between sexes for each WUT score. **CONCLUSION**: There are no sex differences in P_{OSM}, USG, and U_{OSM} between WUT0-WUT3. However, based on SPEC and SENS, WUT3 and WUT0 can accurately detect hydration status in both sexes. WUT2 might be used to detect hydration status only for females.