

Armstrong et al, 2012 – Hydration biomarkers and dietary fluid consumption of women



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Introduction

Adults require simple but valid ways to assess hydration status. However, hydration status is difficult to measure because the distribution of total body water is a dynamic fluid matrix. All hydration assessment techniques are therefore best viewed as singular measures of this complex distribution. Normative values for hydration biomarkers have recently been published for men (Armstrong et al. 2010); but corresponding norms and hydration categories do not exist for women. Furthermore, the volume and types of fluid consumed by healthy young women are not well described. This study, which took place over two consecutive days, had two aims. The first was to discover normative values for 24-hour fluid intake, and hydration biomarkers in urine (osmolality, specific gravity, colour, and volume) and blood (serum osmolality). The second aim was to describe representative volumes and types of fluid consumed by young women who undertook normal daily activities.

Key findings

Fluid Consumption: In a group of healthy women (age, 20 ± 1 years; BMI, 21.4 ± 2.4 kg/m²), mean daily fluid consumption on Day 1 (drinking water plus beverages) was 1829 ± 975 mL/day, with the majority of fluid coming from drinking water (1298 ± 1037 mL/day). In normal daily living conditions, women consumed a wide range of fluid volumes, from a low of 0.7 to a high of 4.3 L/day. Similar values were reported on Day 2.

Normative Values: Hydration categories, based on distributions for each measured biomarker, suggest that a well-hydrated young woman consumes >1.8 L/d of fluids (and >2.5 L/d of total water) and produces >1.2 L of urine per day. Her 24-hour urine specific gravity is <1.016 and the urine colour is ≤ 4 . At the centre of each distribution (i.e., 41st to 60th percentile), urinary hydration biomarkers had the following values: osmolality, 549–705 mOsm/kg; specific gravity, 1.016–1.020; colour, 5; volume, 951–1239 mL/day. Serum osmolality was centred around 293–294 mOsm/kg.

Relevance for healthy hydration

Between women who consume a small versus a large daily fluid volume, the main difference was in the consumption of drinking water. Establishing normative values for common biomarkers of hydration status enables health professionals to provide women with objective measures to determine if they are drinking enough to be well-hydrated. Urine colour and specific gravity, due to their ease of measurement, are particularly well-suited for the daily tracking of hydration status.

Armstrong LE, Johnson EC, Muñoz CX, Swolka B, Le Bellego L, Jimenez J, Casa DJ, Maresh CM. Hydration biomarkers and dietary fluid consumption of women. *J Acad Nutr Diet.* 2012 Jul;112(7):1056-61.

J Acad Nutr Diet Link to Abstract: <http://www.andjrn.org/article/S2212-2672%2812%2900471-6/abstract>

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