ses which also supply additional energy and nutrients, such as fresh pressed fruit and vegetable juices, milk, soya and cereal based drinks, soups, gazpacho, etc. Finally, the fourth level includes sugar sweetened beverages which are recommended to be occasionally consumed. There is no evidence to support the contribution for hydration purposes of alcoholic beverages, including fermented beverages such as wine, cava and beer and therefore, such drinks are not included in the Healthy Hydration Pyramid.

Recent data from the ANIBES study on food consumption and energy balance in the Spanish population show that water and fluid intake is below recommended levels, especially in adults and elderly population. A Healthy Beverage Index has been recently tested and preliminary results report positive associations between higher HBI scores and more favorable lipid profiles; hypertension risk in adults, although further research is needed. Adequate water and fluid intake contributes to health and wellbeing.

Key words: dietary guidelines, health, beverages, hydration.

DOI:10.3305/nh.2015.32.sup2.10381

Water intake and hydration indices in healthy adults; the European Hydration Research Study (EHRS)

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Hydration status is linked to health, wellness and performance. Consequently, it is of public health interest to evaluate hydration status of population groups and to relate it with water intake from foods and beverages.

In this study, our objective was to evaluate hydration status, water intake and the output of 7 consecutive days in healthy adults in summer and winter. It was studied in three European countries (Spain, Germany and Greece).

The volunteers living in Spain, Germany or Greece (n=577, 40±12 y, (50.2 % males)), 25.06±4.62 kg/m² BMI have participated in an 8-day study protocol during summer and winter. Total water intake was evaluated from food and drink records gathered in 7 day diaries. Hydration status was measured in 24h urine samples collected for 7 days and in blood samples collected on days 1 and 8 of the protocol. Hydration indices in urine (24h volume, specific gravity, colour, sodium and potassium concentration) and blood (haemoglobin, haematocrit and osmolality) were associated with water intake.

Total water intake was 2.63±0.98L/day, water from beverages 2.09±0.94L/day, water from foods 0.63±0.31 L/day, 24h urine volume 1.65±0.88 L/day, 24h urine osmolality 628±219 mOsmol/kgH₂O, 24h specific gravity 1.020±0.07, 24h sodium concentration 117±5 mEq/L, 24h potassium concentration 50±18 mEq/L, colour 4.2±1.4, haemoglobin 14.7±1.7 g/dL, haematocrit 43±4% and serum osmolality 294±9 mOsmol/kgH₂O. Water intake was higher in summer than in winter (p<0.001). Water intake was associated negatively with urine specific gravity, urine colour, urine sodium and potassium concentration (p<0.01). Applying urine osmolality cut-offs for hydration status, 21% of participants were hyperhydrated, 60% euhydrated and 19% dehydrated. Predictors for urine osmolality were age, country, gender and BMI but not season or physical activity.

Hydration indices on a large number of free-living individuals are provided. Most participants were euhydrated but a substantial number showed evidence of over- or under-hydration. Seasonal differences on total water intake were observed.

Key words: Hydration status, water intake, urine hydration indices, blood hydration indices, seasonality.

DOI:10.3305/nh.2015.32.sup2.10265