Hydration guidelines for fractionation of liquid intake in hot environments: report of Latin America


Introduction: Total water intake is the sum of the liquid provided by water and all types of fluids, beverages and foods that contain it. It is assumed to represent around 80% of total intake by humans, including 20% from foods (EFSA). Water intake is mostly achieved though fluids like water, juices, energetic drinks, caffeinated drinks, soft drinks or soups. The needs of water intake vary depending on characteristics such as gender, life span, physical activity, geography, weather conditions, and others. Considering the life cycle, our first fluid intake, as suggested by the World Health Organization, should be breast milk. If the healthy newborn is well hydrated it can self-regulate the human milk intake. After the first six months of age and until 2 years old, others liquids and foods different from breast milk are responsible of the hydration and nutrition of the infant. Then, breastfeeding is displaced by others fluids, that may change across life cycle.

In hot weather a thirsty infant may want to breastfeed more frequently but for shorter periods. Extra fluids are normally not required if the child is breastfed whenever he needs and this may be more often than usual. In this way he is getting more low-fat breast milk and so is satisfying his thirst. In hot conditions, mothers should assure their own water intake is adequate (Australian Breastfeeding Association). With growth, self-regulation of fluids becomes more complex and is not necessarily satisfied optimally.

South America climate is variable, including wet and hot areas. In the Amazon basic temperatures vary from 21.1 °C - 32.2 °C while in the Andes it is cold during the whole year. According to the U.S. Environmental Science Services Administration the highest temperature registered in South America was from Argentina of 48.9 °C. These hot temperatures affect the temperature regulation of the body, increasing the amount of water and fluids needed to satisfy the requirements of the population. Children and older people are most at risk of being dehydrated.

Methods: A systematic review from the official web pages of the Ministries of Health, Institutes of Nutrition, Institutes of Public Health of each country, and pages like those from FAO from 20 Latin American countries, ranging from Mexico to Chile, were visited. The languages used for the search were Spanish, Portuguese and English. The key words were: hydration guidelines + the name of the country, reference values of water and fluids, nutritional needs of water and fluids and food guidelines. We selected the official guideline of each country, and searched for differences across life cycle, gender and characteristics of the weather.

Results: Although 15 of the 20 Latin American countries had food guidelines for their populations, only 9 countries (Bolivia, Brazil, Chile, Costa Rica, El Salvador, Honduras, Mexico, Nicaragua, and Paraguay) suggested as a general recommendation drinking 6 to 8 glasses of water a day. Venezuela recommended drinking liquids, without indications as to the quantity and frequency of intake, while Ecuador and Peru had no detailed food guideline. In the icons used to promote in the consumers to think, select and eat a healthy and varied meal, the presence of water and liquids is scarce. The most frequent liquid present in these icons were the milk and yogurt. A reference to water is present in a few icons such as in Argentina. Only Colombia recommended increasing the intake of fluids in hot environments, without any advice regarding to quantity or fractioning of consumption. Each country had their own references values for water and other liquids adapted to their cultural characteristics, geographic and weather conditions. Mexico and Venezuela supported their water and fluids references intakes as recommended by the Institute of Medicine of United States of America.

Conclusions: To our knowledge in Latin American countries, hydration guidelines for fractionation of liquid intake in hot environments do not exist. These countries have no official recommendations for water and fluids intakes. This may be due to different climates ranging from tropical areas with few variations of temperatures, to dramatic changes in climate across a year in the south. The food guidelines usually include a message related with water
consumption, but this message was not clear or specific to age, gender, quantity and/or frequency. Latin America and the Caribbean will face a challenge that will affect their optimal fluid intake. Estimates predict a rise of 4 °C in temperature for the next years, according to the study “Turning down the Heat” from World Bank. Another challenge is the need of surveying populations in the Latin American region to assess the intake patterns of different types of fluids (water and all other beverages) across gender and the life cycle. This requires developing the water and fluids intake references for the Latin American population for different climatic conditions.

Key words: water, hydration, food, latin american countries

Evidence behind daily water and beverage intake recommendations

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Water requirements to meet hydration needs can be met by plain water, by water from caloric and non-caloric beverages, and by moisture from foods. The Dietary Reference Intake (DRI) values for water, established by the Institute of Medicine (IOM) in the US and the European Food Safety Authority (EFSA) in Europe, are based in part on observed population intakes of plain drinking water (tap and bottled); water from other caloric and non-caloric beverages, and on moisture from foods. For children, the US IOM recommendations for adequate intakes (AI) for water are 1,700 mL/d for boys and girls aged 4-8y and 2,100 mL/d for girls and 2,400 mL/d for boys aged 9-13.

Being mostly water, beverages contribute more to hydration than they do to energy intakes. Based on the national food consumption data for the US, plain drinking water and beverages accounted for up to 75% of total water intakes, with the remaining 25% provided by moisture in foods. By contrast, solid foods provided as much as 81.3% of daily calories for people aged >4y, whereas caloric beverages provided only 18.7%. Among the key beverages consumed in the US are plain drinking water, milk, juices, sodas and fruit drinks, coffee and tea.

Most data on beverage consumption patterns and consumption trends in the US come from federal agencies. The ongoing National Health and Nutrition Examination Survey (NHANES) conducted by the National Center for Health Statistics is the prime source of beverage consumption data, based on one or 2-day food recalls. The NHANES data are based on a representative sample of the US population, spanning different demographics and age groups. The US Department of Agriculture maintains national food availability data, useful for tracking long-term time trends by beverage category.

Consumption patterns of different beverages vary sharply by age. Young children are more likely to drink milk, whereas older adults are more likely to drink coffee. The consumption of citrus juices and sodas reaches a peak in adolescence but declines in adult life. Consumption patterns can also vary by socioeconomic status (SES). In the US, the consumption of plain tap water, bottled water, skim milk, and diet soft drinks has been linked to higher education and to higher incomes. By contrast, the consumption of regular soda and whole milk was linked to lower SES.

Nutrient density of beverages has been expressed in nutrients per calorie and nutrients per serving. While drinking water, tap and bottled, contains no calories and no nutrients, other beverages are important dietary sources of vitamin C, potassium, calcium and other vitamins and minerals. Although sweetened beverages are the biggest source of added sugars, they are not the biggest source of dietary calories. Added sugars account for about 13-18% of total daily calories in the American diet, depending on age. Sugar sweetened beverages (SSBs) account for about 40% of added sugars, on the average. Thus, the mean contribution of SSBs to total daily calories in the US has been estimated at 6-7%. Recent national data for the US point to a sharp decline in energy intakes from sugar sweetened beverages. The consumption of added sugars has also declined.

In summary, relying on food moisture does not come close to satisfying daily hydration needs. Water and beverages supplied 75% of daily water intakes, depending on age. Importantly non caloric plain water, both tap and bottled, contributed between 30% and 37% of total water intakes. Drinking plain drinking water and beverages is the key to satisfying hydration needs.

Key words: drinking water, beverages, hydration, calories, trends

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