What drove us to drink 2 litres of water a day?

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In 1976, the anthropologist Claude Paque published a paper on the water consumption of Saharan nomads. This paper, *Water consumption in Saharan nomads. A remarkably reduced and constant consumption,* considered the reasons why these tribes drank so little water in one of the world's hottest regions. The adaptability of these nomads is reflective in the water allocation reported by Paque, with it being half the consumption of the Europeans living in the same environment.[1] Given that even in a harsh environment, the consumption of water can be minimal, why do we insist on drinking such large volumes of water every day?

Australian health and dietary authorities currently encourage Australians to consume eight glasses, or two litres, of fluid daily for optimal health.[2] This has been misinterpreted to mean two litres of water specifically and it has driven a steady growth in the use of bottled water over the years. Drinking water is healthy; it can contribute to weight loss, reduce the consumption of sugary beverages[3] and − when consumed out of a bottle − can be healthier still, at least according to the water bottle industry.[4] Thirty years ago you didn't see a water bottle anywhere, now they appear as fashion accessories. It supports the emergence of a new status;[5] as May called it, "the new cultural class".[6] As tokens of instant gratification and symbolism, the very bottle itself is seen as cool and hip.[7] Glamour has played a pivotal role. The use of water in weight-loss programs has given added impetus to the notion that drinking large volumes of water a day will help lose weight. This is partly true, but it requires a low-calorie diet in the same way as any other weight-loss program. Research revealed that the inclusion of high volumes of water does nothing more than reduce the appetite.[3] Further, Dr Victoria Potter noted that consuming water in food eaten had a greater benefit in weight reduction than avoiding foods altogether.[8]

Heinz Valtin posed the question, "Why do we need to drink eight glasses of water a day?"[9] In a recent article by Dr Margaret McCartney in the *British Medical Journal*, the notion of needing to drink large volumes of water for health had been reinforced by the National Health Service (NHS) in Britain, without any substantial evidence to support it.[10] There are institutional recommendations in Australia as well, for instance, the National Health and Medical Research Council (NHMRC) recommends a similar quantity of fluid to that discussed by Valtin. McCartney further showed that despite the claims of bottled water producers that more water is required, evidence suggests the over-consumption of water, particularly in children, could be detrimental. Both Valtin and McCartney consider the recommendation of eight glasses or two litres of water a day to be driven by vested interests, rather than a need for better health. Even so, from where did this recommendation originally stem?

A bit of history

The recommendation to consume large quantities of water can be traced back to the 19th Century, to the 'hydropathists', those alternative practitioners who considered that water had the power to cure any ailment.[11] Hydropathy was a discipline developed and promoted by Vincent Priessnitz (1799-1851), who learned of the apparent curative effects of water as a child. Over the years he experimented with his 'water cure' on farm animals and his own family and through further work and experimentation he began dispensing his water cure through an institution he founded in Graefenburg in Austria in 1829. The popularity of his treatment quickly spread around the globe and water sanatoriums sprang up in Europe, the US and Australia.

The hydropathy method involved the use of quite heroic water therapies, but in addition the patient was required to drink copious amounts of water over the course of the day along with treatments of cascading waterfalls or sitz baths. Priessnitz considered the consumption of water an essential part of the process and the ingestion of large volumes "brings bad stuff out of the system".[11]

One of hydropathy's strongest supporters, the Australian hygienist John Hern, considered it "one of the most valuable curative agents of the time".[12] His method required his patients to drink "the only real drink – water" the equivalent of 1.1 to 1.7 litres a day.[12]

Science steps in

Scientific endorsement of a minimal water requirement first appeared as a brief footnote in 1945, when the Food and Nutrition Board of the National Academy of Sciences in the US published its Dietary Guidelines. It recommended that, as the average male diet would consume 2,500 kilocalories (10,467 kilojoules), this diet would require 1 mL of water for each kilocalorie; consequently 2,500 mL of fluid should be ingested on a daily basis.[13] This recommendation was repeated in the 1948 revision[14] with no reference or authority cited in the calculation.

Frederick J. Stare (1910-2002), a renowned nutritionist, was a strong supporter of the need to drink at least six glasses of water a day.[15] Nevertheless, he did not support water consumption on spurious scientific foundation. In his criticism of The Stillman Diet, he noted that Dr Stillman claimed consuming eight glasses of water a day was necessary for the kidneys to wash away the fatty acids resulting from the breakdown of fats. The reasoning for this, Dr Stillman admitted, was not fully understood.[16]

Taken to extremes

There are those who believe even two litres of water a day is not enough. Dr Fereydoon Batmanghelidj, a medical practitioner in Virginia in the US, claims that Unintentional Chronic Dehydration (UCD) is behind chronic pain and many degenerative diseases. According to Dr Batmanghelidj, lack of water − and this alone − is the progenitor of many diseases, and that by consuming water daily these diseases can be prevented.[17] His interpretation is that conditions signalling dehydration that are not heeded can degenerate until a recognisable disease pathology becomes evident. Attention is then applied to this pathological expression and the true nature of the disease is ignored.

In today's western society there is an accepted popular view that the moment one feels thirsty, one is dehydrated.[9,18] Consequently, the only way to avoid this high-risk situation is to consume copious amounts of water. Supporters of this view believe consuming beverages other than water will only lead to further dehydration. According to Dr Batmanghelidj, drinking tea or coffee will not only prevent the absorption of the water inherent in the beverage, but additional water is lost as well,[19,20] a conclusion echoed by others, including dieticians and nutritionists.[18,21,22] Institutions that establish dietary needs including intakes of water do not acknowledge this and research has suggested the diuretic effect of some beverages, such as tea or coffee, is somewhat overrated.[23-25]

Adequate intake

Unlike many nutrients, there is no set minimum level of water intake. The level of acceptable water ingestion is the Adequate Intake (AI). It is used in place of an Estimated Average Requirement (EAR).[26] The estimated AI for water ranges from 1.01 mL/kcal to 1.05 mL/kcal depending on age and gender.[27]

In 1995, the NHMRC funded the National Nutrition Survey (NNS 1995). This broad and detailed survey sought to determine what healthy Australians were eating and drinking across the country. This resulted in a fluid AI of 2.8 litres/day for adult women and for adult men, 3.4 litres/day. This included the water found in food as well as drinks. The optimal extrinsic fluid intake (that is, the water from plain water, teas, coffee, juices, etc) was determined to be 2.6 litres for men and 2.1 litres for women.[28] Interestingly, 30 to 40% of the participants of the survey failed to achieve this level of intake.[2]

So, what happens when you drink the recommended 2 litres of water each day? This often depends on how you drink this water. If you realise that you have yet to drink the requisite 2 litres and drink a large quantity within a short time, this will likely mean the water you drink will not reach the extracellular space, where it is needed, and as such has no real effect on hydration; all it does is dilute the urine.[29] So, if using urine specific gravity to measure hydration it will indicate the urine is of a low concentration of electrolytes and, as such, there is normal hydration, but it is possible the body is hypohydrated and still requires fluid.[30]

Conclusion

Humans need to maintain fluid balance and need to drink water when required, but should also consider fluid in unprocessed fruits and vegetables and juices. There is further evidence that water and a well-balanced diet does far more than water alone[8,31,32] and this type of research should not be ignored. It may not be just water that's needed; it may also be the other components that go along with it that will mean the body is well hydrated. Claude Paque[1] noted the need to consider the foods eaten and cultural behaviours as well as the water consumed.

Water is important for health; however, the recommendation of 8 glasses of pure water per day appears an overestimation of requirements. All fluids are important in meeting requirements and water should not be singled out. We should be educating the general public that beverages like tea and coffee, despite their caffeine content, do not lead to dehydration and will contribute to a person's fluid needs, something worth considering when discussing fluid requirements.

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References

1. Paque C. Water consumption in Saharan nomads. A remarkably reduced and constant consumption. *Nouv Presse Med*. 1976;5(32):2087-90.
2. National Health and Medical Research Council. *Nutrient Reference Values for Australia and New Zealand. Including Dietary Intakes*. Canberra (AUST): NHMRC; 2005.
3. Dennis EA, Dengo AL, Comber DL, Flack KD, Savla J, Davy KP, et al. Water consumption increases weight loss during a hypocaloric diet intervention in middle-aged and older adults. Obesity. 2010;18(2):300-7.
4. Australasian Bottled Water Institute. *Did You Know...*[Internet]. Sydney (AUST): ABWI; 2004 [cited 2011 Nov 27]. Available from: http://www.bottledwater.org.au/scripts/cgiip.exe/WService=ASP0003/ccms.r?PageId=5002
5. Connell J. 'The Taste of Paradise': Selling Fiji and FIJI Water. *Asia Pac Viewp*. 2006;47(3):342-50.
6. May J. 'A Little Taste of Something More Exotic': The Imaginative Geographies of Everyday Life. *Geography*. 1996;81(1).
7. Fishman C. *Message in a Bottle* [Internet]. New York (NY): Fast Company; 2007 [cited 2010 Jul 29]. Available from: http://www.fastcompany.com/magazine/117/features-message-in-a-bottle.html
8. Vieira Potter VJ. Eat Your Water for Health, Sport Performance, and Weight Control. *Am J Lifestyle Med*. 2011;5(4):316-9.
9. Valtin H. "Drink at least eight glasses of water a day." Really? Is there scientific evidence for "8 x 8"? *Am J Physiol Regul Integr Comp Physiol*. 2002;283(5):R993-1004.
10. McCartney M. Waterlogged? *BMJ*. 2011;343:d4280. PubMed PMID: 21750074.
11. Whorton JA. *Nature Cures: The History of Alternative Medicine in America*. New York (NY): Oxford University Press; 2002.
12. Hern J. *Advanced Hygiene: Or, How to Cure Disease without Recourse to Drugs or Medicines of Any Kind*. Melbourne (AUST): Mason, Firth & McCutcheon; 1892.
13. Johnson AC. *Food and Clinical Practice for Medical Workers*. Minneapolis (MN): Burgess; 1949.
14. National Research Council. *Recommended Dietary Allowances Revised October, 1948*. Reprint and Circular Series, Number 129. Washington (DC): The National Academies; 1948.
15. Saxon W, Frederick J. Stare, 91, Dies; Influential Early Nutritionist. *New York Times*. 2002;Sect. A29.
16. Stare FJ. *Diet Books: Facts, Fads and Frauds* [Internet]. Jamaica Plain (MA): AtkinsExposed; 2004 [cited 2011 Mar 14]. Available from: http://www.atkinsexposed.org/atkins/96/fredrick_j._stare,_ph.d..htm
17. Batmanghelidj F. *Your Body's Many Cries for Water*. Falls Church (VA): Global Health Solutins; 2008.
18. Are you drinking enough water? With the heat of summer ahead of us, make sure you don't suffer the effects of dehydration. *Choice*. 2001:17(3).
19. Dumyn L. Research clashes with flashes on (eight) glasses. *OHS Canada*. 2004;20(8):18.
20. Nowlan S. The thirst for bottled water (consuming choices). *Habitat Australia*. 2004;32(5):30(1).
21. Natural Therapy Pages. *Dehydration − The Facts* [Internet]. Sydney (AUST): NTP; 2010 [cited 2010 Apr 1]. Available from: http://www.naturaltherapypages.com.au/article/dehydration_the_facts
22. Nielson K. *Drink Water: Be Well*. Toronto (CAN): Plus50lifestyles.com; 2007 [cited 2010 Apr 1]. Available from: http://www.plus50lifestyles.com/health3.htm
23. Gardner EJ, Ruxton CHS, Leeds AR. Black tea − helpful or harmful? A review of the evidence. *Eur J Clin Nutr*. 2006;61(1):3-18.
24. Maughan RJ, Griffin J. Caffeine ingestion and fluid balance: a review. *J Hum Nutr Diet*. 2003;16(6):411-20.
25. Grandjean AC, Reimers KJ, Bannick KE, Haven MC. The Effect of Caffeinated, Non-Caffeinated, Caloric and Non-Caloric Beverages on Hydration. *J Am Coll Nutr*. 2000;19(5):591-600.
26. Institute of Medicine. *Dietary Reference Intakes: Applications in Dietary Assessment*. Washington (DC): National Academy Press; 2000 [cited 2010 Apr 2]. Available from: http://www.nap.edu/openbook.php?record_id=9956&page=106
27. Bidlack WR. Interrelationships of food, nutrition, diet and health: the National Association of State Universities and Land Grant Colleges White Paper. *J Am Coll Nutr*. 1996;15(5):422-33.
28. Baghurst K. *Drink Plenty of Water. Dietary Guidelines for Australian Adults*. Canberra(AUST): National Health and Medical Research Council; 2003. p. 95-105.
29. Armstrong LE. Assessing Hydration Status: The Elusive Gold Standard. *J Am Coll Nutr*. 2007;26 Suppl 5:575-84.
30. Armstrong LE, Soto JA, Hacker FT Jr, Casa DJ, Kavouras SA, Maresh CM. Urinary indices during dehydration, exercise, and rehydration. *Int J Sport Nutr*. 1998;8(4):345-55.
31. Pollan M. *The Omnivore's Dilemma. A Natural History of Four Meals*. London (UK): Penguin Books; 2007.
32. Neumann TW, Arnott ML, Baker PT, Dahlquist PA, Desai ID, Gouletquer PL, et al. A Biocultural Approach to Salt Taboos: The Case of the Southeastern United States [and Comments and Reply]. *Curr Anthropol*. 1977;18(2):289-308.

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