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Mixed messages

Medical myths

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Sometimes even doctors are duped, say **Rachel C Vreeman** and **Aaron E Carroll**

Physicians understand that practicing good medicine requires the constant acquisition of new knowledge, though they often assume their existing medical beliefs do not need re-examination. These medical myths are a light hearted reminder that we can be wrong and need to question what other falsehoods we unwittingly propagate as we practice medicine. We generated a list of common medical or medicine related beliefs espoused by physicians and the general public, based on statements we had heard endorsed on multiple occasions and thought were true or might be true. We selected seven for critical review:

People should drink at least eight glasses of water a day

We use only 10% of our brains

Hair and fingernails continue to grow after death

Shaving hair causes it to grow back faster, darker, or coarser

Reading in dim light ruins your eyesight

Eating turkey makes people especially drowsy

Mobile phones create considerable electromagnetic interference in hospitals.

We used Medline and Google to search for evidence to support or refute each of these claims. Because “proving a negative” can be challenging, we noted instances in which there was no evidence to support the claim.

People should drink at least eight glasses of water a day

The advice to drink at least eight glasses of water a day can be found throughout the popular press.^{w1-w4} One origin may be a 1945 recommendation that stated: A suitable allowance of water for adults is 2.5 litres daily in most instances. An ordinary standard for diverse persons is 1 millilitre for each calorie of food. Most of this quantity is contained in prepared foods.^{w5} If the last, crucial sentence is ignored, the statement could be interpreted as instruction to drink eight glasses of water a day.^{w6}

Another endorsement may have come from a prominent nutritionist, Frederick Stare, who once recommended, without references, the consumption “around 6 to 8 glasses per 24 hours,” which could be “in the form of coffee, tea, milk, soft drinks, beer, etc.”^{w7} The complete lack of evidence supporting the recommendation to drink six to eight glasses of water a day is exhaustively catalogued in an invited review by Heinz Valtin in the *American Journal of Physiology*.^{w8} Furthermore, existing studies suggest that adequate fluid intake is usually met through typical daily consumption of juice, milk, and even caffeinated drinks.^{w9} In contrast, drinking excess amounts of water can be dangerous, resulting in water intoxication, hyponatraemia, and even death.

We use only 10% of our brains

The belief that we use only 10% of our brains has persisted for over a century, despite dramatic advances in neuroscience. In another extensive expert literature review, Barry Beyerstein provides a detailed account of the origins of this myth and the evidence disputing it.^{w10} Some sources attribute this claim to Albert Einstein, but no such reference or statement by Einstein has ever been recorded.^{w10} This myth arose as early as 1907, propagated by multiple sources advocating the power of self improvement and tapping into each person's unrealised latent abilities.^{w10-w13}

Evidence from studies of brain damage, brain imaging, localisation of function, microstructural analysis, and metabolic studies show that people use much more than 10% of their brains.^{w10} Studies of patients with brain injury suggest that damage to almost any area of the brain has specific and lasting effects on mental, vegetative, and behavioural capabilities.^{w14-w16} Numerous types of brain imaging studies show that no area of the brain is completely silent or inactive.^{w10 w17 w18} The many functions of the brain are highly localised, with different tasks allocated to different anatomical regions.^{w19 w20} Detailed probing of the brain has failed to identify the “non-functioning” 90%.^{w10} Even micro-level localisation, isolating the response of single neurones, reveals no gaps or inactive areas.^{w10 w21} Metabolic studies, tracking differential rates of cellular metabolism within the brain, reveal no dormant areas.^{w10}

Hair and fingernails continue to grow after death

Morbid information about the body captures the imagination and reinforces medical mythology. In *All Quiet on the Western Front*, the author describes a friend's fingernails growing in corkscrews after the burial.^{w22} Johnny Carson even perpetuated this myth with his joke, “For three days after death hair and fingernails continue to grow, but phone calls taper off.”^{w23} To quote the expert opinion of forensic anthropologist William Maples, “It is a powerful, disturbing image, but it is pure moonshine. No such thing occurs.”^{w24}

This myth does have a basis in a biological phenomenon that can occur after death. As Maples and numerous dermatologists explain, dehydration of the body after death and drying or desiccation may lead to retraction of the skin around the hair or nails.^{w24} The

skin's retraction can create an appearance of increased length or of greater prominence because of the optical illusion created by contrasting the shrunken soft tissues with the nails or hair. The actual growth of hair and nails, however, requires a complex hormonal regulation not sustained after death.w25 w26

Shaving hair causes it to grow back faster, darker, or coarser

Another common belief is that shaving hair off will cause it to grow back in a darker or coarser form or to grow back faster. It is often reinforced by popular media sourcesw27 and perhaps by people contemplating the quick appearance of stubble on their own body.

Strong scientific evidence disproves these claims. As early as 1928, a clinical trial showed that shaving had no effect on hair growth.w28 More recent studies confirm that shaving does not affect the thickness or rate of hair regrowth.w29 w30 In addition, shaving removes the dead portion of hair, not the living section lying below the skin's surface, so it is unlikely to affect the rate or type of growth.w26 Shaved hair lacks the finer taper seen at the ends of unshaven hair, giving an impression of coarseness.w31 Similarly, the new hair has not yet been lightened by the sun or other chemical exposures, resulting in an appearance that seems darker than existing hair.

Reading in dim light ruins your eyesight

The fearful idea that reading in dim light could ruin one's eyesight probably has its origins in the physiological experience of eye strain. Suboptimal lighting can create a sensation of having difficulty in focusing. It also decreases the rate of blinking and leads to discomfort from drying, particularly in conditions of voluntary squinting.w32 w33 The important counterpoint is that these effects do not persist.

The majority consensus in ophthalmology, as outlined in a collection of educational material for patients, is that reading in dim light does not damage your eyes.w34 Although it can cause eye strain with multiple temporary negative effects, it is unlikely to cause a permanent change on the function or structure of the eyes.w34 Even in patients with Sjögren's syndrome (an autoimmune disease that features inflammation in certain glands of the body), decreased functional visual acuity associated with strained reading improves when they stop reading.w35

One review article on myopia concludes that increased use of one's eyes, such as reading in dim light or holding books too close to the face, could result in impaired ocular growth and refractive error.^{w36} The primary evidence cited was epidemiological evidence of the increased prevalence of myopia and the high incidence of myopia in people with more academic experience.^{w36} The author notes that this hypothesis is just beginning to "gain scientific credence." In the past reading conditions involved even less light, relying on candles or lanterns, so increased rates of myopia over the past several centuries does not necessarily support that dim reading conditions are to blame.^{w37} In contrast to that review, hundreds of online expert opinions conclude that reading in low light does not hurt your eyes.^{w38}

Eating turkey makes people especially drowsy

The presence of tryptophan in turkey may be the most commonly known fact pertaining to amino acids and food. Scientific evidence shows that tryptophan is involved in sleep and mood control and can cause drowsiness.^{w39} ^{w40} L-tryptophan has been marketed as a sleep aid.^{w41}

The myth is the idea that consuming turkey (and the tryptophan it contains) might particularly predispose someone to sleepiness. Actually, turkey does not contain an exceptional amount of tryptophan. Turkey, chicken, and minced beef contain nearly equivalent amounts of tryptophan (about 350 mg per 115 g), while other common sources of protein, such as pork or cheese, contain more tryptophan per gram than turkey.^{w42} Any effects of the tryptophan in turkey are probably minimised by consuming it in combination with other food, which would limit its absorption according to expert opinion.^{w43} In fact, consuming supplemental tryptophan on an empty stomach is recommended to aid absorption.^{w44} Other physiological mechanisms explain drowsiness after meals. Any large solid meal (such as turkey, sausages, stuffing, and assorted vegetables followed by Christmas pudding and brandy butter) can induce sleepiness because blood flow and oxygenation to the brain decreases,^{w45} and meals either high in protein or carbohydrate may cause drowsiness.^{w46-w51} Accompanying wine may also play a role.^{w52} ^{w53}

Mobile phones create considerable electromagnetic interference in

hospitals

In a search by www.snopes.com we could not find any cases of death caused by the use of a mobile phone in a hospital or medical facility.^{w54} Less serious incidents, including false alarms on monitors, malfunctions in infusion pumps, and incorrect readings on cardiac monitors, have occasionally been reported. Although no references or dates are given, one government website published an anecdote in 2002 describing how use of a mobile phone in an intensive care unit resulted in an unintended bolus of adrenaline (epinephrine) from an infusion pump.^{w55} After publication of a journal article citing more than 100 reports of suspected electromagnetic interference with medical devices before 1993,^{w56} the *Wall Street Journal* published a front page article highlighting this danger.^{w57} Since that time, many hospitals banned the use of mobile phones, perpetuating the belief.

Despite the concerns, there is little evidence. In the United Kingdom, early studies showed that mobile phones interfered with only 4% of devices and only at a distance of <1 meter.^{w58} ^{w59} Less than 0.1% showed serious effects.^{w58} At the Mayo Clinic in 2005, in 510 tests performed with 16 medical devices and six mobile telephones, the incidence of clinically important interference was 1.2%.^{w60} Similarly rigorous testing in Europe found minimal interference and only at distances less than 1 meter.^{w61} Recent technological improvements may be lessening even this minimal interference. A 2007 study, examining mobile phones “used in a normal way,” found no interference of any kind during 300 tests in 75 treatment rooms.^{w62} In contrast, a large survey of anaesthesiologists suggested that use of mobile phones by doctors was associated with reduced risk of medical error or injury resulting from delays in communication (relative risk 0.78; 95% confidence interval 0.62 to 0.96).^{w63}

Conclusions

Despite their popularity, all of these medical beliefs range from unproved to untrue. Although this was not a systematic review of either the breadth of medical myths or of all available evidence related to each myth, the search methods produced a large number of references. While some of these myths simply do not have evidence to confirm them, others have been studied and proved wrong.

Physicians would do well to understand the evidence supporting their medical decision making. They should at least recognise when their practice is based on tradition, anecdote, or art. While belief in the described myths is unlikely to cause harm, recommending medical treatment for which there is little evidence certainly can. Speaking from a position of authority, as physicians do, requires constant evaluation of the validity of our knowledge.

Summary points

- Even physicians sometimes believe medical myths contradicted by scientific evidence
- The prevalence and endorsement of simple medical myths point to the need to continue to question what other falsehoods physicians endorse
- Examining why we believe myths and using evidence to dispel false beliefs can move us closer to evidence based practice

Footnotes

- Contributors and sources: RCV and AEC are both health services researchers, whose research focuses on examining health policy and professional practices. They have both studied and reported widely on the most effective ways to improve children's health. This article arose from discussions of how seldom physicians pause to examine the beliefs that they already hold as true. Both authors were responsible for the study concept and design, acquisition of data, and analysis and interpretation of data. RCV was responsible for the drafting of the manuscript and critical revision and is guarantor.
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