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PROMOTING WATER CONSERVATION HABITS IN SHOWER USE: REVIEW OF WATER UTILITY WEBSITES IN OECD CITIES

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Abstract: Personal hygiene accounts for 30–45% of water use in households in OECD countries, and of this water, the greatest proportion is used in showering. More efficient showers can be achieved through the use of efficient technologies—mainly efficient showerheads—as well as through the adoption of sustainable habits, such as reducing shower frequency and duration. A review of the websites of water utilities in cities of OECD countries shows little effort to promote water-saving shower habits. Addressing this shortcoming would improve the sustainability of water use, compared to the current focus on efficient technologies.

Keywords: water-saving tips; water utilities; water conservation; OECD countries; saving shower habits.

1. INTRODUCTION

Water conservation, an essential objective within the broader aim of overall water resource protection, continues to be crucial all over the world due to increasing water scarcity and deterioration, and the growing number of uses and users.

Looking at the different end uses of residential water, showering or bathing often represents the highest indoor demand, accounting for 30% to 45% of total residential use (Energy Saving Trust, 2015; Water Research Foundation, 2016; Moslehi et al., 2020). There is also evidence that, among personal hygiene options, showering is preferred over bathing in developed countries. For example, in a survey of approximately 10,000 households in 10 OECD countries, 85% of the interviewees said they prefer showers over baths (Grafton et al., 2011).

Thus, any strategy for encouraging water conservation in homes should include guidance on showering. Regarding water conservation in the shower, two determinants have been identified: technology and human behaviour. The main water-saving shower

technologies are efficient showerheads (Willis et al., 2013; Watson, 2017); alarm and time control devices (Beal et al., 2013; Stewart et al., 2013), which also support the greatest energy saving (Lam et al., 2017); and digital feedback-based interventions (Hartley et al., 2021). However, efficient technology does not guarantee a more sustainable use of water and can lead to a rebound effect (Shove, 2003; Lindsay & Supski, 2017). The disconnect between the use of efficient technologies and the sustainable use of water can be explained in terms of individual resistance to the sacrifice associated with putting into practice pro-environmental attitudes (Ananga et al., 2019), or just because behaviour is not always rational and can be guided by habits or automatic routines (Steg & Vlek, 2009). Therefore, the pro-environmental use of the shower also requires the development of good habits.

Among these good habits, the most significant is to limit shower frequency and duration. Although personal hygiene is necessary, showering includes an important discretionary component. Showering too often or taking overly long showers can be considered a discretionary activity (Russell & Knoeri, 2020). Thus, hygiene habits are a relevant, but often ignored, factor in sustainability (Gram-Hansen, 2007). There are two other habits that can contribute to water saving in the shower: collecting cold water for other uses while waiting for the water to heat up, and turning off the tap while soaping up (Ananga et al., 2019).

Water utilities recognise that awareness campaigns are some of the most effective means to reduce per capita water consumption (Tortajada et al., 2019). However, we question whether they promote pro-environmental shower habits as much as they should. This viewpoint reviews the tips for pro-environmental and efficient shower use provided by water utilities (through their websites) in a sample of OECD cities. Overall, the amount of guidance provided in this way is quite small. We discuss whether water utilities should make greater efforts to promote water conservation habits while using the shower. After all, many people may see the adoption of such habits as a sacrifice, making it an unpopular initiative.

This viewpoint is structured as follows. After this introduction, we show that there is scope for saving water by changing shower habits. We highlight the importance of awareness campaigns for water saving, review the tips for pro-environmental shower use on water utilities' websites, and estimated water use depending on the duration and frequency of showers as well as showerhead design. We complement our findings with a discussion of people's willingness to change their habits even when it is not easy, and conclude with reflections on future research.

2. BACKGROUND

2.1. Shower habits conditioning water use

Shove and Walker (2010) argue that daily showering has gone from the routine of a few to the norm. Shower frequency can be surprisingly high. Households in Melbourne and Brisbane reported taking between 0.9 and 1.8 showers per day (Brinks et al., 2016). In the United States, the reported average is once per day, but up to 18% of the population takes multiple showers per day (Wilkes et al., 2005). Marzano et al. (2020) administered an online questionnaire in the United States and Canada, focusing on a website (Microworkers, www.microworkers.com) for its popularity and ease of use. They found an average weekly shower frequency of 5.7, but some people reported showering up to 11 times a week.

Regarding shower duration, most studies estimate it at between 5 and 10 minutes, but again, some people take far longer. In United States, the Water Research Foundation (2016) reports an average of 7.8 minutes, but according to Marzano et al. (2020), the average is a bit more than 11 minutes—and some of their interviewees reported spending up to an hour. Adeye et al. (2020) discussed that, in a 2-week study with 12 volunteers, women spent more time in the shower compared to men. Average time for women was 11 min, and 9.5 min for men. Men spent more than 10 min in the shower in 50% of the cases, and women did so 70% of the times.

Across the UK, showers also represent the largest use of water in the home. Around 840 billion litres of water are used for showers each year, and people spend around £2.3bn on heating water for these showers (Energy Saving Trust, 2015). In a UK-led national study, 32% of a sample of nearly 160,000 persons using EST's Water Energy Calculator reported an average shower length of 7.8 minutes (The Water Energy Calculator is an online tool that helps households in the UK understand the energy associated with water use in their home, and identify opportunities to manage their consumption and bills.) In the study by Simpson et al. (2019), university students in campus accommodations in Bristol, UK, reported an average shower duration of 10–12 minutes, higher than reported UK norms.

While there is no universal agreement on the ideal frequency or duration of showers, some references are worth noting. Regarding duration, the United Nations recommend short showers to improve progress towards Sustainable Development Goal 6. Five minutes was set as the sustainable shower duration for the World Water Day water conservation campaign in 2020 (UN, 2020a,b). The objective is to balance good personal hygiene with pro-environmental habits. Shorter showers are also suggested by the US Environmental Protection Agency (EPA, n.d.) as a part of 'showering better' (which refers to saving both water and electricity). Some researchers suggest that less frequent showering is still fine for personal hygiene (Shmerling, 2021), and furthermore that too

much soap and water can strip the skin of its protective barrier, damaging it. A few people have taken the notion even further and have decided not to shower at all (Hamblin, 2016, 2020). While this is probably too drastic a response, many showers could be replaced by sponge baths. People who shower to relax might consider alternative (more environmentally friendly) relaxation techniques. In any case, a significant amount of water could be saved if people took shorter and/or fewer showers.

There are other ways to improve water use efficiency in showering, such as turning off the tap while soaping up or collecting cold water for other uses, but such practices are not common. Most of the people Kappel and Grechenig (2009) interviewed did not turn off the tap while soaping up. In a study in Ada, Oklahoma, only 15% of respondents collected cold water for other uses while waiting for the shower water to heat up (Ananga et al. 2019).

2.2. Awareness campaigns for water savings

Traditionally, the instruments for changing behaviour in water use can be grouped into pricing and non-pricing (García-Valiñas et al., 2015). Pricing instruments have only a small impact on water use. This is because the demand for water is relatively inelastic (Worthington & Hoffman, 2008; Sebri, 2016) and because water bills normally represent a small percentage of household incomes (Leflaive & Hjort, 2020).

Awareness campaigns are the main non-pricing instrument used to influence household water use habits. They can significantly influence conservation behaviour and reduce water use (Kenney et al., 2008; March et al., 2015; Moglia et al., 2018). In a study in Queensland, Australia, Fielding et al. (2013) found that giving families practical advice on how to save water could reduce their water use by up to 16%.

However, to have long-term impacts, campaigns must be sustained. Studies have seen significant impacts at the beginning, say the first one to three months; but after this, water use returns to the baseline (Koop et al., 2019). Even campaigns maintained for years may gradually lose their effect. For example, in a four-year study by Lee et al. (2011), less impact was observed in the last two years.

On the precise impacts of water-saving campaigns, evidence is ambivalent. For example, an awareness campaign by Thames Water and the UK Environment Agency that directed mailings, posters, and newspaper and radio advertisements at 8,000 households in Swindon, UK, had only minor effects. Only 5% of the population reported being aware of the campaign (Howarth & Butler 2004). According to the authors, this lack of success could be due to a lack of public awareness of any problem of water scarcity. On the other hand, Brick et al. (2017) saw reductions in water use of between 0.6% and 1.3% from a tips and social norm campaign in Cape Town, South Africa.

Many water utilities offer talks in schools. It is easier to introduce good habits to children and teenagers—who can also influence their parents (Damerell et al., 2013; Çoban et

al., 2011). In this regard, educational materials are normally aimed at children, such as animated cartoons, stories, and theatre plays (Sauri, 2020).

More recently, information technologies have enabled low-cost campaigns that aspire to global impacts. Websites and social networks have been used to raise public awareness (Tate et al., 2014; Kuppaswamy, 2020). The advantage of social networks over the web is that they reach the younger populations, who are their main users (Elena-Bucea et al., 2021). The downside could be a briefer impact because the world of social media changes so rapidly.

Overall, it can be concluded that there is scope for making use of the shower more sustainable and that water utilities could promote such sustainable use through awareness campaigns.

3. METHOD

Water utilities' websites are a means of promoting the sustainable and efficient use of water. When people need information, many of them consult their water company's website.

Given that information usually remains on a website for some time, we can assess how important shower water saving is in water utilities' conservation campaigns. If it is not mentioned on the website, it will probably not be included in social media. Messages on social media may have only a brief effect since they are quickly replaced by new information. Social media are perhaps best used for timely (or even emergency) information, such as notice of upcoming water supply cuts or a warning of health risks following water tests.

This study drew on information extracted from the websites of 38 water utilities, mostly in the capital cities of OECD countries. Only a few were not capital cities. Washington's website was not working, and Sacramento was chosen because it is the capital of the state of California and an area with high water stress. Within the UK, only England was selected. Thames Water serves customers across London and the Thames Valley, and Affinity Water provides water to the boroughs of Harrow and Hillingdon and parts of Barnet, Brent, Ealing, and Enfield.

We focus on country capitals because, generally, they include a large part of the country's population and can be considered as exemplars for the rest of its water utilities. On each website, we did a search for water-saving tips for the specific case of showers: (1) tips on shower frequency; (2) tips on shower duration (or time control); (3) a recommendation to turn off the water while soaping; and (4) a recommendation to collect cold water in a bucket for other uses while waiting for warm water.

We also estimated both the water use and the potential for water saving per person, considering both shower duration and frequency. For these estimates, we assumed

three values: one to take as moderate, one to take as a goal, and one to take as unsustainable.

- For shower time, 10 minutes is moderate, 5 minutes is a reasonable goal (United Nations, 2020a,b), and 20 minutes is unsustainable (though it is widely reported, as mentioned earlier).
- For shower frequency, 7 per week is moderate, 4 per week (complemented by sponge baths) is a decent goal, and 14 per week (twice a day) is unsustainable.
- For shower heads, 10 L/min (AA head) is standard, 7 L/min (AAA head) is widely available, and 20 L/min (A head) is unsustainable (Willis et al., 2013).

4. SHOWER ADVICE ON WATER UTILITY WEBSITES

Here we document the advice related to showering given by 38 water utility websites.

Table 1. Advice promoting pro-environmental behaviours in shower use on water utilities websites of capital cities of OECD countries (2021)

(1) Tips on shower frequency (2) Tips on the duration of the shower (or time control); (3) Recommendation to turn off the water while soaping; (4) Recommendation to collect cold water in a bucket while waiting for warm water for other uses.

Country	City	(1)	(2)	(3)	(4)	
Australia	Canberra		X	X	X	https://www.iconwater.com.au/my-home/saving-water/for-your-home/bathroom.aspx
Austria	Vienna		X			https://www.wien.gv.at/english/environment/klip/pdf/climate-tips.pdf
Belgium	Brussels					https://customers.vivaqua.be/conseils/comment-economiser-leau/ ; https://www.vivaqua.be/fr/qualite-de-leau/
Canada	Ottawa		X			https://ottawa.ca/en/living-ottawa/drinking-water-stormwater-and-wastewater/drinking-water/water-conservation#water-conservation-tips https://ottawa.ca/en/living-ottawa/water-utility-bills
Chile	Santiago de Chile					https://www.aguasandinasinversionistas.cl/es , https://www.aguasandinasinversionistas.cl/es/quienes-somos/sustentabilidad , https://www.aguasandinasinversionistas.cl/es/quienes-somos/sustentabilidad/reportes
Colombia	Bogotá		X			https://www.acueducto.com.co/wps/portal/EAB2/Home/inicio!ut/p/z1/hY5BCslwEEXP4iLb5pugqLtUpCKiVARrNhJrrJG2KWLqr2_AIVBxYBbz581jqKQZlbV6mUJ5Y2tVhvksp5dpusR4BrZDegDSdL7nCT-yZMPp6R8gwxo_SiDcywFEID6wmAPJng0CX44NIUVpr593RX3ls4JKp-aaRd1LsQP75t2QUdQ932k8k7futzbKldV6JA2LUFjnVclwUrEjGBtK01gapMbO-R92NbTbEhHmyrDc1K-tmI0egOHroG0/dz/d5/L2dBISEvZ0FBIS9nQSEh/
Czech Republic	Prague		X			https://www.pvk.cz/vse-o-vode/pitna-voda/spotreba-vody/jak-a-proc-setrit-vodou/
Denmark	Copenhagen	X	X	X		https://www.hofor.dk/privat/spar-penge/spareraad-til-vand/spar-vand-paa-badevaeriset/
Estonia	Tallinn		X			https://vesi.evg.ee/firmast-1/ ; http://www.kvd.ee/index.htm ; https://tallinnavesi.ee/en/corporate-social-responsibility/soovitused-vee-saastmiseks/
Finland	Helsinki		X			https://www.hsy.fi/en/water-and-sewers/tips-for-water-use/
France	Paris			X		http://www.eaudeparis.fr/leau-au-quotidien/une-consommation-maitrisee/#conso_moyenne
Germany	Berlin					https://www.bwb.de/content/en/html/2266.php
Greece	Athens					https://www.eydap.gr/en/LearnAboutWater/enviromental-programms/
Hungary	Budapest					https://www.vizmuvek.hu/en/
Iceland	Reykjavik					https://www.veitur.is/en/bathroom
Ireland	Dublin		X			https://www.water.ie/conserves/ ; https://www.water.ie/conservation/business-water-conservation/business-conservation-tip/
Israel	Jerusalem					https://www.hagihon.co.il/water/?lang=en
Italy	Rome					https://www.gruppo.acea.it/en/serving-people/water/acea-ato-5/acea-ato-5-reports/2020/05/water-is-precious-here-are-some-tips-on-how-to-save-it ; https://www.gruppo.acea.it/en/serving-people/water/acea-ato-5/acea-ato-5-

						reports/2020/07/saving-water-shared-commitment; https://www.gruppo.acea.it/en/serving-people/water/acea-ato-5/acea-ato-5-reports/2019/09/ten-invaluable-rules-for-saving-water-home
Japan	Tokyo			X		http://www.waterworks.metro.tokyo.jp/eng/topics/20160614.html
Korea	Seoul					http://english.kwater.or.kr/eng/about/sub02/orgnPage.do?s_mid=1102
Latvia	Riga					https://www.rigasudens.lv/
Lithuania	Vilnius					https://www.vv.lt/en/about/
Luxembourg	Luxembourg					https://www.vdl.lu/fr/la-ville/participez-vous-aussi/economisez-leau
Mexico	Mexico City				X	https://www.sacmex.cdmx.gob.mx/cultura-del-agua ; https://www.sacmex.cdmx.gob.mx/atencion-usuarios/camp/derecho-al-agua
Netherlands	Amsterdam	X	X			https://www.waternet.nl/en/service-and-contact/tap-water/average-water-use/ ; https://www.waternet.nl/en/service-and-contact/tap-water/
New Zealand	Wellington		X		X	https://www.wellingtonwater.co.nz/your-water/drinking-water/looking-after-your-water/water-conservation/water-conservation-inside/
Norway	Oslo					https://www.oslo.kommune.no/vann-og-avlop/tilknytningsgebyr-arsgebyr-og-vannmaler/vann-og-avlopsgebyrer/
Poland*	Warsaw					http://www.mpwik.com.pl/
Portugal	Lisbon		X	X		https://www.epal.pt/EPAL/en/menu/our-water/campaigns/efficient-use
Slovak Republic	Bratislava					https://www.bvsas.sk/
Slovenia	Ljubljana		X			https://www.vo-ka-celje.si/sl/porabniski-center-63
Spain	Madrid			X	X	https://www.canaldeisabelsegunda.es/documents/20143/616729/Consejos+de+ahorro+de+agua_En+tu+hogar_010419_v.pdf.pdf
Sweden	Stockholm		X	X		http://www.stockholmvattenochavfall.se/en/
Switzerland	Bern					https://www.ewb.ch/wissen/faq/faq-wasser-wasser-sparen
Turkey	Ankara					https://www.aski.gov.tr/tr/Anasayfa
England*	London (Thames Water)**		X	X		https://www.thameswater.co.uk/help/water-saving/water-saving-tips
England*	London (Affinity Water)***		X			https://www.affinitywater.co.uk/save-water
United States+	Sacramento		X			https://www.dewater.com/savewater

*Within UK, only England was selected. **Thames Water serves customers across London and the Thames Valley. ***Affinity Water, provides water to the boroughs of Harrow and Hillingdon and parts of the boroughs of Barnet, Brent, Ealing, and Enfield

+ Washington's website is disabled. Sacramento has been chosen because it is the capital of the State of California, an area with high water stress.

In general, these websites emphasize the good quality of tap water provided by the utility, along with monitoring and strict regulations. Most also explain that water is energy-intensive, and that managing water consumption will reduce a household's electricity bill, along with its water bill.

Showering is usually seen as a more efficient and sustainable use of water than running a bath, but there also seems to be some agreement that this depends on its length. Some utilities explicitly suggest showers rather than baths (Belgium, Dublin, Ireland, Lisbon, Ljubljana, Madrid, Paris, Rome, Slovenia, and Tallinn). But others think differently, including Reykjavik, Ottawa, Canberra, Wellington, and Affinity Water in London. Reykjavík mentions that hot water is used more efficiently in showers rather than in full bathtubs. However, the difference is estimated at 30 litres of hot water, suggesting that a bath is a comparatively inexpensive luxury. Ottawa suggests filling the tub only one-quarter full. Canberra and Wellington say that although many people believe that baths waste water, they use less water than a very long shower; it is enough to use a partially filled tub, or to reuse the bathwater to wash a car, for example.

Regarding showers, the most common conservation advice on these websites is related to *shower duration*—that is, taking shorter showers; 17 of the 38 water utilities mentioned this (but note that this is still less than half of them). Affinity Water (in London) challenged customers to take a four-minute shower, while the Lisbon utility suggested five minutes. The Copenhagen utility reports the litres saved for every minute a shower is shortened; Helsinki and London use economic language, focusing on water and electricity bill savings, to influence user behaviour. The Canberra utility has some of the most detailed suggestions, including purchasing a timer that will ring after four minutes of showering. Another is to shave before showering, and then rinse off in the shower.

While most of the utility websites recommend turning off the water while brushing teeth and shaving, *turning off the water while soaping up* is recommended by only a few of them. The Paris utility recommends using less soap, so that less time (and water) is needed for rinsing. Lisbon's utility says that turning off the tap during a five-minute shower (for example, while soaping up) can save 36 litres of water". Only four utilities recommend using a bucket in the shower to collect the water before it is hot. The suggested uses of this water vary, and include flushing the toilet (Mexico), and watering plants (Madrid and Wellington). Madrid's utility says that 2-8 litres of cold water can be collected in every shower this way.

Remarkably, *most* of the utilities *do not* provide water-saving tips regarding shower frequency. In fact, there are hardly any references to this issue on their websites. Copenhagen's utility suggests that customers do not shower more than necessary; Amsterdam's gently suggests that a daily shower is all you need.

It should be noted that 8 of the 37 cities in our sample have high water stress (the capitals of Israel, Greece, Spain, Mexico, Italy, Belgium, Turkey and Chile). Water utilities in these cities would be expected to have strong incentives to promote water conservation. However, four of them (Chile, Greece, Israel and Turkey) do not offer any such advice on their websites.

5. WATER CONSERVATION ESTIMATES

To support our arguments regarding sustainable and unsustainable habits in the use of the shower, we estimate the volumes of water used during a shower under the assumptions (previously described) of shower duration and types of showerheads (Table 2).

Table 2. Estimates of water consumption per person based on the duration of showers and types of showerheads (litres).

Showerhead	Duration of the shower			Potential savings	
	5 min	10 min	20 min	10 to 5 min	20 to 10 min
7 L/min	35	70	140	35	70
10 L/min	50	100	200	50	100
20 L/min	100	200	400	100	200

Shortening the shower from 20 to 10 minutes can save 70 to 200 litres of water each time, depending on the type of showerhead. Shortening it from 10 to 5 minutes can save between 35 and 100 litres of water each time.

We also estimated the quantity of shower water used per person per year (Table 3). A ten-minute shower (the average reported length) uses 70, 100, or 200 litres, depending on the showerhead. This can be multiplied by the three frequencies mentioned earlier: 4, 7, or 14 showers per week. We also include estimates of water saved if people decide to adjust their habit—that is, taking one less shower per week than before. This can reduce annual water use by 3,640 litres with a 7 L/min showerhead, 5,200 litres for a 10 L/min showerhead, and 10,400 litres for a 20 L/min showerhead.

Table 3. Estimates of annual water use during showers per person, based on different assumptions of shower frequency per week (litres).

Litres per shower*	Showers per week			One shower less per week		
	4	7	14	From 4 to 3	From 7 to 6	From 14 to 13
70 L /shower	14,560	25,550	51,100	10,920	21,910	47,460
100 L / shower	20,800	36,500	73,000	15,600	31,300	67,800
200 L / shower	41,600	73,000	146,000	31,200	62,600	135,600

* 10-minute shower with showerheads with different flows/minute.

6. DISCUSSION AND CONCLUSIONS

Target 6.4 of SDG 6 calls for a significant increase in the efficient use of water in all sectors by 2030. It is true that the greatest margin for saving water is in agriculture, the main user of water. However, people can also contribute to the conservation of water in their household, specifically in the use of the shower. This can be aided by smart devices, but the most important change is more sustainable habits.

For people to make such changes, they need information. They need to know what sustainable and unsustainable habits look like and what their impacts are. And water utilities' websites are an excellent platform from which to educate their many customers on sustainable habits.

In previous sections we discussed sustainable and non-sustainable habits in the use of the shower. To support our arguments, we estimated the volumes of water used during a shower under plausible assumptions of shower duration and types of showerheads.

These estimates show the potential for saving water through shorter and/or less frequent showers. They also show that technology alone is not enough to make showers efficient and sustainable. Efficient showerheads (7 L/min) can result in higher water use compared to less efficient showerheads if people use them to justify taking longer showers or showering more frequently. In fact, Grafton et al. (2011) did not find significant water savings due to the use of efficient showerheads. Therefore, to save water and avoid a possible rebound effect, sustainable habits are essential. Requiring the installation of efficient showerheads in new housing, or promotional campaigns and subsidies for the installation of efficient devices in the shower, may not be effective if they are not accompanied by the promotion of better habits.

On the websites of the water utilities we studied, suggestions on water conservation and sustainable habits related to personal hygiene focus on tooth brushing and shower

use. In terms of showering, the water utilities suggest taking shorter showers (17), turning off the water while soaping up (8), collecting cold water for other uses while waiting for warm water (4), and showering less often (2). Some suggest how to use baths more effectively (using less water). In any case, shower use is more widespread in the OECD countries (Grafton, 2014). This means that more water can be saved through changes in showering habits.

Given the scant information on water utility websites, one wonders whether the utilities are aware that communication is crucial to engage users in water conservation habits. One also wonders why they are not motivated to provide more information on water conservation. Is it because they do not have this information, or because they do not consider it important? Or could there be a disconnect between realities and policies? For example, since most of the population in OECD countries shower at present, water utilities seem to be out of touch when they suggest that people should take showers rather than baths, and when they do not to provide more recommendations on how to follow a pro-environmental behaviour. This is the case in Berlin, Brussels, Rome, Luxembourg and Warsaw.

Bringing about a change in shower habits is a challenge, especially when showering is associated with multiple functions and not simply personal hygiene (Kurz et al., 2015). In terms of personal hygiene, should there be more discussion of freshness and bodily hygiene (Shove & Walker, 2010), opening the door for water utilities to suggest showering less often? How would people in middle- and high-income OECD countries respond to such a suggestion? Socially speaking, would skipping daily showers result in social rejection, reinforcing biases due to culture and race? Or are cultural expectations around body care, beauty, and hair washing mainly the result of media messages, as suggested by Robbie (2009)? It is known that social networks influence people's views on body care and personal image, mainly in the case of young people (Cohen et al. 2021; Henriques, M., & Patnaik, 2020).

Coming back to new habits, the resistance to forming them is likely to be greater if people associate them with less comfort as well as making a sacrifice (Poortinga et al., 2003). Although people in general are aware of the importance of saving water, households are more likely to engage in behaviours that require little effort or financial investment. In fact, these behaviours are encouraged by some public water services. For example, Sacramento's Water Wise Rebates subsidize the installation of highly water-efficient technology. This reduces the time and money that need to be spent on water conservation upgrades to dwellings. On the one hand, this will probably save a certain amount of water, which is why water utilities in the OECD cities we checked suggest that more efficient showerheads be installed. On the other hand, this progress could be prevented if people take too long or too frequent showers—that is, if they do not change their habits. In this regard, it is important to document whether people are aware of the water they use in the shower and the water they could save by changing their habits.

Another equally important issue is whether people would be willing to change their habits *if they were aware* of the water savings and the resulting drop in their water and electricity bills. These are promising lines of research.

Overall, water utilities should make greater efforts to promote more efficient shower use by encouraging behavioural changes. These attempts may not work if they use messages that are likely to be rejected by most people, and such rejection can be an important hurdle in the battle for water conservation in personal hygiene habits. In this regard, a question remains. With showering having prevailed over bathing, shouldn't the efficient use of water be promoted much more strongly, even if it entails sacrifices by the public? Policymakers and water utilities will have to start this discussion at some point, even if it is likely to be unpopular.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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