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European citizens' opinions on water fluoridation

Marcus Griffin[1], Darren Shickle[1] and Nicola Moran[2]

[1]Academic Unit of Public Health, Institute of Health Sciences and Public Health Research, University of Leeds, Leeds, UK, [2]Social Policy Research Unit, University of York, York, UK

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Abstract – *Objectives:* To understand European citizens' opinions on water fluoridation, as part of research on their attitudes to the tensions between private and public interest. *Methods:* Sixty-eight focus groups held (with an average of eight people per group) in September and October 2003 in 16 countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Poland, Portugal, Spain, Sweden and the UK). *Results:* Most participants were against water fluoridation, although groups in Greece, Ireland, Poland and Sweden were more in favour. Many felt dental health was an issue to be dealt with at the level of the individual, rather than a solution to be imposed en masse. While people accepted that some children were not encouraged to brush their teeth, they proposed other solutions to addressing these needs rather than having a solution of unproved safety imposed on them by public health authorities whom they did not fully trust. They did not see why they should accept potential side effects in order that a minority may benefit. In particular, water was something that should be kept as pure as possible, even though it was recognized that it already contains many additives. *Conclusions:* While the vast majority of people opposed water fluoridation, this may be indicative of shifts away from public support of population interventions towards private interventions, as well as reduced trust in public agencies. Thus if research were to demonstrate more clear benefits of water fluoridation over and above that which can be achieved by use of fluoride toothpaste, then the public may become more supportive. However, lobby groups are likely to remain influential.

Key words: water fluoridation; European public attitudes

Professor Darren Shickle, Academic Unit of Public Health, Institute of Health Sciences and Public Health Research, University of Leeds, Leeds LS2 9PL, UK
Tel: +44 113 343 7213
Fax: +44 113 246 0899
e-mail: d.shickle@leeds.ac.uk

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A systematic review of the effectiveness and safety of water fluoridation concluded that 'the best available evidence …suggests that fluoridation does reduce caries prevalence, both as measured by the proportion of children who are caries-free and by the mean dmft/DMFT score' (1). The report adds the caveat that 'the degree to which caries is reduced, however, is not clear from the data available'. It also stated that the reduction in dental caries prevalence 'should be considered together with the increased prevalence of dental fluorosis' but that 'overall, the studies examining other possible negative effects provide insufficient evidence on any particular outcome to permit confident conclusions'. The report also noted that 'given the level of interest surrounding the issue of public water fluoridation, it is surprising to find that little high quality research has been undertaken'. The scope of the review was therefore not broad enough to answer the question 'should fluoridation be undertaken on a broad scale in the UK?' Instead, the report recommended that 'research into the safety and efficacy of water fluoridation should be carried out with appropriate methodology to improve the quality of the existing evidence base'. A full economic evaluation was also required as well as consideration of the ethical, environmental, ecological costs, and legal issues.

Despite the lack of clear evidence of cost effectiveness, water fluoridation has strong advocates and even more vociferous opponents (2–7). Indeed, in October 2003, the authors of the York systematic

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review issued a statement saying that they were 'concerned about the continuing misinterpretations of the evidence and think it is important that decision makers are aware of what the review really found' (8). They reiterated the evidence of benefits and adverse effects and since their report was published in October 2000 'there has been no other scientifically defensible review that would alter the findings of the York review'. There has been limited recent research into public opinions on fluoridation across Europe. Previous research was mainly in the UK and Scandinavia (9–15).

This paper forms part of a study of the ethics of public health practice and public opinion on tensions between private and public interest covering a range of public health policy. One of the objectives was to provide policy makers across Europe with a better understanding of the strength of public opinion to population approaches to improving health, in particular, in relation to reasons for supporting specific public health policies and their enforcement. This paper reports the findings in relation to water fluoridation.

Methods

A total of 96 focus-group meetings were held in September and October 2003 in 16 European countries, and water fluoridation was discussed in 68 focus groups: six groups in Austria (Linz and Vienna), five in Belgium (Antwerp and Liege), two in Denmark (Copenhagen), five in Finland (Helsinki and Jyväskylä), four in France (Paris and Tours), six in Germany (Hamburg and Leipzig), five in Greece (Athens and Salonica), four in Ireland (Cork and Dublin), four in Italy (Milan and Rome), two in Luxembourg, five in the Netherlands (Amsterdam and Eindhoven), six in Poland (Krakow and Warsaw), five in Portugal (Lisbon and Oporto), four in Spain (Barcelona and Madrid), one in Sweden (Stockholm) and four in the UK (London and Glasgow). Additional pilot groups had previously been held in the UK and France to test the question topic guide.

The focus group methodology enabled participants to discuss issues that they may not have previously considered and to form or challenge their opinions through discussions with other people (16–18). Focus group participants (with an average of eight people per group) were recruited by Market Research companies in each country via a range of techniques: telephone directories, recruiter database of contacts, and door-to-door or on-street recruitment. In order to obtain as representative a sample as possible, a screening questionnaire was used. For example, potential recruits were excluded if they were 'very active in working for political issues' or who had absolutely 'no interest in current political and social issues', or who worked for the government, in marketing or the health industry. The groups were segregated according to gender; age (20–30 or 45–60 years); marital status; parental status; educational status; and smoking status.

The focus groups each lasted approximately 2 h and were conducted in the appropriate local language. A range of public health policies were discussed. The question on water fluoridation was phrased thus:

> It is also possible to add fluoride to the water supply. Fluoride is important for strong and healthy teeth. Fluoride is not harmful unless it is taken in extremely large amounts (not likely). Adding fluoride in this way is especially good for children who do not brush their teeth as often as they should. Unlike adding vitamins to cereals, it is more difficult to avoid drinking water that has fluoride added. Do you think that some people would object to having to drink water with fluoride added?

The focus groups were transcribed, then translated into English and were coded using Atlas Ti software and analysed using qualitative grounded theory (19).

Of the countries studied, water fluoridation is permitted in Greece (since 1974), Ireland (since 1964), Spain (since 1986) and the UK (since 1985). Previously, fluoridation was permitted in Finland (until 1972), the Netherlands (until 1976) and Poland (until 1990).

Results

Most participants in Austria, Belgium, Denmark, Finland, France, Germany, Italy, Luxemburg, the Netherlands, Portugal, Spain and the UK were opposed to water fluoridation. In comparison, most participants in Greece, Ireland, Poland and Sweden were supportive. In part, this pattern reflects current or past experience of water fluoridation in these countries. However, it should be noted that in some countries only one or two groups discussed fluoridation.

Physical harms

Many people were concerned about the health risks of fluoridation or fluoride overdose, particularly for children or others who may be more susceptible to harm. Some were aware of fluorosis or made associations with other diseases, e.g. bone cancer, arthritis and mental retardation. However, the majority of participants did not specify what side effects concerned them. People worried that supplementary fluoride in toothpastes, rinses, etc. could combine dangerously with the levels proposed in fluoridated drinking water.

> I am taking fluoride supplements, tooth paste enriched with fluoride. And on top of that, drinking water! I will be totally fluoridated.

Leipzig/male/20–30/no children/standard education

> I drink three litres of water a day – am I supposed to tell a child that they can only have one glass of water a day and that's it? … Because I'm an adult and I can cope with anything but some children might be harmed

Madrid/female/45–60/single/no children/further education

> It is the same as with the vaccinations, some can take it, others not.

Linz/male/45–60/married/children/further education

Some participants noted that fluoride is classified as a poison in their country or were concerned about fluoride getting into their bloodstream.

> But then you can also say that there's fluoride in toothpaste, and there's fluoride in that fluoride rinse. We always had to spit that out, and we spit out the toothpaste too. So why should we suddenly have something like that in our stomachs?

Copenhagen/female/20–30/no children/standard education

The 'purity' of water

People within the focus groups placed a great deal of value on their water being 'pure'.

> I just love clean, pure water and I think it is polluting to add fluoride in it.

Helsinki/female/45–60/married/children/further education

> I don't think you should tamper with things like that… I think you should keep things as natural as possible … I don't think it's good for society.

Glasgow/female/45–60/no children/further education

Participants were suspicious of additions made by the authorities, although they recognized that chlorination is necessary to make water clean enough to drink.

> In Italy water was so good, but now we hold a record in selling mineral water. Because there is chlorine, there is atrazine. The State, in my opinion, should sanitize water we have and not adding anything.

Milan/male/45–60/married/children/further education

Various participants were convinced that adding fluoride would change the taste or smell of water.

> I would not like it, I think it tastes bad.

Helsinki/male/20–30/single/no children/standard education

Rights, responsibilities and trust

Many saw fluoridation as an imposition on their freedom of choice, with the State making decisions for them rather than individuals taking responsibility for their own health.

> Things are being imposed …It seems like they've got us on a leash. That's it. – We've actually take no responsibility for ourselves, for our children. We've got no choice. They're putting us in a mould. Take your vitamins morning, noon and night. They're not telling us why it's good. … they want to make us rely more and more on their help … we don't have to think about anything any more.

Paris/male/20–30/single/no children/standard education

> I just think that it's a problem, doing this instead of getting involved at the root of the problem. There are some people who don't teach their children the dangers of drugs or why you should brush your teeth, so we intervene. I mean we go along and say: 'OK. We'll take care of that for you. You don't need to worry about that. … You're making a whole society of grown adults into people who can't sort things out for themselves.

Copenhagen/female/20–30/single/no children/further education

Many participants wondered what would else would be added to their water?

Tomorrow we put fluoride in it, the day after we put something else in it, where does it stop.
Luxembourg/female/45–60/single/no children/further education

The Chinese for example would put some contraceptive or something like that into their drinking water simply because they have too many people.
Hamburg/male/45–60/married/children/further education

They'll find that the population is over excited, they'll put downers in the water also!
Liege/male/20–30/single/no children/no further education

It was clear that many in the groups did not trust their politicians or the experts they employ to act in the public's best interests. There was also concern that harms may emerge in the future when it would be too late.

Do you know that the person that gave the expert evidence in Australia, the first thing he did when they put fluoride in the water was invest in some kind of gadget to take the fluoride out of the water going into his house … Who the hell do you believe?
London/male/45–60/married/children/further education

I think that a lot of stuff they add to our food now, they don't have a clue what effect it actually has on us. Then twenty years later you get some study or other and they say oh right, it's actually that E759 thing that has an influence on people getting cancer or losing brain cells.
Copenhagen/female/20–30/single/no children/standard education

Many felt dental health was an issue to be dealt with at the level of the individual, rather than a solution to be imposed en masse.

It is like shooting at sparrows with canons.
Vienna/male/20–30/married/children/standard education

It was pointed out that the policy would be ineffective as many do not drink tap water.

I don't think that we drink that much water, we use it for the laundry. I don't like tap water … I rather have mineral water or a coke. Whether this is healthy is another question, but I don't drink tap water.
Vienna female/45–60/single/no children/further education

Some participants did not see why they or their children (who had good teeth) needed to be subjected to (undefined) risks such that a minority may benefit.

Well this is kind of ''just'' teeth, that's my feeling. I mean that the entire population of Denmark could get, could end up with too much fluoride, an accumulation and so on. I mean you can sort that out in some other way. You know perfectly well how to sort out problems with your teeth.
Copenhagen/female/20–30/single/no children/standard education

People expected either parents to take responsibility for their children's dental health or the State to ensure that they do. Many people who advocated these alternatives did so with the attitude that other children's dental health was not their problem and that the issue should be dealt with in a way that least interferes with their lives.

Toothpastes are becoming cheaper and cheaper and all of them are with fluorine.
But there are some people who can't afford toothpastes.
I don't agree. It would be better if the social care gave them money for toothpastes.
Warsaw/male/20–30/married/children/standard education

Instead of adding fluoride they could subsidise dentists more, couldn't they?
Barcelona/male/45–60/married/children/standard education

Some people suggested as an alternative, tablets or rinses could be used to supplement fluoride levels so that those in need are individually targeted.

You can give a fluoride tablet to your children daily. They like them, they enjoy having a little pill.
Helsinki/female/45–60/married/children/further education

Groups in some countries suggested that schools should take responsibility, either by providing toothpaste, brushes and supervision, or administering tablets or rinses.

At school they brush their teeth two times a day and they should do it more frequently.
Krakow/female/45–60/married/children/further education

Some felt that if parents behaved irresponsibly and did not enforce tooth brushing and healthy diets, then social services should intervene.

> I think that in such a case the youth welfare department has to become active. These families are known to them.

Leipzig/female/20–30/single/standard education

Reasons given for fluoridation

Some people felt responsible for the wellbeing of other members of the community who were not as fortunate as themselves. As such they felt it was their duty to support measures by the government to help the socially disadvantaged.

> If there has to be fluoride in water and this will benefit the whole population, of course they have the right … to protect poor people who don't have the income to take vitamins.

Athens/female/20–30/married/children/no further education

> *Should the state have the right to make these choices for us?*
>
> If it is for our health, yes – this is why we vote, we vote people to make these choices for us.

Athens/female/45–60/single/no children/further education

> When they take note of the health, public health, I think it's OK. Yeah, then they do have the right, not the duty, but a right.

Eindhoven/female/20–30/married/children/standard education

Some participants, mostly in Poland saw the addition of fluoride as another good initiative to add on to the success of chlorination.

> Yes, if it's not harmful. We already have chlorine in our tap water, so fluorine wouldn't make a difference. … We were drinking chlorine for so many years so fluorine is not a problem.

Warsaw/male/20–30/single/no children/further education

In countries where there had been fluoridation, many felt that they suffered no ill effects and therefore were supportive or at least did not oppose fluoridation.

> When I was a child I drank water enriched with fluoride. In the GDR this was common…I had white teeth.

Leipzig/male/20–30/single/no children/standard education

> Well I've drunk the water all my life and brush my teeth and hasn't done me any harm, so I go with what I know.

Dublin/female/20–30/single/no children/further education

Conditional acceptance

Where there was acceptance of fluoridation, it was often conditional upon one or more provisos being met. For example, the measure could not harm anyone, even if it benefited many people; there could be no change in water taste or smell; no increase water costs; an independent review to prove effectiveness and safety; public consultation or referendum.

> If we're really sure that it's safe, with no colour and taste, then it's OK.

Warsaw male/20–30/married/children/standard education

> There should be a petition to ask people whether they want that… they could hold a referendum.

Luxembourg/female/45–60/single/no children/further education

Discussion

This research represents the largest international comparative study of public attitudes to water fluoridation. Water fluoridation was one of many policy issues discussed and people were not told specifically that water fluoridation would be a topic. Moreover, people who admitted that they were very active in political causes or held strong views on particular issues or who belonged to specific occupations were excluded from the research. Thus efforts were made to reduce the chance that focus group discussions would be biased by people with strong views in favour or against water fluoridation or the other policy issues discussed. The number of focus groups conducted was large by qualitative standards, but the number of groups in each country or involving specific demographic categories was proportionately less. Care must also be taken when making comparisons between countries and demographic groups to take into account historical and legislative differences as well as linguistic issues.

There seemed to be a majority among our focus groups across Europe against water fluoridation, apart from those countries where people have

experienced fluoridation without adverse effects. Significant differences between the various demographic groups represented were not detected, although the number of focus groups was large the number of citizens in each country was still relatively small.

The public generally perceive risks to be more worrying (and less acceptable) if they consider them (20):

- to be involuntary (e.g. exposure to pollution) rather than voluntary (e.g. dangerous sports or smoking);
- as inequitably distributed (some benefit while others suffer the consequences);
- as inescapable by taking personal precautions;
- to arise from an unfamiliar or novel source;
- to result from man-made, rather than natural sources;
- to cause hidden and irreversible damage, e.g. through onset of illness many years after exposure;
- to pose some particular danger to small children or pregnant women or more generally to future generations;
- to threaten a form of death (or illness/injury) arousing particular dread.
- to damage identifiable rather than anonymous victims;
- to be poorly understood by science;
- as subject to contradictory statements from responsible sources (or, even worse, from the same source).

Public concerns around water fluoridation may be explained by many of these elements.

The participants were very familiar with the concept of adding substances to the water, e.g. chlorine to make it wholesome, and with other food additives for health reasons such as vitamins or iodine. However, many had a poor understanding of the benefits and costs associated with fluoridation. They seemed unaware that water could naturally contain fluoride or that some bottled mineral waters actually have a very high fluoride content.

Studies in the USA and South Africa have shown that many people did not know water fluoridation was intended to prevent tooth decay, although that knowledge was better in higher educated groups and among older people (21–23). Other studies have also found that the public are aware that fluoride can strengthen teeth, because they know that it is added to toothpaste (9, 24). However, no demographic differences in knowledge or attitude were observed between our focus groups. The main concerns about water fluoridation for focus group participants were imposition on choice and responsibility, water purity, taste and the nonspecific risk of harm. Similar concerns have been found in studies in the USA and UK (9, 10, 24).

The main reasons given by people opposing water fluoridation in South Africa were: 'water should stay as it is' (26%), concerns about it staying in the body (16%) and (negative) effect on health (12%) (25). Follow-up surveys in Norway (conducted in 1973 and 1983) and Denmark (1969 and 1975) found that public opinion had become more negative over time (13–15). Rise and Kraft (15) thought that the public may not see water fluoridation as being necessary as dental health had improved through use of fluoride toothpaste. They also noted the influence of the media and an increase in the public's ability to participate in political decision making.

While the UK public wished to be informed of plans for water fluoridation, they did not want to be involved in decision making about fluoridating their water, preferring such policy to be left to experts (11). However, in our research there seemed to be doubts about the veracity of experts. Schwartz and Hansen (14) described how the announcement by a prominent dentist that he disagreed with the Danish Dental Association about water fluoridation led to public concern about conflict between experts and mistrust of the professional body.

Newspapers were the predominant source of information regarding fluoridation in the USA (24). Lowry (26) noted that the majority of UK media coverage was antifluoridation, reflecting what he believed was a general anti-establishment bias against health promotion messages amongst journalists and the success of the antifluoridation lobby in influencing the media. He also noted that with concerted effort it was possible for the profluoridation lobby to reverse this bias.

Hastings et al. (9) found that dental public health was not seen as a great priority for the UK public and most people may not feel strongly about water fluoridation one way or another. Their concern about dental health tended to be limited to the impact of appearance of poor teeth. Studies in Australia and the UK both found that the public found fluorosis aesthetically objectionable, and even considered that childhood fluorosis was an indicator of parental neglect (27, 28). Hastings (29) suggested that the public 'will not rise up and demand fluoridation and do not feel sufficiently

skilled to make final judgements on its efficacy'. Instead, antifluoridation lobbyists may be much more vocal. Dixon and Shackley (10) showed that although the majority (62%) of UK respondents were in favour of fluoridation, the intensity of opposition of the 31% who were against was greater than the intensity of support of those in favour of the measure.

Dixon and Shackley's (10) finding of a majority of their UK sample being in favour of fluoridation seems at odds with the response of our UK focus groups. But this may be due to the majority of people not holding strong views about dental public health, or an artefact of the way questions are asked, and the ability of people to develop and explain their opinions within qualitative research, compared with the 'Yes'/'No' option originally presented by Dixon and Shackley.

The debate around fluoride has lasted for over 50 years (30). There remains uncertainty around the benefits and risks of fluoridation (1). The debate remains polarized, although the apparent vehemence in the debate may reflect arguments between a relatively small number of lobbyists on either side. Holloway commented in 1977 that because the general public does not have a particular view on fluoridation 'decision makers would have little guidance except for the activities of the pressure groups involved' (31). He suggested that both pro- and antifluoridation groups 'adopt similar strategies in that they communicate with those members of the community who are likely to influence decisions on water fluoridation', but that antifluoridation groups were more likely to use the media to influence the public directly.

Lobbying strategies do not seem to have changed significantly over time. Antifluoridation websites propose various claims about diseases caused by fluoride, although with the exception of fluorosis these have not been proven (1). However, despite these relatively one-sided messages, European citizens within our focus groups have not reflected back the antifluoride rhetoric about morbidity; instead they have been more concerned about the impact on civil liberties and water taste. Where they have raised concerns about harm, they tended to be nonspecific and follow a precautionary principle (32). They preferred not to take any risks when benefits were ill-defined and, perhaps more importantly, where they recognized that better dental health could be achieved by the individual action of using fluoride toothpaste/rinses/tablets. In such a climate, and with improving dental health in developed countries, it is unlikely that politicians will wish to tackle the opponents of fluoridation, even if they only represent a minority of the public, and require water fluoridation, despite its potential impact on health inequalities (33). Alternatively, governments, e.g. in the UK, have preferred to give responsibility for decisions about water fluoridation policy to others. Indeed, the tendency in Europe has been for artificial water fluoridation schemes to be removed rather than introduced.

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