A qualitative exploration of the public perception of municipal drinking water

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Abstract

Surveys of water consumption patterns in Canada and the USA show a high frequency of alternative water use, including bottled water and water treatment devices. An in-depth understanding of the public perception of municipal water would enable public health and water utility professionals better to address the needs of residents in their jurisdictions. We explored these perceptions and the self-described behaviour and needs of participants served by municipal water systems in the City of Hamilton, Ontario (Canada). We conducted three focus groups; two with men and women aged between 36 and 65 years, and one with men and women aged between 20 and 35 years. In general, participants expressed negative views of the municipal water supplied to their homes. Concerns included unpleasant sensory qualities of the water, perceived poor source-water protection, a perceived insufficiency in water treatment and testing and potential contamination along the distribution system. Reasons for alternative water use included perceived improvements in quality and safety over regular tap water, although convenience also contributed to bottled water use. Participants wanted more information on water testing and suggested a variety of dissemination approaches. This study suggested important lines of inquiry and action regarding the perception of municipal drinking water in this population.

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Introduction

In Canada, numerous epidemics of waterborne gastrointestinal illness and boil water advisories have been reported in recent years (Alary & Nadeau, 1990; Moorehead et al., 1990; Millson et al., 1991; Isaac-Renton et al., 1994; Beller et al., 1997; Bruce-Grey-Owen Sound Health Unit, 2000). The advertising of alternative water sources, including bottled water and water treated with in-home devices, is commonplace in Canada and the USA, and sales continue to rise (Auslander & Langlois, 1993; Levallois et al., 1998; Kohane, 2002; Health Canada, 2003; Petrie & Wessely, 2004). This, in combination with reports of waterborne disease associated with municipal water supplies, is likely to influence the public perception of municipal drinking water. Several studies report the reasons for alternative water use to include perceived improvements in sensory quality and safety of the water compared to regular tap water (Auslander & Langlois, 1993; AWWARF, 1993; Levallois et al., 1999; Lee et al., 2002). While these studies provide important information regarding perceptions about drinking water, they are quantitative/semi-quantitative in nature and provide only a summary view of a potentially complex issue. A more in-depth understanding of alternative water use and the perceptions of municipal drinking water is needed. This would enable public health and water utility professionals better to address the needs and concerns of residents in their jurisdiction. Such data, for instance, would aid in the design of effective public education activities, drinking water policy and future water management and treatment approaches. Focus groups, like other qualitative methods, are useful in generating rich, detailed data that cannot be acquired via the use of quantitative surveys alone, and help to identify participants’ issues and responses, in a comprehensive, in-depth manner (Morgan & Krueger, 1997; Krueger & Casey, 2000).

The purpose of this study was to explore the drinking water perceptions and self-described behaviour and needs of participants served by municipal water systems in the City of Hamilton, Ontario (Canada). This included participant perceptions of drinking water, the reasons behind any alternative water use and their self-identified needs and desire for information pertaining to municipal drinking water supplies. The City of Hamilton is a large urban centre surrounded by suburban and rural areas, and has a diverse population of approximately 500,000. Statistics Canada 2001 census data pertaining to the demographic characteristics of this population are provided in Table 1.

Methods

In September 2003, we facilitated three focus groups with English-speaking, adult residents (20 years or older) of the City of Hamilton who received their household water from a municipal water system. We developed participant recruitment criteria that were used by a professional marketing firm for telephone screening and enrollment of participants. The sampling frame was a commercial database of residential telephone numbers for the City of Hamilton. To gather information from residents of various ages and to avoid problems of mixing distinct age groups (Krueger & Casey, 2000), we stratified the focus groups by age. Two focus groups were conducted with men and women between 36 and 65 years of age, and one
with men and women between 20 and 35 years of age. Exclusion criteria included being employed in the water industry and having participated in a focus group within the last calendar year. Further, only one resident per household was eligible to participate. Eight or nine participants were recruited for each group to ensure attendance of at least six participants per group (Morgan & Krueger, 1997; Krueger & Casey, 2000). Participants were provided with a small honorarium for their participation. The Human Subjects Committee at the University of Guelph approved the study and all participants provided written, informed consent.

A trained facilitator (the first author) moderated the discussions, which were audio-taped and professionally transcribed to maximize data capture and facilitate analyses. An assistant also recorded notes on the discussion and group interactions. A pre-tested, structured questioning route was developed according to Krueger & Casey (2000), which used a combination of structured questions and pre-planned probes to improve detail and understanding. The focus group discussions were carefully moderated to gather data regarding participant perceptions of water quality, alternative water sources and their self-identified need for information pertaining to drinking water. We used systemic procedures to ensure reliability and validity in data collection including verifying data with participants during and at the end of each focus group, a debriefing session between the moderator and assistant moderator.

Table 1. 2001 Census population data pertaining to the demographic characteristics of residents of the City of Hamilton, Ontario (Canada).

<table>
<thead>
<tr>
<th>Census population (%)</th>
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<tbody>
<tr>
<td>Sex</td>
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<tr>
<td>Male</td>
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<tr>
<td>Female</td>
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<tr>
<td>Age (years)</td>
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<td>20–29</td>
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<td>30–39</td>
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<td>40–49</td>
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<td>50–59</td>
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<tr>
<td>60–69</td>
</tr>
<tr>
<td>70 or older</td>
</tr>
<tr>
<td>Education</td>
</tr>
<tr>
<td>Less than grade 9</td>
</tr>
<tr>
<td>Grade 9–13, no high school diploma</td>
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<tr>
<td>Grade 9–13, high school diploma</td>
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<tr>
<td>College or trade school diploma</td>
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<tr>
<td>University, graduate or professional degree</td>
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<tr>
<td>Total household income (in Canadian dollars)</td>
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<tr>
<td>&lt;$10,000</td>
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<tr>
<td>&gt;$10,000 to &lt;$20,000</td>
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<td>&gt;$20,000 to &lt;$30,000</td>
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<td>&gt;$60,000 to &lt;$70,000</td>
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<tr>
<td>&gt;$70,000</td>
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<tr>
<td>Mean number of people in household</td>
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immediately after each focus group, and the use of field notes and audio transcripts. Transcripts were checked for accuracy against the original audio recordings and field notes. Major coding categories were derived from the questioning route and sub-themes were derived using content analysis, as described in the literature (Morgan & Krueger, 1997; Krueger & Casey, 2000; Taylor-Powell & Renner, 2003). Direct quotations from participants were used for support and illustrative purposes; proper names were removed from the quotations reported herein and portions of quotations that needed clarifying context were supplemented with additional text that was placed within square brackets.

Results

Participants

Seven people attended each of the two focus groups conducted with people between 36 and 65 years of age. Six attended the group conducted with participants between 20 and 35 years of age. Each group had a roughly equal proportion of men and women and reflected a variety of income levels and educational backgrounds. All participants but one were Caucasian.

Consumption of municipal water

While many participants said that they consumed their municipal water, several of them did so only with provisions. Some would only consume tap water on an occasional basis, or only if the tap first ran freely for several minutes to flush out any sediment. Further, several participants said that they consumed tap water only if it was first treated with an in-home device. For instance, one participant said: “only if it’s filtered” and another commented: “... I will drink the tap water but only if I’m making a cup of tea or coffee because then I know I’m boiling it...”. One participant said she did not consume any water from the tap and instead relied solely on commercially bottled water. All participants were included in the analyses presented here.

Perceptions of drinking water

Beginning with a series of general questions, the facilitator stimulated participants’ discussions about their likes, dislikes, concerns and appreciation of their household municipal water. Without direct influence from the investigators, the participants introduced into the discussion many aspects of drinking water, including the sensory quality of the water, source water protection, water testing/treatment and the distribution system. The following themes arose during the discussions of participants’ perceptions:

Sensory quality of water. A few participants said their tap water was “good” or acceptable (“I think it’s fine”). Many however, commented on the objectionable odour caused by summer algal blooms (“Moss. It smells like mildew”) and chlorine (“It stinks. It just smells. Sometimes you can smell the chlorine and everything, when you turn the tap water on”). Others said that they did not like the taste or the colour of municipal water (“I have turned on my tap water and had brown water come out of it occasionally... it doesn’t make me feel very good about what I’ve been drinking”).
A number of participants said that they suspected off-colour or odours in the water to be indicative of problems with its safety. For instance, one participant said: “I heard what they said on the radio and read what they said in the newspaper, ‘everything safe, it’s just bad odour. It won’t hurt you.’ But boy, it certainly wasn’t pleasant”, to which one participant replied: “But what causes the odour? I mean, the odour doesn’t come out of nothing?” and another nodded and agreed “Something’s there”.

**Water contamination.** Concerns about contamination and problems with source water protection were frequently cited. A few participants were uncomfortable with the fact that the source of their drinking water was a lake that frequently had public health-related beach closures in the summer. Several others were concerned about industrial pollution and the presence of chemicals and carcinogens in the source water (“…businesses that do drop so much stuff into the water”). One participant described the source water as being “full of coal dust from the [industrial] plant. You can see the black coal dust floating in the water”. Similarly, others reported concerns about prescription drugs in the source water.

Several participants related these concerns to perceived insufficiencies of surveillance and treatment. For instance, these participants said that they recognized water testing was not exhaustive; there are only limited numbers of items for which tests are done. Further, some reported concerns that insufficient detection limits of tests and long turn-around times might result in unsafe water being distributed to the population. Several participants agreed with one participant’s comment: “I think that’s what was behind my thinking when we went [to] distilled [water] … there would be certain things that [the water utilities] would be looking for. There were other things that they wouldn’t be looking for, and couldn’t find if it was there. And this pharmaceutical thing, … never mind [someone] that’s dumping it illegally, it’s, to use the expression, the water cycle – the pharmaceuticals that you and I take eventually find their way into the lake\(^1\), one way or another. So there’s an element there of unease with me as to what may or may not be there, without even putting into the equation the idea that somebody is deliberately not doing their job or a breakdown of the filtration system or the checks and balances. It’s just what may be there that nobody knows is there”.

While the presence of industrial factories in the city provided some participants with some cause for concern, others thought that this would result in increased water safety. For instance, one participant commented: “I think because Hamilton has always been so industrialized that our water supply has been overcompensated, that they try to work at it harder to make it good, because if there’s any failures on it, it will be cataclysmic … so, I think as a result, Hamilton’s water supply is probably one of the best in Ontario…”.

**Water utility employees.** Many participants were concerned about poorly qualified and insufficiently trained water utility employees not doing their jobs and not being adequately supervised. The large and well-publicized waterborne outbreak of *E. coli* 0157:H7 in Walkerton, Ontario ([Bruce-Grey-Owen-Sound Health Unit, 2000](https://iwaponline.com/wp/article-pdf/9/4/425/407302/425.pdf)) was a common discussion point in this regard: “I think in Walkerton … [the employees] just, they didn’t know, they didn’t understand, they weren’t trained, they weren’t aware that not testing every day could be a problem… They didn’t have a superior that they

\(^1\) February 9, 2003 Mark Stevenson, CTV News Environment Specialist, released a news report stating that four of ten samples of drinking water taken from ten Canadian cities tested positive for trace amount of prescription drugs. A trace amount of carbamazepine was found in a sample from the City of Hamilton.
had to report to that had the education that could have gone down there and pulled up the report saying, wait a minute. This doesn’t look right. No one was checking their work”.

A few participants were also concerned about breakdowns in the treatment system (“you never know if someone’s not doing their job”).

While many shared these concerns, several participants reported having confidence and trust in the drinking water service providers. One participant said that, despite some of his concerns with the water, “I still have confidence in our city and the people who are doing the jobs”. Other participants commented: “… I know that what’s come out of that tap, in my opinion, … is clean and it isn’t like I’m going to be sick or I’m going to die from that kind of thing…” and “… most often, if it’s a city employee, they’re going to want to go and look after their families too. They’re not going to want to sugar-coat what’s in the water”.

A few participants thought that consumers’ trust in water utility employees could be better developed if the water utilities sent to their consumers newsletters featuring interviews or mini-profiles of their employees; something to add a more personalized element to the relationship between employees and their consumers.

**Water treatment.** Several participants were concerned that the water treatment system was not advancing proportionally to the decline in source water quality and increased contamination. One participant said: “I don’t know how much longer water is going to be safe. Like, with all the pollution, I don’t know how much more they can treat it”. Similarly, some participants were concerned that the treatment system could not effectively treat all of the possible contaminants: “But what’s in the water – the pharmaceuticals and whatnot that can’t be taken out”.

Concerns were also expressed that chlorine might have long-term health effects, and participants spoke of the increasing incidence of cancer while discussing chlorine in drinking water. While many participants valued the addition of fluoride to the water because of its benefits to dental health, a few were also concerned about potential negative health effects associated with its use (“… who knows what else it’s bad for”).

**Municipal water distribution system.** Concerns regarding the municipal water distribution system were extensive. Several participants reported concerns about “residues” and a few about lead within the water pipes. Cross-contamination within the distribution system was another commonly raised concern; the old pipes and declining infrastructure within the city were mentioned in this regard. Several participants explained: “See, that’s my fear… It’s not the water but where the water comes from, and comes through…” and “… a pipe was replaced in our house and I saw the pipe that came out and say it was a pipe that was supposed to be… maybe an inch in diameter, and the actual opening that the water ran through was just miniscule from years and years of just gunk, and you look at it and that’s disgusting. So the water itself coming from the treatment plant is probably fine, but by the time it gets to you, who knows what process it’s gone through” and “… we had a big tree on our property, and I don’t know how much of the roots had gone through the pipes, so they could be contaminated by that as well, but you never know that until there’s a problem”.

**Government funding.** Concerns about cutbacks in government funding and the perceived lack of appropriate resources having a negative effect on water quality were frequently cited. Some participants said the cutbacks were probably limiting the effectiveness of, and preventing possible advances in, the
municipal water system, and therefore increasing the risk of waterborne disease. Further, many feared government employees would be forced to take shortcuts that were not in the public’s best interest. There was widespread agreement with the following participant statements: “I know that the amount of money that was available [now] is not. You don’t have to be a whiz kid to figure out what that means. If the money isn’t there, the job isn’t getting done” and “…that concerns me today, our people in political positions and management positions and the guy in the plant doing it. Is he having to make decisions based on dollars versus making decisions that are in my best interest? That concerns me a great deal”.

Other considerations. While the discussion pertaining to participant perceptions of water was extensive, a few participants also said that they, and people in general, often took water for granted, relying on the assumption that the government and water utilities provide a safe water supply. Several others commented that, while they may have had concerns regarding their water, there was also a need to maintain perspective: “You know, life is the way it is. And you know, if you start worrying about every [thing], you wouldn’t be walking down streets because of exhaust from cars”.

Finally, participants acknowledged that people’s perceptions of water were likely to be strongly influenced by acclimatization to the water in a particular geographic area. Regarding the sensory quality of water for instance, one participant said: “Different areas of water taste different. I guess you get used to the way your water tastes” and another commented: “it’s all about what you’re used to”. Even when discussing the mal-odour associated with summer algal blooms in municipal water, a participant responded: “I think because I was born in Hamilton I don’t notice it as much here; just because I’ve gotten used to it”. This acclimatization theme was illustrated in all of the focus groups, despite it not being asked about specifically.

Knowledge of municipal water testing

Most participants said that they were largely uncertain of the details of municipal water testing. Many said they did not know who was responsible for testing, but assumed that it was independent laboratories that were blind to the source of the water. A few participants worried about privatized water testing laboratories, saying that they were profit motivated, and therefore not trustworthy: “…the whole organization is profit motivated. To me, it just begs [for] some kind of larceny or fraudulent reporting of results”.

Similarly, many participants said that they did not know how often water was tested. Responses that were provided were variable, ranging from “daily” to “two to three times a day”, to “depends on what is being tested for”. Many participants said that they did not know what the water was tested for and even when responses were provided, they were associated with a high degree of uncertainty. The list of standard test items compiled by respondents was wide ranging, including: bacteria, “chemicals” (mainly industrial waste and pesticides), algae, chlorine, fluoride and heavy metals. Other testing parameters included “cleanliness”, “colour” and generic “quality”. In general, there was a high degree of uncertainty pertaining to municipal water testing among all three groups.

Bottled water

Participant opinions on bottled water could be categorized into two major groups: those that were highly skeptical, and those that believed it to be superior to tap water. With respect to the former, several
participants were doubtful of marketing advertisements’ “subtle and not so subtle” claims that bottled water was better than regular tap water. Many suspected it to be subject to as much pollution as their regular tap water: “What’s the difference in [bottled water], like, it’s gone through our ground with all our chemicals in it and everything, and people really truly think that it’s cleaner than stuff that comes out of a tap?”

Television “exposés” gave a few participants confidence in their skepticism. For instance, one participant recalled a news story that found bottled water to be of equal quality to tap water and another recalled reading that municipal water standards were higher than those of bottled water. On the other hand, other participants reported that bottled water was of higher quality and safety than tap water. Many said that bottled water companies, in order to maintain profits, had to rely on a consistent, high quality product, and had to make every effort to ensure quality and safety because it would otherwise be disastrous to their business. One respondent explained: “Whether [the bottled water companies] would cheat to make more profit – hey, I wouldn’t bet against it. However, the down side risk for them is, if people decide that [it] has a funny taste, or if there is a problem with one bottle . . . they’re finished”.

Several other participants reasoned that bottled water was safer because companies added fewer intentional chemicals in the treatment process. For instance, one bottled water user said: “And when it says natural spring water . . . then I assume that it’s not gone through the process of having chemicals; first of all, coming from the lake and being you know, really inundated by all kinds of undesirable stuff, and then going through a process, you know, where they try to take out that undesirable stuff. I assume that spring water is a little less tainted. Maybe it’s been filtered by natural charcoal or something or you know, some kind of natural process”.

Other participants believed bottled water was safer than regular tap water, but were unable to explain why. For instance, one participant commented: “It’s not a given I have to have bottled water because, it’s just something in the back of my mind, just thinking, ‘oh, this is great, I’m drinking bottled water.’ I feel better on some level”.

Participants cited numerous reasons for using bottled water. The most extensive was convenience. A large number of participants bought bottled water merely because the bottle was portable, convenient and generally well accepted in the workplace and schools. Many participants reported re-filling the bottles with their regular tap water. Many also said that they only purchase bottled water when they were out and wanted something to drink other than pop or juice. While convenience played a major role in choosing to consume bottled water, several participants reported choosing bottled water because of its superior taste, lack of odour and perceived increase in purity compared to tap water. For instance: “. . . I like bottled water too for the taste because I can taste chlorine [in tap water]. And you know, I just think the less chemicals you ingest, the better”.

Similarly, one participant reported switching to commercially bottled distilled water: “. . . when the water developed those smells a few years back. A couple of summers in a row we had not very nice stuff coming out of the tap and at that time I actually went to distilled water with the idea that if I was going to drink pure water, why didn’t I drink pure water and we just kind of stuck to it ever since”.

Many participants also thought that marketing had influenced societal perceptions of tap water, resulting in the common use of bottled water. Specifically, they reported that marketing companies portrayed bottled water as cleaner and more pure than regular tap water. The following comment was from a participant who used bottled water and was met with agreement: “I think that’s probably what is causing the switch to bottled water is precisely that, that the commercial companies do specifically and by insinuation suggest that they test and whatever, more frequently, whether they do or not?”
Participants often used the term “brainwashing” in discussing the effect of advertising. Many reported that children have especially been influenced by advertisement “bombardment” on television, billboards and vending machines and report that children deem tap water inferior to bottled water. Agreement was met with several participant comments: “I know from my own kids, they don’t want the tap water. They refuse. They would have a glass of milk, but won’t have a glass of tap water” and “… our children are very fussy about things, but I think it’s because it’s been ingrained in them, listening to people talk about the tap water, but when I say, oh, why don’t you get a glass of water, they go, ‘oh, I don’t want tap water’, you know. And because it’s not as cold as the bottled water, they’ve got this perception that [tap water] is just not as clean and as good”. Another participant said that her grandchildren “got this thing in their head, [that] they’re not supposed to drink water from the tap”.

While recognizing this effect of marketing, several parents in the groups also said that they were happy to supply their children with bottled water, because they saw it as a healthier alternative to pop and sugary juices: “I don’t mind. As far as my kids, I’m glad that they’re going to drink water. I don’t care as long as they drink a lot of water, which they do now”.

Finally, some respondents reported buying bottled water during perceived or real emergency situations, like the “Y2K crisis” and during a power blackout the previous summer.

**In-home water treatment devices**

Approximately half of the participants in the 36–65-year-old age group and all members of the 20–35-year-old age group, reported using a water treatment device in their homes. The majority of these participants used jug filters, while a few used tap and in-line filters. One participant reported boiling her drinking water and storing it in the freezer.

Many participants expressed the belief that tap water was probably safe, but even a marginal improvement in safety was justification for using a water treatment device: “… I filter the Hamilton water, and not because I don’t believe that the Hamilton water is clean, but because at least I know that if I filtered it that little bit more, if there was something left in it, at least I’ve tried to get a little bit more out of it. Not that it will really matter”.

Another participant summarized this theme well and was met with agreement in the group, when he said: “I think it’s a hedging of your bet. You’re aware of stuff that has been in the [tap] water but you’re also aware of things that are in there that [the water utility employees] are not aware of. You’re pretty confident that it’s safe, therefore you would drink it, but I have an alternative that I think is a little safer. So if it’s convenient and affordable, I’ll do it”.

Another participant stated: “I make a point, if I’m making juice for the kids or something, and the Brita is empty, I’ll fill it up and wait until there’s water back in there again before I finish making it rather than just taking it from the tap”. When she was asked to comment on the reasoning for this, she responded: “I don’t know. I guess it’s just a psychological thing that I think this water is cleaner than that… I think, like I said before, I think you’re brainwashed. … because in my head I think, oh, it’s a little bit better for the kids”, but she then added, “It probably is no different”.

A few participants reported using treatment devices to improve the taste of tap water: “I just filter water because it tastes good”. Others reported peer influence or marketing as reasons for device use. For instance, one participant had purchased a device solely for when friends visited. Two others reported that
they originally acquired the devices because of their novelty (“it was a hot item”) and continued to use it mainly out of habit.

While a few participants said that reports of waterborne disease outbreaks, like the Walkerton outbreak of *E.coli*, had not had an effect on their behaviour, others cited these outbreaks as reasons for using a treatment device. One participant’s explanation used strong vocabulary: “...I think it’s just the fear and paranoia that’s been placed in everybody. Whether our water is cleaner today than it maybe was five or six years ago, people still are too leery about it to actually drink a lot of it through the tap...”. Another said he began using a water filter “probably when the Walkerton stuff hit – you know, just an extra thing”.

**Public education**

Several participants preferred not to receive information pertaining to drinking water, reporting, “ignorance is bliss”. For instance, one participant commented: “I think if everybody really knew a lot about it, they wouldn’t drink it. Period”. Another explained: “I don’t want to know about the safety of the water, I don’t get sick with the water – everybody’s healthy, so I don’t want to know what goes on with it, as long as it gets to my house and it’s drinkable”.

Some wanted more information, but expressed concern about an information overload, and not being able to decipher the information provided. Many participants however, indicated a desire for more information. One participant commented, “I think education would be good because you got to start somewhere and if you’re just going to play ignorant, it’s only going to get worse”.

Specifically, many participants said that they wanted to learn more about the details of municipal water testing, including who performs the tests, the frequency with which tests are done, what water is tested for, how effective these tests are and the test results. A few participants also indicated a desire for more information regarding the treatment process and many wanted to know what health hazards might remain in the water post-treatment. A few participants also said that they wanted to know what caused the occasional odours in their municipal water.

A wide range of media was suggested for disseminating this information. Common responses included local flyers/brochures mailed to the home, newspapers, the City webpage and radio messages played on local stations during commuting hours. Other suggestions included television, particularly the “Weather Network”, library displays and using water bills as a means of directing consumers to more information.

Participants offered further advice with respect to designing effective educational programmes. Many said that information should be presented clearly, using simple vocabulary, such that “average people” could understand it, because “nobody likes reading words they can’t first of all pronounce, and second, don’t understand”. One person suggested: “You have to write so anybody, any background can understand it. Not to insult [someone’s] intelligence or whatever, but for someone who’s never been past grade school like my parents, that could read and understand the content of it”.

While many participants agreed with this, one participant feared the consequences of oversimplification. A few also said that the information should not be presented in a way as to cause people alarm or panic. Regarding flyers, some participants said they should not be mixed with other advertisements, to avoid them being discarded without being read. Some participants thought that such flyers should include only the basic facts, and should direct people to another source (e.g. a website) for further information. They believed that this would result in more efficient use of paper, as well as provide information in a non-forceful manner.
Discussion

While there was some discussion of the positive characteristics of municipal tap water, overall, negative opinions predominated. Negative perceptions of the sensory quality of municipal water, including taste and odour, have been described in other North American studies (Auslander & Langlois, 1993; Levallois et al., 1999; Lee et al., 2002; Mackey et al., 2004). In this study, some participants were concerned that off-colours and odours were indicative of problems with water safety. This association between consumer risk perception and drinking water quality has also been described elsewhere (Jardine et al., 1999; US Environmental Protection Agency, 1998; Mackey et al., 2004). McGuire (1995) also reports that the tendency for consumers to link offensive taste and odours to potential health risks is reasonable given that they have little else on which to judge water quality. Further, Jardine et al. (1999) have affirmed this to be a rational act on part of consumers. The findings of these studies are corroborated by the results presented here.

As a result of their concerns, some participants chose to use bottled water, considering it to be superior in taste and safety compared to regular tap water. Others reported using bottled water merely because of its convenience. Both reasons for bottled water use have been reported in other North American studies (Auslander & Langlois, 1993; AWWARF, 1993; Levallois et al., 1999; Lee et al., 2002), however, a greater emphasis was placed on the convenience of bottled water in the current study. Similarly, the use of water treatment devices was frequent, with many participants reporting a perceived increase in safety over that of regular tap water. The effect of the well-publicized Walkerton outbreak on increasing the use of these devices was noted. However, manufacturers of many treatment devices, for example, jug filters using activated carbon filtration, state that their devices should be used only with microbiologically safe water; hence, treatment devices may not provide the protection that participants appear to assume is present. Other North American studies have also reported reasons for treatment device use, namely water filters, to include improved sensory quality and safety (Auslander & Langlois, 1993; AWWARF, 1993; Levallois et al., 1999; Lee et al., 2002). Interestingly, despite much discussion of the perceived benefits of treatment devices, only one participant mentioned the possible problems with water quality if these devices were not properly maintained. Given that the misuse of devices can result in post-treatment water to be of poorer chemical and/or microbiological quality than the municipal tap water entering the device (Daschner et al., 1996; Health Canada, 2003), this may indicate the need for increased dissemination of information regarding the importance of proper device maintenance.

Participants reported that marketing had an influence on “society’s” perceptions of tap water and therefore, the use of alternative water sources. Such marketing can instill and exploit residents’ fears (Petrie & Wessely, 2004), the negative consequences of which are clear. The effect on children was a focal discussion point in this regard. Some participants indicated that their children now had an “inherent” belief that tap water is inferior to bottled water. Similarly, a consumer attitude survey in the USA stated that people between the ages of 18 and 34 years were more likely to believe in the safety and health benefits of bottled water compared to those over the age of 35 (AWWARF, 1993). The long-term effect of such marketing on future generations, if allowed to go unchecked, should be considered. It is suggested that future studies of drinking water perceptions include the investigation of children’s perceptions and the potential need, and avenues for, education programmes specific for this age group.

While some participants were eager to show trust and support for water utility employees in the City of Hamilton, many were left, in the wake of the Walkerton E.coli outbreak, with suspicion and skepticism regarding the abilities and integrity of these employees and the safeguards in the system.
The participants’ ideas for a newsletter highlighting employee dedication may help to improve perceptions, as consumers have been found more likely to perceive their water as high quality when they believe that their water utilities care about their water quality (AWWARF, 1993). In general, concerns about the municipal water system were wide ranging, including source water protection, water treatment and testing and the distribution system. Further investigation is required to determine whether these concerns are representative of the general population. If so, it will be vital for action be taken to alleviate residents’ concerns wherever possible.

With regard to current knowledge, participants said that they were largely uninformed regarding municipal water testing and treatment and many indicated a keen desire for more information. Participants wanted information regarding all aspects of water testing, as well as the treatment process, its efficacy and what health hazards might remain in the water post-treatment. These requests are similar to those described in four focus groups conducted in the USA (AWWARF, 1993). In the current case, much of this information is currently available to the general public in the form of drinking water summary reports on the City of Hamilton’s website (http://www.city.hamilton.on.ca); however, the participants in this study were unaware of their existence. Further, the participants wanted clear language, with little scientific jargon, which corroborates the findings in other studies (AWWARF, 1993; US Environmental Protection Agency, 1998), and is supported by Rudd et al. (2004).

Two North American studies report that their participants obtained information on drinking water from newspapers, television and radio (AWWARF, 1993; Jardine et al., 1999). Participants in this study suggested using a variety of media including newspapers, flyers, television, radio and the internet to deliver information about drinking water. Given the high advertising costs associated with these types of media, financial difficulties may prevent health departments from disseminating the information and using the media requested by their constituents. Ideally, suitable funding would be made available to the appropriate health departments to implement these measures. Potentially, such services could be provided in kind from radio, newspaper and television companies, or could be subsidized by the water utilities. Nevertheless, existing information initiatives and dissemination methods used in this population, and potentially other Canadian populations, require new attention.

An understanding of residents’ concerns regarding drinking water can serve as an effective blueprint for action on the part of public health professionals, water utilities and those involved with policy development. Some concerns identified in this study seemed to result solely from a lack of knowledge rather than actual risk; hence some reduction in participants’ concerns may be possible through simple educational programmes. Others however, may require strategic planning efforts by water utilities, or change at various levels of government. Nevertheless, by directly asking and discussing with residents their needs and concerns, we better equip ourselves with the information required to meet most effectively the needs of our constituents. These focus groups allowed us to explore, in depth, participants’ perceptions of municipal drinking water, including what they appreciated about the water, as well as their concerns, reasons for use of alternative water and their self-identified needs and desire for more information. We were able to gain this understanding with little interviewer influence and were therefore privy to participant issues that we had not previously considered. Thus, while labour- and cost-intensive, these focus groups provided us with a detailed level of understanding of drinking water perceptions that could not be gained through quantitative survey methods alone.

However, the results of these focus groups do not provide us with knowledge of the population’s perceptions as a whole – the intent of focus groups is not to generalize, but rather to understand. We cannot, therefore, make recommendations based solely on the results of this study; to do so requires a
more representative sample of the population. These results have, however, provided essential information that will be used to develop a survey instrument to investigate this population’s perceptions on a larger scale. Specifically, we discovered a core set of items, identified as important by members of the target audience themselves and experienced the language used (and not used) by participants to discuss the topic(s) under investigation. It is important to note that some of these items were unanticipated by the researchers, illustrating the importance of focus groups in determining the breadth and scope of the issue to be surveyed. Hence, our survey questions and categories are more likely to reflect the residents’ empirical world, which will contribute to the validity of our survey instrument.

Despite their benefits, selection bias may have been introduced to these focus groups if, for example, people with strong opinion or those highly motivated by the small honorarium were more likely to agree to participate than others. According to Statistics Canada 2001 census data of the City of Hamilton, approximately 97% of the population is able to converse in English, so any selection bias caused by language barriers is likely to have been minimal. Further, it is possible that some participants responded to questions in a socially desirable manner. Knowing that group awareness of participants’ employment or socio-economic status can influence responses (Morgan & Krueger, 1997; Krueger & Casey, 2000), we were very careful to avoid any talk of such matters prior to and during the focus groups. We also made it clear before the groups started that there were no “right or wrong” answers and participants were encouraged to agree or disagree with one another as appropriate. Despite these efforts, it is possible that some participants modified their true opinions as a result of others in the room. For instance, in discussing why they choose to use treatment devices, two respondents, at the end of their explanations, negated their reason of “increased safety” by stating: “not that it will really matter” and “it is probably no different”. Despite this, however, given that the focus groups were non-confrontational and friendly in nature, we believe that participant influence in this manner was minimal.

Conclusions

This study allowed for an in-depth investigation of participants’ perceptions of drinking water in the City of Hamilton, Ontario (Canada). While some perceptions were positive, concerns with the municipal water system were wide ranging and there were numerous reasons for alternative water use. Valid and reliable information regarding the perceptions of drinking water is integral to the development of effective public education programmes, water utility strategic planning and drinking water policy. The seriousness of participants’ concerns is indicative of the need for further investigation of perceptions within this population. If these opinions indeed reflect those of the general population, action on the part of multiple organizations, including public health officials, water utilities and potentially, various levels of government, is necessary. Only by asking residents directly about their drinking water needs and concerns can the key stakeholders, including the water utilities, government, public health professionals and advocacy groups, be best equipped to strategize and serve their public effectively.

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