

Exploring the Relationship Between Boil Water Advisories and Beverage Attitudes and Intake in Adults in Newfoundland and Labrador

Objective

To explore the factors influencing water consumption in Newfoundland and Labrador (NL) and assess the impact of attitudes towards tap water and boil water advisories (BWAs) as a predictor of intake of water and sugar-sweetened beverages (SSB).

Practice Points

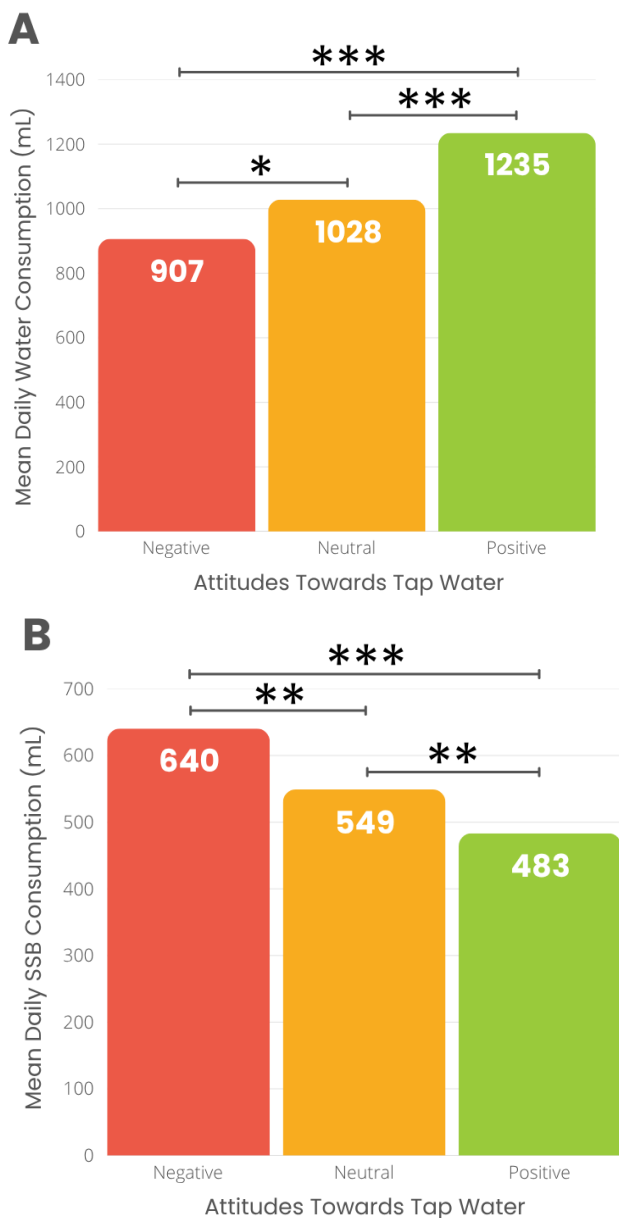
1. Approximately 15% of Newfoundlanders and Labradorians surveyed lived under BWAs, but only two-thirds of these people reported that they were aware of their BWA.
2. Participants who believed that they lived under a BWA had lower water intake, but not higher SSB intake.
3. Negative attitudes towards tap water were associated with lower water intake and higher SSB intake among adults in NL. After controlling for sociodemographic factors, SSB intake was no longer associated with negative attitudes towards tap water, but the association with water intake remained significant.
4. Intakes of SSB are generally high in NL. After controlling for sociodemographic factors, there were no differences in SSB intake between those with positive, neutral, and negative attitudes toward tap water, nor between those with and without perceived or actual BWAs.
5. Public health interventions to encourage water as a healthier beverage alternative to sugary drinks should consider barriers to water consumption such as perceptions of water safety and BWAs.
6. Improving water systems in NL and improving attitudes towards tap water may help to increase water consumption and support efforts to decrease consumption of SSBs.

Methods (M. Pomeroy, R. Prowse, K. Dooley, Y. Yi, D. Zaltz, K. Crichton, S. Harding)

1. Cross-sectional online surveys were conducted with adults living in NL (n = 3,093) in Aug 2022 and Sep to Dec 2023.
2. Survey questions assessed weekly beverage intake, attitudes toward tap water, perceptions of being under a BWA and sociodemographic characteristics.
3. By postal code, participants were classified as having a government-reported BWA, according to government records at the time of the surveys.
4. Bivariate statistical tests were used to investigate group differences in relation to beverage consumption, water attitudes, and BWA (self-report and government-reported).
5. Regression models examined associations between attitudes toward tap water, BWAs (self-report and government-reported), and beverage intake while controlling for sociodemographic variables (sex, age, education level, income, and urban vs rural region).

Results

Note: It is a common practice to report unadjusted findings before adjusting for covariates in public health research. When adjusting for covariates makes a relationship insignificant (i.e. water attitudes predicting SSB consumption), it doesn't indicate a lack of importance or relevance in the findings, rather it demonstrates that it may be explained by other factors (i.e. sociodemographics shape water attitudes which in turn explain SSB consumption).

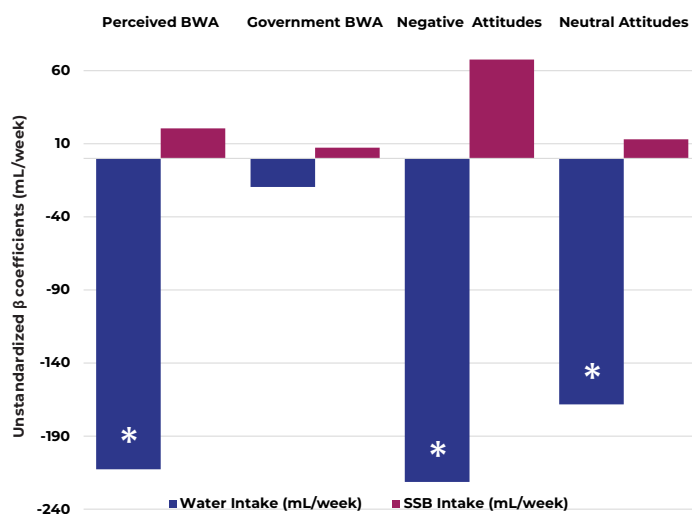


Significance is denoted by * for $p < 0.05$, ** for $p < 0.01$, and *** for $p < 0.001$.

Figure 1. Mean Daily Intake of (A) Water and (B) SSBs among Those with Negative, Neutral, and Positive Attitudes Towards their Tap Water, Unadjusted for other Factors, NL 2022/23.

- 1 in 5 participants had negative attitudes towards water – disliking the taste, smell, or colour of their tap water, feeling that their tap water is unsafe, feeling the need to add juice/flavouring to drink it, and feeling that it limits the foods they can prepare.

- A pattern towards increased water and decreased SSB consumption was observed as attitudes towards tap water moved from negative to positive (Figure 1). Those who reported having negative attitudes towards water consumed significantly less water than those with positive water attitudes ($p < 0.001$) and neutral attitudes ($p = 0.045$). Additionally, those with negative water attitudes consumed more SSBs than those with positive attitudes ($p < 0.001$) and neutral attitudes ($p = 0.014$).



* for $p < 0.05$

Figure 2. Fully Adjusted Associations Between BWAs, Water Attitudes, and Beverage Intake, NL 2022/23

- Unstandardized β coefficients (mL/week) from fully adjusted linear regression models are presented for total water intake and sugar-sweetened beverage (SSB) intake. Predictors include self-reported (perceived) BWA, government-reported (active) BWA, and water attitudes (negative and neutral). Reference groups had no BWA and positive water attitudes. Models were adjusted for sociodemographic characteristics and relevant covariates. Negative values indicate lower intake, and positive values indicate higher intake. * $p < 0.05$.
- There was a significant association between the perception of a BWA and water attitudes ($p < 0.001$). Those self-reporting being under a BWA responded with a greater proportion of negative attitudes towards water (45.5%) and fewer positive attitudes (24.6%).

- Self-reported BWAs were associated with lower water intake (-213 mL/week, $p = 0.042$), but government-reported BWAs were not ($p=0.797$). Negative attitudes toward tap water predicted lower total water consumption (-221 mL/week, $p = 0.002$) (Figure 2).
- Neither self-reported nor government-reported BWAs were associated with SSB intake (p -values >0.05).
- Negative attitudes toward tap water were associated with higher SSB intake (+123 mL/week, $p<0.001$), however this did not remain significant after controlling for sociodemographic factors (+68mL/week, $p=0.090$) (Figure 2).

- Inconsistencies were seen between government data on BWAs and participants' perception of being under one: according to government data, 315 respondents were under an active BWA at the time of survey collection however, only 211 survey respondents said that they were under one. Of those who self-reported being under a BWA, only 42 (31.1%) were confirmed by government records.

Conclusion

1. Having negative attitudes towards tap water and a self-reported BWA predicted lower total water consumption after accounting for sociodemographic variables. Having negative attitudes towards tap water did not significantly predict SSB intake after controlling for sociodemographic factors.
2. The perception of being under a BWA was associated with more negative attitudes towards tap water and less water consumption compared with those who did not report a BWA, suggesting that the perception of water safety, alone, may be a more important predictor of beverage choice.
3. Both perceptions of tap water safety and negative attitudes towards tap water play an important role in beverage consumption habits; these factors have the potential to limit the effectiveness of policies designed to reduce SSB intake when water, considered the beverage of choice, is not perceived as a safe alternative.
4. Addressing water safety concerns and improving trust in drinking water infrastructure may support healthier beverage choices in NL.

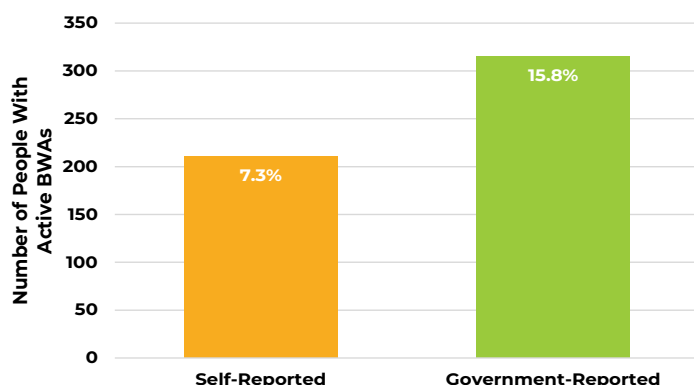


Figure 3. Number of Active BWAs Self-Reported by Survey Population Versus Number of Active BWAs Reported by Government of NL Records within the Survey Population Based on Postal Code, NL 2022/23.

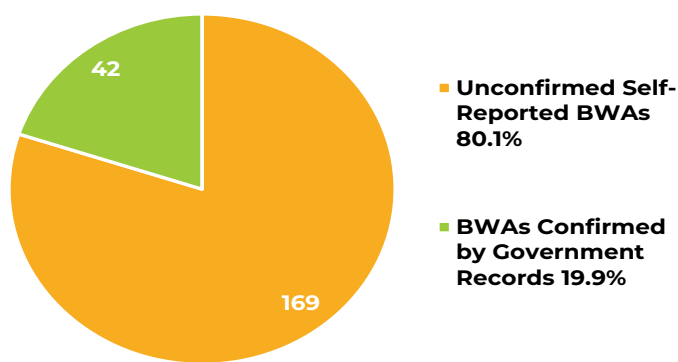


Figure 4. Number of Active BWAs Self-Reported by Survey Population, Confirmed Versus Unconfirmed by Government of NL Records Based on Postal Code, NL 2022/23.