

Evaluation of the Daycare Managers' Knowledge, Attitude, and Practice on Lead in Drinking Water at Daycares Licensed by the Fraser Health Authority

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Overview

Introduction

Method

Result & Discussion

Knowledge Translation

Limitations & Recommendation

Further Research

Conclusion



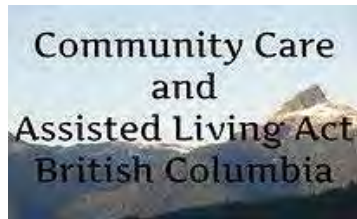
Introduction

BC Ministry of Education

Community Care and Assisted Living Act

The purpose of this study is to

**Evaluating daycare managers' Knowledge, Attitude, and Practice on lead in DW
conceptions or needs for additional education**



THE VANCOUVER SUN

May 27, 2016

“Drinking Water in BC schools was NOT tested annually for lead”

> 1/4 of BC's school districts exceeding the safe limits

92% of 1578 public schools in BC

Old lead pipes and lead solder before 1990 for water lines

Threshold for health = 5 ppb (shell, 2016).

No one is in charge with the lead issue in drinking water.

Lead Exposure & Blood Lead Level

Center for Disease Control and Prevention

“Childhood lead poisoning data, statistics, and surveillance”

There is no safe blood lead level (BLL) under the age of 6.

Young children, infants and pregnant women are high risk for detrimental health effects from lead exposure.

Guidelines of Canadian Drinking Water Quality

Maximum Acceptable Concentration (MAC): 10 ppb

Sources of lead in drinking water:



Literature reviews:

Children absorb 40-50% of water-soluble lead

BLL reaching 10-15 ppb for long term exposure

“Lead-free” pipes contains up to 8% of lead

Taking lead samples is difficult and uncommon

Lead contamination is usually underestimated

4 provinces in Canada do DW sampling for lead

(Ngueta et al, Levin et al, & Deshommes et al.)

Max concentrations 13,200 ppm (long) and 3890 ppm (short) in stagnations

Higher in institutions compared to residential homes

Impact of Lead Exposure

Damage to brain and nervous system

Delayed growth and development

Difficulties in hearing and speech

Learning and behavioural problems

Lowering IQ and ADHD, juvenile delinquency and criminal behaviour

Not able to be reversed or corrected by any treatment
(CDC)

Complications occur at BLL below 100 ppb, federal provincial-territorial interventional level



Method

Evaluate the Knowledge, Attitude and Practice (KAP) of daycare managers regarding how the presence of lead in pipes affects DW in daycares.

Self-administered online survey with Google Forms

Non-randomly selected participants

Online KAP survey, cover letter, consent form

Email distribution

Demographic information & KAP questions



Results

Numerical & nominal Data

Knowledge (K, /14): 12 above (High), 9-12 (Medium), below 9 (Low)

Practice (P, /12): 9 above (High), 4-8 (Medium), below 4 (Low)

Attitude (A): Good, Bad, Neither, Not Sure

106 responses



Descriptive Statistics

97.2% female and 2.8% male / 106 responses of managers

	Age	Managerial experience
Mean (SD, min-max)	47 (10.25, 28-72 yrs)	11 (7.60, 0.083-37 yrs)

Education Level	%
certificate/diploma	59.4
Undergraduate	13.2
Graduate or higher	10.4
Some post-secondary	9.4
High school or less	3.8

Types of daycare	%
Public	16
Private	70.8
Others	13.2

Fixtures	%
Taps	84
Fountains	4.7
Bottled water	22.6

Overview:

- 88.7% from city water

70.8% run the drinking water before consumption

Age of buildings surveyed:

- 30 yrs old (16.55, 1-75 yrs)
- 16% pipes repairment recently

Figure 1: Frequency of number times per day let the drinking water run before consuming. (Note: 0 – None; 1 – Every time it's consumed; 2 – Every break; 3 – once; 4 – twice; 5 – Three or more; 6 – Not sure).

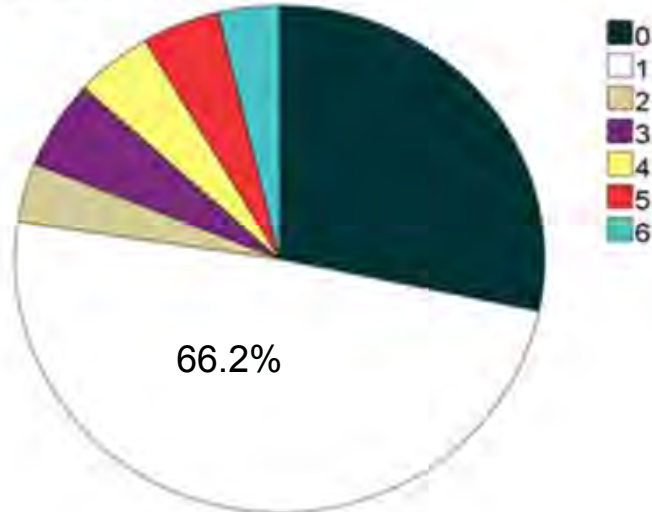
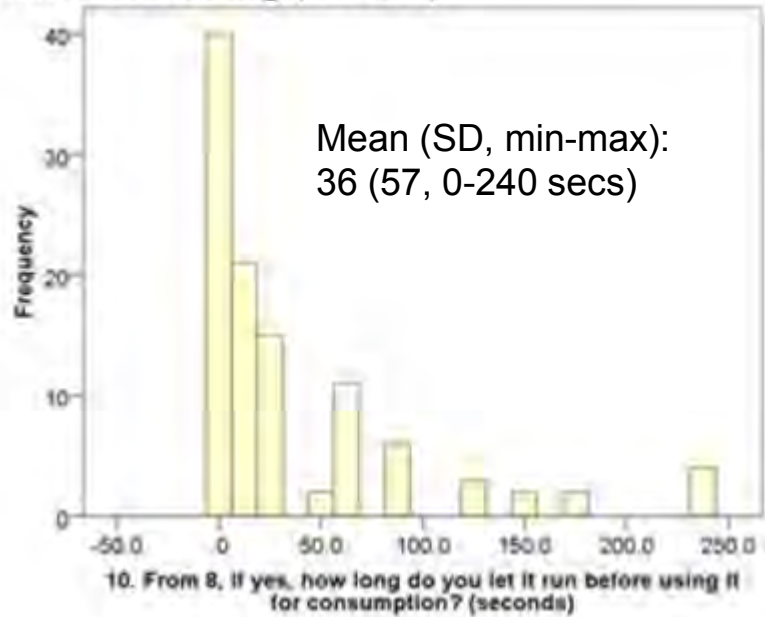


Figure 2: Length of drinking water running before consuming (seconds).



Managers - General Overview

Managers	%
Heard of DWQ	85.5
Training of DW Reg	2.8
DWQ Education	6.6
Aware that boiling increased Increasing [Pb]	5.7
Training children in DW	0.9

Receive info on lead toxicity: (top 3 sources)


- 43% (media), 37% (internet), 24% from HA .

Only 4% facilities tested for lead in their DW

Drinking water of children: (top 3 ways)

- Filling their water bottles from the taps or fountains (57.5%)
- Bringing their own water from home (50.9%)
- Directly taken from taps or fountains (26.4%)

Brita or other filtration system: 63.2% used in their facilities



Managers' Perceptions about Poor Water Quality and Lead Toxicity:

Types of disease associated with poor water quality:

- 46% with gastrointestinal (GI) illness, 10% with lead poisoning, and 11% with infectious disease

Sign + Symptom related to lead toxicity:

- 25.5% GI illness syndrome, 13.2% with development delay, 9.4% with a feeling of fatigue, 9.4% of the neurological syndrome, 7.5% with irritation in mucous membranes, 5.7% with weight loss and 4.7% with fever or flu-like syndrome

Comments for their DW:


- 13% of managers considered “BC has the best DW or safe to drink”, 7% of managers felt concerned, 6% of more DW info and testing was needed in daycare facilities.
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Figure 3: Distribution of knowledge scores for daycare managers.

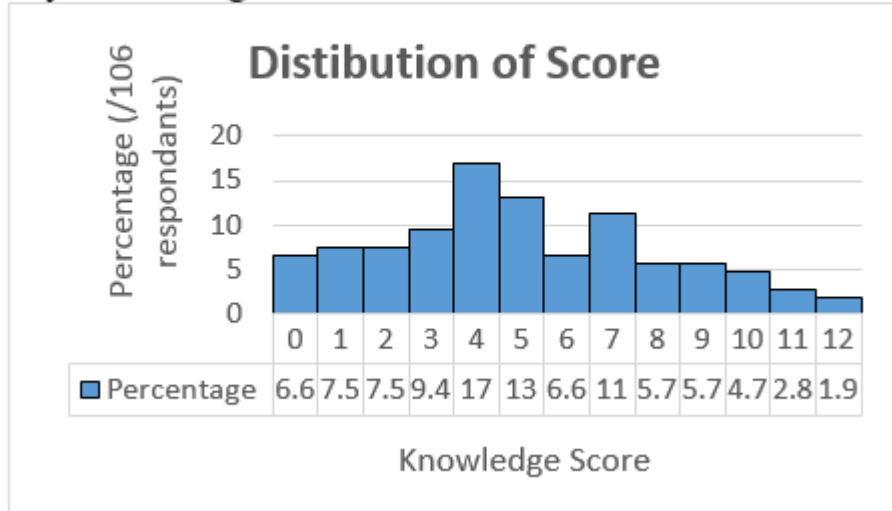
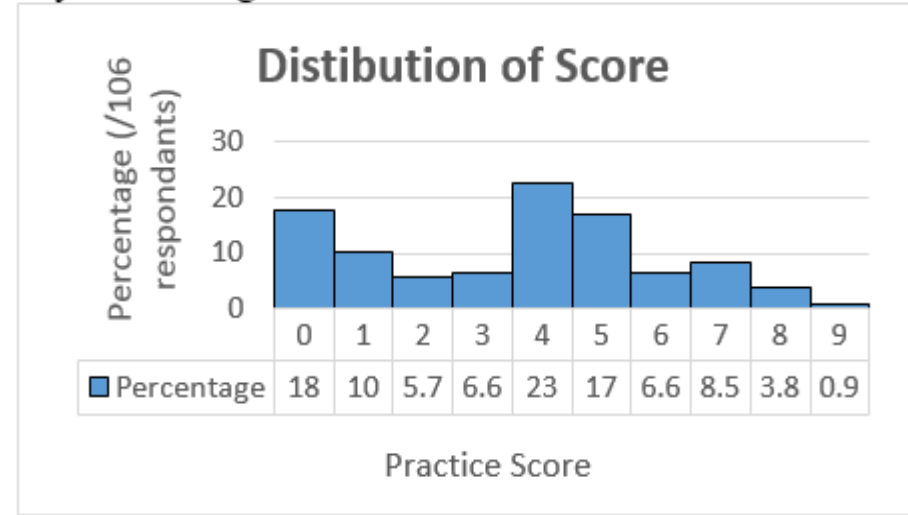


Figure 4: Distribution of practice scores for daycare managers.



Knowledge - mean (SD, min-max): 5 (3.04, 0-12), -> below 9, Low

Practice - mean (SD, min-max): 3.5 (2.45, 0-9) -> below 4, Low

Inferential Statistics

- Evaluation: managerial experience, age, type of daycare
- No statistical correlation between
 - Managerial experience and knowledge
 - Managerial experience and practice
 - Age and practice
- A statistically significant correlation between the age and knowledge with very weak association
- No statistically significant association between managers' attitude towards water contaminants either grouped by managerial experiences or by age
- No difference in DW knowledge and practice between public, private and other daycares.

Discussion

Knowledge and Practice => Low score levels

Attitudes towards these DW components:

Coliforms, *E. coli*, Viruses (biological)

Lead, Mercury, Arsenic, Copper, Cadmium (chemical)

=> No association between managerial experience and age

A need for intervention in drinking water education for daycare managers.



Brita filter

Activated carbon - reduce chlorine and ion exchange resin to reduce metals: copper, lead, cadmium, mercury and zinc.

Brita faucet filtration system (point-of-use type):

NSF/ANSI Standards 42 (aesthetic effects) **and 53 (health effects)**

Brita bottles:

NSF/A



Only the Br

ants and lead reduction.

Lead Monitoring and Control Across Health Authorities:

VCH: implements a “protecting children from lead in DW at child daycare facilities” program

Ask operator to develop a plan for their DW based on GCDWQ standards

Conduct baseline water quality tests samples

FH: No lead reduction requirements in the DW program developed for the daycare.

Received lead toxicity information via media and the internet



fraserhealth
Better health. Best in health care.

Knowledge Translation

FHA could implement lead in DW program or additional education or water samples.
Child Care Licensing officers may require the licensees to attend DW courses before issuing or renewing their permits.

FHA should try to look for means, ie. internet or social media.

Maximum Acceptable Concentration of lead in Guideline of Canadian Drinking Water Quality should be set at a lower limit, 5 ppm.

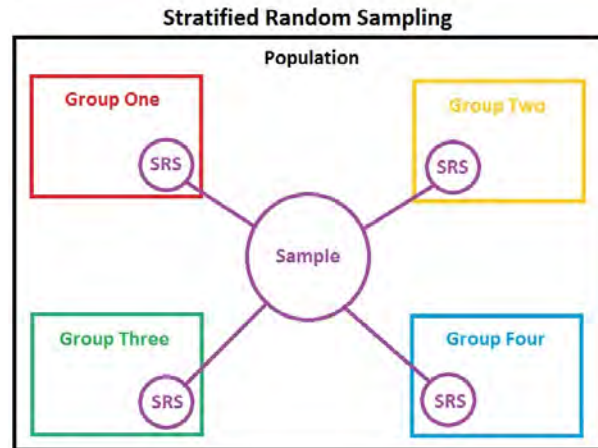


Limitations & Recommendations


Increase the sample size

Demographic questioning or applying stratified sampling for the city or areas of daycares

Additional language versions for this survey



Further Research

1. KAP study can be conducted to evaluate the daycare managers/operators DW perceptions before and after DW education or information delivered.
 2. Conduct KAP study based on the cities or areas of Fraser Health.
 3. Compare the KAP study between Vancouver Coastal Health and Fraser Health, or other health authorities whether the DW program or education have been implemented.
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Conclusion

Low level of Knowledge & Practice regarding lead in DW

No correlation between Knowledge & Practice of daycare managers

Attitudes towards the drinking water contaminants had no association in their years of managerial experience and age

Young children may be potentially at risk of lead exposure due to lack of knowledge and improper practice of managers.



**GET THE
LEAD OUT!**

Important information about
drinking water and lead



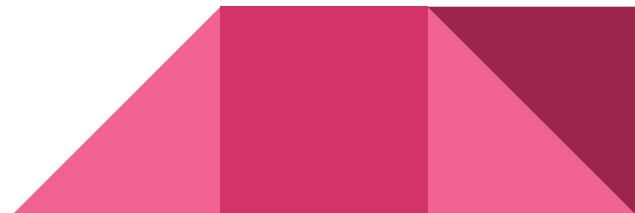
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Questions?

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