
Carol Bassim
Background: Oral Health is Essential to Health

**Dysfunction**
- Chewing and eating problems
- Altered eating patterns, nutritional risk, underweight and obesity

**Symptomatic**
- Pain and discomfort
- ER visits, pain medication and antibiotic use, loss of work time

**Systemic Health**
- Associations with cardiovascular disease, diabetes, and respiratory diseases
- Independent risk factor for morbidity and mortality

**Psychosocial**
- Concerns with smiling or speaking
- Social aspects of eating
- Stigma for health inequities
Background: Frailty

“Frailty is a clinical state in which there is an increase in an individual's vulnerability for developing increased dependency and/or mortality when exposed to a stressor”

– Morley et al., 2013: JAMDA
Objective

Assess the association of poor oral health and frailty at the baseline wave of the CLSA.

- Age (age groups 45-54, 55-64, 65-74, 75-85)
- Sex (male and female)
- Income (<50K, 50-100K, >100K)
- Social support (Social Support Availability (SSA))
- Physical activity (Physical Activity Scale for the Elderly (PASE))
- Smoking (current, previous, never)
- Servings of fruits and vegetables per day
Methods

- 30,097 Comprehensive/In-Person Interview
  - 28,789 (96%) completed Oral Health questionnaire
Frailty Index in the CLSA

• Deficits were selected based on literature and discussion with an expert panel to form the index of 76 items
  • Physical function tests (5 items)
  • Self-rated general health
  • Self-rated mental health
  • Eyesight rating
  • Hearing rating
  • Depressive symptoms (CES-D 10) (10 items)
  • Cognitive function tests (4 items)
• Activities of daily living (OARS scale) (14 items)
  • Social participation prevented by health
  • Body mass index
  • Chronic conditions (32 items)

• Calculating the Frailty Index (0=No deficits, 100=All possible deficits)
  • Sum of deficits in the individual, divided by the number of potential deficits
Oral Health in the CLSA

Prevalence of Oral Health Problems

<table>
<thead>
<tr>
<th>Oral Health Problem within the previous 12 months</th>
<th>Prevalence a</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wears dentures/has false teeth</td>
<td>22.2</td>
<td>21.7 - 22.8</td>
</tr>
<tr>
<td>Brushes teeth less than twice daily</td>
<td>21.5</td>
<td>20.9 - 22.1</td>
</tr>
<tr>
<td>Dry mouth</td>
<td>16.0</td>
<td>15.5 - 16.5</td>
</tr>
<tr>
<td>Natural tooth decayed b</td>
<td>14.4</td>
<td>13.8 - 14.9</td>
</tr>
<tr>
<td>Toothache b</td>
<td>14.2</td>
<td>13.6 - 14.7</td>
</tr>
<tr>
<td>Gums bleed</td>
<td>12.4</td>
<td>11.9 - 12.9</td>
</tr>
<tr>
<td>Natural tooth broken b</td>
<td>10.9</td>
<td>10.4 - 11.3</td>
</tr>
<tr>
<td>Uncomfortable to eat c</td>
<td>10.6</td>
<td>10.0 - 11.3</td>
</tr>
<tr>
<td>Gums sore</td>
<td>8.9</td>
<td>8.5 - 9.4</td>
</tr>
<tr>
<td>Bad breath</td>
<td>8.5</td>
<td>8.1 - 9.0</td>
</tr>
<tr>
<td>Chewing inadequacy</td>
<td>8.1</td>
<td>7.7 - 9.4</td>
</tr>
<tr>
<td>Avoinds eating foods c</td>
<td>6.6</td>
<td>6.1 - 7.2</td>
</tr>
<tr>
<td>Jaw joint pain</td>
<td>6.2</td>
<td>5.9 - 6.6</td>
</tr>
<tr>
<td>No natural teeth</td>
<td>5.7</td>
<td>5.4 - 6.0</td>
</tr>
<tr>
<td>Jaw muscle sore</td>
<td>5.7</td>
<td>5.3 - 6.0</td>
</tr>
<tr>
<td>Natural tooth loose b</td>
<td>5.7</td>
<td>5.4 - 6.1</td>
</tr>
<tr>
<td>Swelling inside of mouth</td>
<td>4.9</td>
<td>4.6 - 5.2</td>
</tr>
<tr>
<td>Dentures loose a</td>
<td>19.4</td>
<td>17.4 - 21.5</td>
</tr>
<tr>
<td>Dentures uncomfortable a</td>
<td>18.8</td>
<td>16.8 - 21.1</td>
</tr>
<tr>
<td>Denture sores a</td>
<td>16.6</td>
<td>14.7 - 18.7</td>
</tr>
<tr>
<td>Dentures broken a</td>
<td>3.2</td>
<td>2.3 - 4.3</td>
</tr>
<tr>
<td>Teeth or dentures dirty</td>
<td>3.0</td>
<td>2.8 - 3.3</td>
</tr>
<tr>
<td>Burning mouth</td>
<td>1.7</td>
<td>1.5 - 1.8</td>
</tr>
<tr>
<td>Dentures missing d</td>
<td>1.2</td>
<td>0.6 - 2.3</td>
</tr>
</tbody>
</table>

a: Weighted data used for prevalence estimates.
b: Prevalence among those with natural teeth.
c: Because of problems with mouth or teeth.
d: Prevalence among those wearing dentures/false teeth.

Categorical PCA Oral Health Problems: 5 categories

Figure. Factor loading plots for oral health problem patterns. Bars indicate loadings; line indicate threshold of 0.3 for identifying parameters that load of each factor.
Number of Oral Health Problems

Accumulation of oral health problems across the life span.

Barriers to dental care and oral hygiene accumulate with increasing age.

Ramsey, et. al.* used concept of oral frailty.

Increase in Frailty Index, by Characteristic

- Age Group:
  - 75-84
  - 65-74
  - 55-64
  - 49-64

- Sex:
  - Female
  - Male

- Income:
  - <50,000
  - 50,000-100,000
  - >100,000

- Smoking:
  - Current
  - Previous
  - Never

- Oral Health*:
  - Highest quartile On
  - 2nd quartile On
  - Lowest quartile On

- Physical Activity*:
  - Lowest quartile PAF
  - 2nd quartile PAF
  - Highest quartile PAF

- Social Support*:
  - Lowest quartile SS
  - 2nd quartile SS
  - Highest quartile SS

- Fruits/Vegetable Servings*:
  - Lowest quartile FV
  - 2nd quartile FV
  - Highest quartile FV

* Best quantile is the Reference category, compared with worsening quantiles.

Higher age group,
Being female,
Low income,
Smoking,
Poor oral health,
Low physical activity,
Low social support,
Few servings of fruits/vegetables,
Are associated with increased frailty (FI points)
Increase in Frailty Index, by Characteristic

Comparing the effects of different characteristics on worsening frailty score:

In the fully adjusted model, poor oral health is associated with an increase of over 3 points on the frailty index, over the mean ($\beta_{adj}= 3.08$, 95%CI=3.87-3.30).

* Best quantile is the Reference category, compared with worsening quantiles.
Mean Frailty Score with number of oral health problem, by age-group and sex.

- Increased age-group and being female are associated with increased frailty score, at every number of oral health problems.
- Similar patterns across age-groups and between sexes for the association between increasing oral health problems and increasing frailty score.
- Each additional oral health problem is associated with over half a point on the Frailty Index ($\beta_{adj}=0.66$, 95%CI=0.62-0.71).
Discussion

STRENGTHS

• Provides the latest and most comprehensive description of self-reported oral health problems across Canada for adults.

• Includes age groups that represent middle-aged people, older adults, and the elderly.

• Allows for the association of oral health and frailty to be placed in the context of important competing risk factors for frailty.

LIMITATIONS

• Baseline cross-sectional analysis.

• Participation in the CLSA is voluntary, and estimates may not be fully representative of population.
Discussion: Conclusions

1. Canadian adults age 45-85 years old complain of common oral health problems, including
   - tooth loss and denture problems
   - teeth problems and dental discomfort/pain
   - gum and jaw problems,
   - and oral medicine/hygiene concerns.

2. Oral health problems increase across increasing age groups.

3. Oral health problems are strongly and independently associated with frailty.

4. Supports theory that oral health could contribute to the etiology and progression of frailty.

5. Dental care at all age groups could help with healthy aging.
Thank you.

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## Oral Health Measure Prevalence (%, 95%CI)

<table>
<thead>
<tr>
<th>Oral Health Measure</th>
<th>Prevalence (%, 95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Self-reported Oral Health</strong></td>
<td></td>
</tr>
<tr>
<td>Fair or Poor</td>
<td>7.4 (7.0-7.8)</td>
</tr>
<tr>
<td>Good</td>
<td>21.2 (20.6-21.8)</td>
</tr>
<tr>
<td>Very Good or Excellent</td>
<td>71.4 (70.8-72.1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Odds Ratio for Fair or Poor Oral Health (age- and sex-, and sampling plan adjusted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edentulous Yes</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Eating Discomfort Often or Sometimes</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Chewing Inadequate Yes</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Natural Tooth Problem Yes</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Denture Problem Yes</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Gum Problem Yes</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Dry Mouth Yes</td>
</tr>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of Oral Health Problems</th>
<th>Prevalence (%, 95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>51.9 (51.2-52.6)</td>
</tr>
<tr>
<td>1</td>
<td>26.8 (26.2-27.4)</td>
</tr>
<tr>
<td>2</td>
<td>11.8 (11.4-12.3)</td>
</tr>
<tr>
<td>3</td>
<td>5.6 (5.3-5.9)</td>
</tr>
<tr>
<td>4-7</td>
<td>3.9 (3.5-.4.4)</td>
</tr>
</tbody>
</table>

**Poor Oral Health in the Baseline Wave of the CLSA.**