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Barriers to oral care: a cross-sectional analysis of the Canadian longitudinal study on aging (CLSA)

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Abstract

Background Oral health plays a role in overall health, indicating the need to identify barriers to accessing oral care. The objective of this study was to identify barriers to accessing oral health care and examine the association between socioeconomic, psychosocial, and physical measures with access to oral health care among older Canadians.

Methods A cross-sectional study was conducted using data from the Canadian Longitudinal Study on Aging (CLSA) follow-up 1 survey to analyze dental insurance and last oral health care visit. Logistic regression was used to estimate odds ratios (ORs) and 95% confidence intervals (CIs) for the association between socioeconomic, psychosocial, and physical measures with access to oral care, measured by dental insurance and last oral health visit.

Results Among the 44,011 adults included in the study, 40% reported not having dental insurance while 15% had not visited an oral health professional in the previous 12 months. Several factors were identified as barriers to accessing oral health care including, no dental insurance, low household income, rural residence, and having no natural teeth. People with an annual income of <\$50,000 were four times more likely to not have dental insurance (adjusted OR: 4.09; 95% CI: 3.80–4.39) and three times more likely to report not visiting an oral health professional in the previous 12 months (adjusted OR: 3.07; 95% CI: 2.74–3.44) compared to those with annual income greater than \$100,000.

Conclusions Identifying barriers to oral health care is important when developing public health strategies to improve access, however, further research is needed to identify the mechanisms as to why these barriers exist.

Keywords Oral health, Barriers, Dental insurance, CLSA

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Introduction

Maintaining good oral health is an integral aspect of overall health. Adverse oral health outcomes increase with age, and include complete loss of teeth (edentulism); the need to have dental prostheses or false teeth; dental-related problems with chewing and eating; and dry mouth and mouth sores [1, 2]. Poor oral health has been associated with age-related chronic conditions, cognitive impairment, and even premature mortality [3–5] and has been linked to the development of chronic cardiac, pulmonary and metabolic diseases, including diabetes [6–9].

Access to regular oral health care is crucial for the early identification and prevention of oral diseases. Many barriers to accessing care continue to exist, including the cost of dental treatments, lack of transportation, psychosocial factors, including anxiety or depression, and accessibility and availability of oral health providers [10–13]. Additionally, the perception of oral health status is an important factor in oral care utilization [14]. Gaszynska et al. (2014) reported that study participants were over-optimistic about their oral health condition and dental needs, highlighting the disparity between perceived and actual oral health [15]. Similarly, it has been reported that the majority of dentate (with natural teeth) and edentulous (without natural teeth) elderly believe they would not seek oral care until they feel pain, have a chewing problem, or experience social embarrassment [16]. Another study examining edentate individuals reported that 48% of those aged 65–74 and 63% of those aged 75 and older had not accessed oral care for over 10 years [17]. Access to dental insurance is also a barrier that exists and may influence oral care [18]. For instance, in Canada, most oral care is paid for out-of-pocket or through private insurance with select groups receiving insurance through the federal government, which may influence if people regularly see their oral health professional [18, 19]. Disparities in oral health care increase the risk of oral diseases [20, 21]. By examining barriers to oral care and the characteristics of those facing specific barriers, guidelines and solutions may be developed to improve regular and timely oral health care. Previous studies have examined barriers to oral health care; however, differences across jurisdictions and countries have been noted, and cross-sectional studies with small sample sizes have been used, signifying the importance of further exploring barriers using population-based samples [22, 23]. The objectives of this study were to identify barriers to oral care by examining the association between socioeconomic, psychosocial and physical measures with access to oral care (measured by dental insurance and last oral health visit).

Methods

Data source and study design

A cross-sectional study was conducted using data from the Canadian Longitudinal Study on Aging (CLSA). The CLSA is a longitudinal study of Canadians who were between the ages of 45 and 85 at time of recruitment (2011–2015). People were eligible for inclusion if they spoke English or French, were community-dwelling from one of the 10 provinces, did not live on a First Nations reserve or were not a member of the Canadian Armed Forces. Data are planned to be collected every three years for an anticipated 20 years, or until a participant dies or is lost to follow up. At CLSA baseline, 2011–2015, there were 51,338 participants, at follow-up 1, 2015–2018, 44,817 participants were included. A description of the analytic sample for the current study can be found in Fig. 1. A more in-depth description of the CLSA has previously been published [24]. The CLSA is comparable to similar population-based Canadian samples, however, is not representative of the Canadian population [24]. Ethics approval was granted for this study through the Health Canada and the Public Health Agency of Canada Research Ethics Board (REB) (REB project #2014-0015). For the CLSA, ethics approval was granted from each data collection site across Canada [24].

Oral care outcomes

Oral health care was measured using self-reported dental insurance and oral health visit question, which were taken from CLSA follow-up 1, which was collected from 2015 to 2018.

Dental insurance. To measure if participants had dental insurance they were asked, “What type of dental insurance do you currently have?” Response options were: (1) private; (2) public; (3) none. This was dichotomized into yes (private or public) versus no.

Last oral health visit. Participants were also asked “When was the last time you visited a dental professional?”, which was dichotomized into ≤ 12 months versus > 12 months. Participants were also asked about reasons for not visiting an oral health professional. Response options included: (1) not needed (perceived); (2) difficulty getting an appointment; (3) no dentist in the area; (4) no dental hygienists/denturist in the area; (5) transportation problems; (6) personal and family responsibilities; (7) unable to leave house due to health condition. Participants could only select one main reason for not visiting an oral health professional. In addition, participants were specifically asked about cost as a barrier: “In the past 12 months, have you not gone to a dental professional because of the cost of care?” Responses included: (1) yes; (2) no.

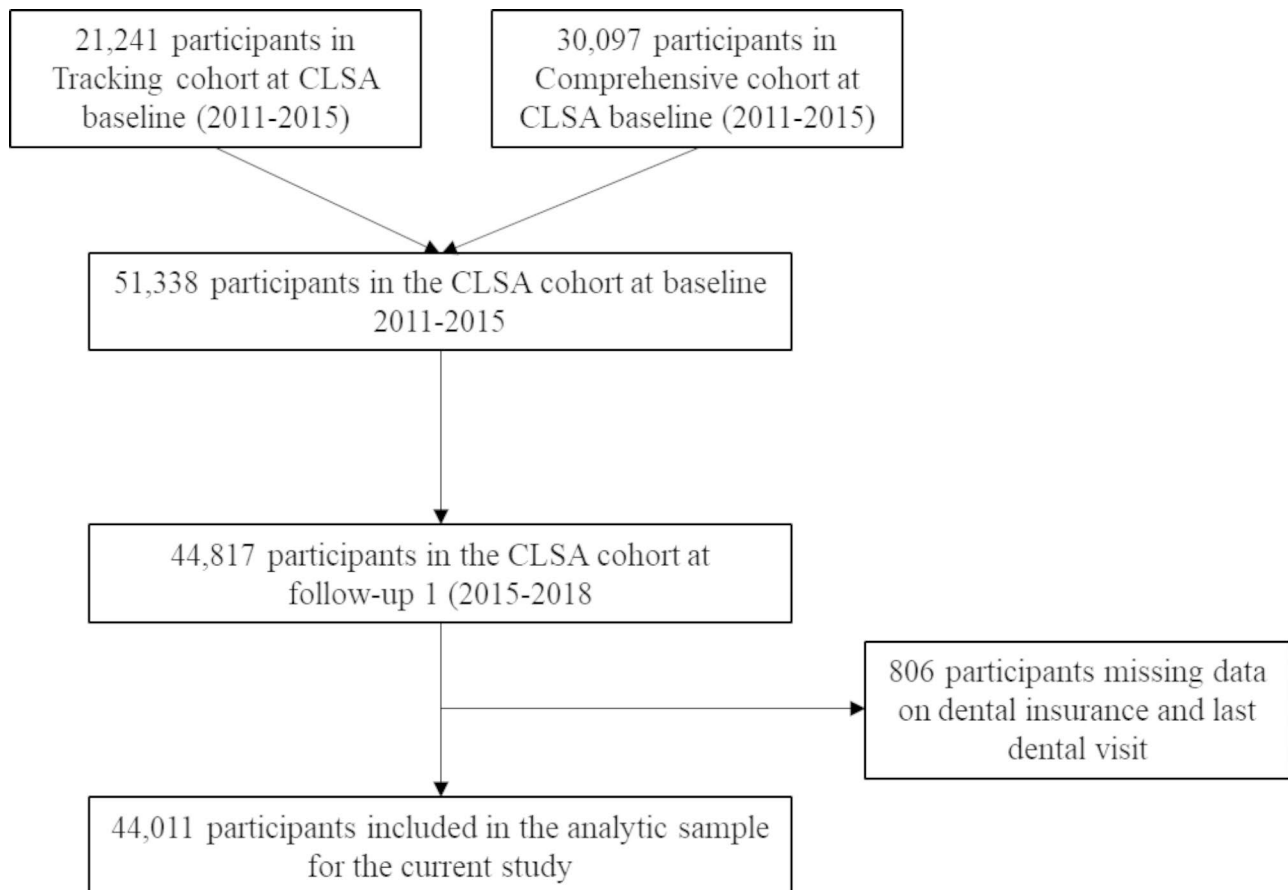


Fig. 1 Participant flow diagram describing analytic sample for current study using participants from the Canadian Longitudinal Study on Aging (CLSA)

Socioeconomic, psychosocial, and physical measures

Socioeconomic, psychosocial, and physical measures were taken from both CLSA baseline (2011–2015) and CLSA follow-up 1 (2015–2018). From CLSA baseline, participant sex (male, female) and education (post-secondary, no post-secondary) were taken. All remaining variables were taken from follow-up 1, including age group (45–54, 55–64, 65–74, 75+); edentulous (yes, no); total household income (<\$50,000, \$50–100,000, >\$100,000); urban/rural status (urban, rural); past 30-day smoking status (daily [≥ 30 cigarettes; i.e., at least one per day], occasional [1–29 cigarettes], none [0 cigarettes]); number of chronic conditions (0, 1 or more). Social support was ascertained using the functional support Medical Outcomes Study (MOS) score, dichotomized into two groups: low social support (bottom 20%) and high social support (above 20% cut-off) [25]. Anxiety and depression were measured by asking participants, “Has a doctor ever told you that you have an anxiety disorder such as a phobia, obsessive-compulsive disorder or a panic disorder?” and “Has a doctor ever told you that you have a mood disorder such as depression (including manic depression), bipolar disorder, mania, or dysthymia?”, respectively.

Both were dichotomized as yes versus no. Similarly, memory problem was measured by asking participants, “Has a doctor ever told you that you have a memory problem?” and “Has a doctor ever told you that you have dementia or Alzheimer’s disease?”. A yes response to either question was classified as yes, if no was responded to both, it was classified as no.

Statistical analysis

For all analyses, sampling weights were used. For descriptive statistics such as frequency and percentages, inflation weights were used, and for regression analyses, analytic weights were used. Multivariable logistic regression models were used to estimate odds ratios (ORs) and 95% confidence intervals (CIs), for the association between socioeconomic, psychosocial, and physical measures with (1) dental insurance and (2) last oral health visit. Models were adjusted for all socioeconomic, psychosocial, and physical variables (age group, sex, household income, education, residence, smoking status, mood disorder, anxiety, memory problem, chronic conditions, social support, edentulous, last dental visit). Statistical

analyses were conducted using SAS [26]. Complete case analysis was conducted given minimal data was missing.

Results

Sample characteristics

After removing those who were missing dental insurance and last dental visit ($n=806$), 44,011 adults were included in the study. A complete description of the sample can be found in Table 1. Just over half (51.7%) of the sample were females and were aged 46 to 64 years of age (57.2%) at the time of data collection. Almost 40% of the sample reported not having dental insurance and 15% reported their last dental visit was over 12 months prior to completing the survey.

Dental insurance

The prevalence of dental insurance by socioeconomic, psychosocial, and physical measures can be found in Table 2. People with a household income of less than \$50,000, compared to those with a household income greater than >\$100,000 (adjusted OR: 4.09; 95% CI: 3.80–4.39), resided in a rural residence, compared to urban (adjusted OR: 1.36; 95% CI: 1.26–1.48), reported no natural teeth (edentulous), compared to those who had at least one natural tooth (adjusted OR: 1.39; 95% CI: 1.15–1.44) and reported their last dental visit greater than 12 months, compared to those who visited an oral health professional within the past 12 months (adjusted OR: 2.62; 95% CI: 2.42–2.83) had greater odds of not having dental insurance. Whereas people aged 46–54 years had greater odds of having dental insurance compared to all other age groups (Table 2).

Last dental visit

The characteristics of those who visited a dentist within the last 12 months, and those who did not are in Table 3. People who reported no natural teeth were almost 10 times (adjusted OR: 9.95; 95% CI: 8.90–11.13) more likely to report not seeing an oral health professional within the past 12 months, compared to those who reported having at least one natural tooth. People with an income less than \$50,000 (adjusted OR: 3.07; 95% CI: 2.74–3.44) and a household income from \$50,000–\$100,000 (adjusted OR: 1.77; 95% CI: 1.60–1.97) compared to those with an income greater than \$100,000, had greater odds of reporting not visiting an oral health professional within the past 12 months. Additionally, those who were daily smokers, compared to those who were not smokers (adjusted OR: 1.84; 95% CI: 1.61–2.11), had no social support, compared to social support (adjusted OR: 1.14; 95% CI: 1.05–1.25), and reported no dental insurance, compared to having dental insurance (adjusted OR: 2.61; 95% CI: 2.41–2.83) were more likely to report they did not visit an oral health professional in the last 12 months.

Reasons for no dental visit in the past 12 months

Reasons for not visiting an oral health professional in the last 12 months are shown in Table 4. Among the 2,562 who reported a reason for not visiting an oral health professional in the past 12 months, the most commonly reported reason was that it was not needed (80.4%), followed by personal and family responsibilities (10.6%). When stratifying reasons for not visiting an oral health professional by insurance, reasons were somewhat similar. However, people without insurance had a slightly higher proportion of people who reported that they did not need to visit an oral health professional; whereas people with dental insurance had a slightly higher proportion of people who reported personal and family responsibilities and difficulty getting an appointment as the reason. Given the large proportion of people who reported a reason for not visiting an oral health professional ($n=2,562$; 39.3%), a sensitivity analysis was conducted to explore differences between those who reported reasons versus those who did not. Among those who did not report a reason, there was a slightly higher proportion of people aged 46–54, who resided in an urban residence and had a mood disorder compared to those reporting a reason for not visiting an oral health professional (Table A1).

Participants were also asked if the reason for not going to an oral health professional in the past 12 months was due to cost of care. Among people with no dental insurance, 19.2% reported this to be a reason for not visiting an oral health professional, compared to 5.4% of people who had dental insurance (Table 4).

Discussion

This study identified several key factors that play a role in barriers to accessing oral health care, measured using last dental visit and dental insurance. For instance, people who reported not having any natural teeth were almost 10 times more likely to not have visited an oral health professional in the past 12 months, and 1.4 times more likely to not have dental insurance. Other factors suggested to be access barriers include age, household income, and rural residence. Although a small proportion of people who did not visit an oral health professional in the past 12 months reported the reason, most reported they did not need oral health care.

Similar to our study, an Ontario study found 76.0% of people aged 65 or older had visited an oral health professional in the past 12 months [18]. This study also noted that having dental insurance leads to a greater likelihood of visiting an oral health professional, thus leading to improved oral health [18]. The use of oral health care has been linked to a socioeconomic gradient, meaning people of lower income or lower education were less likely to visit an oral health professional [27, 28]. Given the consistency of findings related to barriers in accessing

Table 1 Characteristics of Canadian adults from the Canadian Longitudinal Study on Aging (CLSA)

Characteristics	Number of participants (n = 44,011)	Weighted % ¹
Age group		
46–54	6493	19.4%
55–64	14,564	37.8%
65–74	13,112	26.3%
75–92	9842	16.5%
Sex		
Female	22,487	51.7%
Male	21,524	48.3%
Household Income		
<\$50,000	11,917	25.9%
\$50,000–\$100,000	15,025	36.6%
>\$100,000	14,403	37.5%
Missing	2666	6.0%
Education		
Less than post-secondary	10,484	25.4%
Post-secondary	33,426	74.6%
Missing	101	0.2%
Residence		
Rural	4649	14.7%
Urban	37,384	85.3%
Missing	1978	4.5%
Smoking Status		
None	40,787	92.0%
Occasional	659	1.8%
Daily	2535	6.2%
Missing	30	0.7%
Mood Disorder		
No	36,016	83.4%
Yes	7525	16.6%
Missing	470	1.1%
Anxiety		
No	39,554	90.9%
Yes	3994	9.1%
Missing	463	1.1%
Memory problem or dementia/Alzheimer's		
No	42,680	98.0%
Yes	875	2.0%
Missing	456	1.0%
Chronic conditions		
No	3652	10.3%
One or more	40,127	89.7%
Missing	232	0.5%
Social support		
No	8428	16.9%
Yes	34,237	83.1%
Missing	1346	3.1%
Edentulous		
No	40,845	92.6%
Yes	3162	7.3%
Missing	4	0.01%
Dental Insurance		
No	16,891	39.8%
Yes	26,903	60.2%
Missing	217	0.5%
Last Dental Visit		
≤12 months	37,439	85.1%
>12 months	6512	14.9%
Missing	60	0.1%

1. Percentage missing not included in total percent

Table 2 Adjusted association between various characteristics and not having dental insurance among Canadian adults from the Canadian Longitudinal Study on Aging (CLSA) at CLSA follow-up 1 (2015–2018)

Characteristics	Dental Insurance (Weighted %)		Adjusted OR ¹ (95% CI)
	Insurance	No Insurance	
Age group			
46–54	77.1%	22.9%	1.00
55–64	69.1%	30.9%	1.35 (1.25–1.47)
65–74	47.1%	52.9%	2.59 (2.38–2.82)
75–92	40.6%	59.4%	2.94 (2.68–3.22)
Sex			
Female	57.7%	42.3%	1.10 (1.05–1.16)
Male	62.9%	37.1%	1.00
Household Income			
<\$50,000	35.5%	64.5%	4.09 (3.80–4.39)
\$50,000–\$100,000	60.6%	39.4%	1.79 (1.68–1.91)
>\$100,000	78.3%	21.7%	1.00
Education			
Less than post-secondary	51.6%	48.4%	1.04 (0.98–1.10)
Post-secondary	63.2%	36.8%	1.00
Residence			
Rural	50.4%	49.6%	1.36 (1.26–1.48)
Urban	61.9%	38.1%	1.00
Smoking Status			
None	60.6%	39.4%	1.00
Occasional	60.4%	39.6%	1.21 (0.97–1.51)
Daily	54.2%	45.2%	1.06 (0.95–1.19)
Mood Disorder			
No	59.9%	40.1%	1.00
Yes	61.6%	38.4%	0.95 (0.87–1.02)
Anxiety			
No	60.1%	39.9%	1.00
Yes	61.8%	38.2%	0.96 (0.87–1.05)
Memory problem or dementia/Alzheimer's			
No	60.3%	39.7%	1.00
Yes	56.8%	43.2%	0.87 (0.73–1.03)
Chronic conditions			
No	66.7%	33.3%	1.00
One or more	59.4%	40.6%	0.94 (0.85–1.03)
Social Support			
No	54.9%	45.1%	1.00 (0.94–1.07)
Yes	61.9%	38.1%	1.00
Edentulous			
No	62.6%	37.5%	1.00
Yes	30.1%	69.9%	1.39 (1.15–1.44)
Last Dental Visit			
≤12 months	64.8%	35.2%	1.00
>12 months	34.1%	65.9%	2.62 (2.42–2.83)

1. Adjusted for all covariates in the table (age group, sex, household income, education, residence, smoking status, mood disorder, anxiety, memory problem or dementia/Alzheimer's, chronic condition, social support, edentulous and last dental visit)

oral health care, it signifies the need to develop targeted preventive measures aimed at those who may face greater barriers.

It is apparent that dental insurance is a crucial component of access to oral health care [18]. The cost of treatment plays a crucial role in people receiving oral health

treatment and care, as people often delay treatment due to the costs [29]. Income has been linked to access to dental insurance [30, 31], which is related to visiting an oral health professional [18]. This suggests the need for easier access to dental insurance plans, as access to insurance will increase oral health visits, thus improving oral

Table 3 Adjusted association between various characteristics and last dental visit > 12 months among Canadian adults from the Canadian Longitudinal Study on Aging (CLSA) at CLSA follow-up 1 (2015–2018)

Characteristics	Last Dental Visit (Weighted %)		Adjusted OR ¹ (95% CI)
	≤ 12 months	> 12 months	
Age group			
46–54	88.1%	11.9%	1.00
55–64	87.6%	12.4%	0.75 (0.67–0.85)
65–74	83.7%	16.3%	0.55 (0.49–0.62)
75–92	78.0%	22.0%	0.56 (0.49–0.64)
Sex			
Female	86.1%	13.9%	0.63 (0.58–0.68)
Male	84.0%	16.0%	1.00
Household Income			
<\$50,000	71.1%	28.9%	3.07 (2.74–3.44)
\$50,000–\$100,000	86.5%	13.5%	1.77 (1.60–1.97)
>\$100,000	93.6%	6.4%	1.00
Education			
Less than post-secondary	76.3%	23.7%	1.53 (1.41–1.65)
Post-secondary	88.1%	11.9%	1.00
Residence			
Rural	80.5%	19.5%	1.09 (0.98–1.21)
Urban	86.2%	13.8%	1.00
Smoking Status			
None	86.2%	13.8%	1.00
Occasional	85.2%	14.8%	1.28 (0.96–1.70)
Daily	67.9%	32.1%	1.84 (1.61–2.11)
Mood Disorder			
No	85.2%	14.8%	1.00
Yes	84.7%	15.3%	0.97 (0.88–1.08)
Anxiety			
No	85.3%	14.7%	1.00
Yes	83.0%	17.0%	1.08 (0.95–1.23)
Memory problem or dementia/Alzheimer's			
No	85.2%	14.8%	1.00
Yes	78.3%	21.7%	1.07 (0.85–1.36)
Chronic conditions			
No	87.3%	12.7%	1.00
One or more	84.8%	15.2%	0.99 (0.86–1.14)
Social Support			
No	79.8%	20.2%	1.14 (1.04–1.25)
Yes	86.5%	13.5%	1.00
Edentulous			
No	89.0%	11.0%	1.00
Yes	35.1%	64.9%	9.95 (8.90–11.13)
Dental Insurance			
No	75.3%	24.7%	2.61 (2.41–2.83)
Yes	91.6%	8.4%	1.00

1. Adjusted for all covariates in the table (age group, sex, household income, education, residence, smoking status, mood disorder, anxiety, memory problem or dementia/Alzheimer's, chronic condition, social support, edentulous and dental insurance)

health and the burden of disease associated with poor oral health.

Since only a few participants reported reasons for not visiting an oral health professional, it was difficult to draw conclusions. However, our findings indicate that most people did not visit an oral care professional as they felt

they did not need to go. Research has found that people tend to perceive their oral health as good, but still have oral health problems [15]. It is important to develop population-based strategies aimed at educating people on the importance of regular oral care visits. This may include training health care professionals to better educate the

Table 4 Reasons for not visiting an oral health professional in the last 12 months stratified by dental insurance

	Overall n=2,562		Insurance n=842		No insurance n=1,700	
	n	Weighted %	n	Weighted %	n	Weighted %
<i>Reasons for not visiting a dentist in the past 12 months¹</i>						
Not needed	2147	80.4%	668	76.2%	1462	82.5%
Difficulty getting an appointment	81	3.7%	35	5.5%	46	2.8%
No dentist, dental hygienist, dentist, or denturologist in the area	52	2.3%	24	2.6%	27	2.0%
Transportation problems	32	1.2%	11	1.2%	21	1.3%
Personal and family responsibilities	210	10.6%	86	11.9%	123	10.0%
Unable to leave the house due to health condition	40	1.9%	18	2.8%	21	1.4%
	Overall n=43,959		Insurance* n=26,885		No insurance* n=16,862	
	n	Weighted %	n	Weighted %	n	Weighted %
<i>Did not go to dentist in past 12 months due to cost of care²</i>						
Yes	4581	10.9%	1347	5.4%	3214	19.2%
No	39,378	89.1%	25,538	94.6%	13,648	80.8%

1. Participants could select all that apply

2. Participants were asked this question separately from other reasons for not visiting a dentist

*Significant difference between those who reported yes versus no ($p < .0001$)

importance of good oral health, and potential implications if oral health is not maintained [22]. In addition, a small proportion reported difficulties related to transportation as a reason for not visiting an oral health professional. This has been identified as a barrier to access in other studies [22], and governments may consider offering programs to enhance to ability to free transportation specifically for healthcare needs, such as oral health appointments.

The use of the CLSA to explore barriers to accessing oral health care is a strength, given the large sample size of aging Canadian adults. The CLSA contains rich data on oral health, as well as data on socioeconomic, psychosocial, and physical measures. Given the planned future waves of the CLSA, this study can be used to inform future research exploring the longitudinal impact of barriers to oral health. A limitation of this study was the cross-sectional design, making it difficult to infer temporality. Also, the characteristics of the CLSA, the large proportion of people who reported a high household income, or are highly educated, thus not making the sample representative of the broader Canadian population, however, findings from this study can be generalized to those who share similar characteristics to those in our study. The CLSA also does not include individuals living in institutions and in the Canadian territories, thus making it difficult to translate findings to these groups of people. A small proportion of people reported the reason for not visiting an oral health professional in the past 12 months was related to cost of care. This low proportion may be related to the participants included in the sample, as we may not have adequately included people of lower income who may have reported this as the reason for not receiving oral care. Another limitation includes the

self-reported assessment of chronic conditions, anxiety, depression, and mood disorders. This could lead to misclassification of disease status potentially biasing results.

Conclusions

To our knowledge, this is the first study to examine barriers accessing oral health care using a national population-based cohort of Canadian adults. Our study demonstrated that various factors impact duration since last oral health visit and dental insurance. Identifying these barriers is useful from a public health perspective when developing strategies to improve access to oral care, as targeted strategies can be created aimed at those not accessing oral health. For instance, the provision of access to dental insurance to high-risk groups is an example of an effort to increase access to oral health care which may contribute to a reduction of disease associated with poor oral health. Future research should consider exploring the mechanisms as to why these barriers lead to decreased access to oral care, as this can contribute to the development of targeted interventions further improving access to oral care.

List of Abbreviations

CI	Confidence Interval
CLSA	Canadian Longitudinal Study on Aging
OR	Odds Ratio
REB	Research Ethics Board

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12903-023-02967-3>.

Supplementary Material 1

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Author contributions

Conceptualization: Vanessa De Rubeis, Ying Jiang, Margaret de Groh, Lisette Dufour, Annie Bronsard, Howard Morrison, Carol W. Bassim; Analysis: Vanessa De Rubeis; Writing – Original draft: Vanessa De Rubeis; Writing – review and editing: Vanessa De Rubeis, Ying Jiang, Margaret de Groh, Lisette Dufour, Annie Bronsard, Howard Morrison, Carol W. Bassim.

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Availability of data and materials

The data that support the findings of this study are available from the CLSA (<https://www.clsa-elcv.ca/>) but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of the CLSA.

Declarations

Ethics approval and consent to participate

Ethics approval for this study was granted through the Health Canada and the Public Health Agency of Canada Research Ethics Board (REB) in accordance with the Declaration of Helsinki. Informed consent was waived by the Health Canada and the Public Health Agency of Canada Research Ethics Board (REB) since this project only conducted secondary data analysis of de-identified data. For the CLSA, ethics approval was granted from each data collection site across Canada, including informed consent. Information about ethics approval for the CLSA can be found at: Raina P, Wolfson C, Kirkland S, Griffith LE, Balion C, Cossette B, et al. Cohort Profile: The Canadian Longitudinal Study on Aging (CLSA). *International Journal of Epidemiology*. 2019 Dec 1;48(6):1752–1753j.

Consent for publication

Not applicable.

Competing interests

The authors declared no conflicts of interest.

Disclaimer

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