The Role of Dental Treatment in Welfare-to-Work

By

Sonica Singhal

A thesis submitted in conformity with the requirements for the

Degree of Doctor of Philosophy

Graduate Department of Dentistry

University of Toronto

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Abstract

**Background:** Social assistance recipients in Canada receive limited dental care in order to meet health needs and to promote the move from welfare-to-work. Policy advocates argue for the expansion of such services for similar reasons. However, the hypothesis that dental care can improve the chances of employment has been rarely tested. This project was designed to provide policy makers better understanding about the relationship between dental treatment and employment outcomes among social assistance recipients of Ontario, Canada.

**Methods:** First, we conducted a systematic review of the relevant existing literature. Then we designed a retrospective cohort study using large administrative data (total n = 8742) from five Ontario regions and from the province’s social assistance ministry. We also conducted an exploratory pilot study of a convenience sample of assistance recipients (n = 30) using a pre- and post-dental treatment survey.

**Results:** Systematic review revealed minimal and weak evidence concerning the idea that dental services can improve employment outcomes. Our retrospective cohort study showed no significant difference in employment outcomes between treatment and no-treatment group (adjusted odds ratio = 0.93; 95% CI: 0.83-1.03). However, over the one year, people who received treatment (124% increase) had significantly better trajectory (p=0.0014) of leaving assistance as compared
to their counterparts (83% increase). Our pilot study revealed that both oral health related quality of life (OHRQoL) and job-seeking self-efficacy (JSS) improved significantly after receiving dental care and there was a significant correlation between these two outcomes.

**Conclusion:** Our research suggests that at one year, dental treatment does not appear to be significantly associated with leaving social assistance for employment. However, people who received dental treatment appeared to be particularly disadvantaged and dental treatment may have helped to level them up in terms of employment outcomes over time. Also, our results indicate that OHRQoL and JSS are correlated.
Acknowledgements

This dissertation could not have been possible without the guidance, support, and blessings of many. First and foremost, I would like to thank my supervisor, Dr. Carlos Quiñonez, who believed in my potential, and always encouraged me to push my boundaries and be an achiever; thank you Carlos. I am fortunate to have you as my mentor and a friend. I am very thankful to my co-supervisor, Dr. Howard Tenenbaum, who guided me all through the project and always prompted me to think out of the box. I am highly indebted to my committee members, Dr. Muhammad Mamdani and Mr. Andrew Mitchell, who have been a great support all these years. I am also thankful to Dr. Gerald Lebovic for his statistical support. I would also like to thank Mr. Akliliu Tefera, Dr. Patricia Abbey, Dr. Dick Ito, Dr. Andrea Feller, Dr. Barry Doerksen, Ms. Nancy Kennedy, Mr. Ted Burley, Mr. Jamie Moran, Dr. Hazel Stewart, and Dr. Dean Herd for their support in obtaining data.

During the program, I was fortunate to develop some friendships, which are keepsakes. Thank you, Rafael and Martha, for always being there. Jodi and Julie, although you came late in my DPH life, I really appreciate your support and friendship. I am also thankful to Dr. Herenia Lawrence for her constant encouragement.

To my mom, mother-in-law, father-in-law, aunt Uma, my brother Arvind and his family, and my sister Alpna and her family for their unconditional love. My deepest gratitude to my husband, Anuj, who is my best friend and without whose encouragement, I would not even have considered taking up this endeavor. To my son Daksh who has never complained of my divided attention he got over these past years; thank you Daksh, for being so supportive and caring for me when it has to be otherwise. I would like to dedicate this work to my father, who though is not physically present with me anymore, but his blessings keeps me going.
I am very thankful to all my funders: The Population Health Improvement Research Network (PHIRN); Harron Scholarship from the Faculty of Dentistry, University of Toronto; David Mock Scholarship from the Nusbaum family; Ontario Graduate Scholarship; and Public Health Policy Fellowship from the Canadian Institute of Health Research.
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Chapter 1: Introduction and literature review

In Canada, there are two major concerns regarding oral health, namely unequal distribution of oral disease among people of different social strata and inequalities in access to dental care among the same. In relation to this, according to the Canadian Health Measures Survey (CHMS), 30% of lower income adults have untreated decay while only 14% of higher income adults have untreated decay. Also, 35% of people in the lower income cohorts avoided visiting a dental professional within the last year because of costs in comparison to 9% of those in the high income cohort. According to Thompson et al., individuals who experience cost barriers to dental care, have more missing teeth and report more oral pain than those who do not face cost barriers. Those facing cost barriers also have more treatment needs including untreated decay.

Most dental care in Canada is not funded publicly, while about 94% of dental services are covered by private insurance or by out-of-pocket, making income a strong predictor of utilization and access of dental care. For people who cannot afford dental treatment, it has also been shown that cost of treatment is a major barrier to timely access to care. Delayed treatment not only prevents people from achieving and maintaining good oral health, but has implications for an individual’s social and economic participation within society. Therefore, access to dental care has become an increasingly important policy issue in Canada. It has gained the attention of Canadian society through discussions regarding the inadequate levels of government service provision, especially when related to unemployed, low income, and/or working poor individuals.

For people on social assistance in particular, the current welfare system mainly supports access to emergency dental treatment in an effort to promote the move from welfare-to-work. In this context, policy advocates have been arguing for more funds for dental care within social assistance schemes. Yet the assumption that removing barriers to accessing dental care can
improve the chances of employment is a long-standing policy hypothesis, and one that has been tested rarely. This work outlined in this thesis endeavors to fill this knowledge gap and to provide policy makers with better information about the effects of dental treatment on employment outcomes amongst recipients of social assistance.

This work entails three components: The first part synthesizes the existing literature, providing a better understanding of the relationship between dental treatment and employment outcomes; the second part constitutes the largest study ever done in this area, and collected administrative data to detect the effect of dental treatment on employment outcomes among social assistance recipients; and the third part involved the use of face-to-face interviews with a small sample of social assistance recipients to understand their self-perceived employment-related psychosocial changes after receiving dental treatment. Hopefully the findings reported here will prove useful to governments as they shape social assistance policies in this context.

**Organization of the dissertation**

This dissertation is organized as follows: Chapter 1 reviews the existing literature on the health and economic impacts of oral diseases; the specific relationship between poor oral health, unemployment, and self-efficacy; pathways between dental treatment and employment outcomes; a description of social assistance in Canada and Ontario; the funding of and access to dental care in Canada; and the various perspectives by which improved access to dental care for social assistance recipients is rationalized; Chapter 2 details the methodology used for all three parts of this research; Chapter 3 presents the manuscript for part 1 and has been published in the journal *Health Policy*; Chapter 4 presents the manuscript for part 2 and has been submitted to the *Journal of Community Dentistry and Oral Epidemiology*; Chapter 5 presents the manuscript for part 3,
which has been submitted to the *BioMed Central: Oral Health*; and Chapter 6 presents a general discussion, future directions, and conclusions.

**Health and economic impacts of oral diseases**

Oral diseases affect routine functions such as the ability to eat and speak, but also impact on self-esteem, psychological and social wellbeing, interpersonal relations, and employment\(^9\)-\(^{15}\). A model of oral health, proposed by Locker, suggests that dental diseases lead to physical, psychological and social disability\(^{16}\). In 2010, the World Health Organization (WHO) published an important report “Equity, social determinants and public health programs” flagging poor oral health as a major public health concern and acknowledging that poor oral health can lead to missed working hours, with subsequent loss of earnings and productivity\(^{11}\). According to the recent Canadian Health Measures Survey (CHMS), 4.15 million working days are lost annually due to dental visits or dental sick-days\(^1\). The Centers for Disease Control and Prevention (CDC), in its Healthy People 2010 report, also mentions that employed adults lose more than 164 million hours of work each year due to oral health problems or dental visits \(^{17}\).

The U.S. Surgeon General\(^{15}\) states that persons with dental diseases are less employable, as employers are reluctant to hire persons with poor visual appearance due to tooth loss, and more reluctant to have employees with potential frequent absences due to unmet dental needs. Importantly, Mobius et al. demonstrated a strong association between physical appearance and an individual’s non-cognitive skills, such as self-confidence and locus of control, which may also have direct effects on productivity\(^{18}\).

In 1999, the Melbourne Public Health Division, Australia, proposed a conceptual framework to demonstrate the causal pathway associated with the economic burdens that oral diseases can place on the health system and society, including reduced self-esteem, productivity
and loss of work (Figure 1)\textsuperscript{14}. This pathway includes the physical, functional, psychological and social problems related to oral diseases that ultimately lead to negative outcomes. Dental pain, in particular, has consequences that can severely affect a person’s life in terms of social and economic productivity. Someone in pain might avoid social contact or interpersonal relations, might miss work or school, or, if unemployed, might limit their attempts to search for and acquire a job\textsuperscript{14}. 
Figure 1: The impact of oral diseases on health system (Source: Department of Human Services, Melbourne, 1990)
Oral diseases, social disadvantage, and employment

The association of psychological and social function with determinants of dental health appears to be particularly strong in people who experience social disadvantage. In a qualitative study, Bedos et al. demonstrated that people on social assistance defined oral health in a social manner, placing significant value on dental appearance, while also reporting negative impacts on self-esteem, social interaction, and employability when their dental appearance was compromised\textsuperscript{19}. In a quantitative study, Saunders et al. demonstrated the detrimental effects of a lack of dental insurance coverage and the challenges of affording dental care for people with limited incomes, including a reduction in their self-esteem and employment prospects, and ultimately barriers to their economic and social inclusion\textsuperscript{20}.

Dental disability, unemployment and self-efficacy

People who are unemployed can lack the necessary job-seeking skills that are required to secure a job. Strengthening self-efficacy in job-seeking in individuals with disabilities, such as those with a dental disability, has been identified as an important factor in facilitating job procurement and maintenance\textsuperscript{21}. Self-efficacy is defined as one’s belief in their own capacity to mobilize the physical, emotional, and intellectual resources required to succeed in specific situations\textsuperscript{22}. Feeling efficacious motivates intensification of efforts and persistence. Self-efficacy is a predictor of behavior, including job-seeking\textsuperscript{23}, and appears to play a crucial role in motivating an individual to find a job\textsuperscript{24}. The stronger the perceived self-efficacy, the more active are the efforts, whereas a low level of self-efficacy tends to promote self-limiting behaviors that create obstacles to new experiences\textsuperscript{23}. Self-esteem is another term which is related closely to self-efficacy; it is used widely as a measure of well-being\textsuperscript{25}. Research has demonstrated that self-esteem is not a stable character; rather, it is affected by the immediate situation\textsuperscript{26}.
Extensive literature in psychology demonstrates that self-efficacy, self-esteem and employment are intimately related\textsuperscript{24-29}. Self-esteem declines with unemployment, and in turn, affects self-efficacy. Becoming re-employed acts as a restorative measure and enables self-esteem and self-efficacy to rebound\textsuperscript{24}. A vicious cycle of unemployment and self-efficacy has been identified, which is depicted below (Figure 2).

![Vicious cycle of unemployment and self-efficacy](image)

**Figure 2: Vicious cycle of unemployment and self-efficacy**
Potential pathways that might link dental treatment and employment outcomes

The available literature suggests that receiving dental treatment may help to restore physical and social function, while also leading to an improvement in self-esteem\textsuperscript{30}. For example, a study that assessed the effects of prosthodontic appliances for replacement of posterior teeth to improve masticatory function demonstrated that there was a significant improvement in subjective as well as objective masticatory function in subjects receiving prostheses\textsuperscript{31}. Davis et al. showed that aesthetic restorative treatment also had a positive effect on patients’ self-esteem\textsuperscript{32}.

Based on the existing dental and psychosocial literature, we designed a conceptual framework, which depicts the association between dental care and employment outcomes (Figure 3). According to this framework, addressing physical, pathological and psychological concerns related to dental issues can potentially improve an individual’s sense of self-efficacy, which in turn may result in positive outcomes relating to employment. This dissertation was designed, in part, to explore and confirm the existence of the pathways proposed within the framework described above.
Figure 3: Conceptual pathways of receiving dental care to employment and quality of life outcomes
Social assistance in Canada and Ontario

In Canada, social assistance programs, also known as income assistance or welfare, can be considered a last resort social safety net established to catch those who fail to financially support themselves and their families\(^3^3\). Therefore, such programs, which are administered provincially, are fundamentally important for alleviating the effects of poverty and meeting the basic necessities of life\(^3^4,3^5\). To establish social assistance for such vulnerable populations, the Canada Assistance Plan (CAP) became effective as a statute in 1966. In its early years, the proportion of people on social assistance in Ontario were much lower as compared to Canada overall. However, in the wake of a recession (early 1990s), the number of assistance recipients skyrocketed in Ontario\(^3^3\) (Figure 4). Welfare transfers to provinces were capped at this time, which created questions of sustainability in social assistance programming in Ontario. As a result, in 1996, Ontario changed the nature of its program by making it a mandatory work-for-welfare program and named it “Ontario Works” (OW). The purpose of the OW program was to help people become employed and self-reliant\(^3^5\). According to Kneebone and White, in the year 2012, 1,868,585 social assistance beneficiaries existed in Canada, out of which 873,461 (46.7%) lived in Ontario. “The number of beneficiaries refers to the total number of single individuals and heads of family units on social assistance, plus all their dependents (i.e., spouses, dependent children and dependent adults)”\(^3^3\). However, according to Statistics Canada, in the same year, approximately 38.7% of Canada’s population lived in Ontario\(^3^6\).
Table 1: Social assistance recipients in Canada and Ontario

<table>
<thead>
<tr>
<th></th>
<th>General population*</th>
<th>Social assistance recipients**</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Canada</strong></td>
<td>34,880,491</td>
<td>1,868,585</td>
</tr>
<tr>
<td><strong>Ontario</strong></td>
<td>13,505,900</td>
<td>873,461</td>
</tr>
</tbody>
</table>

* Statistics Canada, 2012
** Kneebone and White, 2014

Figure 4: Trends in social assistance rates in Canada and Ontario (Source: Kneebone and White, 2014)
Funding dental care in Canada

In Canada, the majority of dental services are paid for on a private basis with or without the assistance of private dental insurance. Provincial and municipal governments offer few dental programs often with limited procedures available. Their approach is not universal, but targeted to specific groups such as low-income children, seniors, or social assistance recipients. Because dental care is not a publicly insured service, income is a strong predictor of service utilization and access. According to the recent Canadian Health Measures Survey, 32% of Canadians have no dental insurance, and must pay for dental treatment using their personal funds. In turn, 17.3% of Canadians have also reported that they have avoided visiting a dental professional within the last year because of costs.

Social assistance policy and access to dental care in Canada

Access to dental care is becoming an increasingly important policy issue in Canada. It has gained the attention of the public as well as dental and medical professionals; specifically in terms of the inadequate levels of government support for unemployed, low income, and/or working poor individuals. In 2007, the Toronto Star newspaper featured the story of Jason Jones, a 25 year-old male, whose predicament was the inability of finding and maintaining employment due to consistent pain from infected teeth. The Toronto Star also explored the case of a low-income worker named Moses Han, who lost his vision as a consequence of a dental infection because he lacked the means to pay for treatment.

Many organized bodies are also mounting pressure on Canadian governments to expand public dental services to marginalized populations. A lobby group called Modernizing Income Security for Working-Age Adults, supported by business executives and community activists, has been calling for a ‘Denticare’ program because of the health problems caused by dental disease.
and the barriers a broken smile can create for people trying to find jobs. In Toronto, Canada’s largest municipality, the Toronto Oral Health Coalition has stated that poor oral health adds to the difficulty of obtaining good jobs, and that oral health can form part of the bridge to employment and financial independence. Therefore, timely access to dental care is positioned as important for achieving good oral health, in turn alleviating the physical and psychological aspects of poor oral health, and ultimately helping in the attainment of positive social and economic outcomes.

In acknowledging dental health issues as a barrier to employment, the province of Ontario supports discretionary dental care benefits for adults under the OW program, which is run locally by municipalities and supported by the Ministry of Community and Social Services (MCSS). This program primarily provides financial and employment assistance to social assistance recipients and, in addition, discretionary dental care to support a person’s efforts at employability. Importantly, improving access to dental care was also a large part of the Ontario government’s recent poverty reduction strategy. The assumption is that long-term unemployed persons, who often face multiple barriers to employment, are unable to obtain dental care, which reduces their chances of becoming work ready. On this basis, there are social and economic imperatives for providing timely dental treatment. Again, for this reason, many have and continue to argue that Canadian governments should be placing more emphasis on dentistry.

**Welfarism and neo-liberal rationalizations**

Overall, providing access to dental care to people on social assistance can be regarded as an important policy instrument from two perspectives:

1) **Welfarism**: Interventions that aim to overcome barriers to health care, increase individual capacity, and improve social benefits and employment should be promoted to address
inequity. The emphasis here is on increasing employment rates by providing the social services needed to allow people to take up work. World Health Organization policies advocate for such interventions in this context\textsuperscript{11,42}.

2) Neoliberalism: The idea of “welfare-to-work” demands that access to dental care be framed as a cost savings proposal, because spending on dental care is expected to break cycles of dependency resulting in savings in social assistance thereby leading to reductions in the costs of welfare. The idea is about making investments in services and benefits now, such that they will pay-off in the future, thus preventing social exclusion while promoting social inclusion\textsuperscript{43}.

Rationale

Given the above, significant advocacy and policy attention has been placed on the connection between poor oral health and compromised employment outcomes\textsuperscript{44}. Policy recommendations to improve access to dental care for socially disadvantaged populations have been based on the assumption that the provision of needed dental care will improve the chances of an individual provided such treatment acquiring a job. Yet the question must be asked: What evidence is there to actually support the notion that receiving dental care will improve a person’s employment outcomes?

Goal and hypothesis

The goal of this research was to provide policy makers with better information about the effects of dental treatment on employment outcomes among people on social assistance. According to my null hypothesis, for people on social assistance who have oral and dental problems, receiving dental care will have no effect on their employment outcomes. As per my alternative hypothesis,
for people on social assistance who have oral and dental problems, receiving dental care will improve their employment outcomes.
Chapter 2: Methodology

In this chapter, after enumerating my specific objectives, I will present detailed methods used for each objective. I will present details of data sources, how data were obtained, managed and analyzed, and from what organizations ethics approval was obtained. Importantly, these methods will be duplicated to a large extent in three successive chapters (3, 4, and 5), which are the manuscripts pertaining to each objective.

Objectives

To assess the potential impact of dental treatment on employment outcomes among people on social assistances, the following objectives were formulated:

1) Conduct a systematic review of the literature on the relationship between dental treatment and employment outcomes.

2) Assess the employment outcomes of social assistance recipients in Ontario after receiving dental treatment.

3) Observe self-perceived changes related to employment among OW adult recipients after receiving dental treatment.

Methods for the first objective

The first objective was to conduct a systematic review of the literature on the relationship between dental treatment and employment outcomes. We were aware that no such work had ever been done in Canada and therefore this was going to be the first in this domain. However, before conducting any such study, it was important to determine if any such work has been done anywhere else in the world and, if so, what findings were obtained, and what were the conceptual and methodological methods used that could inform the design of my investigation.
**Study design:** Utilizing the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, a systematic review of all published literature was conducted that studied any association between dental care interventions (from prevention to complete oral rehabilitation) and employment outcomes. Published studies were identified by searching electronic databases and hand searching of archives at the Harry R Abbott Dentistry Library, University of Toronto. Databases included: EMBASE, Ovid MEDLINE, Scopus, and Web of Science. Keywords used in the search strategy were based on the PICOS (Population, Intervention, Control, Outcome, and Study design) framework. These steps are detailed in Table 2 along with inclusion and exclusion criteria, and in Table 3. The keywords searched (and exploded) included: Oral Health, Dental Care, Dental Intervention, Dental Restoration and Dental Economics as intervention terms; Social Welfare, Vulnerable Populations and Unemployment as population terms; and Employment, Job Application and Job Satisfaction as outcome terms (Table 4). Using the Boolean method, the three sets of terms were combined. Results were limited to English language studies (due to logistic constraints) and for adults aged 18 to 64 years as people above sixty four are generally in their retirement. Endnote software was used to import all the searches from each database and in order to remove duplicates. Three independent authors searched the titles and abstracts, obtained from the initial computerised search, for potentially relevant articles for full review.

To avoid publication bias, search engines like Google and Lycos were explored to include grey literature. Contact was also made by e-mail with authors of related articles in order to obtain details about their publications, to utilize their knowledge of other possible studies that might relate to our research question, and for their expert opinion on the subject. For example, further information was retrieved from the authors of “Welfare Dental Intervention Improves Employment
and Quality of Life”, regarding the details of the list of codes used to measure the outcomes of interest in their article\textsuperscript{46}. In general, all responses were helpful in terms of background information.

Table 2: PICOS framework, inclusion and exclusion criteria

<table>
<thead>
<tr>
<th>Population</th>
<th>Adults having low affordability accessing dental treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>Any type of dental treatment</td>
</tr>
<tr>
<td>Control</td>
<td>The study may or may not have a control group; if yes, then those adults who did not access dental treatment</td>
</tr>
<tr>
<td>Outcome</td>
<td>Employment gain or better job performance or achieving promotions or better wages</td>
</tr>
<tr>
<td>Study design</td>
<td>An intervention study was an ideal choice; however, due to scarcity of literature, other study designs like cohort and cross-sectional were included</td>
</tr>
<tr>
<td>Inclusion criteria</td>
<td>Any study that included dental intervention with resulting employment outcomes; articles published in English for adults aged 18 to 64 years</td>
</tr>
<tr>
<td>Exclusion criteria</td>
<td>Studies with dental interventions that lacked employment considerations as an outcome and studies, which observed the effect of employment on dental care utilization</td>
</tr>
</tbody>
</table>

Table 3: Databases searched

<table>
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<tr>
<th>Search history of databases</th>
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<tbody>
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<td>EMBASE</td>
<td>260</td>
</tr>
<tr>
<td>Ovid MEDLINE</td>
<td>204</td>
</tr>
<tr>
<td>Scopus</td>
<td>370</td>
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<tr>
<td>Web of Science</td>
<td>346</td>
</tr>
<tr>
<td>Duplicate articles removed (429)</td>
<td>751</td>
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<tr>
<td>Relevant articles at title stage</td>
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<tr>
<td>Total articles selected</td>
<td>3+4 = 7</td>
</tr>
</tbody>
</table>
Table 4: Search strategy

<table>
<thead>
<tr>
<th></th>
<th>Search strategy</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>exp dental care/ or dental intervention.mp.</td>
<td>225151</td>
</tr>
<tr>
<td>2</td>
<td>exp &quot;health care cost&quot;/ or exp income/ or dental economics.mp.</td>
<td>220862</td>
</tr>
<tr>
<td>3</td>
<td>exp dental health/</td>
<td>1701</td>
</tr>
<tr>
<td>4</td>
<td>oral health.mp.</td>
<td>11744</td>
</tr>
<tr>
<td>5</td>
<td>or/1-4</td>
<td>451628</td>
</tr>
<tr>
<td>6</td>
<td>social welfare.mp. or exp social welfare/</td>
<td>13463</td>
</tr>
<tr>
<td>7</td>
<td>vulnerable population.mp. or exp vulnerable population/</td>
<td>6051</td>
</tr>
<tr>
<td>8</td>
<td>exp unemployment insurance/ or exp unemployment/ or employment.mp. or exp self-employment/</td>
<td>10924</td>
</tr>
<tr>
<td>9</td>
<td>6 or 7 or 8</td>
<td>30027</td>
</tr>
<tr>
<td>10</td>
<td>exp temporary employment/ or exp parttime employment/ or exp employment/ or employment.mp. or exp self-employment/</td>
<td>64020</td>
</tr>
<tr>
<td>11</td>
<td>job satisfaction.mp. or exp job satisfaction/</td>
<td>20106</td>
</tr>
<tr>
<td>12</td>
<td>10 or 11</td>
<td>82374</td>
</tr>
<tr>
<td>13</td>
<td>5 and 9 and 12</td>
<td>727</td>
</tr>
<tr>
<td>14</td>
<td>limit 13 to (human and English language and adult &lt;18 to 64 years&gt;)</td>
<td>260</td>
</tr>
</tbody>
</table>

Quality assessment of the studies was done in accordance with the checklist for internal validity of studies and level of evidence (Table 5) provided in the guidelines of the Canadian Task Force on Preventive Health Care (CTFPHC)47. Recommendation grades were assigned to each study according to CTFPHC guidelines (Table 6). A final recommendation was also made based on GRADE (Grades of recommendation, assessment, development and evaluation) guidelines developed for clinicians and policymakers in a six part British Medical Journal series48.
Table 5: Quality criteria and level of evidence (Source: adapted from the Canadian Task Force on Preventive Health Care, 2002)

<table>
<thead>
<tr>
<th>Internal validity criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Was there appropriate assembly and maintenance of comparable groups?</td>
</tr>
<tr>
<td>2. Was there adequate follow-up?</td>
</tr>
<tr>
<td>3. Were interventions clearly defined?</td>
</tr>
<tr>
<td>4. Were equal, reliable and valid outcome measures used?</td>
</tr>
<tr>
<td>5. Were the analyses/ sample size appropriate and was intention to treat analysis used?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level of evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Evidence from at least one well-designed randomized controlled trial</td>
</tr>
<tr>
<td>II-1 Evidence from well-designed controlled trials without randomization</td>
</tr>
<tr>
<td>II-2 Evidence from well-designed cohort or case-control analytic studies, preferable from more than one centre of research group</td>
</tr>
<tr>
<td>II-3 Evidence from comparisons between times and places with or without the intervention; dramatic results from uncontrolled studies could also be included here</td>
</tr>
<tr>
<td>III Opinions of respected authorities, based on clinical experience; descriptive studies or reports of expert committees</td>
</tr>
</tbody>
</table>

Table 6: Recommendation grades (Source: adapted from the Canadian Task Force on Preventive Health Care, 2002)

<table>
<thead>
<tr>
<th>Recommendation grades for specific clinical preventive actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>A The CTF concludes that there is a <strong>good</strong> evidence to recommend the clinical preventive action</td>
</tr>
<tr>
<td>B The CTF concludes that there is a <strong>fair</strong> evidence to recommend the clinical preventive action</td>
</tr>
<tr>
<td>C The CTF concludes that the existing evidence is <strong>conflicting</strong> and does not allow making a recommendation for or against use of clinical preventive action; however other factors may influence decision-making.</td>
</tr>
<tr>
<td>D The CTF concludes that there is a <strong>fair</strong> evidence to recommend against the clinical preventive action</td>
</tr>
<tr>
<td>E The CTF concludes that there is a <strong>good</strong> evidence to recommend against the clinical preventive action</td>
</tr>
<tr>
<td>I The CTF concludes that there is <strong>insufficient</strong> evidence (in quantity and/or quality) to make a recommendation, however other factors may influence decision-making.</td>
</tr>
</tbody>
</table>
Methods for the second objective

The second objective was to assess employment outcomes of social assistance recipients in Ontario after they had received dental treatment. We wanted to analyze local public health unit data for OW adult recipients in combination with administrative data held at the MCSSS, to examine changes in employment outcomes after the receipt of dental treatment. The primary objective was to assess the proportion of OW recipients who left assistance within twelve months of receiving dental treatment and compare that to those who did not receive treatment. Secondary objectives were to observe the proportion of recipients who left within one year of receiving various types of treatment.

Study design: Using administrative data from five regions in Ontario, we conducted a retrospective cohort study to evaluate the effect of dental treatment provided to social assistance recipients (OW clients), aged 18-65 years, in terms of their employment outcomes. OW clients who received any kind of dental treatment constituted the exposed cohort, and those who did not receive any such treatment constituted the non-exposed cohort. Both cohorts were followed for a one-year time period to observe if they left OW at intervals of three (T3), six (T6), and twelve (T12) months from baseline (T0). For the exposed cohort, T0 was the month of their last dental appointment and for the non-exposed cohort it was the first month of observation. Our main working assumption was that people who did not receive treatment did not have any significant self-perceived dental problems. Ethics approval for conducting this research was obtained from the Research Ethics Board of the University of Toronto and also from social services departments of each participating region in Ontario.

Data sources and variables: Through the Ontario Association of Public Health Dentistry (OAPHD) listserv we contacted all Public Health Units (PHUs) asking for their participation in
this project. Five PHUs agreed to participate and prepared dental treatment data in consultation with their respective social services departments. PHUs did not want their identities disclosed. Dental treatment data of the exposed cohort were obtained for the year 2011, which included the case identification number of the OW client, date of the last treatment, the type of treatment received, and the treatment code as per the Ontario Dental Association fee guide. Treatment codes were used to distinguish the treatment types received, such as receiving dentures for missing teeth; treatment for gingival and periodontal infections; treatment for front teeth; or preventive treatment. Case identification numbers were used to match these data with administrative data held at the MCSS. This allowed us to access demographic information. For the non-exposed cohort, using the Microsoft SQL Server 2008 Random Number Generator, random OW clients that did not receive dental treatment in the year 2011 were selected from the MCSS administrative data for the same five regions.

We prepared a variable concerning the reason for leaving OW. Clients leave OW for varied reasons; in the MCSS database there are approximately fifty codes to identify these reasons. These reasons include but are not limited to employment; enrolled in some training program; death; or moving out of the province or onto other social assistance programs. There can be more than one reason for leaving OW; however, the code matching the most suitable reason was noted. Unemployment rates of the five regions were also collected from Statistics Canada’s Canadian Socio-Economic Information Management System (CANSIM). After matching the datasets for all five regions, data were combined and anonymized by removing all identification numbers.

**Sample size and statistical analysis:** The available literature suggests that approximately 20% of clients leave social assistance programs in Canada on an annual basis. The only other study that was similar to ours was conducted in San Francisco, US, and showed that people who completed
dental treatment had twice the proportion of favorable/neutral employment outcomes, as compared to those who did not complete treatment\textsuperscript{46}. Thus estimating a 20% probability of leaving OW for the non-exposed cohort and using a conservative odds ratio of 1.7, we assessed that the exposed cohort had a probability of 29.8% of leaving OW. The test statistic used was the Z test with pooled variance and a two sided significance level of 0.05\textsuperscript{50,51}. Based on this, our sample size calculation resulted in 302 participants in each cohort to detect the desired difference between groups.

Standardized differences were used to compare variables of interest between the two cohorts. The primary analysis assessed whether dental treatment changed the probability of leaving OW within 12 months of receiving treatment (irrespective of the treatment type). Chi-squared analysis was performed to calculate the proportions and the unadjusted odds of leaving at T12. Multivariable binary logistic regression was then performed to adjust for other possible confounding variables, including age, sex, level of education, family structure, family size, child count, young child (< 4 years), country of birth (born in or outside Canada), earning at baseline, the amount earned at baseline, and regional unemployment rate. All variables in the model were specified \textit{a priori} to avoid over-fitting, biased standard errors, and falsely narrow confidence intervals\textsuperscript{52}. Variance inflation factors were used to check for multi-collinearity among predictors.

A secondary analysis assessed whether the probability of leaving OW within 12 months of receiving treatment changed by the type of dental treatment received. We also assessed whether the proportion leaving for employment was different between the treatment and the no-treatment cohort. A post-hoc analysis employed longitudinal methods to observe if the trajectory of leaving OW over the one year time period was different for those who received any treatment or particular types of treatment, as compared to those who received no treatment. Specific months for leaving OW were requested from the MCSS to conduct this analysis.
Methods for the third objective

The third objective was to observe self-perceived changes related to employment among OW adult recipients after they had received dental treatment. We wanted to conduct a pre- and post-dental treatment survey among OW recipients who have dental problems, to understand what psychosocial changes related to employment are perceived at the individual level after receiving dental treatment. We hypothesized that for people on social assistance with dental problems; receiving treatment reduces their dental disability and thereby improves their job-seeking self-efficacy. Therefore our sub-objectives were to observe changes in dental disability and job-seeking self-efficacy among recipients of social assistance after they had received dental treatment. Also, we wanted to determine the correlation between change in dental disability and change in job-seeking self-efficacy.

Study design: A descriptive correlational study was designed to conduct a pre- and post-dental treatment survey among people on social assistance. A fifty-item questionnaire was administered to assess oral health related quality of life, job-seeking self-efficacy, and self-perceived dental needs of participants. Information about participants’ demographics, habits, and general health was also collected. This information included: age; sex; general health conditions; habits such as smoking, alcohol, recreational drugs, gambling; family structure; type of accommodation; number of children in care and their age; born in or outside Canada, and if outside, for how long have they been in the country. Qualitative data were also collected through open-ended questions to assess how dental problems affect an individual physically, pathologically and psychosocially from an employment perspective; what financial hardships social assistance recipients experience in accessing dental care; and what changes, if any, are present in their employment experiences after receiving dental treatment.
Study participants: Clients of OW (age range 18-65 years), who had any kind of dental problem and who sought dental care at public health clinics in the City of Toronto, at dental clinics of Faculty of Dentistry, University of Toronto, or at Community Health Centers (CHCs) in Toronto were selected for this study. Ethics approval for conducting this research was obtained from the Research Ethics Board of the University of Toronto (protocol reference # 30174) and also from Toronto Public Health (file # 2014-17). An invitation letter for the participants, describing the purpose of the study and contact information of the principal investigator (PI) was made available at reception desks and notice boards at CHCs. Potential subjects who phoned the PI were provided further details of the study and screened through simple inclusion criteria questions (social assistance status, age, and having a dental problem). They were then invited to the Faculty of Dentistry for a face-to-face survey. The interviews were conducted in an isolated, well lit room, with comfortable chairs, where only the PI and the interviewee were present. Participation was strictly voluntary. A thorough verbal explanation of the study, along with a hard copy of its details was provided to all participants. Those who wished to participate were then enrolled and a written informed consent was signed. Pre- and post-treatment non-identifiable pictures were taken for those who consented. A second interview was conducted after one month of receiving dental treatment, which has been reported as being a reasonable time gap to conduct a post-treatment survey. The same item questionnaire was re-administered, asking if any demographic or behavioral factors had changed.

We know of no study that has tried to assess employment-related psychosocial changes after the receipt of dental treatment. Therefore, ours is a pilot study, having both a quantitative and a qualitative component, with a convenience sample size of 30 participants. As per Hardon et al., for descriptive studies, a sample size of at least a sample of 30 people is needed; it needs to be
large enough to reflect important variations in the study population, but small enough to facilitate intensive study. To increase the recruitment and retention of participants, we provided an honorarium of CAD 50 for their time at each appointment.

**Instruments used**

**Oral Health Impact Profile (OHIP-14):** This instrument was developed to measure people’s perception of the social impact of oral diseases on their well-being. It assesses the oral health related quality of life of a patient, which is considered important in monitoring patient progress. It was originally developed as a 49-item questionnaire, which has been validated and widely used. Then a short form, comprised of 14 items, was developed and also validated. The frequency of the impact experienced is recorded on a five-point Likert scale: 0= ‘never’; 1= ‘hardly ever’; 2= ‘occasionally’; 3= ‘fairly often’; and 4= ‘very often’ (Table 7). For analysis, these ordinal values can be computed three ways: prevalence - proportion of participants reporting one or more items ‘fairly often’ or ‘very often’; extent - number of items out of fourteen reported ‘fairly often’ or ‘very often’; and severity - sum of ordinal responses, which additionally considers impacts experienced ‘hardly ever’ or ‘occasionally’ and could range from 0 to 56. To take into consideration the complete account of OHIP-14 scores, severity was computed.

The OHIP-14 has been validated in other languages, including Chinese, Japanese, Portuguese, and Spanish. The OHIP-14 has been shown to be reliable, sensitive to changes, and has adequate cross-cultural consistency. It has a rich history in understanding the physical and psychosocial impacts of poor oral health. The OHIP has been shown to be sensitive (i.e. significant changes in scores) to the effects of the provision of dental care. According to Locker et al., a change of five points on the scale is a minimally important difference. This instrument has also been used in a study of welfare recipients in San Francisco, Unites States, and explored the
association between dental treatment and employment outcomes. As the OHIP-14 questionnaire comprises some important questions about the impacts of dental problems on the activities of daily living, including employment, and the ability to work and function, it was concluded that this instrument would be valuable for this study.

Using a slightly different report, others have compiled seven dimensions of disabilities associated with dental issues (as described by Locker’s model of oral health) into two major domains: physical and psychosocial\textsuperscript{62}. The physical domain is comprised of functional limitation, physical pain, and physical disability, and the psychosocial domain includes psychological discomfort, psychological disability, social disability, and handicap. Using the instrument described by Ozhatyat, we assessed which domain most strongly correlated with change in job-seeking self-efficacy among recipients of OW\textsuperscript{62}. 
Table 7: Oral Health Impact Profile -14 (OHIP-14) questionnaires

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional limitation</td>
<td>Have you had <em>trouble pronouncing any words</em>, because of problems with your teeth, mouth or dentures?</td>
</tr>
<tr>
<td></td>
<td>Have you felt that <em>your sense of taste has worsened</em> because of problems with your teeth, mouth or dentures?</td>
</tr>
<tr>
<td>Physical pain</td>
<td>Have you had <em>painful aching</em> in your mouth?</td>
</tr>
<tr>
<td></td>
<td>Have you found <em>uncomfortable to eat any foods</em> because of problems with your teeth, mouth or dentures?</td>
</tr>
<tr>
<td>Psychological discomfort</td>
<td>Have you been <em>self-conscious</em> because of your teeth, mouth or dentures?</td>
</tr>
<tr>
<td></td>
<td>Have you felt <em>tense</em> because of problems with your teeth, mouth or dentures?</td>
</tr>
<tr>
<td>Physical disability</td>
<td>Has your <em>diet been unsatisfactory</em> because of problems with your teeth, mouth or dentures?</td>
</tr>
<tr>
<td></td>
<td>Have you had to <em>interrupt meals</em> because of problems with your teeth, mouth or dentures?</td>
</tr>
<tr>
<td>Psychological disability</td>
<td>Have you find it <em>difficult to relax</em> because of problems with your teeth, mouth or dentures?</td>
</tr>
<tr>
<td></td>
<td>Have you been a <em>bit embarrassed</em> because of problems with your teeth, mouth or dentures?</td>
</tr>
<tr>
<td>Social disability</td>
<td>Have you been a <em>bit irritable with other people</em> because of problems with your teeth, mouth or dentures?</td>
</tr>
<tr>
<td></td>
<td>Have you had <em>difficulty doing your usual jobs</em> because of problems with your teeth, mouth or dentures?</td>
</tr>
<tr>
<td>Handicap</td>
<td>Have you felt that <em>life in general was less satisfying</em> because of problems with your teeth, mouth or dentures?</td>
</tr>
<tr>
<td></td>
<td>Have you been <em>totally unable to function</em> because of problems with your teeth, mouth or dentures?</td>
</tr>
</tbody>
</table>
**Job-seeking Skills Self-efficacy (JSS) scale:** The JSS is a validated scale consisting of 12-item measures to assess the perceived influence of self-efficacy on the job-seeking skills of persons with chronic disabilities and has been previously used for people with arthritis\(^{63}\) (Table 8). Dental disease is chronic in nature and leads to physical, psychological and social disability\(^{16}\); therefore, the JSS scale was considered a useful tool to assess job-seeking self-efficacy among people with dental disabilities. The instrument was included in pre- and post-surveys to assess changes in job-seeking self-efficacy after receiving dental treatment. The scale has two factors, independence skills (IS) and social skills (SS). The IS factor is a summated scale of the first five items of the JSS, which assess confidence levels for the first five items of the questionnaire. The SS factor is a summated scale of the rest of the seven questions of the JSS. All questions are assessed on a seven-point Likert scale of where a score of one 1 indicates ‘not at all confident’ and a score of 7 indicates ‘very confident’.

**Table 8: Job-seeking Skills Self-efficacy (JSS) scale**

<table>
<thead>
<tr>
<th>Items</th>
<th>Measures to address one’s perceived level of confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Requesting a job application form?</td>
</tr>
<tr>
<td>2.</td>
<td>Completing a job application form?</td>
</tr>
<tr>
<td>3.</td>
<td>Creating a resume?</td>
</tr>
<tr>
<td>4.</td>
<td>Traveling to the interview?</td>
</tr>
<tr>
<td>5.</td>
<td>Working on your own?</td>
</tr>
<tr>
<td>6.</td>
<td>Your interview skills?</td>
</tr>
<tr>
<td>7.</td>
<td>Presenting you at an interview?</td>
</tr>
<tr>
<td>8.</td>
<td>Speaking during an interview?</td>
</tr>
<tr>
<td>9.</td>
<td>Meeting new people?</td>
</tr>
<tr>
<td>10.</td>
<td>Contributing to a meeting or discussion?</td>
</tr>
<tr>
<td>11.</td>
<td>Working with a team?</td>
</tr>
<tr>
<td>12.</td>
<td>Career advancement?</td>
</tr>
</tbody>
</table>
A set of ad-hoc questions related to an individual’s oral health and their effects on employment prospects were also asked.

1) Are you completely satisfied with how your teeth look?

2) Are you completely satisfied with your smile?

3) Do you feel the appearance of your smile/teeth make it difficult for you to interview for a job?

4) Do you feel confident that you will find work in the next three months?

These questions were asked on a digital scale of 1 to 10; with the left anchor (at 1 cm) being ‘do not agree at all’ and the right anchor (at 10 cm) was ‘completely agree’. This approach is considered a simple, sensitive and reliable way of measuring subjective experiences. However, a training/test was conducted among participants before posing the actual questions to familiarize subjects on how to use the scale (Figure 5). This helped to confirm that the subject answering the test questions using the scale understood how it is used. Four squares were depicted ranging from extreme black to extreme white and for each square the respondent was asked how black the square was on a scale of 1 to 10, where 10 means ‘extremely black’ and 1 means ‘not at all black’. If responses generate a normalization curve on box-blackness, which is more or less a straight line (Figure 6), we can presume that study population grasped what they are supposed to do with the scale.
Please answer the next four questions on a scale of 1-10, where 1 is not at all and 10 is extremely, circle any one number.

1) How black/dark is this square?

![Image of a fully black square]

Not at all ___________________________ Extremely

2) How black/dark is this square?

![Image of a less black square]

Not at all ___________________________ Extremely

3) How black/dark is this square?

![Image of a less black square]

Not at all ___________________________ Extremely

4) How black/dark is this square?

![Image of a completely white square]

Not at all ___________________________ Extremely

Figure 5: Black-box training instrument to ensure reliability of responses, answered on VAS scale
Figure 6: Normalization curve on box-blackness

Statistical analysis: Descriptive statistics for all demographic variables was conducted by univariate analysis. Shapiro-Wilk test of normality was conducted for the distribution of data of the JSS and OHIP-14 scores. If data were normally distributed, the paired t-test was used; otherwise, the Wilcoxon signed rank sum test was conducted. Effect sizes for both scales to assess changes after receiving dental treatment were calculated. For normally distributed data, mean change scores were calculated by subtracting the baseline scores from those at follow-up; effect size was calculated by dividing the mean change scores by baseline standard deviation. For data that were not normally distributed, the standard score (z) was divided by the square root of N (N = number of observations), to calculate the effect size. According to Cohen, an effect size of 0.2 is considered small, 0.4 moderate, and 0.8 large. Pearson product correlation was also performed between JSS and OHIP scores to assess if change in oral health related quality of life was correlated to job-seeking self-efficacy. Pearson correlation ranges from -1 to +1, where the sign indicates the direction of correlation and the value indicates the magnitude; 0.5 to 0.7 is considered moderate and 0.7 to 1.0 is considered strong.
Qualitative data were collected utilizing standard interview techniques, specifically a dialogical interview process\textsuperscript{67}. These data were transcribed, and then major themes were identified. Interrelated ideas were grouped together to generate themes. Themes are fundamental concepts that characterize experiences of participants by the more general insights that are apparent from the whole of the data\textsuperscript{68}.
Chapter 3: The impact of dental treatment on employment outcomes: a systematic review

Abstract

Objective: Policy advocates in North America argue that access to dental care for low income and unemployed populations can help improve the chances of acquiring a job or attaining a better job, thus having positive economic and social benefits. Our objective is to review the evidence in support of the policy hypothesis that timely access to dental care can improve employment outcomes.

Methods: A systematic review was conducted by searching various scientific databases and search engines. Key words included Dental Care, Dental Intervention, Social Welfare, Unemployment, Employment, and Job.

Results: Seven articles were considered eligible for this review. They varied in study design, target population and intervention studied. Overall, they presented low levels of evidence due to small sample sizes, lack of control groups, combined interventions or being based on anecdotal reports.

Conclusions: There is a limited amount of evidence concerning the assumption that dental care can improve employment outcomes. The scarcity of well-conducted studies and the poor quality of evidence makes it difficult to judge the effect of dental care on employment outcomes. More studies need to be conducted in order to confirm or dismiss this generalized assumption.
Introduction

Oral diseases are some of the most common chronic conditions in the world, and their adverse effects, including pathological, physical and psychological, have been abundantly demonstrated in the literature\textsuperscript{10-15, 42, 70}. The association of such adverse effects to an individual’s employment situation has also been well acknowledged \textsuperscript{11, 14, 15}. In 1999, the Department of Human Services (DHS) of the Melbourne Public Health Division, Australia, proposed a conceptual framework to demonstrate the economic burdens that oral diseases can place on the health system and society, including reduced productivity and loss of work (Figure 1)\textsuperscript{14}. In 2010, the World Health Organization (WHO) published an important report “Equity, social determinants and public health programs” flagging poor oral health as a major public health concern and acknowledging that poor oral health can lead to missed working hours, with subsequent loss of earnings and productivity \textsuperscript{11}. The U.S. Surgeon General \textsuperscript{15} estimated that 1.9 work days are lost each year because of acute dental conditions for every 100 persons. According to the recent Canadian Health Measures Survey (CHMS), 4.15 million working days are lost annually due to dental visits or dental sick-days \textsuperscript{1}. The Centers for Disease Control and Prevention (CDC), in its Healthy People 2010 report, also mentions that employed adults lose more than 164 million hours of work each year due to oral health problems or dental visits \textsuperscript{17}.

As described in Figure 1, poor oral health has a negative impact on employment participation partly due to poor appearance and reduced self-esteem, preventing attendance at job interviews and/or regular work, and reducing marketability due to social stigma\textsuperscript{14}. The U.S. Surgeon General \textsuperscript{15} states that persons with dental diseases are less employable as employers are reluctant to hire persons with poor visual appearance due to tooth loss, and more reluctant to have employees with potential frequent absences due to unmet dental needs. Mobius et al.\textsuperscript{18} have also
associated physical appearance to an individual’s non-cognitive skills, such as self-confidence and locus of control, and propose that this has a direct effect on productivity. This association is acutely relevant in the case of people on social assistance; Bedos et al.\textsuperscript{19} revealed that people on social assistance define oral health in a social manner, placing tremendous emphasis on dental appearance and the devastating impact that compromised dental appearance can have on self-esteem, social interaction, and employability. Saunders et al.\textsuperscript{20} have also described the detrimental effects that unaffordable dental care can place on the poor, including preventing their social and economic inclusion. Overall, all of these authors have emphasized the importance of urgent action towards ameliorating this situation by providing timely access to necessary dental care.

In Canada, the great majority of dental care is not publicly funded. Approximately 94\% of dental services are covered by private insurance or by out-of-pocket expenses, making income a strong predictor of utilization and access\textsuperscript{3}. According to the CHMS, 17.3\% of Canadians report avoiding visiting a dental professional within the last year because of costs, and an additional 16.5\% report declining recommended dental treatment within the last year because of costs \textsuperscript{1}. For people who cannot afford dental treatment, cost is a major barrier to timely access to care. Delayed treatment not only inhibits people from achieving good oral health but as reviewed, has implications on an individual’s social and economic participation\textsuperscript{4-7}. Therefore, timely access to dental care is becoming an increasingly important policy issue in the country. Over the past few years, it has gained the attention of Canadian society through discussions about the inadequate levels of government service provision, especially when related to unemployed, low income, and/or working poor individuals\textsuperscript{8}. Many organized bodies have pressured Canadian governments to expand and/or extend public dental services for these groups. For example, a lobby group called Modernizing Income Security for Working-Age Adults, supported by business executives and
community activists, has been calling for a ‘denticare’ program because of the health problems caused by poor teeth and the barriers a broken smile can create for people trying to find jobs. In Canada’s largest municipality, a report by the Toronto Dental Coalition stated that poor oral health affects self-esteem and the ability to enter the workforce or training. In Canada’s largest province, the Commission for the Review of Social Assistance in Ontario also recently acknowledged that many people on social assistance are not able to afford needed dental work and that its impact on health and self-confidence acts as a barrier to their employment prospects.

In acknowledging dental health issues as a barrier to employment, the province of Ontario supports discretionary dental care benefits for adults under the “Ontario Works” program, run locally by municipalities and supported by the Ministry of Community and Social Services. This program primarily provides financial and employment assistance to social assistance recipients and, in addition, discretionary dental care is provided, which is meant to support the person’s efforts at employability. This approach was further supported by the province’s Poverty Reduction Strategy, which was developed in 2008, with a focus on removing barriers and increasing opportunities for people to work. The government has identified employment as a key route for individuals and families to escape poverty. This strategy is underpinned by the belief that individual deficiencies are at the root of poverty and unemployment, rather than inadequate labour demand or the structure of employment opportunities. In this way, Ontario Works is similar to the welfare reform strategies employed in many neo-liberal countries that have prioritized rapid labour force attachment over longer-term human capital development. The neo-liberalist approach privileges individualism, the market, and the global economy by attempting to enable people on welfare and promote them from welfare-to-work. Providing access to dental care has been considered one of the options to enable this population. Again, for this reason, many argue that
Canadian governments should be placing more emphasis on dentistry, since it has the promise of decreasing the country’s level of unemployment.

Ultimately, the assumption that removing barriers to accessing dental care will improve the chances of employment is a policy hypothesis. The evidence base to support this assumption is unknown. Consequently, the aim of this paper is to review the evidence in support of this policy hypothesis.

Methods
Utilizing the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, a systematic review of all published literature was conducted, which observed an association between dental care interventions of any type (from prevention to complete oral rehabilitation) and employment outcomes. Published studies were identified by searching electronic databases and hand searching of archives at the Harry R Abbott Dentistry Library, University of Toronto. Databases were searched, and included: EMBASE, Ovid MEDLINE, Scopus, and Web of Science. Keywords used in the search strategy were based on the PICOS (Population, Intervention, Control, Outcome, and Study design) framework. These steps are detailed in Table 2 along with inclusion and exclusion criteria, and in Table 3. The keywords searched (and exploded) included: Oral Health, Dental Care, Dental Intervention, Dental Restoration and Dental Economics as intervention terms; Social Welfare, Vulnerable Populations and Unemployment as population terms; and Employment, Job Application and Job Satisfaction as outcome terms (Table 4). Using the Boolean method, the three sets of terms were combined. Results were limited to English language studies (due to logistic constraints) and for adults aged 18 to 64 years as people above sixty four are generally in their retirement. Endnote software was used to import all the searches from each database and in order to remove duplicates. Three
independent authors (SS, RC, and CQ) searched the titles and abstracts, obtained from the initial computerised search, for potentially relevant articles for full review.

To avoid publication bias, search engines like Google and Lycos were explored to include grey literature. Contact was also made by e-mail with authors of related articles in order to obtain details about their publications, to utilize their knowledge of other possible studies that might relate to our research question, and for their expert opinion on the subject. For example, further information was retrieved from the authors of “Welfare Dental Intervention Improves Employment and Quality of Life”, regarding the details of the list of codes used to measure the outcomes of interest in their article. Responses were helpful in terms of background information.

Quality assessment of the studies was done in accordance with the checklist for internal validity of studies and level of evidence (Table 5), provided in the guidelines of the Canadian Task Force on Preventive Health Care (CTFPHC) of clinicians and methodologists that makes recommendation for clinical preventive actions and promoting public health based on rigorous systematic review and synthesis of evidence. Recommendation grades were assigned to each study according to CTFPHC guidelines, after the quality assessment of studies was done (Table 6). After evaluating all studies, a final recommendation was made based on GRADE (Grades of recommendation, assessment, development and evaluation) guidelines developed for clinicians and policy-making users as a six part British Medical Journal series.

Results

Overall, seven articles were considered eligible for this review. The study size, PICOS, and critical appraisal comments for each study is presented in Table 6. The studies varied in design from intervention, prospective, retrospective, quantitative or qualitative. Two of the seven studies had
dental care interventions integrated in general health care services, which did not allow for the isolation of the effectiveness of the dental intervention; however, due to the scarcity of the literature related to the subject, these studies were included to assess if added health coverage has any potential benefits in employment outcomes. All studies presented low levels of evidence due to various reasons, including small sample sizes, lack of control groups, insufficient follow-up, large proportions lost to follow up, combined interventions or being based on anecdotal reports. The articles were also not comparable in terms of population, type of intervention or measurement of employment outcomes.

Specifically, Hyde et al\textsuperscript{46} assessed the intervention effects of rehabilitative dental treatment, under the Personal Assisted Employment Services (PAES) program in San Francisco, US, on employment outcomes of welfare recipients. Three hundred and seventy-seven welfare recipients participated, who were enrolled for a period of eighteen months (October 1999 to March 2001), in the study. The mean age of participants was 45 years and the majority (71\%) of them were males. Treatment services were rehabilitative (\textit{e.g.}, scaling and root planing, restorations, extractions, dentures) rather than involving full-mouth reconstruction. Employment outcomes were based on codes established by the municipality’s Welfare Office, which the authors divided into three categories: (1) Favourable outcomes (gained employment, transferred to other benefit programs such as Social Security or Veteran's Affairs); (2) Neutral outcomes (voluntarily left PAES, continued to remain compliant in the PAES program, or were ineligible to receive benefits due to institutionalization, death, or moving out of the country); and (3) Unfavourable outcomes (ineligible to receive benefits due to noncompliance or fraud). The method of testing the employment outcome was not strong and lacked detail and accuracy. Due to the ambiguity of codes used, the authors combined the favourable and neutral outcomes and treated the outcome as a
binary variable. In response to our e-mail, Hyde\textsuperscript{46} explains: “These employment outcome codes represented only the most current employment outcome and information regarding previous outcomes was lost”. Their research showed that participants were twice as likely to gain a favourable/neutral employment outcome after completing their dental treatment (OR (95% CI): 2.0 (1.1, 3.6)). Thirty-five percent of the participants were lost to follow-up. There was no control group in the study and nothing was mentioned as to whether the post-treatment follow up period was same for all participants.

Albright et al.’s\textsuperscript{73} report prepared for the Probation and Parole division of New Mexico’s Department of Corrections, US, described a program that was initiated to provide dental services for parolees with significant dental problems in hope of reducing barriers to employment and increasing their chances of successful re-entry into workforce. This was also an intervention study, conducted for eighteen months (May 2008 to November 2009), which was evaluated by using pre- and post-treatment surveys of the participants. While a specific inclusion criterion was set for the participants, the selection remained at the discretion of the Probation and Parole Officer (PPO), compromising the enrolment procedure. Of the 33 participants who completed the pre-treatment survey, 24 completed the treatment and 19 completed all the program requirements including the post-treatment survey. The second interview was conducted after two months of completion of dental treatment. Out of 19 participants, 10 were employed and 9 were unemployed at the time of enrolment. At the time of the post-treatment survey, 9 out of 10, who were already employed, were still employed and 2 out of 9, who were not employed at the time of enrollment, were now employed. In general, most of the participants reported no change in their employment status. However, there was a significant change to “on the job” experience. Eight participants reported that the treatment had improved their workplace experience in terms of increased confidence and
improved interactions. One participant received a promotion in her current job. An additional six participants expected that their improved oral and dental health status would increase their prospects for future employment. Overall, 74% of participants perceived some kind of positive effect of dental treatment towards their employment. As this was a small pilot program, where participants were followed for a short time period and did not have a control group, it could not effectively predict the impact of the program.

Bond conducted pre- and post-treatment surveys and interviews to evaluate the impact of the treatment program “Teeth First Trial” on long-term unemployed clients with dental conditions at The Brotherhood of St. Lawrence, a not-for-profit organization, in Australia. This trial was also conducted for eighteen months; from December 2007 to July 2009. Thirty-five people were eligible in the trial, but only ten participants finished their treatment. Treatment provided was not restricted to restorations, extractions or dentures as jaw surgery was also provided, when required. Nine out of ten completed the post-treatment survey. Eight of them reported improvements in their self-image after treatment. One participant found work, and two other participants believed that they would find work soon. The results reveal that psychological disability, which is a major barrier to employment, was addressed satisfactorily; however, the employment gain was not significant. Change in self-perception can be immediate after the treatment but gaining employment needs time; therefore, it is important to know the time elapsed between completion of treatment and post-treatment survey, which was not mentioned. Due to small sample size, lack of control group, large percentage of loss to follow up, and the nature of self-evaluation, the study was not of strong design.

Based on anecdotal feedback from HIV patients and low income individuals in the Columbia Oral Health Clinic, Tucker also reported higher levels of self-esteem after receiving free
due to improvement of physical appearance\textsuperscript{74}. Patients, whose appearance said mattered in their work, reported an increased ability to secure and maintain their jobs. However, no control group was present in the study. The most critical weakness of the study was the lack of available data in the report supporting the above conclusions, although the author claimed that 9400 patients in total were served since the year 2000. Answers to some essential questions were missing, such as how many patients finished treatment and what percentage reported improvement. The results were presented as anecdotal reports, not quantifying their findings. We attempted to contact the author for additional information regarding this issue, but did not receive any response by the time of completion of this review.

Whalen et al\textsuperscript{75} conducted a comprehensive evaluation of the impact of the Demonstration to Maintain Independence and Employment (DMIE) program, in four states (Hawaii, Kansas, Minnesota and Texas) of the US, as part of the 1999 Ticket to Work and Work Improvement Act ("Ticket Act"). The program provides improved access to medical care and other supports (including dental care) for working adults with disabilities, based on the assumption that providing such early intervention could prevent impairments from becoming a disability and result in sustained employment and independence from disability benefits. One of the eligibility criteria was that every participant should be working at least 40 hours per month at the time of enrolment. All DMIE programs were structured as randomized trial designs; the target population was recruited and then randomly assigned to two groups. The intervention group received health services beyond existing health insurance coverage and along with it included dental and vision care, expedited mental health visits, and home visits for assistance with activities of daily living. The control group received routine health services. Three reports were released from this program at different time periods. Employment outcomes in the final report were measured at 12 to 24
months after enrolment. The time period of this evaluation was different across four states because the enrolment of participants started at different times; Kansas in April 2006, Minnesota in January 2007, Texas in April 2007, and Hawaii in April 2008 and all the services ended in September 2009. The impact of the DMIE program on employment outcomes was evaluated in three ways: 1) not working in the past month, 2) average hours worked in the past month, and 3) annual earnings. Among all three measures, there were no statistically significant differences observed between the intervention and control group. This was arguably influenced by the baseline selection criteria, which required participants to be working at the time of enrolment. The authors acknowledged that a longer follow up might show some substantive changes in employment outcomes. As this study was primarily observing effects of medical care, and dental care was only a part of it, any direct association of the dental intervention on employment outcomes could not be derived.

Using data from the Brazilian National Household Survey for the time period between 1995 and 2003, Rocha and Soares\textsuperscript{76} compared the adult labour supply and employment levels of municipalities of Brazilian North and Northeast regions, covered by the Family Health Program (Programa Saúde da Família – PSF) with those not covered by the program. The results revealed that municipalities eight years into the PSF program had an adult labour supply 6.8\% higher and employment levels 11\% higher than otherwise equivalent municipalities not covered by PSF. A large number of participants were followed up for a considerable amount of time; however, as the intervention was an integrated one (dental service in conjunction with general health care), it could not allow the demonstration of a direct association between access to dental care and employment outcomes.

Glied and Neidell\textsuperscript{77} evaluated the impact of community water fluoridation exposure in childhood on earnings of adults, who were born between the years 1957 and 1964. They combined
secondary data abstracted from several different sources including the CDC (for record of water fluoridation), National Longitudinal Study of Youth demographic data (NLSY79) (for demographic data), and City and County Data Books and Bureau of Economic Analysis county level data (for family income). The study exploited the quasi-random timing of the adoption of community water fluoridation in various American counties. Their results showed that access to fluoridated water during childhood increased earnings by roughly 2% overall, with approximately 4% in low-income women but no detectable effect for similar men. The authors argue that their study supports the argument that better teeth lead to better employment, and that women are held to a different standard in their physical appearance when compared to men. Interestingly, the effects are largest for women from low socioeconomic status families, meaning that these women experience greater gains by growing up in communities that fluoridate their water supplies. As reported by the authors, although great efforts were made to minimize the measurement errors in the study, those errors were inevitable due to the diverse sources of data and the many co-variables in the statistical analysis. The results were also weakened by the numerous assumptions that the authors had to make in the data analysis. As presented in their paper, in their baseline estimates, they assumed that respondents remained in the county of their birth for the first five years of life. This approach may misallocate fluoride exposure and be considered a measurement error. Apart from this, there is a possibility of various others unaccounted for variables, which could have affected adult employment outcomes.
Table 9: Methodological quality of studies on the effectiveness of dental interventions on employment outcomes

<table>
<thead>
<tr>
<th>Study</th>
<th>Internal Validity Criteria*</th>
<th>Level of evidence*</th>
<th>Overall rating and recommendation**</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Hyde et al., 2006</td>
<td>-</td>
<td>?</td>
<td>+</td>
</tr>
<tr>
<td>Albright et al., 2011</td>
<td>-</td>
<td>-</td>
<td>?</td>
</tr>
<tr>
<td>Bond et al., 2010</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Tucker, 2010</td>
<td>-</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Whalen et al., 2011</td>
<td>+</td>
<td>?</td>
<td>+</td>
</tr>
<tr>
<td>Rocha &amp; Soares, 2009</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Glied &amp; Neidell, 2010</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

*Based on Table 4, ** Based on Table 5
Table 10: Details of the studies included in the review

<table>
<thead>
<tr>
<th>Author, date</th>
<th>Population (Age, sex, location)</th>
<th>Intervention (Number studied)</th>
<th>Control treatment (Number studied)</th>
<th>Outcome</th>
<th>Study design and critical appraisal</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. Hyde et al., 2006</td>
<td>Welfare recipients 21-63yrs; 71% male; San Francisco, CA, USA</td>
<td>Rehabilitative dental treatment; 377 participants</td>
<td>No control group, participants who did not finish treatment were considered controls</td>
<td>Twice as likely to gain favourable/neutral outcomes by PAES Codes from SFDHS</td>
<td>An intervention study in a community. Grouping of favourable and neutral outcomes does not seem reasonable; 35% lost to follow up.</td>
</tr>
<tr>
<td>D. Albright et al., 2011</td>
<td>People on probation or parole, mean age 43 yrs, 61% females, New Mexico, USA</td>
<td>Comprehensive dental care depending on need of the participant, including cosmetic care except teeth whitening and/or straightening with braces, 33 participants</td>
<td>No control group</td>
<td>74% of participants perceived some kind of positive effect of dental treatment towards their employment</td>
<td>An intervention study. As it was a pilot study, the sample size was small and lacked power. The follow up time too short to assess effectiveness.</td>
</tr>
<tr>
<td>S. Bond, 2010</td>
<td>Long-term unemployed; 22-48yrs with median age 36; 54% females, Frankston and the Mornington Peninsula, Melbourne, Australia</td>
<td>Rehabilitative to surgical dental treatment; 35 participants received dental assessment, 26 commenced treatment and only 10 completed the required treatment</td>
<td>No control group</td>
<td>9 out of 10 who finished treatment completed post-treatment questionnaire. Outcome was assessed more in a qualitative manner. 8 believed that treatment improved their self image; 1 found work; 2 believed they would obtain work soon; 1 would start further training soon</td>
<td>An intervention study in a community. No control group; small sample size; subjective evaluation of the results; large percentage lost to follow up</td>
</tr>
<tr>
<td>B. Tucker, 2010</td>
<td>HIV+ and homeless and uninsured individuals in Columbia Oral Health</td>
<td>Oral examination, rehabilitative treatment with limited endodontic treatment, and oral cancer screening. 1237 HIV+ and</td>
<td>No control group</td>
<td>Increased self-esteem and employability; increased ability to take medication and enhanced access to</td>
<td>Interventions at community level, no quantitative analysis as results are based only on anecdotal reports. The</td>
</tr>
<tr>
<td>Study</td>
<td>Location</td>
<td>Population / Setting</td>
<td>Services Provided</td>
<td>Results / Findings</td>
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<tr>
<td><strong>D. Whalen et al., 2011</strong></td>
<td>Clinic, South Carolina, USA</td>
<td>846 homeless and uninsured individuals were examined between Oct 2008 and Sept 2009</td>
<td>Dental service (anecdotal reports)</td>
<td>At 12-24 months of interval from enrollment, there was no difference in employment outcomes between intervention and control group.</td>
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<td></td>
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<td></td>
<td>A randomized controlled trial in four communities. As all participants were employed at baseline, a longer follow up might be needed to assess changes related to employment or income.</td>
<td></td>
</tr>
<tr>
<td><strong>R. Rocha &amp; R. Soares, 2009</strong></td>
<td>Working adults with disabilities, 18-62yrs old with mean age 46yrs, approximately 62% females, Hawaii, Kansas, Minnesota and Texas, USA</td>
<td>Early comprehensive health care including dental, eye and mental health care, participant numbers vary by state; Kansas-500, Minnesota-1155, Texas-1585, Hawaii-184</td>
<td>Routine existing health coverage which does not include dental, eye, and mental health care</td>
<td>At 12-24 months of interval from enrollment, there was no difference in employment outcomes between intervention and control group.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A randomized controlled trial in four communities. As all participants were employed at baseline, a longer follow up might be needed to assess changes related to employment or income.</td>
<td></td>
</tr>
<tr>
<td><strong>S. Glied &amp; M. Neidell, 2010</strong></td>
<td>Communities exposed to fluoridated water, Census, USA</td>
<td>Community Water Fluoridation, CDC (N=72,395), Demographic data: NLSY79 (N=over 12,000)</td>
<td>Fluoride exposure in childhood increased earnings by roughly 2% overall; approximately 4% in women. Effects of fluoride exposure on earnings are largely concentrated among low SES women.</td>
<td>Limited validity due to many covariables and significant assumptions made by authors in data analysis.</td>
<td></td>
</tr>
</tbody>
</table>
Discussion

The difficulty we encountered in finding relevant literature pertaining to the provision of dental care and employment outcomes among low income and unemployed populations suggests that while it is easy for people to assume that dental care can improve such outcomes, it is much harder to demonstrate that this is or is not the case. In terms of the evidence that does exist, it was not strong. This can be due to the complex nature of the intervention or the population of interest. To be sure, the populations observed across studies were diverse. Although all studies mainly focused on vulnerable and low socioeconomic status populations, the target groups varied from welfare recipients, unemployed clients, HIV positive participants, to homeless recipients in poor communities. Most of the studies were intervention studies, however, the dental services varied significantly, ranging from clinical examinations, restorations, extractions, cleanings, dentures, limited endodontic treatments, surgeries, oral cancer screenings and crowns, to community water fluoridation. This diversity prevented any comparison between studies, leading to difficulty in evaluating the effectiveness of specific dental procedures on the proposed outcome, thus not allowing for a common conclusion. The methods used for assessment of the outcomes varied as well. In the seven articles, different measurements were used to evaluate the impact of receiving dental care on employment outcomes, including surveys, administrative data from a computerized welfare system, reported earnings, labor supply, employment rate and anecdotal feedback from patients. The power of some studies was also low because of the small sample sizes and loss to follow up. One of the studies was a randomized controlled trial, a study design able to provide strong evidence, but as the study’s intervention was comprehensive health care services including dental care as only one part, the true effect of dental care could not be assessed. Apart from this, the follow-up period of the study was also too small to determine any stable effects. All the studies,
except the study done by Hyde et al. showed insufficient evidence. Hyde et al. examined a direct evaluation of a dental intervention and the sample size was also adequate; however, assimilation of favorable and neutral employment outcomes did not seem reasonable and therefore gives conflicting evidence.

In the context of making recommendations, the quality ratings reflect the extent of reviewers’ confidence that the estimates of an effect are adequate to support a particular decision or recommendation. Three studies had an indirect estimation of the effectiveness of a dental intervention, two studies had too small of a sample size to predict the effect of the intervention, and one study was based on anecdotal feedback with a lack of details. The only study (Hyde et al.) with a reasonable study design also suffered from apparent measurement bias. The study designs were not totally flawed, yet, because of lack of control groups, small sample sizes and inadequate follow-up, this substantially reduced the quality of evidence and internal validity of the studies. Thus, the risk of bias, imprecision in measurement, inconsistency in study designs, and the indirectness of assessing the effectiveness of a dental intervention makes the overall recommendation for effectiveness weak; dental care interventions among vulnerable, low socioeconomic individuals may have a positive effect on employment outcomes but uncertainty exists.

**Conclusion and implications**

The scarcity of well-conducted studies, as well as the poor quality of evidence in the reviewed articles, makes it difficult to judge the effect of dental care on employment outcomes. Our review shows that there is a limited amount of evidence concerning the idea that dental care can improve employment outcomes. This does not mean that the assumption is false, only that if it is to be used as a strong argument for public policy, more evidence is needed. The lack of
published work in this area points to the pressing need for further investigation with well-designed studies. Therefore, we considered conducting a study among social assistance recipients of Ontario, with large sample size, adequate follow-up period, and minimal risk of loss of participants during follow-up. We also wanted to make sure to achieve an adequate proportion of people who leave social assistance specifically for employment reasons.
Chapter 4: The impact of dental treatment on the employment outcomes among social assistance recipients

Abstract

Background: Similar to many welfare states, Canada’s most populated province, Ontario, provides limited dental care to people on social assistance programs in order to meet health needs and to promote the move from welfare-to-work. Policy advocates continue to argue for the expansion of services for similar reasons. However, there is little to no evidence to support the idea that receiving dental care ultimately improves employment outcomes. This study was conducted to contribute to the evidence base regarding this policy hypothesis.

Methods: A retrospective cohort study was designed using administrative data from five Ontario regions and from the province’s social assistance ministry. Employment outcomes among treatment and no-treatment cohorts were assessed at three, six and twelve months from baseline, with the primary endpoint defined as twelve months. Multivariable regression modeling was performed to observe whether there were differences in employment outcomes between the two groups.

Results: We received data for 8742 people (2742 treatment, 6000 no-treatment). At one year, employment outcomes were not significantly different for people who received dental treatment (adjusted odds ratio = 0.93; 95% CI: 0.83-1.03) relative to those who did not receive treatment. Post-hoc analysis revealed that the change in proportion of individuals leaving social assistance for employment over time was significantly higher (p=0.0014) among those receiving treatment (13% to 29%; 124% increase) than those not receiving treatment (18% to 33%; 83% increase).

Conclusion: At one year, dental treatment does not appear to be significantly associated with leaving assistance for employment in this population. However, this study suggests that people
who received dental treatment may have been particularly disadvantaged and dental treatment may help to level them up in terms of employment outcomes over time.

**Introduction**

Oral diseases affect routine functions such as the ability to eat and speak, and also impact self-esteem, psychological and social well-being, interpersonal relations, and employment\(^9\text{-}^{15}\). In this regard, the burden of oral disease and its impacts are disproportionately concentrated among socially disadvantaged individuals\(^1\), while at the same time, the latter’s association of psychological and social function with dental health is reported as being particularly strong\(^9\text{-}^{10}\). For example, in a qualitative study conducted in Canada, Bedos et al. demonstrated that people on social assistance defined their oral health in a social manner, placing significant value on dental appearance, and reporting negative impacts on self-esteem, social interactions, and employability when their dental appearance was compromised\(^19\). In a quantitative study in Australia, Saunders et al. demonstrated the detrimental effects that a lack of dental insurance coverage can have on self-esteem and employment prospects among people with limited incomes, as well as on their economic and social inclusion\(^20\).

In welfare states, such as Australia, Canada, and the United States (US), access to dental care continues to be a challenge, as the majority of care is funded on a private basis with or without dental insurance\(^3\text{-}^{20},^{46}\). This issue has gained the attention of health professionals and policy stakeholders, specifically in regards to the inadequate levels of government support for unemployed, low income, and/or working poor individuals\(^37\). In the province of Ontario, Canada most populated jurisdiction, oral health issues are acknowledged as a barrier to employment and limited financial resources as a barrier to accessing dental care, thus discretionary dental care benefits are provided for adults under the Ontario Works (OW) program. The OW program is run
locally by municipalities and supported by the province’s Ministry of Community and Social Services (MCSS)\textsuperscript{41}, and provides financial and employment support to social assistance recipients. Importantly, improving access to dental care is also a part of the Ontario government’s recent poverty reduction strategy\textsuperscript{37}; the assumption being that unemployed persons are unable to obtain dental care, which may reduce their chances of becoming work ready.

Providing access to dental care to people on social assistance has generally been rationalized from different perspectives. From a social justice perspective, interventions that aim to overcome barriers to health care are believed to increase individual capacity and self-efficacy and should be promoted to address inequity. Providing social services, such as dental services, to allow people to take up work can increase employment rates thereby promoting social inclusion. World Health Organization policies advocate for such interventions in this context\textsuperscript{11, 42}. The neo-liberal turn in Canada and in other welfare states demands that access to dental care be framed as a cost savings proposal, because spending on dental care is expected to break cycles of dependency resulting in savings by reducing social assistance costs. The idea is to make investments in services and benefits now, such that they will have pay-offs in the future\textsuperscript{43}.

For such reasons, policy entrepreneurs across welfare states continue to advocate for improvements in access to dental care for socially disadvantaged groups\textsuperscript{20, 44, 79, 80}. Yet this policy advocacy lacks evidence to support the notion that receiving dental care improves employment outcomes\textsuperscript{21}. In particular, the scarcity of well-conducted studies makes it difficult to understand the effect of dental care on the employment outcomes of socially disadvantaged populations. The objective of this study was thus to examine the effects of dental treatment on employment outcomes among those receiving social assistance in Canada’s most populated jurisdiction, Ontario.
Methods

Study design: Using administrative data from five regions in Ontario, we conducted a retrospective cohort study to evaluate the effect of dental treatment provided to social assistance recipients (OW clients), aged 18-65 years, in terms of their employment outcomes. OW clients who received any kind of dental treatment constituted the exposed cohort, and those who did not receive any such treatment constituted the non-exposed cohort. Both cohorts were followed for a one-year time period to observe if they left OW at intervals of three (T3), six (T6), and twelve (T12) months from baseline (T0). For the exposed cohort, T0 was the month of their last dental appointment and for the non-exposed cohort it was the first month of observation. Standardized differences were used to compare variables of interest between the two cohorts. Our main working assumption was that people who did not receive treatment did not have any significant self-perceived dental problems. Ethics approval for conducting this research was obtained from the Research Ethics Board of the University of Toronto and also from social services departments of each participating region in Ontario.

Data sources and variables: Through the Ontario Association of Public Health Dentistry (OAPHD) listserv we contacted all Public Health Units (PHUs) asking for their participation in this project. Five PHUs agreed to participate and prepared dental treatment data in consultation with their respective social services departments. PHUs did not want their identities disclosed. Dental treatment data of the exposed cohort were obtained for the year 2011, which included the case identification number of the OW client, date of the last treatment, the type of treatment received, and the treatment code as per the Ontario Dental Association fee guide. Treatment codes were used to distinguish the treatment types received, such as receiving dentures for missing teeth; treatment for gingival and periodontal infections; treatment for front teeth; or preventive treatment.
Case identification numbers were used to match these data with administrative data held at the MCSS. This allowed us to access demographic information. For the non-exposed cohort, using the Microsoft SQL Server 2008 Random Number Generator, random OW clients that did not receive dental treatment in the year 2011 were selected from the MCSS administrative data for the same five regions.

We prepared a variable concerning the reason for leaving OW. Clients leave OW for varied reasons; in the MCSS database there are approximately fifty codes to identify these reasons. These reasons include employment; enrolled in some training program; death; or moving out of the province or onto other social assistance programs. There can be more than one reason for leaving OW; however, the code matching the most suitable reason was noted. Unemployment rates of the five regions were also collected from Statistics Canada’s Canadian Socio-Economic Information Management System (CANSIM). After matching the datasets for all five regions, data were combined and anonymized by removing all identification numbers.

**Sample size and statistical analysis:** Literature suggests that, annually, approximately 20% of clients leave social assistance programs in Canada.\(^\text{49}\) The only other similar study to ours was conducted in San Francisco, US, and showed that people who completed dental treatment had twice the proportion of favorable/neutral employment outcomes, as compared to those who did not complete treatment.\(^\text{46}\) Thus estimating a 20% probability of leaving OW for the non-exposed cohort and using a conservative odds ratio of 1.7, we assessed that the exposed cohort had a probability of 29.8% of leaving OW. The test statistic used was the Z test with pooled variance and a two sided significance level of 0.05.\(^\text{50,51}\) Based on this, our sample size calculation resulted in 302 participants in each cohort to detect the desired difference between groups.
The primary analysis assessed whether dental treatment changed the probability of leaving OW within 12 months of receiving treatment (irrespective of the treatment type). Chi-square analysis was performed to calculate the proportions and the unadjusted odds of leaving at T12. Multivariable binary logistic regression was then performed to adjust for other possible confounding variables, including age, sex, level of education, family structure, family size, child count, young child (< 4 years), country of birth (born in or outside Canada), earning at baseline, the amount earned at baseline, and regional unemployment rate. All variables in the model were specified *a priori* to avoid over-fitting, biased standard errors, and falsely narrow confidence intervals\(^5\). Variance inflation factors were used to check for multi-collinearity among predictors.

A secondary analysis assessed whether the probability of leaving OW within 12 months of receiving treatment changed by the type of dental treatment received. We also assessed whether the proportion leaving for employment was different between the treatment and the no-treatment cohort. A post-hoc analysis employed longitudinal methods to observe if the trajectory of leaving OW over the one year time period was different for those who received any treatment or particular types of treatment, as compared to those who received no treatment. Specific months for leaving OW were requested from the MCSS to conduct this analysis.

**Results**

Our analyses included records for 8742 OW clients from five Ontario regions; 6000 were in the no-treatment group and 2742 constituted the treatment group. Overall, the OW clients in the two groups were similar in terms of sex, education, family structure, and baseline earnings. The treatment group had a higher proportion of people born outside Canada with a higher mean age as compared to the no-treatment group (Table 11).
Table 11: Baseline characteristics of study participants who received or did not receive treatment

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Treatment (2742) number (%)</th>
<th>No treatment (6000) number (%)</th>
<th>Standardized difference†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>1141 (41.6%)</td>
<td>2839 (47.3%)</td>
<td>0.10</td>
</tr>
<tr>
<td>Age (mean, SD)</td>
<td>36 (± SD:12)</td>
<td>34 (± SD:12.5)</td>
<td>0.16</td>
</tr>
<tr>
<td>Born in Canada</td>
<td>1808 (65.9%)</td>
<td>4476 (74.6%)</td>
<td>0.19</td>
</tr>
<tr>
<td>Child &lt;= 4 years</td>
<td>774 (28.2%)</td>
<td>1441 (24.0%)</td>
<td>0.09</td>
</tr>
<tr>
<td>Earning at baseline</td>
<td>299 (10.9%)</td>
<td>570 (9.5%)</td>
<td>0.04</td>
</tr>
<tr>
<td>Education &lt; high school</td>
<td>241 (8.8%)</td>
<td>361 (6.0%)</td>
<td>0.10</td>
</tr>
<tr>
<td>Single with children</td>
<td>889 (32.8%)</td>
<td>1775 (29.6%)</td>
<td>0.07</td>
</tr>
</tbody>
</table>

† Imbalance if absolute value > 0.20 (anything between 0.1 and 0.2 is slight to moderate)

Our primary analysis revealed that at twelve months, 28.7% of clients who received any kind of dental treatment, and 33.0% of clients who did not receive any treatment, left OW (Table 12). Following adjustment for confounding variables, this difference was not found to be statistically significant (OR=0.93, 95% CI = 0.83-1.03). Factors such as female sex, old age, children, and less than high school education were observed to be predictors of risk for staying on social assistance (Table 13).

Table 12: Proportion of clients leaving OW; and unadjusted and adjusted odds ratios of leaving OW at time T12

<table>
<thead>
<tr>
<th>Type of treatment</th>
<th>Percentage leaving OW</th>
<th>Odds of leaving OW</th>
<th>Odds of leaving OW</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Unadjusted (95% CI)</td>
<td>Adjusted (95% CI)</td>
</tr>
<tr>
<td>No treatment (6000)</td>
<td>33.00%</td>
<td>Ref.</td>
<td>Ref.</td>
</tr>
<tr>
<td>Any treatment (2742)</td>
<td>28.70%</td>
<td>0.82(0.74-0.90)</td>
<td>0.93(0.83-1.03)</td>
</tr>
<tr>
<td>Preventive (468)</td>
<td>34.20%</td>
<td>1.02(0.95-1.09)</td>
<td>1.25(1.01-1.54)</td>
</tr>
<tr>
<td>Periodontal (113)</td>
<td>31.90%</td>
<td>0.98(0.87-1.12)</td>
<td>1.20(0.79-1.83)</td>
</tr>
<tr>
<td>Front teeth (427)</td>
<td>28.10%</td>
<td>0.93(0.88-0.99)</td>
<td>0.90(0.72-1.14)</td>
</tr>
<tr>
<td>Dentures (202)</td>
<td>24.30%</td>
<td>0.88(0.82-0.96)</td>
<td>0.97(0.68-1.38)</td>
</tr>
</tbody>
</table>
Table 13: Adjusted odds of leaving OW at time T12: results of multivariable binary logistic regression

<table>
<thead>
<tr>
<th>Predictor variables significantly affecting the outcome at T12</th>
<th>Unadjusted (95% CI)</th>
<th>Adjusted (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Male vs. Female</td>
<td>1.41(1.29-1.55)</td>
</tr>
<tr>
<td></td>
<td>Age (for each one year less)</td>
<td>1.01(1.01-1.02)</td>
</tr>
<tr>
<td>Family structure</td>
<td>Single with children</td>
<td>Ref.</td>
</tr>
<tr>
<td></td>
<td>Single without children</td>
<td>1.10(0.88-1.35)</td>
</tr>
<tr>
<td></td>
<td>Couple without children</td>
<td>1.15(1.01-1.32)</td>
</tr>
<tr>
<td></td>
<td>Couple with children</td>
<td>1.50(1.36-1.68)</td>
</tr>
<tr>
<td>Education level</td>
<td>Less than high school</td>
<td>Ref.</td>
</tr>
<tr>
<td></td>
<td>Some high school</td>
<td>1.16(1.03-1.31)</td>
</tr>
<tr>
<td></td>
<td>High school</td>
<td>1.42(1.26-1.60)</td>
</tr>
<tr>
<td></td>
<td>Post-secondary education</td>
<td>2.36(1.87-2.98)</td>
</tr>
<tr>
<td></td>
<td>Child &lt;= 4 years</td>
<td>Ref.</td>
</tr>
<tr>
<td>Child  &lt;= 4 years</td>
<td>No vs. Yes</td>
<td>1.04(0.94-1.16)</td>
</tr>
<tr>
<td>Earning at baseline</td>
<td>Yes vs. No</td>
<td>1.69(1.47-1.95)</td>
</tr>
<tr>
<td>Unemployment rate of the region (for each 1% less)</td>
<td>1.09(1.06-1.12)</td>
<td>1.05(1.01 – 1.08)</td>
</tr>
</tbody>
</table>

Our secondary analysis, stratifying by treatment type, showed that after adjustment, people who received preventive treatment had approximately 25% better odds (95% CI: 1.01-1.54, p = 0.026) of leaving OW in comparison to the no-treatment group. The other component of our secondary analysis revealed that, at time T12, among those who left OW, approximately one in four left due to employment-related reasons, which was not significantly different (p = 0.473) between the treatment (N = 183, 23.3%) and the no-treatment (N = 456, 23.0%) groups.

Interestingly, people who received treatment showed larger changes in the proportion leaving OW over time, as compared to those who did not receive treatment (Table 14). For
example, at time T3, people who received dentures had the lowest rates (8.4%) of leaving assistance; however, by time T12, the rate of leaving almost increased threefold (24.3%), which was an increase of 189%. Our post-hoc longitudinal analysis also revealed that the trajectory of leaving OW for people who received treatment (p = 0.0014), specifically for those who received dentures for their missing teeth (p = 0.0008) and preventive treatment (p = 0.04), was significantly better than the no-treatment group (Table 4). To observe the effect of particular treatment types, we also ran a longitudinal analysis by stratifying treatment groups in such a way that they were mutually exclusive of each other. The results (not shown), however, did not change.

**Table 14: Trajectory of leaving OW within one year of receiving different types of treatment**

<table>
<thead>
<tr>
<th>Dental treatment</th>
<th>Percentage leaving OW</th>
<th>Percentage increase in proportion from T3 to T12</th>
<th>Trajectory of leaving OW within one year, p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T3</td>
<td>T6</td>
<td>T12</td>
</tr>
<tr>
<td>No treatment (6000)</td>
<td>18.10%</td>
<td>27.90%</td>
<td>33.00%</td>
</tr>
<tr>
<td>Any treatment (2742)</td>
<td>12.80%</td>
<td>19.60%</td>
<td>28.70%</td>
</tr>
<tr>
<td>Preventive (468)</td>
<td>15.40%</td>
<td>23.90%</td>
<td>34.20%</td>
</tr>
<tr>
<td>Periodontal (113)</td>
<td>11.50%</td>
<td>18.60%</td>
<td>31.90%</td>
</tr>
<tr>
<td>Front teeth (427)</td>
<td>11.70%</td>
<td>21.80%</td>
<td>28.10%</td>
</tr>
<tr>
<td>Dentures (202)</td>
<td>8.40%</td>
<td>14.90%</td>
<td>24.30%</td>
</tr>
</tbody>
</table>
Figure 7: Impact of dental treatment over the one year time period

Figure 8: Impact of receiving dentures over the one year time period
Figure 9: Impact of receiving preventive treatment over the one year time period
Discussion

This study investigated the effects of dental treatment on employment outcomes among people on social assistance in the province of Ontario, Canada’s most populated jurisdiction. The findings suggest that, at one year, employment outcomes were not significantly different between people who received or did not receive dental treatment. However, our secondary analyses, which observed employment outcomes stratified by the type of treatment received, suggests that people who received preventive treatment may have better chances of leaving assistance over time relative to those who did not receive treatment. Also, the change in proportion of individuals leaving assistance over time was higher among those receiving treatment relative to those not receiving treatment.

Given the very different initial rates of leaving assistance between the groups, this may indicate that people who received treatment were more disadvantaged at baseline and thus had poorer employment prospects compared to those who did not receive treatment. If this is the case, dental treatment may have potentially addressed their employment barriers in some way, such that over one year, their assistance outcomes leveled up and became comparable to those who did not receive treatment. Similarly, if the above logic is sound, stratified analyses by type of treatment may suggest that people who received treatment for missing teeth were potentially the most disadvantaged, as they had the lowest chances of leaving assistance. This is in agreement with the existing literature, which shows that people with missing teeth have less satisfaction with their oral health related quality of life in terms of appearance, physical and social function, and psychological status\textsuperscript{7,19,81}. Nevertheless, given the lack of oral health and psychosocial information between the two groups, these conclusions must be taken with caution.
In this regard, this study has some limitations; the first was the assumption that the probability of receiving dental treatment was similar between the two groups and therefore, people who did not receive treatment did not have any significant dental problems. This assumption was made because the oral health condition of OW recipients was unknown, irrespective of whether they received dental treatment or not. Importantly, controls were selected from the same regions, having the same dental coverage, with similar baseline demographic characteristics; therefore, we expected that anybody on social assistance who had dental issues would have been able to access dental care in a similar manner, and if they did not receive treatment, then they may not have had any significant problems. While the probability of receiving dental treatment in the two groups could have been tested by running propensity scores, such methods only reduce bias due to differences in measured covariates and not unmeasured covariate differences between the two treatment groups. According to a systematic review, for observational studies, propensity scores methods also give similar results to traditional regression analysis. Therefore, regression analysis was performed to adjust for possible confounding variables. Further, one could also argue that people who did not seek dental treatment might have been worse off and felt incapacitated even in seeking treatment. However, as per our results, a higher proportion of people who did not seek treatment left assistance, which does not support this line of argument.

Second, we did not have information about the past assistance record of recipients. At MCSS, every time a client is on assistance, a new case file begins. No specific records show how many times the client has been on assistance or whether an individual is on OW for the first time or is a ‘recidivist.’ Importantly, we would expect to see differences in the assistance outcomes between such individuals. Studies suggest that approximately 20-35% of ‘leavers’ return to assistance in a span of one year. There is currently no literature suggesting an association between
dental problems or dental treatment and recidivism. The limitations of our data do not allow us to inform this potential relationship; however, this will be of interest for future studies.

This study also has some major strengths; it is the first of its kind, with such a large number of social assistance recipients having been successfully observed for a prolonged period of time to assess the effect of dental treatment on employment outcomes. The robust study design also had no scope of loss to follow up. Another important and useful aspect was the fact that we were able to tease out the administrative codes for employment-related reasons for leaving social assistance. This positions our study positively compared to the only other major study conducted in this field in San Francisco, United States, where favorable and neutral codes (such as death or moving out of the county) were grouped together46.

Our study also attempted to include all possible variables that could affect the probability of leaving social assistance. People who earned at baseline could have been characteristically different than people who did not earn and therefore baseline earning was controlled for. Similarly, the unemployment rate of a region was an external factor that could have affected social assistance outcomes, and therefore was also accounted for in the multivariable modeling. Our study was also a multicenter study, as data were collected from five different Ontario regions, varying in their demography, dental treatment coverage and unemployment rates; therefore, the results of this study can be generalizable to other such regions.

Ultimately, this study suggests that, among social assistance recipients, people who have dental problems may be particularly disadvantaged and dental treatment may help to level them up, which in turn may positively impact their employment outcomes. In the context of current policy debates concerning timely access to dental care for socially marginalized groups, this knowledge is important. Moreover, during a time when austerity agendas are being implemented

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and/or contemplated around the world, where various social policies are under scrutiny and reductions in budgets for publicly funded dental care are often discussed as potential money saving options, this knowledge provides a window into what may be sacrificed by not providing publicly funded dental care to social assistance recipients.

As noted previously, we were not aware of our study participants’ oral health or other determinants such as physical, social, psychological or behavioral, which might have affected their oral health and employment outcomes, simultaneously; therefore, we planned to conduct face-to-face surveys among social assistance recipients to have a better understanding about the different aspects that may influence the relationship between oral health and employment prospects.
Chapter 5: Self-perceived changes among social assistance recipients regarding employment prospects after receiving dental treatment

Abstract

**Background:** Strengthening self-efficacy in seeking work among individuals with dental problems has been identified as an important factor in facilitating job procurement and maintenance. There is no knowledge if receiving dental treatment improves someone’s self-efficacy in seeking a job. This work is an endeavour to explore such pathways.

**Methods:** An exploratory pilot study of a convenience sample of 30 participants was conducted using a pre- and post-dental treatment survey among adult social assistance recipients in Ontario, Canada. The survey included the validated instruments Oral Health Impact Profile (OHIP-14) and Job Seeking Self-efficacy scale (JSS). Changes in scores of both scales following dental treatment were calculated. Pearson correlation was performed between OHIP-14 and JSS scores to assess if change in oral health related quality of life was correlated to job-seeking self-efficacy.

**Results:** Mean scores for OHIP-14 (23.4 to 6.7, p<0.001, effect size: 1.75) and JSS (4.9 to 5.5, p=0.002, effect size: 0.40) changed significantly after receiving dental treatment. A significant negative correlation (-0.56, p=0.001) was observed between the two scores, which indicates that job-seeking self-efficacy improves with improvement in oral health related quality of life.

**Conclusion:** Among the sample of social assistance recipients interviewed, our results indicate that after receiving dental treatment, oral health related quality of life and self-efficacy in job-seeking improves.
Introduction

According to Locker’s model of oral health, dental diseases lead to physical, psychological and social disability, influencing the way people eat, speak and/or socialize\(^{16}\). Among people who experience some level of social marginalization, the association of psychosocial function and dental health appears to be particularly strong\(^ {19, 20}\). In this context, the association of such disabilities to an individual’s employment situation has also received attention\(^{11, 14, 15}\).

Oral diseases are distributed disproportionately in society and are concentrated among populations with low socioeconomic status. One such disadvantaged group includes people on social assistance, who along with poor oral health, also experience economic consequences as a result of oral disease\(^{20}\). In this regard, policy entrepreneurs in welfare states have advocated for improved access to dental care for people on social assistance not only from an ethical perspective, but also to improve their prospects of employment\(^ {19}\). Since little to no evidence exists to support this policy hypothesis, we conducted a population-based study among social assistance recipients in Ontario, Canada’s most populated province, to compare employment outcomes among those who received and did not receive dental treatment under the province’s social assistance program, Ontario Works (OW). Our study suggested that people who received dental treatment were more disadvantaged at baseline, and that treatment may have addressed their employment barriers to some extent, such that employment outcomes were levelled up over time\(^ {85}\). This leads us to question what employment barriers may be addressed by receiving dental treatment? What are the self-perceived changes in terms of employment after receiving treatment for dental problems among this population? Does dental treatment, for example, affect self-efficacy among those seeking a job?
People with disabilities (including dental disabilities) who are unemployed may lack the necessary job-seeking skills required to secure employment. Strengthening self-efficacy in job-seeking among individuals with disabilities has been identified as an important factor in facilitating job procurement and maintenance. Psychologist Albert Bandura defined self-efficacy as one’s belief in one’s capacity to mobilize the physical, emotional, and intellectual resources required to succeed in specific situations. Feeling efficacious motivates intensification of efforts and persistence. The stronger the perceived self-efficacy, the more active the efforts are, whereas low levels of self-efficacy tends to result in self-limiting behaviors that create obstacles to new experiences.

The relationship between employment and self-efficacy has been demonstrated in the literature. For example, self-efficacy and self-esteem are intimately involved with unemployment. Self-esteem declines with unemployment and, in turn, affects self-efficacy. Securing employment acts as a restorative measure and enables self-efficacy to rebound. A vicious cycle of unemployment and self-efficacy has been identified, which is depicted in Figure 2.

Again, there is very little knowledge regarding how receiving dental treatment may mediate positive employment outcomes for disadvantaged populations. Based on the existing literature, we designed a conceptual framework that depicts the association of dental care and employment outcomes (Figure 3). According to this framework, addressing physical, pathological and psychological concerns related to dental issues has the potential to improve the efficacy of job-seeking, which could lead to positive employment outcomes. The work presented here was an endeavour to explore the pathways proposed in this framework.
Methods

We hypothesized that for people on social assistance who have dental problems; the provision of dental treatment would reduce their dental disability and thereby improve the self-efficacy of job-seeking. Specific objectives were to observe changes in dental disability and job-seeking self-efficacy among social assistance recipients after they have received dental treatment; and to determine whether there is a correlation between change in dental disability and change in job-seeking self-efficacy.

**Study design:** A descriptive pilot study was designed to conduct a pre- and post-dental treatment survey among people on social assistance. Data collection was performed using a semi-structured interview process, which was primarily quantitative in nature; however, participants were encouraged to share their experiences at any point of time during the interview. A fifty-item questionnaire (which included demographics, habits and two validated survey instruments) was designed in consultation with officials at Toronto Employment and Social Services. This questionnaire was administered to assess oral health related quality of life, self-perceived dental needs, and job-seeking self-efficacy. Information was also collected on: age; sex; general health conditions; habits such as smoking, alcohol, recreational drugs, gambling; family structure; type of accommodation; number of children in care and their age; born in or outside Canada, and if outside, for how long have they been in the country.

**Study participants:** Clients of OW (age range 18-65 years), who had any kind of dental problem and who sought dental care at public health clinics in the City of Toronto, at dental clinics of Faculty of Dentistry, University of Toronto, or at Community Health Centers (CHCs) in Toronto were selected for this study. Ethics approval for conducting this research was obtained from the Research Ethics Board of the University of Toronto (protocol reference # 30174) and also from...
Toronto Public Health (file # 2014-17). An invitation letter for the participants, describing the purpose of the study and contact information of the principal investigator (PI) was made available at reception desks and notice boards at CHCs. Potential subjects who phoned the PI were provided further details and screened through simple inclusion criteria questions (social assistance status, age, and having a dental problem). They were then invited to the Faculty of Dentistry for a face-to-face survey. The interviews were conducted in an isolated, well lit room, with comfortable chairs, where only the PI and the interviewee were present. Participation was strictly voluntary. A thorough verbal explanation of the study, along with a hard copy of its details was provided to all participants. Those who wished to participate were then enrolled and a written informed consent was signed. While interviewing, the PI read the questions to interviewees through her copy and also provided a hard copy of the questionnaire to the interviewee to reduce any chances of misinterpretation. The PI in her copy marked interviewee choices for survey questions; also, as a part of qualitative data collection, the PI hand transcribed the responses interviewees expressed during the interview. Member checking was conducted by reading the responses back to the interviewee to make sure that responses were not misreported. Pre- and post-treatment non-identifiable pictures were taken for those who consented. A second interview was conducted after one month of receiving dental treatment, which has been reported as being a reasonable time gap to conduct a post-treatment survey. The same item questionnaire was re-administered, asking if any demographic or behavioral factors had changed.

We know of no study that has tried to assess employment-related psychosocial changes after receiving dental treatment. Therefore, ours is a pilot study, having both a quantitative and a qualitative component, with a convenience sample size of 30 participants. As per Hardon et al., for descriptive studies, a sample size of at least 30 people is needed; it needs to be large enough to
reflect important variations in the study population, but small enough to facilitate intensive study. To increase the recruitment and retention of participants, we provided an honorarium of CAD 50 for their time at each appointment.

**Instruments used: Oral Health Impact Profile (OHIP-14)** - This instrument was developed to measure people’s perception of the social impact of oral diseases on their well-being. It assesses the oral health related quality of life of a patient, which is considered important in monitoring patient progress. It was originally developed as a 49-item questionnaire, which has been validated and widely used. Then a short form OHIP-14, comprised of 14 items, was developed and also validated. Further, it has been validated in other languages, including Chinese, Japanese, Portuguese, and Spanish. The OHIP-14 has been shown to be reliable, sensitive to changes, and has adequate cross-cultural consistency.

The frequency of the impact experienced is recorded on a five-point Likert scale: 0= ‘never’; 1= ‘hardly ever’; 2= ‘occasionally’; 3= ‘fairly often’; and 4= ‘very often’ (provided as an appendix). For analysis, these ordinal values can be computed three ways: prevalence - proportion of participants reporting one or more items ‘fairly often’ or ‘very often’; extent - number of items out of fourteen reported ‘fairly often’ or ‘very often’; and severity - sum of ordinal responses, which additionally considers impacts experienced ‘hardly ever’ or ‘occasionally’ and could range from 0 to 56. To take into consideration the complete account of OHIP-14 scores, severity was computed.

It has a rich history in understanding the physical and psychosocial impacts of poor oral health. The OHIP-14 has been shown to be sensitive (i.e. significant changes in scores) to the effects of the provision of dental care. According to Locker et al., a change of five points on the scale is a minimally important difference. This instrument has also been used in a study of welfare
recipients in San Francisco, Unites States, and explored the association between dental treatment and employment outcomes\textsuperscript{46}. As the OHIP-14 questionnaire comprises some important questions about the impacts of dental problems on the activities of daily living, including employment, and the ability to work and function, it was concluded that this instrument would be valuable for this study.

Others have compiled the seven dimensions of disabilities associated with dental issues (as described by Locker’s model of oral health) into two major domains: physical and psychosocial\textsuperscript{62}. The physical domain is comprised of functional limitation, physical pain, and physical disability, and the psychosocial domain includes psychological discomfort, psychological disability, social disability, and handicap. Using the instrument described by Ozhayat, we assessed which domain most strongly correlated with change in job-seeking self-efficacy among recipients of OW\textsuperscript{62}.

\textbf{Job-seeking Skills Self-efficacy (JSS) scale} - The JSS is a validated scale consisting of 12-item measures to assess the perceived influence of self-efficacy on the job-seeking skills of persons with chronic disabilities and has been previously used for people with arthritis\textsuperscript{63} (provided as an appendix). Dental disease is chronic in nature and leads to physical, psychological and social disability\textsuperscript{16}; therefore, the JSS scale was considered a useful tool to assess job-seeking self-efficacy among people with dental disabilities. The instrument was included in pre- and post-surveys to assess changes in job-seeking self-efficacy after receiving dental treatment. The scale has two factors, independence skills (IS) and social skills (SS). The IS factor is a summated scale of the first five items of the JSS, which assess confidence levels for the first five items of the questionnaire. The SS factor is a summated scale of the rest of the seven questions of the JSS. All questions are assessed using a seven-point Likert scale of where 1 is ‘not at all confident’ and 7 is ‘very confident’.
A set of ad-hoc questions related to an individual’s oral health and their effects on employment prospects were also asked: Are you completely satisfied with how your teeth look? Are you completely satisfied with your smile? Do you feel the appearance of your smile/teeth make it difficult for you to interview for a job? Do you feel confident that you will find work in the next three months? These questions were asked on a digital scale of 1 to 10; with the left anchor (at 1 cm) being ‘do not agree at all’ and the right anchor (at 10 cm) was ‘completely agree’. This approach is considered a simple, sensitive and reliable way of measuring subjective experiences.

Statistical analysis: Descriptive statistics for all demographic variables was conducted by univariate analysis. Shapiro-Wilk test of normality was conducted for the distribution of data of the JSS and OHIP-14 scores. If data were normally distributed, the paired t-test was used; otherwise, the Wilcoxon signed rank sum test was conducted. Effect sizes for both scales to assess changes after receiving dental treatment were calculated. For normally distributed data, mean change scores were calculated by subtracting the baseline scores from those at follow-up; effect size was calculated by dividing the mean change scores by baseline standard deviation. For data that were not normally distributed, the standard score (z) was divided by the square root of N (N = number of observations), to calculate the effect size. According to Cohen, an effect size of 0.2 is considered small, 0.4 moderate, and 0.8 large.

Correlation testing was also performed between JSS and OHIP scores to assess if change in oral health related quality of life was correlated to job-seeking self-efficacy. Correlation ranges from -1 to +1, where the sign indicates the direction of correlation and the value indicates the magnitude; 0.5 to 0.7 is considered moderate and 0.7 to 1.0 is considered strong. Pearson correlation is considered the most appropriate for measurements taken from an interval scale, while the Spearman is considered for measurements taken from ordinal scales. However, when
measurements of the ordinal scale are summed, as done in this case, one ends up with a measurement that is really neither ordinal nor interval and is difficult to interpret. In such a case, Pearson correlation is considered as the better choice between the two. Therefore, though both Pearson and Spearman correlations were analyzed and reported, Pearson’s correlations were considered.

Qualitative data were collected utilizing standard interview techniques, specifically a dialogical interview process. These data were transcribed, and then major themes were identified. Interrelated ideas were grouped together to generate themes. Themes are fundamental concepts that characterize experiences of participants by the more general insights that are apparent from the whole of the data.

Results

Quantitative results: Participants were enrolled over a time period of eight months (April 2014 – November 2014). Thirty-four OW clients were invited by the PI to participate in the study. In terms of baseline demographic information (Table 15), the ratio of men to women was approximately 40:60; mean age of participants was 48 years; 35% were single with children and 20% had children less than four years of age. These characteristics matched the population-based data from our previous study (described in chapter 4), except for those Canadian or foreign born, with the current sample having fewer of the former.
Table 15: Baseline demographic characteristics of study participants

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Proportions (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>41.20%</td>
</tr>
<tr>
<td>Age</td>
<td>47.7 (± SD: 11.3)</td>
</tr>
<tr>
<td>Born in Canada</td>
<td>38.20%</td>
</tr>
<tr>
<td>Child ≤ 4 years</td>
<td>20.60%</td>
</tr>
<tr>
<td>On social assistance &gt; 4 years</td>
<td>32.40%</td>
</tr>
<tr>
<td>&lt; than high school</td>
<td>8.80%</td>
</tr>
<tr>
<td>Single with children</td>
<td>35.30%</td>
</tr>
<tr>
<td>No children</td>
<td>47.10%</td>
</tr>
</tbody>
</table>

Self-perceived dental needs indicate that, at baseline, a large proportion (85%) of participants accessed dental care in the case of emergency (Figure 10). Most visited a dentist because of severe pain, with some also experiencing swelling along with that pain. Extraction or root canal treatment was advised to most who sought emergency dental care. Sixty-five percent of participants felt the need for dentures (combining removable and fixed). At follow-up, out of the 34 participants: 22 felt they had all their dental needs met post-treatment; eight had their partial dental needs met; and for three, no dental needs were met. One client was lost to follow up. Therefore 30 clients, who had their full or partial dental needs met, were interviewed for a second time. Among the eight clients, whose dental needs were partially met, six could not receive their dentures and two could not get their teeth cleaned. Among the three clients, whose dental needs were not met at all, all needed dentures and had continuing problems with their front teeth. Financial barriers were the only reason identified by all participants, whose dental needs were not met (completely or partially).
According to the Shapiro Wilk test of normality (Table 16), change in OHIP-14 scores was normally distributed (p=0.25); however, JSS scores were not (p<0.001).

Table 16: Test of normality for OHIP-14 and JSS scores

<table>
<thead>
<tr>
<th>Measures</th>
<th>Shapiro-Wilk test</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>OHIP change</td>
<td>0.25</td>
<td>-0.273</td>
<td>-0.835</td>
</tr>
<tr>
<td>JSS change</td>
<td>&lt;0.001</td>
<td>1.42</td>
<td>2.241</td>
</tr>
</tbody>
</table>
Total mean OHIP-14 scores reduced significantly after receiving dental treatment, which reflects the perception among study participants that their oral health related quality of life was improved (Figure 11). These reductions were consistent for both constructs, physical as well as psychosocial. The effect size for total OHIP as well as for each construct individually was large.

![Bar chart showing OHIP scores](image)

Figure 11: Oral Health Related Quality of Life (pre- and post-dental treatment)

Total median JSS scores also increased significantly after receiving dental treatment (from 4.9 to 5.5) suggesting that the study participant’s job-seeking self-efficacy improved (Figure 12). These improvements were consistent for both independence skills and social skills. The effect size for total JSS as well as for each construct individually was moderate.
Pearson correlational analysis revealed a significant negative association between change in OHIP scores and change in JSS scores, which means that, if dental disability among an individual reduces, job-seeking self-efficacy improves (Table 17). For JSS, when stratified by social and independence skills, only social skills were significantly associated with OHIP score changes. The strongest correlation of 0.7 was observed between the social skills construct of JSS and the psychosocial construct of OHIP-14, and this was statistically significant.

**Table 17: Pearson correlation between changes in OHIP and JSS scores**

<table>
<thead>
<tr>
<th></th>
<th>Change in OHIP-14</th>
<th>Physical construct</th>
<th>Psychosocial construct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in JSS</td>
<td>-0.561 (0.001)</td>
<td>-0.322 (0.082)</td>
<td>-0.653 (&lt;0.001)</td>
</tr>
<tr>
<td>Independence skills</td>
<td>-0.153 (0.418)</td>
<td>-0.035 (0.853)</td>
<td>-0.218 (0.247)</td>
</tr>
<tr>
<td>Social skills</td>
<td>-0.623 (&lt;0.001)</td>
<td>-0.378 (0.039)</td>
<td>-0.709 (&lt;0.001)</td>
</tr>
</tbody>
</table>
Table 18: Spearman correlation between changes in OHIP and JSS scores

<table>
<thead>
<tr>
<th></th>
<th>Change in OHIP-14</th>
<th>Physical construct</th>
<th>Psychosocial construct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in JSS</td>
<td>-0.694 (&lt;0.001)</td>
<td>-0.413 (0.023)</td>
<td>-0.722 (&lt;0.001)</td>
</tr>
<tr>
<td>Independence skills</td>
<td>-0.394 (0.031)</td>
<td>-0.261 (0.163)</td>
<td>-0.362 (0.049)</td>
</tr>
<tr>
<td>Social skills</td>
<td>-0.714 (&lt;0.001)</td>
<td>-0.444 (0.014)</td>
<td>-0.737 (&lt;0.001)</td>
</tr>
</tbody>
</table>

Changes observed for OHIP-14 and JSS scales, and the correlation between these changes was consistent with results for the four questions that tried to capture information about satisfaction with teeth/smile and perceiving dental appearance as barriers to employment (Figure 13). Significant differences were observed, pre-and post-treatment, for all four questions.

Figure 13: Self-perceived changes after dental treatment
Pearson correlation coefficient revealed that change in the perception of teeth/ smile being a barrier for a job interview was highly correlated with satisfaction with teeth/ smile; however, being confident to find a job in the next three months was moderately correlated with satisfaction with teeth/ smile (Table 19).

Table 19: Pearson correlation between teeth/smile and barrier for job interview or confidence in finding work

<table>
<thead>
<tr>
<th>Change in satisfaction with how teeth look</th>
<th>Change in perception that teeth/smile appearance acts as a barrier for job</th>
<th>Change in confidence for finding work in the next three months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in satisfaction with smile</td>
<td>-0.836 (&lt;0.001)</td>
<td>0.580 (0.001)</td>
</tr>
<tr>
<td>Change in satisfaction with smile</td>
<td>-0.922 (&lt;0.001)</td>
<td>0.613 (&lt;0.001)</td>
</tr>
</tbody>
</table>

**Qualitative results:** Open-ended questions yielded some rich data, which helped to understand different aspects related to participants’ oral health and employment prospects. In addition to responses to survey questions, some participants provided written narratives of their experiences. The four main themes which emerged are as follows: physical and psychosocial impacts of dental problems; barriers experienced in accessing dental care; changes encountered after receiving dental care; and other barriers apart from poor oral health that participants encountered in seeking a job.

**Physical and psychosocial impacts of dental problems** - Personal experiences among study participants reflected the physical and psychosocial impacts of dental problems. They perceived their poor oral health as a major barrier to their social life. Embarrassment associated and the distressing impact on self-esteem was discussed. Such experiences are in accordance with the study done in Canada by Bedos et al.\(^{19}\) Some of the statements are as follows:
• “I worked at a newcomer center. My supervisor asked several times why I do not get my teeth fixed. My supervisor used to make fun of me and said he wants to put my picture on Facebook. They fired me saying that I am slow. I am taking medicines for depression.”

• “I had a lot of pain in my teeth. Finally got them extracted, had no money for fillings or root canal. Now, I feel better, pain-wise, but, looks-wise it got worse. I smile in a certain way that one can’t see my missing teeth. I can’t afford to have my teeth fixed.”

• “Avoid social functions; do not drop my kid to school but near to it to avoid meeting her friends or their parents.”

**Financial barriers experienced in accessing dental care** - Most of the participants discussed the financial hardship they experienced in accessing dental care. Without enough money of their own, and with OW only covering emergency dental services, the responses reflected their struggle with finding ways to receive cheaper services. One of the participants received tooth cleaning and scaling at George Brown College by dental hygiene students. A number of participants mentioned the Faculty of Dentistry’s monthly payment plan as very helpful in paying their dental bills. One of the patients was very thankful to the Faculty’s Access to Care Fund, through which he received timely dental care. One of the participants stopped going to his regular dentist, as the latter did not accept public insurance. Some of the statements are as follows:

• “They want people to have healthy teeth but all they help is with extraction. I paid through all my savings, they say save for the rainy day, so my rainy day had come.”

• “I paid for my treatment from the child tax benefits.”

• “I was laid off from job, went on EI, and no longer had dental benefits. Had severe pain in one of the teeth, called government services, no help for woman of my age. By the
time my full mouth check-up was done infection spread throughout my jaw, and had to get eighteen teeth removed. I waited for three years to receive treatment for infection.”

Changes encountered after receiving dental care - Some participants shared the changes they perceived after receiving dental treatment. In particular, participants who received dentures were very excited to share their stories.

- “After my dentures are in, my ability to chew food has changed, my energy levels are high. I go out and talk to people in grocery stores.”
- “Since wearing my new teeth I’ve been asked twice by strangers I’ve chatted with if I am a professor. Imagine. Teeth make me look educated? …Did you ever?”
- “I don’t mind opening my mouth and just talking.”

Other barriers encountered in seeking a job: Apart from poor oral health, increasing age, low education, young children, lack of English language proficiency, and poor general health were the main barriers perceived by study participants in seeking a job. Among health issues, mental health and arthritis were the major concerns.

- “My social worker says if you are above 60, forget about getting any work.”
- “Where do I leave my little girl?”
- “Some psychotherapy needed, recovering from smoking, drinking and drugs.”
Figure 14: Pictures of a patient pre- and post-dental treatment
Figure 15: Pictures of a patient pre- and post-dental treatment
Discussion

Face-to-face pre- and post-treatment interviews were conducted among social assistance recipients in Ontario to assess if dental treatment helped in improving oral health related quality of life and in turn enhancing job-seeking self-efficacy. The dental needs of study participants were assessed by self-report and no clinical examinations were performed. Data collection was primarily quantitative in nature and did not use robust qualitative study methods; however, participants’ responses were very informative and corroborated findings of quantitative analysis. This was the first such work conducted in the Canadian context. Participants’ responses reflect the vulnerability of this social group, and suggest that dental treatment can address physical as well as psychosocial disabilities related to dental problems. Change in mean OHIP-14 scores is in accordance with other studies. Job-seeking self-efficacy also appears to have enhanced after receiving dental care.

The effect size for change in OHIP-14 score was large; however, for JSS score it was moderate. Interestingly, the Pearson correlation revealed that change in social skills but not independence skills was significantly associated with change in OHIP-14 scores, specifically with the latter’s psychosocial disability domain. Correlation between the social skills construct of the JSS scale and physical disability due to dental diseases, though significant, was weak. These results can be subjected to bias as participant responses might be modified in response to their awareness of being observed. However, such results seem reasonable, as it is arguably naïve to think that improvements in job-seeking self-efficacy could be completely attributable to improvements in oral health related quality of life. A substantial interplay of other determinants, such as physical, psychosocial or behavioral, with the oral health and employment outcomes of our study participants, was expected, and was confirmed through the qualitative component of our study. Factors such as the inability to eat and speak, feelings of persistent self-consciousness and social
exclusion, financial struggles to make choices between dental treatment and daily utilities, poor general health including mental health issues, and dependence on recreational drugs emerged, which were perceived by participants as barriers to their employment and also to improvements in their oral health.

Ultimately, even though the sample size of the study was not large, participants were recruited from three different sites, which increase the generalizability of our results. This study suggests that timely dental care can, to a certain extent, address employment barriers. From the policy perspective, reducing an individual deficiency (which is poor oral health in this context) to improve employment opportunities is only one aspect of handling social determinants of health and not a complete solution to this wicked problem; however, addressing this important piece of the puzzle cannot be discounted, especially when we now know that improving oral health affects self-efficacy, which has long term positive impacts in general. In the context of current access to dental care debates in Ontario and across the country, these results can inform policy and advocacy efforts at expanding public dental care programs for low-income adults, partly because of the role that dental treatment can play on improving employment outcomes. Importantly, with the effect sizes calculated, larger population-based studies can now be planned to more robustly test the role of dental treatment on the employment outcomes of social assistance recipients.
Chapter 6: Discussion

This research was conducted to explore the potential impact of dental treatment on employment outcomes among people on social assistance. Existing literature shows that people who do not have employment have a high burden of dental diseases. Regarding employability and stigma, the Australian National Advisory Committee on Oral Health report notes that poor oral health has a negative impact on employment participation through the reduced ability to participate in training or study, preventing attendance at job interviews and/or regular work, and reducing marketability due to appearance and social stigma. According to the U.S. Surgeon General, persons with oral disease are also less employable as employers are reluctant to hire persons with poor visual appearance due to tooth loss, and more reluctant to have employees with potential frequent absences due to unmet dental needs.

Importantly, Hamermesh and Biddle found that “good-looking” people earn 5-10% more than “average-looking” people. Facial attractiveness is usually positively associated with widely spaced eyes, a small nose and straight teeth. The esthetic appearance of teeth has an immediate effect on the way we form an opinion of another person based on first impression. Thus, appearance is an important factor in social interaction and success and the mouth and teeth are major elements in these evaluations. Moreover, physical appearance might also affect an individual’s non-cognitive skills, such as self-confidence and locus of control, which may have a direct effect on productivity. Enhanced physical appearance as well as improvements in speech function could also lead to better self-esteem and quality of life by improving a person’s confidence level and these changes could translate into better employability and/or better job performance. Cohen and Jago suggest that the greatest contribution of dentistry is to the improvement of quality of life because most oral diseases and their consequences interfere with,
or have impacts on daily life performances. Nonetheless, as previously stated, the impact of dental treatment on activities of daily living, including employment, has not been robustly tested. There is little evidence, for example, to suggest that timely dental care increases the chances of employment and to reiterate one of the main goals of this dissertation was to shed light in this area.

We hypothesized that people on social assistance who receive dental treatment have better employment outcomes as compared to people who do not receive dental treatment. Results of retrospective cohort study revealed that there was no difference between treatment and no-treatment groups in our cohort of OW recipients. However, when stratifying by treatment type, people who received preventive care had significantly better employment outcomes as compared to those who did not receive treatment. This seems reasonable as one could infer that these people probably did not have any significant dental problems, which were acting as a deterrent for their physical or social activities; they only needed some prophylactic care. One could also argue that people who received preventive care might be different behaviorally from others; they might be more self-motivated as they sought such kind of care.

Another important finding in our study was the change in proportion of individuals leaving assistance over time, which was higher among those receiving treatment relative to those not receiving treatment. Given the very different initial rates of leaving assistance between the groups (Table 14), this may indicate that people who received treatment were more disadvantaged at baseline and thus had poorer employment prospects compared to those who did not receive treatment. If this is the case, dental treatment may have potentially addressed their employment barriers in some way. Therefore, over one year, their assistance outcomes leveled up and became comparable to those who did not receive treatment. Similarly, if the above logic is sound, stratified analyses by type of treatment may suggest that people who received treatment for missing teeth
were potentially the most disadvantaged, as they had the lowest chances of leaving assistance. We also found that factors such as female sex, old age, having children, and having received no more than a high school education were predictors of risk for staying on social assistance. On balance, these results show that within this vulnerable population, not all people have similar employment outcomes and poor oral health is one determinant among several. This is an important finding in terms of policy implications; it needs to be realized that providing dental care will not resolve all barriers to employment for people on social assistance, but may enable the more disadvantaged ones in some way so that they are more likely to find employment (in addition to the clear improvements in quality of life overall).

As mentioned earlier, regarding our retrospective cohort study, some limitations were encountered. We made an assumption that people who did not receive treatment had no self-perceived dental problems. This assumption was made because we were not aware of the oral health condition of any of the OW recipients, irrespective of whether they received treatment or not. Nevertheless, the attempt was made to have similar baseline demographic characteristics for both groups, also, exposed and non-exposed cohorts were selected from the same municipalities; therefore, we expect that in a municipality anybody on social assistance who had dental issues would be able to access dental care in a similar manner, and if they did not receive treatment then they did not perceive a dental problem. Apart from that, we could not get information about the past assistance record of recipients, which could have acted as potential confounder. Also, we were not aware of other determinants, such as physical, social, psychological or behavioral, of our study participants, which might have affected their oral health and employment outcomes, simultaneously. Our face-to-face pre- and post-treatment interviews, conducted among social assistance recipients in Ontario, addressed some of these limitations.
The exploratory pilot study helped to assess if dental treatment helped in improving oral health related quality of life and in turn enhanced job-seeking self-efficacy. Our study though included a non-probabilistic sample of only thirty participants, they were recruited from three different sites, which increase the generalizability of our results. Also, the effect sizes calculated will be useful in conducting a larger study in the future. As the objective of the study was to assess the change in job seeking self-efficacy after receiving dental treatment, no control group was required as such; however, if larger sample size could have been recruited it would have been interesting to observe if job seeking self-efficacy deteriorates, for those, who could not seek required dental treatment. Ultimately, being face-to-face surveys, these results can be subjected to reporting bias as participants responses might be modified in response to their awareness of being observed. However, considering our study population and the information which we wanted to collect, administering face-to-face surveys were considered most suitable to have a thorough understanding regarding different aspects. The responses of our study participants suggested that oral health related quality of life and job-seeking self-efficacy improved significantly after receiving dental treatment; specifically, social skills related to job-seeking improved with reductions in psychosocial disability due to dental diseases. This finding is crucial from a social justice perspective; WHO policies, for example, advocate for interventions that aim to overcome barriers to health care and increase individual capacity, self-efficacy, and social-inclusion, because it will ultimately address inequity in society\textsuperscript{11}.

Ultimately our findings suggest that timely dental care can, to a certain extent, address employment barriers. In the context of current access to dental care debates in Ontario and across the country, these results can inform policy and advocacy efforts at expanding public dental care programs for low-income adults, partly because of the role that dental treatment can play in
improving employment outcomes. Nevertheless, this should not be the only driving factor in policy decision making. The well-being individuals, absence of pain, and a better quality of life are social prerogatives that cannot be ignored and should in fact be emphasized in modern civilized society. In this regard, it is arguably a moral obligation of a caring society, and we would suggest that this should be enough of a reason to bring about expansion of dental care programs. Of course, the inclusion of the economic arguments described here into the discussion is important and necessary, and should be accompanied with scientific support, but again, should not be the sole rationale for provision of dental care to the underprivileged people in our society.

**Future directions**

While we were successful in obtaining data from five municipalities, the possibility of accessing data from other municipalities, including Toronto, which is the most populated municipality of Ontario, can help to provide further evidence regarding the association of dental treatment on employment outcomes among social assistance recipients. As dental care for OW adult recipients is discretionary in nature, it varies among municipalities from being comprehensive to being limited to emergency care. An economic analysis could be conducted comparing municipalities in terms of their dental coverage and employment outcomes. Average per person dental care costs incurred and rates of leaving OW due to employment reasons in participating municipalities could be then calculated. This type of study would be important for those seeking instrumental evidence for the benefits (or lack thereof) of providing timely dental care to social assistance recipients.

We also calculated effect sizes for change in oral health related quality of life and job-seeking self-efficacy after receiving dental treatment. Utilizing these effect sizes, larger population-based studies can now be planned to more robustly test the role of dental treatment on the employment outcomes of social assistance recipients. In our study sample, we found that after
receiving dental treatment, social assistance recipients perceived psychosocial changes related to employment. However, whether this perception actually transforms into positive employment outcomes is to be determined. As such, we will be following our study participants for the next twelve months to observe their employment outcomes. Their employment outcomes will be observed at intervals of six and twelve months from baseline, which will be considered the date of treatment completion, and will be accessed through administrative caseload data held at the Ministry of Community and Social Services.

As the goal of this research was to provide policy makers with better information about the effects of dental treatment on employment outcomes among people on social assistance, we will implement a knowledge translation plan for dissemination of the knowledge gained through this study. The plan will involve (i) identification of key messages to communicate to the target audience; (ii) identification of target audiences; and (iii) using a knowledge translation strategy based on the best available research evidence. We have already contacted all Public Health Units through the Ontario Association of Public Health Dentistry listserv to make them aware of how our study can provide important knowledge regarding the employment implications of dental care. A knowledge dissemination plan has also been discussed with administrative authorities in municipalities who have shown significant interest in our study.

As part of our strategy we also anticipate dissemination through traditional mechanisms such as publication in peer-reviewed policy journals and presentations at national and international conferences. Further, we anticipate engagement with policy entrepreneurs at the municipal and provincial level. We will thus set up a half-day learning session involving directors of dental divisions and administrators at social services departments, the Toronto Employment and Social Services (letter of support appended), and the Ministry of Community and Social Services (letter
of support appended), where the results of the study will be presented and possible policy implications for the oral health care of socially disadvantaged groups will be discussed.

Conclusions

Overall, we have learned that there is a scarcity of well-conducted studies, as well as poor quality of evidence in the studies that do exist, making it difficult to judge the effect of dental care on employment outcomes. The retrospective cohort study that we conducted using administrative data reveals that at one year, dental treatment does not appear to be significantly associated with leaving assistance for employment in this population. Yet, it also suggested that people who have dental problems may be particularly disadvantaged, and dental treatment may help to some extent by levelling them up. Results of our pre- and post-treatment survey among a convenience sample of social assistance recipients indicated that after receiving dental treatment, oral health related quality of life and self-efficacy in job-seeking does improve. During the downswing of the economic resources pendulum, when various social policies are under scrutiny, and reductions in budgets for publicly funded dental services are often discussed as potential money saving options, the knowledge we have provided is arguably important and timely.

Disclaimer:

Any results or conclusions that may arise from the research are not the opinions of the Ministry of Community and Social Services but are solely those of the researchers.
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