

Building Capacity in Dental Assisting Research: The Self-Reported Impact of Occupational Health Stressors on the Work-Life of Canadian Dental Assistants

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Background: National and international literature concerning the occupational health of dental assistants is almost completely non-existent. Research in the area of occupational health and allied oral healthcare professions predominately focuses on dental hygiene, which has often led to the overgeneralization of research findings in this field to that of dental assisting. The implication of this overgeneralization has been the severe underdevelopment of research in the field of dental assisting, potentially to the detriment of the health of Canadian dental assistants. Although dental assisting and dental hygiene share their role as dental support workers, the two professions are vastly different in their scope, and as such, warrant professionally individualized research.

Purpose: The aims of this study were manifold, including to 1) identify the current gaps in occupational health in dental assisting research, 2) develop focused and profession specific driven data within the identified gaps in literature, and 3) begin to close current gaps in the literature through the collection of qualitative data from dental assistants themselves.

Methods: This research employed a four-party study design, which began with an environmental scan of academic and grey literature in the field of occupational health in dentistry and dental hygiene more broadly. A literature review was utilized to draw out elements of dental assisting present in the dentistry and dental hygiene literature. Findings from the literature review, most importantly being the intense gap in dental assisting occupational health literature, were called upon to format a electronic survey tool that was administered online to 300 Canadian dental assistants. Finally, results from the online survey contributed to the structuring of in-depth interview guides. Qualitative data was collected from four in-depth telephone interviews and then coded within broader occupational health themes. Recruitment and participation in this research was completely voluntary and conducted by the Canadian Dental Assistants' Association (CDAA), as such, ethics approval was not required.

Results: Results from all four parts of this research revealed that there is a critical void in current literature speaking to the occupational health of Canadian dental assistants. The latter half of this research has focused on filling the gaps in literature identified by the environmental scan and literature review. Among the many gaps in knowledge identified in the literature, dental

assistants themselves (via the online survey tool and key informant interviews) reported the lack of consistency among Canadian provincial regulators regarding infection control and the impact of poor ergonomics most concerning. Interestingly, dental assistants called for collaboration between dental assistants and dentists regarding good ergonomic practices. Moreover, data collected from an environmental scan, literature review, online survey tool, and key informant interviews confirmed the significance of these concerns (i.e., the impact of poor ergonomics and lack of consistency in infection control standards) among other factors negatively affecting the long-term work life health of dental assistants. More specifically, data collected from the online survey revealed a significant lack of research or support in the area of ergonomics and related musculoskeletal diseases as well as chemical safety. Key informant interviews highlighted the lack of consistency regarding chemical safety regulation and stressed the potential impact of interprofessional collaboration on the long-term work life course of dental assistants.

Discussion and Conclusion: Qualitative data from the online surveys and interviews were thematically coded and revealed four areas of interest, including 1) the need for pan-Canadian coordination for skills and education and, 2) interprofessional collaboration for the promotion of good ergonomics. Dental assistants (DA) from across Canada cited the need for pan-Canadian planning and coordination regarding the skills, regulation, and education of dental assistants. Dental assistants felt that the current lack of national coordination negatively impacts their long-term work life; dental assistants felt they were not protected at the national level and could do little to change the state of workplace hazards without coordination across the country. Moreover, the current lack of educational and regulatory mechanisms creates significant skill differences within the profession among certain jurisdictions; current assistants feel their skillset is not transferable across jurisdictions, which makes interprovincial mobility a stressful endeavor. Dental assistants also highlighted the detrimental long-term impact of poor interprofessional collaboration, in particular, regarding ergonomics. Good ergonomics, dental assistants explained, is heavily dependent on a dentist's ability to efficiently and appropriately work with a dental assistant. The lack of interprofessional training among dentists, dental assistants reported, has led to dentists who do not know how to efficiently use a chair side assistant which creates significant and long-term barriers to good ergonomics. Data from interviews and the survey also spoke to the shifting context of chemical use and safety. RDAs

highlighted the need, once again, for standardization in this area and for more responsibility on behalf of the employer to ensure the safety of DAs. Finally, data revealed the growing importance of infection control in dental assisting. Literature in this area rarely speaks to hazards among dental assistants, instead focusing on dentists. DAs often found themselves acting as advocates for better infection control in a way that was best described as ‘damage control’.

INTRODUCTION

In most provinces in Canada, with the exception of Ontario and Quebec, dental assisting is considered to be a “restricted health care occupation”. The practice of dental assisting involves collaboration with patients, other healthcare professionals and society to achieve and maintain optimal oral health, which is an integral part of overall wellbeing. Dental assistants perform a variety of tasks, for example, dental assistants may assist dentists during the examination and treatment of patients and perform clerical functions as important members of oral healthcare teams (CDAA, 2014).

Dental professionals are predisposed to a number of occupational hazards (Ayatollahi et al, 2012; Leggat et al, 2007). While occupational health concerns have been at the core of research in dentistry, the vast majority of this scholarship excludes the experience of dental assistants and disproportionately considers dentists as a primary research focus. More specifically, the literature overwhelmingly focuses on preventative measures regarding latex allergy and carpal tunnel syndrome; this suggests that preventative measures are not adequate, are not being employed or the positive effects of these measures are diminished by higher rates of productivity among dental assistants. The current literature highlights the need for a shift in concepts of prevention and points of intervention. More specifically, there is a need for ergonomic awareness among dentistry and dental assisting students as well as practicing RDAs.

This paper will report on the cumulative findings of four separate research activities, which that began in February 2015 and concluded in December 2015. Discussions and conclusions in this report represent the cumulative findings of all research activities (i.e., environmental scan, literature review, online survey, and interviews). Qualitative data gathered from the online survey and interviews worked to produce practitioner focused knowledge in a field largely overwhelmed by dentistry scholarship.

METHODOLOGY

This research utilized a four-part study design. The study began with an *environmental scan* of potential topics in occupational health among dental assistants. In general, environmental scans are used to provide decision-makers and researchers with knowledge about current social, technological, political, and cultural contexts and to identify any potential short-term or long-term shifts within these environments (Grahams, Evitts & Thomas-MacLean, 2008). Most

importantly, environmental scans are used by health researchers to address issues within specific communities (e.g., the Canadian dental assisting profession). The environmental scan conducted as part of this study was designed to aid in planning for future research as well as to provide evidence about the current gaps in knowledge within the occupational health and dental assisting literature. More specifically, the scan focused on both grey and academic literature and highlighted research in chemicals, radiation, carpal tunnel, allergies, and infection control.

The second phase of the study design was comprised of a *literature review*. The literature review was conducted on directed topics (i.e., those identified via the environmental scan) in dental assisting, including the long-term negative effects associated with the use of various chemicals and disinfectants commonly used in dental clinics, the development of allergies due to the long-term exposure to dental material, the accumulative trauma in dental assisting, radiation, infection control, and ergonomics. Both broad and narrow key words and phrases were used to search all sources. A broad term such as *dental assistant(s)* was used in an effort to capture information relating the different titles used to refer to dental assistants (i.e. chair side assistants, intra-oral assistants, Level one and Level two assistants, dental nurses etc.). More focused words and phrases such as *dental assistant(s) AND trauma, AND infection control, AND carpal tunnel, AND chemicals* were used in an effort to access data for each of the targeted topics in dental assisting.

The literature review revealed extensive gaps in knowledge in the field of dental assisting and occupational health. Among other findings, the literature review found that there is a significant lack of national or provincially specific research. More specifically, there is a significant lack of current research speaking to the effects of workplace chemicals on health of dental assistants. Moreover, the prevalence of latex allergies and carpal tunnel syndrome among dental assistants has been steadily increasing despite having been well established as occupational health concerns in the literature (Ayatollahi, et al., 2012). Above all else, the literature review demonstrated the significant lack of coordination among dental assisting regulatory bodies in the country, which is evident in the degree of diversity between and among provincial jurisdictions.

Findings from the literature review aided in crafting the online *survey tool*, which was utilized in the third part of this research. The Building Capacity in Dental Assisting Research (BCDAR) survey was an online survey consisting of twenty questions. The survey included

multiple choice and short answer questions on a range of topics in occupational health. The survey remained active for one week, from July 27th-August 3rd, 2015. During this time frame, 316 people completed the survey. Data from the BCDAR survey had been plotted and analyzed for a previous report (See Appendix A full report). In brief, the data analysis report developed a brief demographic snapshot of dental assisting in Canada and highlighted the importance of educational standards in dental assisting, infection control, and interprofessional collaboration.

The final part of this study consisted of four *semi-structured key informant telephone interviews* (See Appendix B for the Interview Guide). The Canadian Dental Assistants Association released a call for interview participants in October 2015; four participants were chosen at random from an e-mail contact list of interested parties. The interviews were conducted between October and December 2015 with participants from Alberta, Nova Scotia, and Quebec. On average, interviews were an hour in duration. The interviews were recorded for accuracy and selectively transcribed.

DISCUSSION

Pan-Canadian Coordination For Skills and Education

In Canada, the regulation of health professions falls within provincial jurisdiction. This means that regulation and education of Canadian dental assistants varies across provincial boundaries. Indeed, Canada is home to more than 80 accredited training programs for dental assistants, with the majority found in large urban centres like Toronto, Montreal, Halifax and Vancouver (CDAA, 2014). Nova Scotia, for example, has two programs that graduate 40 to 45 dental assistants per year¹.

Inter- as well as intra-jurisdictional variability plays a prominent role in self-reported stress among dental assistants. In particular, dental assistants who are more advanced in their careers cited concern regarding the trend towards younger cohorts of students taking up skills typically reserved for dental hygienists. In the following quote, a dental assistant with more than twenty years of experience speaks to RDAs' possibly encroaching scope of practice:

¹ This data does not capture the approximate annual graduates of programs in Quebec, which is estimated to exceed 800. Moreover, accreditation of dental assisting programs differs by jurisdiction.

One of our schools have gone to where dental assistants can scale. I would just throw that out there as, a few things there; I think it encroaches upon the hygienist's job, even though someone would be qualified to do it, it just crosses over a little bit. You know, for anybody such as myself, I still have training but I don't have that training. Qualifications need to be looked at as a standard, something Canada-wide (RDA, Alberta, 22 years of experience).

Stress in the workplace is an occupational health issue. Key informants noted their growing anxiety regarding the uneven training and educations of DAs in Canada, and felt that this would eventually negatively affect their own career prospects. Indeed, dental assistants who participated in this research called for the pan-Canadian coordination of skills and education in Canada as a way to safeguard the profession from mismatching skill profiles. In the following quote, the RDA clearly expresses her unease with new dental assisting programs and their overall lack of standardization:

There are about 20 that have graduated with scaling. It hasn't happened yet, but it will certainly will. We're not as qualified afterwards. There are limitations on it. I think it is something that should be looked as part of the education. Now these dental assistants are putting everyone else at a disadvantage (RDA, Alberta, 22 years of experience).

Interprofessional Collaboration as a Barrier to Good Ergonomics

A reoccurring theme in the data was the need for a new approach to good ergonomics. Previous approaches have almost exclusively focused on equipment, posture, and the overall environment. Good ergonomics is only partially satisfied by a good chair and the proper equipment. At the same time, access to ergonomic friendly tools and environments is largely dependent on the dentists' approval of such modifications, which often acts as a barrier to occupational health:

When I started having a lot of issues with my back, I have been chair siding for 23 years, my massage therapist said if you can get a stool with a backrest it would be a lot easier on you. I mentioned it to my boss and he said sure, and I got one of my sales people to find me one. So he bought me one with a backrest on it. We then replaced the

other assistant stools with backrests as well. I'm one of the lucky ones. My employer cares if I am happy (RDA, 23 years, Nova Scotia).

Interestingly, dental assistants often referred to the lack of interprofessional collaboration between dental assistants and dentists as a driving force behind poor ergonomics:

When dentists are in school they don't have an assistant. So unless you have someone who sees the value in the assistant doing more things for them, it is hard. I have always been lucky to have someone who wants you there doing those things for them. Until you can train that dentists to use you the way you should be used, it's difficult (RDA, 23 years, Nova Scotia).

Power dynamics at play between dentists and dental assistants also figured prominently in discussion of poor ergonomics in the workplace. Dental assistants often felt they had to defer to the dentist at all costs because s/he was the expert. Indeed, at times the power imbalances are so drastic between the dentist and the dental assistants that she will put herself in an ergonomically compromised position in order to meet the needs of the dentist:

Some dental assistants don't feel they can speak up and say anything, it all comes down to who they happen to work for. There are days there are no way around to sit in a position it is not possible to be in a good ergonomic position, it's not always because the dentist but some assistants don't feel that they can have that ability or that they can ask the dentist to maneuver things around differently so it eases pressure on them. A dental assistant kind feels like I am below the dentist in the hierarchy (RDA, 23 years, Nova Scotia).

A new approach to good ergonomics that stresses the importance of interprofessional collaboration is needed in dental assisting. Indeed, in some jurisdictions dental assistants have taken it upon themselves to rectify this issue. For instance, in Nova Scotia a Dalhousie Dentistry professor has developed a continuing education course for dentists and assistants to improve how these professionals work together. Practices such as these are promising and showcase the possibility for innovation within dental assisting itself:

One of the doctors I work with, her and I are putting on a course in January with her dentists that shows them how to use their assistant properly. We are putting on a course how to better utilize dental assistants during root canals. We want the dentists to bring their dental assistant with them

LIMITATIONS

This research represents a preliminary attempt to map, project, and create knowledge in the area of occupational health and dental assisting. As a preliminary study, this research experienced many significant limitations. Perhaps most important to note is the lack of data concerning Quebec. Despite the fact that two key informants were Quebec-based, these interviews as well as the online survey were conducted in English, which may have detracted from the quality and legitimacy of this data. Future research should endeavour to focus on the contextual and political barriers that are facing the dental assisting profession in Quebec today. Unfortunately, a meaningful analysis of dental assisting in Quebec was outside the scope of this paper given this jurisdiction's political, historical, and lingual distinctiveness.

CONCLUSIONS

Data from this study demonstrated the need for research specific to dental assisting as a unique field in allied oral health care. In particular, it was found that the lack of standardization in terms of skills and education acts as a major source of stress for practicing dental assistants. Moreover, data revealed the importance of interprofessional collaboration as an alternative approach to good ergonomics. Future research should seek to develop new perspectives on ergonomics that highlights the impact of interprofessional collaboration. Moreover, more research is needed in the areas of education and skills standardization as provinces move towards a dialogue of pan-Canadian planning.

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APPENDICES

APPENDIX A

Building Capacity in Dental Assisting Research: Survey Data Analysis Final Report

Building Capacity in Dental Assisting Research

Data Analysis and Literature Review Report

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Take Home Messages

The Building Capacity in Dental Assisting Research (BCDR) survey reaffirmed several facets of concern regarding the occupational health of dental assistants (DAs) that had been previously established by the Canadian Dental Assistants' Association (CDAA) led literature review. The BCDR survey also shed light on issues that were not discussed by the literature, in effect, contributing to a growing discourse in this area. Below, I summarize key findings that are presented in greater detail throughout this report:

- Ventilation and air quality were consistently voiced as major areas of concern for dental assistants. Conversely, scholarship considering the effects of ventilation and air quality in the dental office was not prominent in the literature.
- Chemical safety and handling protocol competency data suggests that there is a need for better knowledge translation (KT) practices, regulatory mechanisms to ensure employers offer adequate training opportunities to their employees or a combination of both better KT and employer adherence to chemical safety guidelines.
- Dental assistants identified several negative long-term health affects as a result of chemicals in the workplace; skin conditions, respiratory irritation, chronic migraines. The literature in this area is not thorough, and would benefit significantly from a national prevalence study looking more closely at rates of these issues among dental assistants.
- Data suggests that DAs find ergonomic training insufficient to ensure healthy workspaces. Participants stress the need for training to be focused on dentists and not solely DAs. Dentists and those who work with dentists would benefit greatly from ergonomic training that considers the challenges associated with DA work.
- Overall, DAs do not feel at risk for radiation exposure. The literature suggests that risk of cancer associated with radiation exposure in the dental clinic is extremely low.
- BCDAR survey respondents call for more uniform implementation and monitoring practices regarding infection control. Many were satisfied with current workplace practices while a sizable minority reported funding and convenience taking precedent over infection control guidelines.
- The majority (99%) of dental assistants in Canada are female; a finding consistent with previously established demographic data.
- The survey emphasized the extent to which dental assistants interact with chemicals (90% on a daily basis), and in turn, reiterates the need for scholarship considering the effects of these substances on health of DAs.

Next Steps

1. Identify three to five key informants
2. Draft a semi-structured interview guide
3. Conduct semi-structured interviews with designated key informants
4. Begin drafting the final report; a final culmination of all the research activities (environmental scan, literature review, Building Capacity in Dental Assisting Research survey and key information interviews)

Introduction

Research Trajectory and Report Objectives

In April 2015 the Canadian Dental Assistants Association formed a research partnership with the University of Ottawa based Canadian Health Human Resources Network. The primary objective of this partnership has been to create value-added and focused research as a stepping-stone towards building capacity in Canadian based dental assisting research.

The first phase in this process has been to conduct an environmental scan and draft a literature review. The literature review was guided by four topics identified by the CDAA as pressing areas of concern for dental assistants in Canada:

1. Chemicals: the long-term negative health effects associated with the use of various chemicals and disinfectants commonly utilized in dental clinics
2. Allergies: the development of environment allergies due to long-term exposure to dental material
3. Carpal Tunnel: the accumulative trauma in dental assistants
4. Radiation, infection control and ergonomics

The purpose of the literature review was manifold; to draft an account of what accredited scholars and researchers have published, convey the state of knowledge in these areas and to, most importantly, identify gaps in knowledge. The literature review was successful in all of these pursuits and contributed to the drafting a survey tool.

The survey aimed to provide an easily accessible and broad-based data set that could potentially expand upon findings produced by the literature review. The Building Capacity in Dental Assisting Research (BCDAR) survey was disseminated to CDAA members in July 2015.

The Building Capacity in Dental Assisting Research survey was an online survey consisting of twenty questions. The survey included multiple choice and short answer questions on a range of topics in occupational health. The survey remained active for one week, from July 27th-August 3rd, 2015. During this time frame, 316 people completed the survey. Data from the BCDAR survey had been plotted and analyzed for the purpose of this report.

The present report is a culmination of the above

mentioned research activities; an environmental scan, literature review and BCDAR survey. The objectives of this paper include, but are not limited to, the following action items:

- Develop a demographic snapshot of dental assisting in Canada
- Summarize and discuss the Building Capacity in Dental Assisting Research survey data
- Report congruencies between the literature review and survey data
- Analyze disparities between the literature review and survey data
- Highlight new knowledge produced from survey data
- Mine survey data to further characterize gaps in knowledge

This report represents a concerted effort on behalf of dental assisting professionals, advocates and researchers to build capacity in the field of dental assisting research. Thus, the purpose of this research activity has been two-fold; to articulate new knowledge in the field while at the same time setting the stage for future research to develop.

Demographics of the Profession

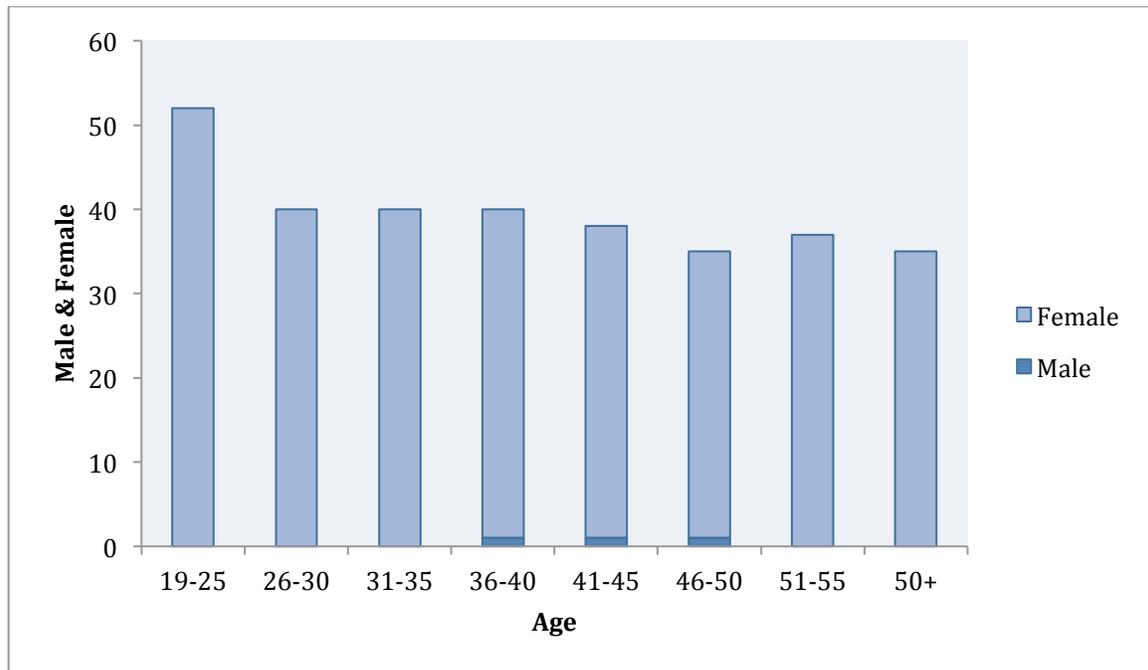
Data collected from the BCDAR survey provides the means to construct a basic demographic sketch of the dental assisting profession in Canada. When speaking to gender make-up of the profession, the literature often projected anywhere from 95%-99% of the profession as female. It was not surprising, then, to find that the overwhelming majority of survey respondents were women: 314 of the 317 dental assistants who participated in the survey identified as women (See Figure 1). The remaining 3 respondents of the total 317 identified as men. Statistically speaking, this means that approximately 99% of dental assistants are female. As a highly feminized² health care profession, dental assistants undoubtedly experience their workplace environment, and in turn, work place hazards through a gendered lens. The gendered nature of dental assisting work is an issue that has yet to be fully unpacked either in the literature or via the BCDAR survey.

In contrast to the disproportionate gender make-up of the profession, the survey revealed a relatively equal representation of dental assistants across all age groups. The highest concentration of dental assistants was found in the 19-25 year old age group and the lowest in the 46-50 and 50+ year old age groups, 16% and 11% respectively.

The BCDAR data contradicts the findings put forth in a literature review of dental assisting prepared in 2010 for the Health Professions Regulatory Council (HPRAC), which found the majority of dental assistants “are older, white females” (4). Instead, the BCDAR data posits that the largest group of DAs falls within the 19-25 year-old age group (16%). It cannot be said for certain if the BCDAR data is reflecting a shift in the demography of dental assisting in Canada (from older professionals to younger professionals), or if younger dental assistants were overly represented in the survey as a result of dissemination practices or other factors. It is important, however, to note this disparity and practice caution when generalizing results from the BCDAR survey.

² Feminization refers to the longstanding gendered division of professional labour: men have predominated in higher-status, higher-paying professions like medicine and dentistry, while women’s health care work has been clustered into support occupations like nursing, dental hygiene and dental assisting (Adams, 2010).

Figure 1: Age and Sex of Canadian Dental Assistants, 2015



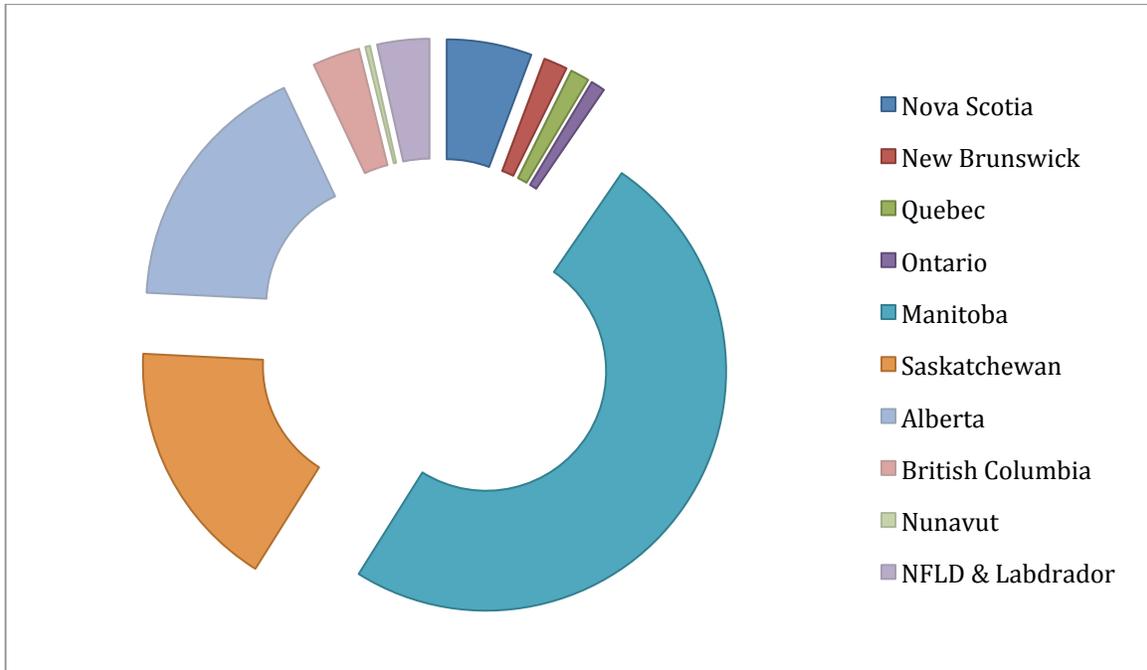
Source: Building Capacity in Dental Assisting Research, BCDAR Survey (2015).

When asked, “in which province do you currently practice?” the survey elicited 314 responses. Almost half of the dental assistants who participated in the BCDAR survey indicated Manitoba as their province of practice (See Figure 2). Saskatchewan and Alberta each represented 17% of the survey respondents. Following Alberta and Saskatchewan were the provinces of Nova Scotia (6%), Newfoundland and Labrador (4%), British Columbia (3%), New Brunswick (2%), Quebec (1%) and Ontario (1%).

The survey suggests that dental assistants are extremely maldistributed among the provinces and territories. In reality, however, this is likely not the case. It would be difficult to generalize the results of this section of the survey to the dental assisting profession as a whole. For instance it was surprising to find that Ontario, as the most densely populated province, is home to a mere 1% of all practicing DAs. The likely over-representation of Manitoban dental assistants could be attributed to several different factors, for example:

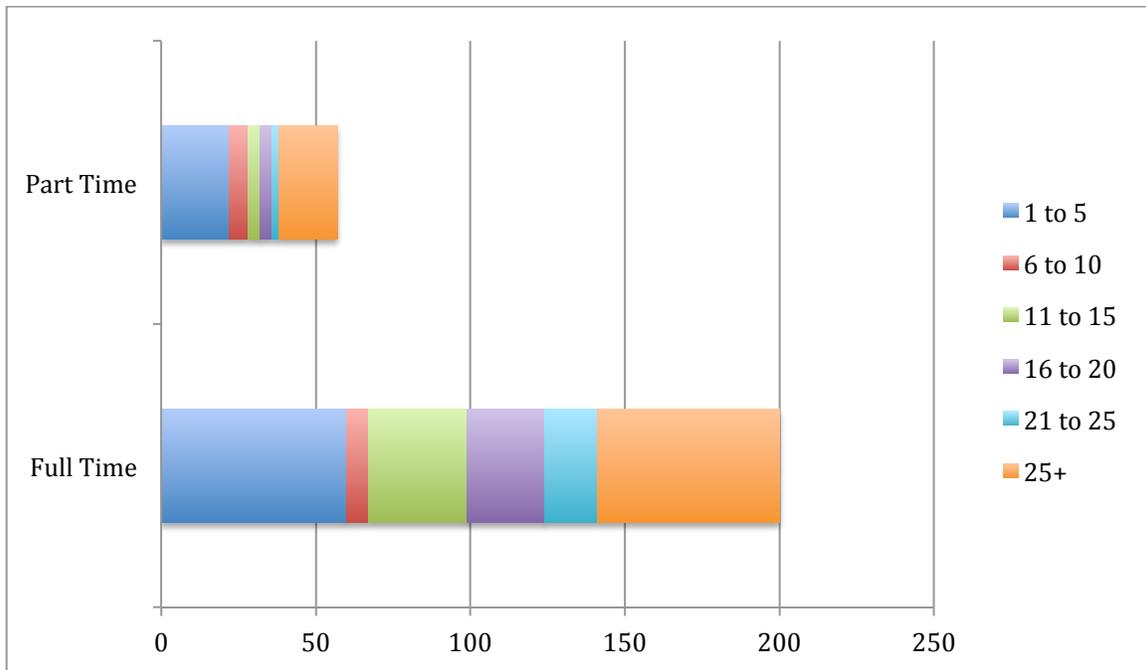
- Higher distribution rates of the survey within this jurisdiction
- Time of survey distribution; survey links may have been posted to social media accounts or e-mailed at more accessible or convenient times for this time zone
- Higher rates of interest in the survey among Manitoban dental assistants
- Lack of participation of Quebec DAs likely related to low participation in national level association and the language (i.e., English) of the research call-out

Figure 2: Province of Practice of Canadian Dental Assistants, 2015



Source: Building Capacity in Dental Assisting Research, BCDAR Survey (2015).

Figure 3: Nature of Work Compared to Years of Practice of Canadian Dental Assistants, 2015



Source: *Building Capacity in Dental Assisting Research, BCDAR Survey (2015)*.

Table 1: Nature of Work Compared to Years of Practice of Canadian Dental Assistants, 2015

	1-5	6-10	11-15	16-20	21-25	25+
Full time	60	37	32	25	17	59
Part time	22	6	4	4	2	19
Relief Hours	4	1	5	1	1	4
Job Sharing	1	1	0	0	2	2

Source: *Building Capacity in Dental Assisting Research, BCDAR Survey (2015)*.

The majority of survey respondents described their work as “full-time”. Dental assistants working full time were most likely to have been working for either 1-5 years or more than 25 years. The concentration of full-time professionals in these age groups is consistent with the results of a previous survey question concerning age, which found more dental assistants were aged 19-25 years old and 46+ years old than any other age group (See Figure 1).

A notable number of respondents, however, described their work as “part-time”. For instance, 25% of dental assistants who have been working for 1-5 years and 23% of dental assistants who have been working for more than 25 years described their work as “part-time”. On the other hand, a very small minority of respondents in all age groups characterized their work as providing “relief hours” or “job sharing,” 8% and 2%, respectively.

Demographic Sketch

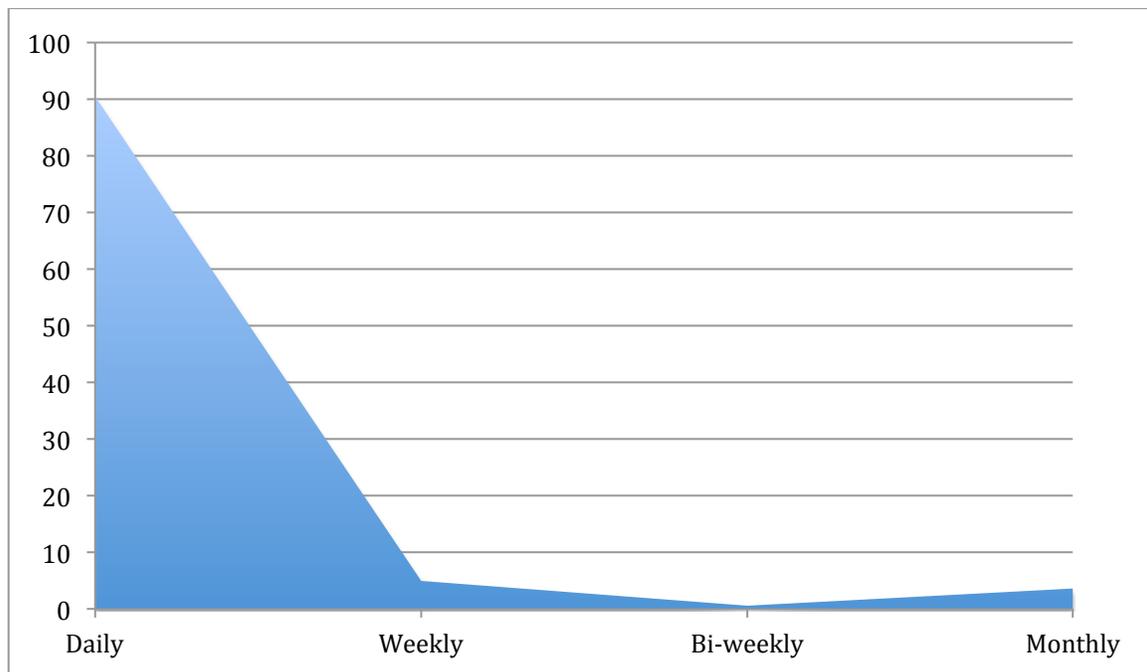
Data collected from the Building Capacity in Dental Assisting Survey can be generalized to create a basic demographic sketch of dental assisting in Canada. With the exception of data speaking to jurisdiction of practice, the BCDAR survey provides a brief look into the demographic characteristics of the average dental assistant. According to respondent answers to a brief set of demographic questions at the outset of the BCDAR survey, we can characterize Canadian dental assistant population by the following traits:

1. Predominately female (99%)
2. Of mixed age
3. Most working full-time (74%)
4. A notable minority working part-time (18%)
5. Majority have been working for either 1-5 years (27%) or more than 25 years (27%)

Occupational Health Concerns in Dental Assisting

Chemicals

Figure 4: Frequency of Interaction (%) with Chemicals in the Workplace of Canadian Dental Assistants, 2015

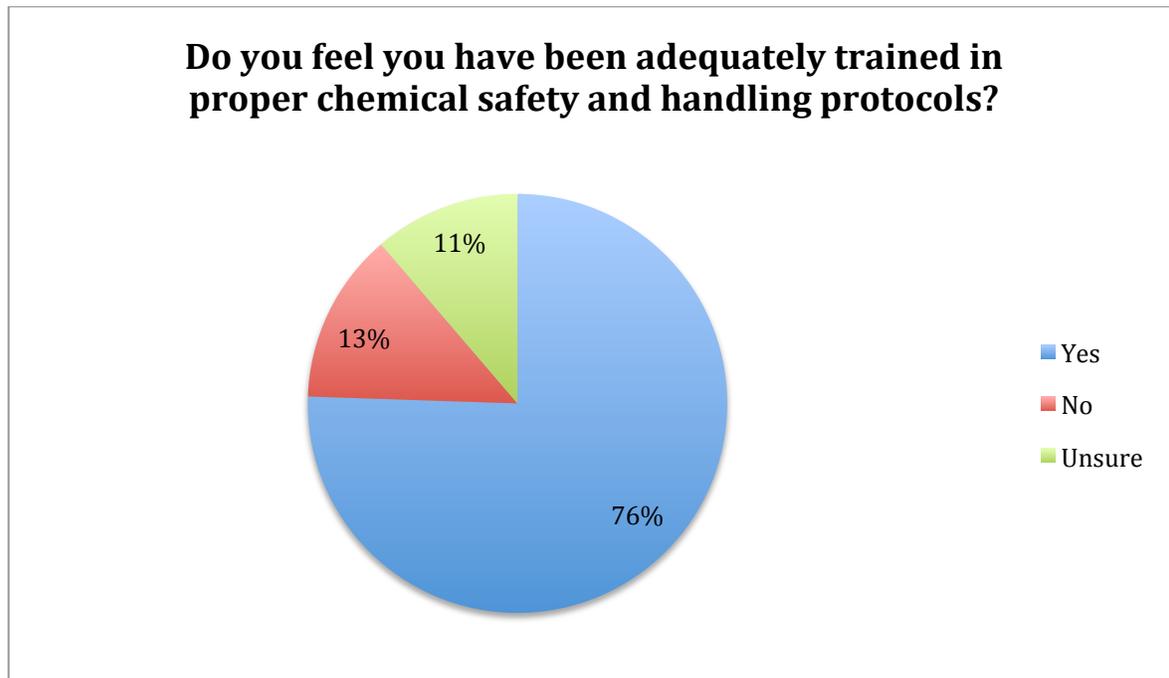


Source: Building Capacity in Dental Assisting Research, BCDAR Survey (2015).

Interacting with chemicals in the workplace is a daily occurrence for 90% of dental assistants who participated in the BCDAR survey. The remaining 10% of respondents reported handling chemicals on a weekly (5%), bi-weekly (1%) or monthly (4%) basis.

Dental assistants' high rate of interaction with chemicals is a central factor in the push for research in the area of this area. There is a similar concern for the effect of chemicals on dental assistants' occupational health among researchers. The literature reaffirms what the BCDAR data conveys; chemicals are a permanent fixture in dental office, and thus, must be considered prominent workplace hazards. For instance, Ayatollahi et al (2012) highlights the depth and complexity of the dental professional's working environment and encourages health workforce planners and occupational health advocates to "remain constantly up-to-date about measures on how to deal with newer strategies and dental materials" (7).

Figure 5: Perceptions of Workplace Hazard Training, Chemicals



Source: Building Capacity in Dental Assisting Research, BCDAR Survey (2015)

The majority of respondents (76%) felt that they had been adequately trained in proper chemical safety and handling protocols (see Figure 5). A notable minority (13%), however, reported that they had not been adequately trained in chemical safety and handling protocols.

The literature review suggests that there is a dearth of research considering the effectiveness of chemical safety and handling protocol training. Scholarship in this area often implies that the existence of chemical handling protocols and guidelines are adequate safety mechanisms in themselves. For example, in a study performed by Leggat et al, which sought to measure the risk of chemical matters in the dental clinic, the author suggests that the implementation of proper safety guidelines and measures is suffice to significantly reduce and manage chemical risk (2007: 618). The authors, however, do not consider how guidelines are formed, how protocols are implemented, and more importantly, if they are implemented.

When we consider current scholarship in the area of chemical safety in combination with data provided by the BCDAR survey, we can arrive at two possibilities to characterize the state of chemical safety as an occupational health hazard for dental assistants:

1. There is either a need for better knowledge translation practices, which would imply that there is adequate knowledge in this area but this research is not being made accessible to the health care professionals who need it, or;

2. The appropriate knowledge translation techniques are in place (i.e. workshops, guidelines, thoroughly disseminated up-to-date research) but the employers are not making these tools available to their staff.

In future research activities it will be imperative to probe the issue of knowledge translation in the area of chemical safety further. There appears to be a disconnect between what the literature is claiming (i.e. there is robust knowledge in this area) and the reality that dental assistants are reporting (i.e. 13% of participants in the BCDAR survey did not feel confident handling chemicals with the training they had received).

Table 2: Figure 5 Response Breakdown

Do you feel you have been adequately trained in proper chemical safety and handling protocols?	
Yes	235
No	41
Unsure	35

Source: Building Capacity in Dental Assisting Research, BCDAR Survey (2015)

In exploring chemicals in the workplace further, participants were asked if they experience any short-term or long-term negative health issues that have been attributed to exposure to chemicals in the workplace. A notable number of responses reported **prolonged skin irritation, respiratory issues and migraine headaches** as a result of daily interaction with chemicals in their workplace.

Chemical Hazards and Skin

One respondent wrote “I get a rash on my hands from the antibacterial soaps used in dental offices,” and several others simply replied “skin irritation,” “skin problems,” “skin rash,” and “skin issues”. Participants also identified their affliction of specific conditions such as **eczema, dermatitis** and **psoriasis** as a result of chemicals in the workplace; “acquired bad psoriasis on my hands and arms,” and “not chemicals, but masks and gloves give me eczema”. Many respondents noted their allergic responses to certain materials in the dental clinic; “acrylic allergies-contact on hands and fingers swell and crack open” (See Table 3).

Chemical Hazards and Respiratory Issues

Several respondents voiced their concerns with the quality of ventilation in their workspace. More specifically, there were numerous reports of working with chemicals in poorly ventilated spaces, which in turn, led to experiences of dizziness, shortness of breath, migraines and more serious conditions like sarcoidosis:

My asthma flares up only at work with endo ice and with disinfectant aerosols.

Sneezing and coughing, stuffy nose (work days only).

Sarcoidosis due to inhalation of chemicals.

Polymers in denture or custom tray liquids if not well ventilated, find as I am older light headed and to leave the area. All offices different to ventilation concerns.

Minor headaches and shortness of breath with prolonged exposure.

Some participants openly asked for “better knowledge on what the chemicals are doing to our bodies if they are breathed in or touched with bare skin” (See Table 4). Others noted a combination of negative long-term health effects associated with chemicals. For instances, one participant noted a “skin a respiratory irritation; dizziness”.

Chemical Hazards and Migraines

As previously noted, ventilation was a common concern among dental assistants who participated in the BCDAR survey. Poor ventilation was often implied to be at fault for respiratory issues as well as neurological discomforts, like migraines and headaches. For example, survey respondents noted experiences of “chronic migraine syndrome,” “headaches,” and “migraine headaches”.

Table 3: Text Response Analysis, Effects of Chemical Exposure

Do you experience any short-term or long-term negative health issues that have been attributed to exposure to chemicals in the workplace?	<i>Chronic migraine syndrome (sensitive to some of the chemicals used)³</i>
	<i>Contact Dermatitis, breathing difficulty, from exposure</i>
	<i>Skin and respiratory irritation; dizziness</i>
	<i>Acrylic allergies-contact on hands fingers swell and crack open</i>
	<i>Acquired bad psoriasis on my hands and arms</i>
	<i>I will refrain from answering this question, as it, really applies more to the in house lab and technicians. Since I do not work in this environment nor would I. I have no</i>

³ Italicized writing represents exact quotes from the text responses received in the BCDAR survey

	<i>concerns for my personal health, but that of my co-workers...well that's a different matter.</i>
	<i>Headaches</i>
	<i>I get a rash on my hands from the antibacterial soaps used in dental offices</i>
	<i>Sinus infection</i>
	<i>Latex allergy due to long time exposure, now work in a latex free environment</i>
	<i>Skin irritation</i>
	<i>Skin problems</i>
	<i>Skin rash</i>
	<i>Not chemicals but the masks and gloves cause eczema</i>
	<i>High liver enzyme counts</i>
	<i>Sarcoidosis due to inhalation of chemicals</i>
	<i>Headaches</i>
	<i>Sneezing and coughing</i>
	<i>I believe that they are possible contributing factors to my migraine headaches</i>
	<i>Contact dermatitis</i>
	<i>Polymers in denture or custom tray liquids if not well ventilated, find as I am older light headed and to leave the area. All offices different to ventilation concerns</i>
	<i>Stuffy nose daily (work days only)</i>
	<i>Headaches</i>
	<i>Allergy to acrylics (methyl methacrylates)</i>
	<i>The chemicals make my hand eczema flare up, regardless of wearing gloves</i>
	<i>Minor headaches and shortness of breath with prolonged exposure</i>
	<i>Cough</i>
	<i>Skin issues, sinus trouble</i>
	<i>Headaches when making custom traps</i>
	<i>Allergic to some hand soaps and masks. Probably the dyes.</i>
	<i>The powder in the surgical gloves is a major</i>
	<i>Eczema</i>
	<i>Rash, cough</i>
	<i>Allergies, neck pain, back pain</i>
	<i>In the past I had contact dermatitis due to the powder used inside latex gloves my employer provided. He allowed me to order more expensive powder free gloves to ensure my skin stayed healthy</i>
	<i>Bad neck and back</i>
	<i>Eczema</i>
	<i>My asthma flares up only at work with endo ice and with</i>

Participants in the BCDAR survey were also asked if they thought the handling and safety measures regarding chemicals in their workplace could be improved, and furthermore, what kind of improvements would be most essential. Overall, responses in this section were divided between two competing camps:

1. A minority of respondents reported being satisfied with their chemical safety training. For example one participant wrote, "I am very well trained in my place of employment," while another (in response to the need for improvements) answered "not that I know of".
2. The majority however, voiced a resounding "YES!" and called for things like "better education," "training that emphasizes the short and long term risks to the staff," and "better more consistent regulation" (See Table 4).

Table 4: Text Response Analysis, Chemical Safety

Do you think the handling and safety measures regarding chemicals in your workplace could be improved? If so, how and why?	<i>Yea. More knowledge</i>
	<i>Very well trained in my place of employment</i>
	<i>Very often pressure to perform very quickly compromises safety. An example of this would be to turn over operatories faster than the kill time of the disinfectants. Having official guidelines would improve this. The current provincial recommendations from the regulatory college were developed by dentists and hygienists not the staff that are actually responsible for all of the infection control (CDAs).</i>
	<i>I am actually a teacher of assistants and no longer practice as an assistant except in stage situation; I see too little workplace training for chemicals- the students learn in school about protocols (eg. WHIMIS) but should have it reinforced, in context, in the workplace</i>
	<i>Not that I know of.</i>
	<i>Yes, better education</i>
	<i>Yes. Training needs to emphasize the short and long term risks to the staff</i>
	<i>More safety training</i>
	<i>Codified procedures, not just a quick read of the MSDS info</i>
	<i>Disposal of products-somehow making it easier or have someone pick them up</i>
	<i>Better, more consistent regulated training</i>
	<i>Yes, better ventilation</i>
	<i>Yes, more knowledge about ill-effects, proper disposal etc.</i>
	<i>WHIMIS program- I believe its mandatory</i>
<i>Absolutely, I would love to see a mandatory maybe every two year course to have someone come to the dental offices and refresh chemicals, disinfectants etc, like CPR. I find we</i>	

<i>do things to help our patients safety at work but the concern for the employees is undermined</i>
<i>Better ventilation</i>
<i>In need of proper air exchange</i>
<i>Proper ventilation, use of brightly coloured labels, signs or markings, manual for office use regarding safety</i>
<i>Proper implementation of safety measures while dealing with and disposing of chemicals</i>
<i>Yes more training, products are always changing</i>
<i>Yes knowledge in what we are handling</i>
<i>Better knowledge on what the chemicals are doing to our bodies if they are breathed in or touches with bare skin</i>
<i>YES!</i>
<i>I think it is good the way it is.</i>
<i>Yes ventilation</i>
<i>More signage</i>
<i>I think if the dentists allow more time for handling and preparing chemicals the resulted were better</i>
<i>Better/stronger gloves in the sterilization area</i>
<i>We follow strict MSDS, OHS policies regarding chemicals in the workplace</i>
<i>That all assistants (not RDAII) understood how to use them properly</i>
<i>If standards were as high as the US standards</i>
<i>We changed to pouring vs spray and wipes</i>
<i>Better training</i>
<i>Yes, it should be mandatory to have in office training the dentist should provide</i>
<i>Less spraying of disinfectant</i>
<i>Yes, no one has trained us properly</i>
<i>Yes, we need better ventilation</i>
<i>Yes, more training, air quality</i>
<i>We could make it a priority to wear gloves, masks, safety goggles when handling all chemicals. Sufficient time could be incorporated into the schedule to allow for this or better yet, a specific person could be given this job in the office</i>
<i>Yes, proper education</i>
<i>Yes, more training and protocols implemented</i>
<i>Yes.... I would like to see the health and safety person take charge and make sure that all assistants were more careful about tossing out empty plastic bottles that held disinfectants and follow the instructions on the labels to be sure they were rinsed, or not re-used for other things</i>
<i>Less spraying of disinfectant</i>

Conclusions

There is a significant gap in Canadian literature speaking to the prevalence of skin related conditions, prolonged skin irritation, respiratory conditions and migraines among dental assistants. Data from the BCDAR suggests that there is a relatively high rate of negative long-term health issues related to interaction with chemicals in the dental clinic. The ability to quantify the dental assistants' experiences in this area would be an invaluable step towards improving the occupational health of Canadian dental assistants. Unfortunately, this task is beyond the scope and capabilities of this report, but nonetheless, should be noted as a priority for future endeavors.

Moreover, survey respondents consistently voiced their concerns regarding the quality of ventilation in dental clinics, the effects of inhaling chemicals, and the need for air quality regulation. Dental assistants' level of concern with issues of ventilation was not echoed in a similar degree in the literature. Early studies, for example the 1984 Heidman study, that consider these issues found no negative health correlation between inhalation of chemicals and spontaneous abortion but failed to consider other negative health issues like migraines or dizziness.

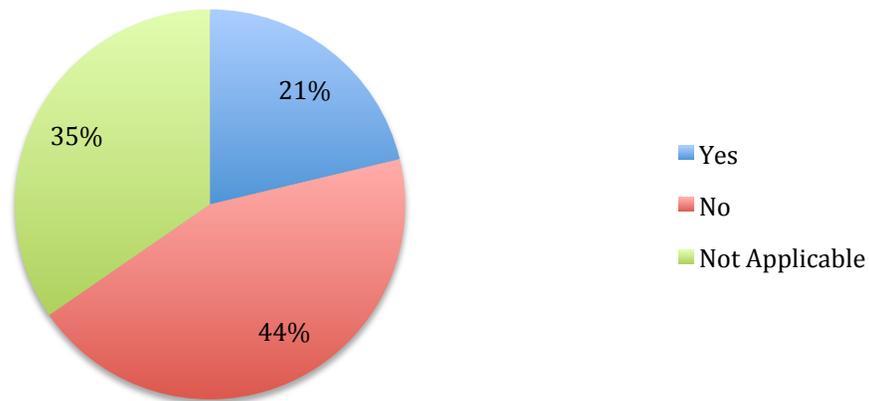
The BCDAR survey data made it apparent that there is a shared concern among dental assistants regarding proper ventilation. As of yet, this concern has not been thoroughly explored by research in this area. Future scholarship should prioritize the possible relationship between air quality, ventilation and reports of migraines. In addition, future research activities should also consider regulatory mechanisms in this area; do ventilation regulations exist? What is the average air quality in dental clinics? Where and how do ventilation and air quality concerns fit more broadly within occupational health research?

Allergies

Almost one quarter (21%) of BCDAR survey participants said that their workplace environment aggravated or induced allergy symptoms (See Figure 6). On the other hand, nearly half (44%) said their workplace did not aggravate or induce allergy symptoms and the remainder (35%) felt that this question was not applicable to their experience.

Figure 6: Perceptions of the Workplace Environment, Allergies

Does your workplace environment aggravate or induce allergy symptoms?



Source: *Building Capacity in Dental Assisting Research, BCDAR Survey (2015)*

The literature review revealed a wealth of research that studied allergies among dental health professionals. In particular, natural rubber latex allergies were considered a common occupational health hazard among dental assistants. With this in mind, it was not surprising to find that over 90% of survey participants reported interacting with natural rubber latex on a daily basis (See Figure 7).

At times, the literature spoke about initiatives aimed to alleviate latex allergies among dental professionals. For example, some dental clinics have begun moving away from using latex. In fact, many clinics were now advertised as latex free work environments. Unfortunately, however latex free work environments do not appear to be the norm in Canada, where over 90% of dental assistants reported working with natural rubber latex daily.

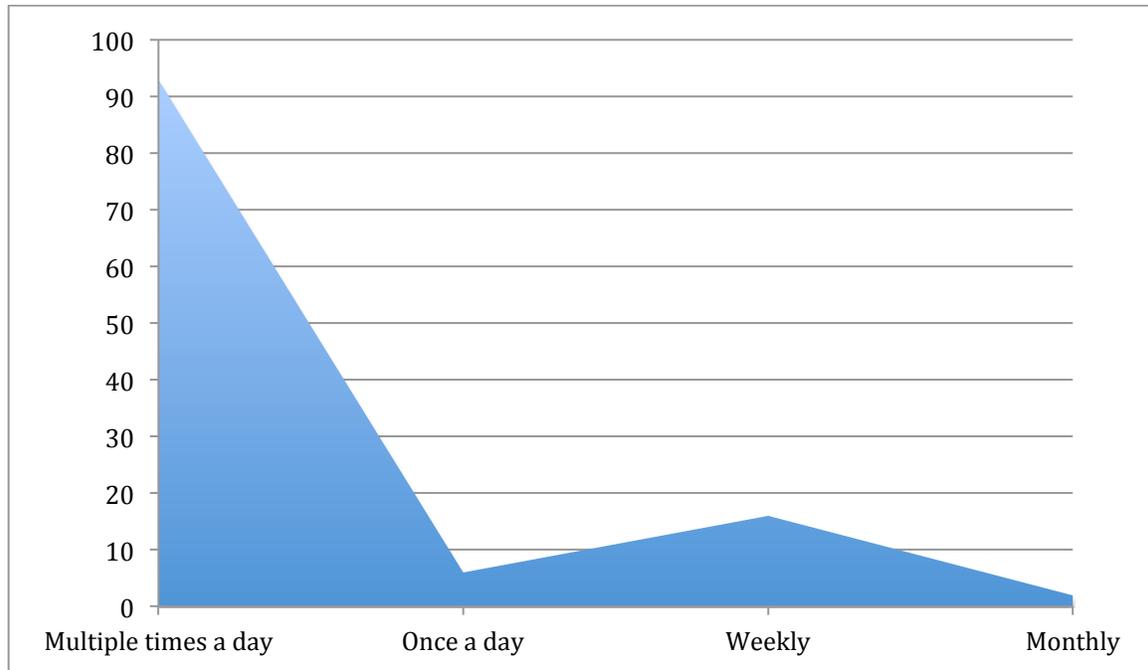
Survey participants were asked to describe their experience, if applicable, with latex safe training. Interestingly, several respondents noted that their clinics were latex free which made this question inapplicable to their experience (See Table 5). On the opposite end of the spectrum, a notable number of respondents stated they had never received latex safe training, nor were they aware that such training existed, for example:

No, I've never even heard of such training.

Never even heard of a latex safe workshop.

Conversely, those who had attended latex safe training praised these tools as very useful. For example, one participant wrote, “yes, info was good knowledge” and “yes, it was useful.” Others mentioned knowing of these tools but had not attended. Indeed, there was a consensus among respondents that latex safe training would be very helpful and many explicitly requested that this type of training become mandatory.

Figure 7: Frequency (%) of Interaction with Natural Rubber Latex



Source: *Building Capacity in Dental Assisting Research, BCDAR Survey (2015)*

Table 5: Text Response Analysis, Allergy Prevention & Safety Education

Have you ever attended latex-safe workshops, participated in allergy prevention training or something of the like? If so, was it useful? What could be improved?	<i>Yes, Yes, Yes. Mandatory guidelines.</i>
	<i>Training is useful but latex is endemic to the dental environment- it's not only in gloves so more in training how to manage exposure?</i>
	<i>Our office switched to latex free to accommodate patients</i>
	<i>No, I've never even heard of such training</i>
	<i>Yes, info was good knowledge.</i>
	<i>Latex free environment</i>
	<i>Yes I have and yes it was.</i>
	<i>Never even heard of a latex safe workshop</i>
	<i>Yes. Clinics should be latex safe, removing latex products like gloves, rubber dam, prophylaxis cups.</i>

	<i>Yes I have and I felt that it is up to the individual to mention what concerns them with type of ie: gloves, rubber dam used.</i>
	<i>No, but I think it would be great!</i>
	<i>Yes, it was useful.</i>
	<i>Our office is basically latex free</i>
	<i>I have not, but would like to.</i>
	<i>Have never attended. Our clinic doesn't use latex gloves, just dental dam. This didn't give "never" as an option because I don't touch dental dam with bare hands</i>
	<i>Latex free environment</i>
	<i>No and yes this would useful. Please offer one.</i>
	<i>Never-but it seems like it would be a good idea. I work in a latex free office- with the exception of rubber bands (front office) and hair elastics provided to patients if they have long hair that needs to be tied back while taking impressions.</i>
	<i>Yes, it was really useful.</i>

Conclusions

The BCDAR survey data revealed that allergy prevention, and in particular, natural rubber latex allergies, continue to warrant significant attention on behalf of researchers and occupational health advocates, alike. The survey data revealed that over 90% of dental assistants interact with latex on a daily basis and that nearly on quarter (21%) felt that their work environment induced or aggravated allergy symptoms. At the same time, however, strides have been made towards reducing the development of natural rubber latex via the introduction of latex free dental clinics.

The survey data suggested that there is strong interest in the continued development of latex safe workshops and training. Many participants demonstrated a desire for this kind of training and noted its applicability to their daily work life. Future research would benefit from the development of latex safe knowledge translation tools and a renewed focus on moving away completely from latex in dental clinics.

Carpal Tunnel

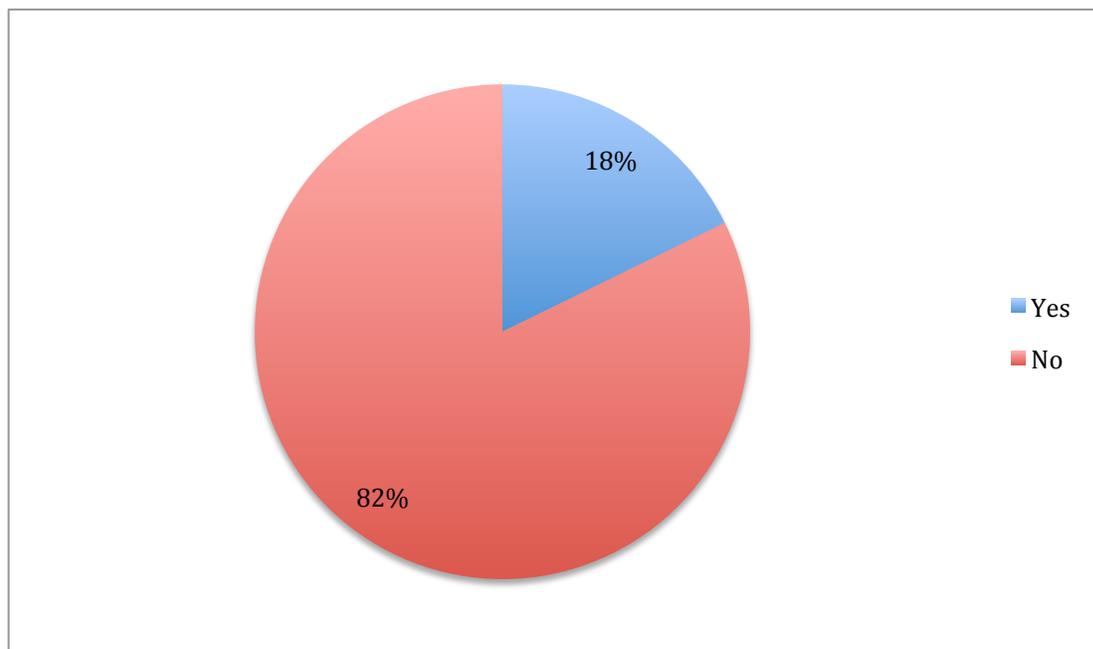
A sizable minority (18%) of survey respondents had been diagnosed with a musculoskeletal disorder (See Figure 8). Perhaps even more concerning is that 44% reported experiencing joint or muscle pain on a daily basis while working (See Figure 9). Another 18% of respondents reported experiencing pain on a weekly basis, 14% on a monthly basis and 17% reported never experience joint or muscle pain while working.

When asked what was the source or trigger of their pain many reported long procedures, sitting in awkward positions, repetitive motions, and chair side assisting. Some respondents noted specific work tasks, such as suctioning, as the source of their pain. Other participants implied that pain was simply part of being a dental assistant. For example, one participant wrote, that their pain was caused by “years of working”.

Conclusions

There is a great deal of literature that speaks to the high pervasiveness of musculoskeletal disorder among health care professions (Hayes et al, 2009; Kumar et al, 2012; Morse et al, 2010). More specifically, Greathouse et al wrote in 2011 that it was a well-established fact that oral health care professionals, such as dental hygienists and dentists, have been reported as having a high prevalence of upper-extremity musculoskeletal disorders, including carpal tunnel syndrome. Data from the BCDAR survey echoes this finding and also reiterates that the occupational demands of dental assisting warrant scholarship focused on prevention and alleviation of musculoskeletal disorders.

Figure 8: Canadian Dental Assistants (%) Reporting a Diagnosed Musculoskeletal Disorder



Source: Building Capacity in Dental Assisting Research, BCDAR Survey (2015)

Figure 9: Frequency (%) of Joint and Muscle Pain Experienced by Dental Assistants in the Workplace

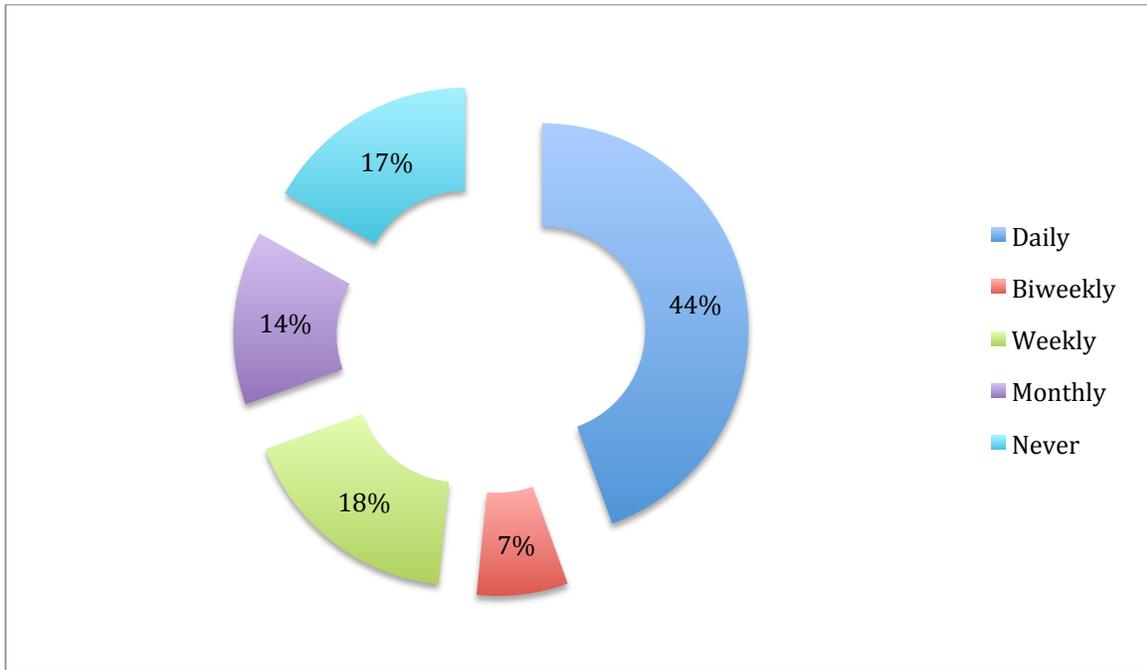


Table 6: Text Analysis, Muscle and Joint Pain

What is the source of trigger of your pain?	<i>My neck while looking over suction</i>
	<i>Standing for long periods in one spot</i>
	<i>Computer mouse</i>
	<i>Sitting in bad positions so I can see what I'm doing</i>
	<i>Arthritic pain in shoulder and neck due to professional posturing</i>
	<i>Repetitive work, poor ergonomics</i>
	<i>Repetitive motions such as hand piece application, sustained suctioning, continuous wipe down and mixing materials</i>
	<i>Sitting in bad positions so I can see what I'm doing.</i>
	<i>Standing in one positions for long periods</i>
	<i>Not sitting properly in my chair</i>
	<i>Bad posture, difficult access</i>
	<i>No breaks throughout the day, sterilizing during breaks</i>
	<i>Sitting too long</i>
	<i>Chair side assisting</i>
	<i>Sitting/standing awkward positions</i>
	<i>Repetitive bending and odd postures needed for assisting patients</i>

	<i>Stress</i>
	<i>I get sore feet, sore back and neck</i>
	<i>Awkward positioning in order to work around dentist during intra oral procedures</i>
	<i>Prolonged sitting, poor ergonomics, visibility</i>
	<i>Long appointments, static positions</i>
	<i>Suctioning weird angels hurts wrists</i>
	<i>Yes to triggers and muscle pain due to chair positions and angels the dentist's uses for procedures. One side of body is more affected due to right or left handed</i>
	<i>Suctioning for long periods of time</i>
	<i>Holding suction</i>
	<i>Years of working</i>
	<i>Holding suction for long periods, sitting at odd angels</i>
	<i>Struggling to see while working chair side</i>
	<i>Length of time spent chairside</i>
	<i>Bad patient access while working</i>
	<i>Long procedures</i>
	<i>Long appointments</i>
	<i>Working for long periods without a break</i>

Ergonomics

Not surprisingly, issues regarding poor ergonomics are closely related to reports of joint and muscle pain, as well as musculoskeletal disorders like carpal tunnel. The literature in the area of ergonomics in the dental office has been well established. There exist numerous studies looking at the ergonomic challenges facing dental professionals (Ayatollahi et al, 2012; Gupta, S., 2011; OHCOW, 2010). Many of these studies have spotlighted preventative measures as the key to alleviating the prevalence of musculoskeletal disorders among dental assistants. In particular, there is large body of detailed scholarship outlining the importance of positioning and ergonomically advantageous equipment such as chairs and other tools.

The BCDAR survey asked participants what kind of measures their employer had taken to support good ergonomics. Several participants were not happy with the steps their employer had taken to incorporate good ergonomics. Many had attended workshops and seminars on good ergonomics and found this type of training to lack sufficient merit in the work place (see Table 7). Several survey participants cited budget constraints as a determining factor in good ergonomics. In other words, employers are aware of how to support and encourage good ergonomics but do not commit a sufficient budget to do so:

In theory, but in practice budget constraints take precedent.

Minimally- some expenses are not allowable.

No, they say they cost too much.

I have purchased my own items to help make it easier for me.

Not really- due to lack of funding.

Indeed, the survey data conveys that, for the most part, dental assistants were not happy with the ergonomic arrangements and tools available in their workplace. In addition to budgetary constraints, respondents also spoke to the dentist's lack of training on how to properly position themselves when working with an assistant. One respondent wrote, "the dentist makes sure they are comfortable, we are not considered". Many others felt that there was simply nothing they could do to incorporate meaningful and substantial change, and more specifically, that joint and muscle pain were unavoidable side effects of working as a dental assistant. For example, one participant wrote, "aside from suspending patients upside down, I'm not sure there's much one can do. It's the nature of the business" (See Table 7).

When asked how to improve ergonomics training for DAs, and more specifically, when should this training be incorporated into DAs career, the majority of respondents agreed that this training should take place as soon as possible. In other words, DAs felt that good ergonomics is something to be formed out of habit and, therefore, the earlier these habits are introduced (i.e. during college training programs) the better (See Table 8). The data also revealed that DAs often felt that the focus of training, not the lack, was the source of poor ergonomics. Indeed, the data revealed a relatively unanimous call for the focus of ergonomic training to lay with dentists. Respondents noted that it was often dentists who had not been trained to work with an assistant during procedures, which as a result, caused the dentist to compromise the DAs ergonomics before their own.

Conclusions

BCDAR data suggested that DAs often felt discouraged in their efforts to improve ergonomics in the workplace. Joint and muscle pain and, at worse, musculoskeletal disorders were often conveyed as simply "part of the territory" of DA work. At times, however, employers had prioritized ergonomics and outfitted the workplace with this in mind. The primary motivating factor behind improving ergonomics, as voiced by BCDAR respondents, were budget constraints. Indeed, lack of funding for

ergonomic assessments, better chairs and suitable work stations was often regarded as the source of poor work environments. Once again, while the literature is well established in this area, the reality of DA work sometimes fails to reflect this evidence. Future research in this area should focus on improved knowledge translation practices, cost-effective alternatives for dental clinics who lack sufficient funding and feedback systems wherein DAs can express their ergonomic concerns with their employer without concern for negative work life repercussions.

Table 7: Text Analysis, Ergonomics

Has your workplace taken measures to incorporate good ergonomics?	<i>I have been to courses that encourage better posture but it hasn't helped much</i>
	<i>Ergo assessment and equipment provided</i>
	<i>No, in fact in this province the dentists are not trained to work with an CDA until post grad training</i>
	<i>In theory, but in practice budget constraints take precedent</i>
	<i>I have been to courses that encourage better posture but that hasn't helped much</i>
	<i>Occupational health and safety provides training</i>
	<i>New chairs and better unit set ups</i>
	<i>Stretching</i>
	<i>Aside from suspending patients upside down, I'm not sure there's much one can do. It's the nature of the business</i>
	<i>Yes, good chairs, wrist supports at computers, adjustable desktops and chairs</i>
	<i>Minimally- some expenses are not allowable</i>
	<i>Some of us have taken courses at conventions but not as a whole</i>
	<i>Chairs are better designed for good ergonomics</i>
	<i>There is not much you can change when just the nature of chair side assisting is quite demanding on mainly back and neck</i>
	<i>One of our employees took a course at a conference and presented to us. We also have a poster in the staff room</i>
	<i>No, the dentist makes sure they are comfortable. We are not considered.</i>
	<i>Not discussed at workplace</i>
<i>No, they say they cost too much.</i>	
<i>Not particularly, however if I ask that the chair be repositioned it does get moved so it is easier for me. I haven't really asked for any other measures to be taken, mainly because I don't think its 100% possible for both</i>	

	<i>of us to maintain good vision of what's being done and the doctor needs to see what he's doing more than what I do, so I try to accommodate without being a nuisance.</i>
	<i>I have purchased my own items to help make it easier for me.</i>
	<i>No, dentists are not trained to work with assistants and do not know how to position them</i>
	<i>Yes, we bring in an occupational therapist to assess our work stations</i>
	<i>Not really, due to lack of funding.</i>
	<i>No⁴</i>

Table 8: Text Analysis, Ergonomic Training and Education

<p>In your opinion, when is the best time to incorporate ergonomics training into a dental assistant's career? Who should be responsible for this training?</p>	<i>The dentist also has to be trained, as they are the ones laying the patient back. They should be aware of how their assistant is positioned in correlation to their patient as well as providing the proper equipment to their staff</i>
	<i>School⁵</i>
	<i>Beginning of the career. The school should teach it along with the dental assisting curriculum.</i>
	<i>Right from the start</i>
	<i>In school by properly trained teachers; positioning etc is fundamental and somatic learning; requires repetition and consistency so much can be learned from the start and continually reinforced until it becomes automatic practice for professionals</i>
	<i>It should be incorporated at the very beginning of their training. The dental assisting program should incorporate it into the curriculum.</i>
	<i>Immediately, by the employer</i>
	<i>School</i>
	<i>Doctors</i>
	<i>The schools should be responsible</i>
	<i>Daily, provided by the employer/dentist.</i>
<i>COLLEGE</i>	
<i>As soon as an assistant is made to sit in a chair. Strictly speaking as an Orthodontic Assistant, as I have no</i>	

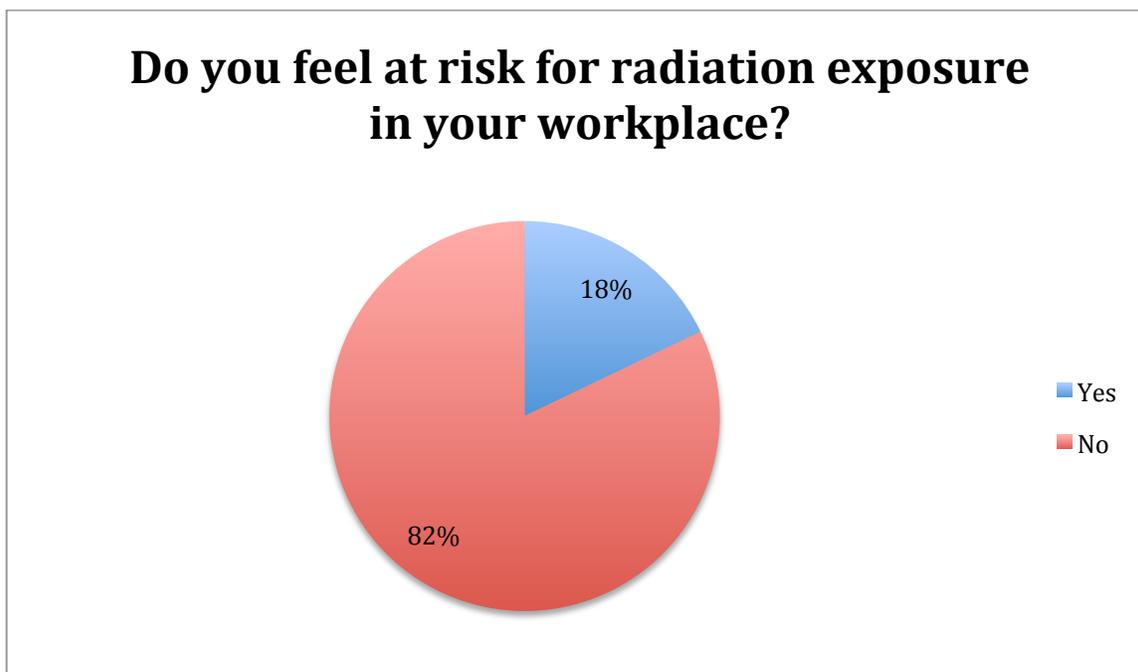
⁴ The overwhelming majority of responses were simply “no”, these responses were not duplicated in Table 7.

⁵ The vast majority of responses indicated the ergonomics training should be incorporated into dental assisting curriculum and initiated while assistants are in training. I have not duplicated responses in Table 8.

	<i>experience in general practice. I have trained number assistants. If attention is not addressed to proper position of patient/dental auxiliaries from the start, bad habits will form. Utilizing the work space is key, for i.e. I always make reference to an assistants work area.</i>
	<i>The college giving the DA course</i>
	<i>During school and every 2-3 years</i>

Radiation

Figure 10: Dental Assistants' Perception of Risk for Radiation Exposure



Source: Building Capacity in Dental Assisting Research, BCDAR Survey (2015)

The overwhelming majority (82%) of participants in the BCDAR survey reported that they did not feel at risk for radiation exposure in the workplace. The literature confirms that a shift in concern away from radiation exposure is likely due to changing dental clinic procedures, which have aimed at reducing or eliminating radiation exposure in the workplace. The literature supports research participants' overall lack of concern for workplace radiation exposure. Indeed, evidence suggests that compared to other sources of radiation, exposure from radiation and the risk of cancer from dental x-rays is relatively low (ADA, 2010).

Infection Control

The majority of survey respondents were satisfied with the infection control practices in their workplace (See Table 9). However, some disagreed and noted that they were not satisfied with infection control practices. Two respondents reported having contracted an infection from their workplace. For instance, one participant wrote, "The dentist I work with doesn't want to spend money on infection control.

For example, I don't have an eye station in my place of work, it's very important!". Similarly, another survey participant noted that, "More attention must be applied to infection control with each and every dental professional in the work place." Concerns regarding infection control practices, while not the general consensus among participants, represented a prominent minority.

Conclusions

There exists a significant lack of literature that considers infection control specifically in relation to dental assistants. Several studies explore sterilisation practices and techniques in dentistry but do not unpack the effects of these practices on dental assisting. For example in Leggat et al (2008) the authors note that "sterilisation or high level disinfectant equipment remains a vital part of infection control," but the effects of these methods remains unacknowledged (614). The HPRAC literature review conducted in 2010 reiterates this finding, stating that with the exception of two commentaries, no research was identified that examined the risks involved in the infection control practices carried out specifically by DAs (7).

When the literature review is expanded to include the infection control practices in the dental clinic more broadly, research suggests that dental professionals are at not at risk for disease transmission (Azarapashooh & Fillery, 2008; Walker et al. 2008; Porter, 2003). A significant stream of infection control literature relies on the implementation of definitive guidelines in the workplace to combat disease transmission (Depaola & Fried, 2009). The BCDAR survey respondents who were not satisfied with infection control practices in their workplace often cited lack of guideline implementation as the source of their dissatisfaction. In sum, the BCDAR data reveals that while the literature may suggest that infection control standards in the dental clinic are up to par, reality suggests that these standards are not being consistently implemented across jurisdictional boundaries.

Table 9: Text Analysis, Infection Control

Have you ever contracted an infection due to a workplace hazard? Are you satisfied with the infection control practices in your workplace?	<i>No I have not contracted an infection due to workplace hazards. I am mostly satisfied with infection control practices at my place of work.</i>
	<i>No but the dentist I work with doesn't want to spend money on infection control. For example, I don't have an eye station in my place of work, it's very important! Even a defibrillator! We don't have it!</i>
	<i>Yes. No, not satisfied.</i>
	<i>We follow the ADA&C Infection Guidelines strictly- I am satisfied with the practices</i>
	<i>No I am not satisfied with infection control in my workplace.</i>
	<i>No infection in the workplace, very satisfied with</i>

	<i>infection control in my office.</i>
	<i>Yes, burned arm on a sterilizer, turned into a blood poison and need antibiotic IV treatment. Infection control at our office is excellent. Over the years we have upgraded as upgrades have been introduced to the dental world.</i>
	<i>I have not contracted an infection at work, however I think that other staff members need to improve on their infection control</i>
	<i>I have my concerns about radiation controls during panoramic exposures</i>
	<i>Yes I am very satisfied.</i>
	<i>No infection, we are always trying to improve.</i>
	<i>More attention must be applied to infection control with each and every dental professional in the work place. So, the answer to this question is NO and thankfully I have not!</i>
	<i>Yes, as an assistant of 35+ years. It is important for ongoing educations updates and training.</i>

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APPENDIX B

Building Capacity in Dental Assisting Research: Interview Guide

Building Capacity in Dental Assisting Research

Unstructured Interview Guide

Type of Interview: Unstructured

In unstructured interviewing it is important to keep the conversation focused on a topic while giving the informant room to define the content of the discussion. The rule is, as discussed by Bernard (1995) present the informant with a topic of interest and get out of the way, let the informant provide information that he or she thinks is important.

Interview Objectives

- Establish key workplace hazards as articulated by respondents
- Garner insider knowledge to address workplace hazards for dental assistants

Discussion Schedule

1. **Opening remarks:** friendly greeting and background information on the research project to date, establish “cultural ignorance” (i.e. interviewer as learner)

2. **Getting to know the respondent:** establish respondent demographics
3. **Outline discussions topics:** allow the respondent to choose which topics may be of interest to her
4. **Closing remarks:** Thank the respondent for her time and ask for any additional comments to add or highlight.

Non-Leading Topical Questions/Discussion Points

Ventilation and Air Quality

- How do you feel about the ventilation and air quality in your workplace?
- How do you think ventilation and air quality could be improved?
- Why do you think this has become a problem?

Chemical Safety

- Do you feel your employer has met his/her responsibilities to ensure chemical safety?
- How do you feel about current chemical safety practices?
- How do you think this could be alleviated?
- Why do you think chemical safety has been voiced as an issue for RDAs?

Allergies in the Workplace

- Do you suffer from workplace-induced allergies?
- What kind of measures has your employer taken to alleviate the incidence of allergies?
- How do you feel the issue of allergies is being handled?
- What kind of role do you think the employer and the RDAs play in ensure allergy safety?

Ergonomics

- How do you feel about the ergonomics in your workplace?
- What kind of experiences put you at risk for poor ergonomics?
- How do you think ergonomic training could be changed?
- What do you think are the biggest barriers to good ergonomics?

Education

- Do you think that current dental assisting training programs prepare students for safe workplaces?
- What role can educators play in ensuring safe workplaces?