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Minnesota State University, Mankato

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Blood Pressure Screening Practices Among Dental Hygienists

By

Mariah Sullinger

A Thesis Submitted in Partial Fulfillment of the

Requirements for the Degree of

Master of Science

In

Community Health

Minnesota State University, Mankato

Mankato, Minnesota

May 2019

April 8th, 2019

Blood Pressure Screening Practices Among Dental Hygienists

Mariah Sullinger

This thesis has been examined and approved by the following members of the student's committee.

Dr. Dawn Larsen

Dr. Mark Windschitl

Trisha Krenik-Matejcek

ABSTRACT

Blood Pressure Screening Practices Among Dental Hygienists

By Mariah Sullinger

Master of Science of Community Health

Minnesota State University, Mankato, 2019

“There is consensus on the importance of early detection and treatment of hypertension and dental care is one of the few medical services which involves a considerable proportion of the population returning for routine check-ups” (Berne, Engstrom, Gahnberg, & Svardsudd, 2011, p 194). Little is known about the frequency and consistency of blood pressure screening practices or barriers affecting these procedures. Research findings may support efforts to increase or routinize scope and frequency of this preventive procedure among dental healthcare providers or make it a standard of care.

Data from the survey was used to assess what type of setting dental hygienists are working in, the length of time they have been practicing, whether blood pressure readings are taken, the type of procedures for which blood pressure readings are taken, reasons that readings may not be taken, and barriers to taking blood pressure readings.

Approximately 500 Colorado Dental Hygiene Association members were asked to participate through an online survey. 109 respondents gave consent

and completed the survey, constituting a 21.8% response rate for the survey. Based on the data collected in the survey, most respondents work in general dental practices and have worked for more than 20 years. Most dental hygienists reported taking blood pressure readings at each recall, whether it be every three-four months or every six months, depending on the recall.

With most of the respondents indicating that blood pressure screening was emphasized in their dental hygiene curriculum, only half of the respondents take blood pressure readings on all patients and for all dental procedures. Study participants reported having too little time in appointments to perform this task and the equipment not being available or functional as the biggest reasonings for not taking blood pressure readings. Respondents reported the most common reason for taking blood pressure readings is that it is valued by themselves. Dental hygienists indicated that they believe the most common barrier for not partaking in blood pressure screening practices is having too little time in appointment.

ACKNOWLEDGEMENTS

I would like to thank those who have helped and supported me through this entire process. To my advisor and chairperson Dr. Dawn Larsen, thank you for your continued support, time, and recommendations. To my other committee members, Dr. Mark Windschitl and Trisha Krenik-Matejcek, MS, RDH, thank you for your time and advice, especially during the last two semesters of my graduate degree. I could not have done it without your guidance and encouragement. I would also like to thank Dr. Joseph Visker for the endless support and guidance.

To the Minnesota State University, Mankato Dental Hygiene Department, thank you for all your guidance and encouragement. You are the reason I have made it this far and have inspired me to continue my dental hygiene career. To the Colorado Dental Hygiene Association and its members, thank you for helping me in my research and making pursuing my goals possible.

To my parents, thank you for inspiring me to follow my dreams. You are my biggest fans and I appreciate your constant support. Mom, thank you for being there for me emotionally and financially when I needed help. Lastly, I would like to thank my fiancé Reuben. I am incredibly thankful for your support and love throughout the last couple years and what is yet to come. I know it has not been easy, but I am forever grateful.

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Chapter 1: Statement of the Problem

Introduction

The American Heart Association (2016a) defines hypertension, or high blood pressure, as the force of blood pushing against the walls of blood vessels being consistently too high. Tissues and organs in the body need oxygenated blood transported by the circulatory system. When the heart beats, it creates pressure that pushes blood through a network of tube-shaped blood vessels. This pressure is the result of two forces including systolic pressure, which occurs as blood pumps out of the heart into the arteries, and diastolic pressure, which is created as the heart rests between beats. These two forces represent the numbers in a blood pressure reading (American Heart Association, 2016a). The incidence of hypertension is high in the United States (Centers for Disease Control and Prevention, 2018). Many individuals do not realize they have hypertension because it typically has no symptoms and tends to go undiagnosed (CDC, 2018).

One in three Americans, or about 75 million people, has hypertension. Only about half, or 54%, of these people have it under control (CDC, 2018). The morbidity rate of adults aged twenty and over with hypertension, according to 2016 data, is 33.2%. In 2015, the number of visits to physician offices with hypertension as the primary diagnosis was 42.7 million. The mortality rate from

hypertension in 2015 was 32,200 per year (CDC, 2017). Subsequently, there are many risk factors associated with hypertension.

Blood pressure tends to rise with age and about nine of ten Americans will develop hypertension during their lifetimes (CDC, 2014b). Women are equally as likely as men to develop hypertension at some point in their lives, and Blacks develop hypertension more often than any other race or ethnicity (CDC, 2014b). In most cases, the damage done by hypertension takes place over time. If left undetected or uncontrolled, hypertension can lead to heart attack, stroke, heart failure, kidney disease, vision loss, diabetes, sexual dysfunction, angina, periodontal disease, and premature births (American Heart Association, 2016). The association with periodontal disease is important because periodontal disease is an infection of the structures around the teeth. These include the gums, periodontal ligament, and alveolar bone. Infection damages the soft tissues and destroys the bone that supports the teeth (Mayo Clinic Staff, 2018). Factors contributing to hypertension include medical conditions such as prehypertension, which is blood pressure that is slightly higher than normal, but not in the hypertensive stages (CDC, 2014a). According to American Heart Association (2017), “normal blood pressure is <120/<80 mm Hg. Elevated blood pressure is considered 120-129/<80 mm Hg. High blood pressure or hypertension stage 1 is 130-139/80-89 mm Hg. High blood pressure or hypertension stage 2 is 140 or higher/90 mm Hg or higher. Hypertensive crisis is 180 or higher/higher than 120 mm Hg.” Diabetes mellitus also increases the risk

for hypertension. It does so by causing sugars to build up in the blood. About 60% of people who have diabetes also have high blood pressure (CDC, 2014a).

Lifestyle choices can also be a contributing factor to hypertension. These include an unhealthy diet, physical inactivity, obesity, excessive alcohol use, and tobacco use. A diet that is too high in sodium and too low in potassium increases risk for hypertension. Lack of exercise can result in weight gain, which can lead to hypertension (CDC, 2014). Genetics and family history are also related to hypertension. Family members share genes, behaviors, lifestyles, and environments that can impact their health and risk for disease. Hypertension can run in a family, and risk for it can increase based on age, race, or ethnicity. The risk for hypertension increases even more when heredity combines with unhealthy life choices, such as smoking cigarettes and unhealthy eating (CDC, 2014b).

Fifty years ago, hypertension was not considered a treatable condition. It is now known that hypertension is treatable and preventable, but it remains a significant problem (Deshpande & Saklayen, 2016). Though a significant number of individuals have hypertension, many are unaware they have it. The only way to ensure awareness of hypertension is to measure blood pressure. Blood pressure screenings are important because not being screened is a risk factor for chronic diseases and other significant, relative medical conditions among Americans. "Medical screening for chronic diseases conducted in the dental setting could save the health care system approximately \$42 million to \$102

million annually, as many patients visit their oral health professional more often than their physicians” (Davide & Lam, 2018, p 46-47). Because dental hygienists are well-positioned to conduct this procedure as part of a routine office visit or a therapeutic service, they have the means to be influential and educational. It is important to take blood pressure in order to screen for hypertension and reduce the increased risk for these conditions, as well as to prevent medical emergencies. If blood pressure is too high, treatment may be postponed or delayed. Dental anxiety, in combination with hypertension, can also trigger an emergency.

Statement of the Problem

“There is consensus on the importance of early detection and treatment of hypertension and dental care is one of the few medical services which involves a considerable proportion of the population returning for routine check-ups” (Berne, Engstrom, Gahnberg, & Svardsudd, 2011, p 194). Little is known about the frequency and consistency of blood pressure screening practices or barriers affecting these procedures. It would be beneficial and productive to have a better understanding of these blood pressure screening practices. Research findings may support efforts to increase or routinize scope and frequency of this preventive procedure among dental healthcare providers or make it a standard of care.

Significance of the Problem

Examining these findings could help dental professionals better understand the limitations and barriers to blood pressure screenings and provide an insight toward implementing necessary changes to provide patients with blood pressure screenings to detect hypertension. “Co-operation between dental & primary care for blood pressure screening appears to be an effective way of detecting previously unknown hypertension” (Berne et al., 2011, p 194).

The American Dental Hygienists’ Association (ADHA) has adopted a policy in support of screening for hypertension during oral healthcare appointments (ADHA Staff, 2016). Dental hygienists are encouraged to become involved in the detection and management of this prevalent condition. When blood pressure readings are taken during patient appointments, dental hygienists can help to make people more aware of a potentially dangerous condition. In addition, dental hygienists will have baseline readings recorded in patient charts. If a future reading is different, dental hygienists will be better able to determine whether a visit to a physician should be recommended or whether dental treatment should be postponed.

Dental hygienists can take blood pressure readings during routine visits, identify hypertensive patients through screenings, and educate patients on hypertension. Subsequently, they can refer patients to their primary care providers or encourage an initial medical visit and possibly save lives. According

to 2017 data, 84.6% of children aged two-seventeen had a dental visit in the past year, 64.4% of adults aged 18-64 had a dental visit in the past year, and 64.3% of adults aged 65 and over had a dental visit in the past year (CDC, 2017a). Since hypertension has no symptoms and many individuals are unaware that they are affected by this condition, dental hygienists are in an appropriate position to screen for hypertension. If dental offices offer this valuable diagnostic procedure as standard protocol, they may be instrumental in preventing or mitigating chronic diseases and medical conditions other than those related to oral health.

Purpose of the Study

The purpose of this study was to survey the current blood pressure screening practices among sampled dental hygienists in Colorado and assess the prevalence of blood pressure screenings among actively practicing dental hygienists. By investigating the current blood pressure screening practices, dental health professionals and other health professionals will learn more about the barriers for screening for hypertension the frequencies at which dental hygienists are screening for hypertension, the types of dental procedures involved in screening for hypertension, and the reasons given for screening or not screening for hypertension.

Research Questions

1. What is the prevalence of blood pressure screening practices among sampled dental hygienists?
2. At what frequency are sampled dental hygienists taking blood pressure readings?
3. For what procedures are blood pressure readings taken by sampled dental hygienists?
4. What reasons are given by sampled dental hygienists for blood pressure screening?
5. What reasons are given by sampled dental hygienists for not doing blood pressure screening?
6. What do sampled dental hygienists currently perceive as barriers for blood pressure screening?

Limitations

1. Low participation rates may have affected the validity of the study.
2. The online survey format may have been unfamiliar and/or intimidating for some participants.

Delimitations

1. This study was focused on blood pressure screening practices of only dental hygienists and not other dental professionals.
2. Data collection was limited to sampled dental hygienists in Colorado who consented to participate in the study.

3. Data was limited to responses from questions included in an electronic online questionnaire via *Qualtrics*®.
4. The time frame for collecting data was limited to fourteen days. Surveys completed after fourteen days were not included in the study.

Assumptions

1. Participants answered survey questions honestly.
2. Participants only answered survey questions once.
3. Participants understood questions as written.
4. The instrument created adequately covered the content that it was designed to measure.

Definitions

1. *Blood pressure* – The pressure of the blood against the inner walls of the blood vessels, varying in different parts of the body during phases of contraction of the heart and under different conditions of health, exertion, etc. (Blood pressure, 2018).
2. *Dental hygienist* – A licensed professional auxiliary in dentistry who is both an oral health educator and a clinician, and who uses preventive, therapeutic, and education methods for the control of oral diseases (Dental hygienist, 2012).

3. *High blood pressure/hypertension* – A condition in which the force of blood pressure or the force of blood pushing against the walls of blood vessels is consistently too high (American Heart Association, 2016a).

Chapter 2: Review of Literature

Introduction

This chapter includes the review of related literature on blood pressure screening practices among dental hygienists, along with possible barriers. The purpose of this literature review was to provide the reader with background on blood pressure screening practices, barriers to screening for hypertension, and research findings. The first part of this chapter gives a brief description of the knowledge and attitudes regarding blood pressure screenings. Next, examples of existing blood pressure screening practice which have been connected to revealing hypertension are presented. Finally, an overview of barriers to screening blood pressure is given.

Search and Review Process

The review of the literature covered a sixteen-year period, from 2008 to 2018. The search included the use of electronic bibliographic database of Medline and CINAHL, with special attention given to journals including dentistry and blood pressure. Twelve research papers met the criteria. Using the Matrix Method, each of the articles was evaluated in chronological order using a structured form including literature versus studies, methodological designs, year(s) of research, purpose, and findings.

Knowledge and Attitudes Regarding Blood Pressure Screening

Because hypertension has become a prevalent condition, the American Dental Association (ADA) recommends that all dental care providers be involved in the detection and management of hypertension (American Diagnostic Corporation, 2016). “The ADA recommends that dental offices should take blood pressure on all new patients & annually on all recalls, while patients with hypertension should be monitored throughout each dental visit during which complex procedures are performed” (American Diagnostic Corporation, 2016, p 1). Dental hygienists are taught the importance of assessing blood pressure during his or her dental hygiene curriculum (Lawson, 2017). Lawson (2017) goes on to explain that “dental hygienists understand normal blood pressure is important to a person’s health, but there are far too many dental professionals who have fallen out of practice in taking patients’ vitals before beginning treatment. It is known that it is the standard of care for dental hygienists to assess & record blood pressure on all patients” (p 32).

Considering the growing evidence regarding the prevalence of high blood pressure or hypertension, it is imperative that the role of dental hygienists is evaluated in terms of blood pressure screenings and assessment practices, opinions regarding the importance of blood pressure screenings, and the practice behaviors of dental hygienists. Research has been conducted in this area and the overall findings have indicated that dental professionals and patients feel it is

important to perform blood pressure screenings. Cardona et al. (2016) explain that the high prevalence of hypertension among the American population is concerning and must be considered when treating dental patients. Glick et al. (2018) found that dentists, physicians, and patients are receptive to screening for medical conditions. A similar study by Laurence (2012) to determine whether dentists considered medical screenings important in the dental office, revealed that 85.8% of respondents thought it was important to screen for hypertension. Bednarsh et al. (2017) reported on the attitudes of dental hygienists towards chairside medical screenings. Ninety-four percent of respondents felt it was important to conduct chairside screening for hypertension. The most important considerations noted were dentist/owner support, time, patient willingness, and training. Dental hygienists are often on the frontlines of detection and prevention of hypertension by evaluating readings, performing risk assessments, and knowing when to consider medical consultation of a hypertensive patient.

Revealing High Blood Pressure Through Blood Pressure Screening

Several risk factors for hypertension, such as smoking, cardiovascular disease, physical inactivity, and family history of hypertension, can be assessed in the dental office. Thorough review of the patient's medical history can provide insight to life style, habits, medications, and conditions. Assessment of blood pressure can be performed in the dental office. Berne et al. (2011) tested the effects of blood pressure screening in dental care centers and found that 20.6%

of the subjects screened positive for hypertension. Their study also found that every fifth patient who came in for a regular dental examination and had a blood pressure assessment screened positive for hypertension. Andersson et al. (2018) conducted a study in which dental care professionals screened for hypertension. The screening resulted in finding 170 new hypertensive participants among the 2,025 regular dental check-up patients that had never been receiving blood pressure screenings. Blair et al. (2017) performed 23,579 blood pressure screenings, revealing that 3,735 subjects were identified with elevated blood pressure. Because dental hygienists may treat a dental patient multiple times during the year, dental hygienists could play a primary role in performing blood pressure screenings for early detection and possible prevention of hypertension.

Current Screening Practices of Dental Hygienists

A study completed by North Carolina dental hygienists found that out of a total of 1,030 surveys, 68% of respondents reported that the medical history was updated at every visit and 66% utilized blood pressure cutoffs beyond which no treatment was provided. A total of 20% of respondents measure blood pressure on all patients, while 62% measure blood pressure on select patients (Bell et al., 2011).

According to Glasscoe-Watterson (2018), there is no definitive rule for frequency of blood pressure readings, when to inquire with the patient's physician, or when to delay treatment. While there are blood pressure guidelines

by the American College of Cardiology and American Heart Association, dental hygienists need to consider a patient's age, history of hypertension, whether the patient is of record or if it was his or her first visit, if blood pressure remained high during treatment, if the patient is overweight, if the patient has mitigating factors such as smoking, diabetes, heart problems, or is taking high blood pressure medication. It's important to remember that some people have high blood pressure all the time, even on medications and some people come to their appointments in a rush, which could cause a rise in blood pressure. It ultimately depends on the patient's age and history, which is something dental professionals need to keep in mind. Using the guidelines given and the best judgement should determine proceeding with the dental appointment (Glasscoe-Watterson, 2018).

Barriers to Blood Pressure Screenings

For the dental field to stay current or employ evidence-based practice, it is essential that dental hygienists become familiar with research evidence and can implement it routinely. This proves challenging, with studies revealing some of those challenges. Andersson et al. (2018) noted that one challenge is collaboration with other healthcare providers. Since dentistry reaches a large portion of the population regularly, it could be appropriate for screening of hypertension. Berne et al. (2011) concluded that co-operation between dental and primary care for blood pressure screening and work-up appears to be an

effective way of detecting previously unknown hypertension. Futoshi et al. (2013) found that 69 participants, or 38%, did not provide blood pressure screening to any patients due to barriers related to patient willingness, cost, and time. According to Fitzgerald (2018), time seems to be a major barrier for dental hygienists to do routine blood pressure screening. It used to be common to have a standard sixty-minute working time for a hygiene visit. However, treatment times are being shortened. Many hygienists report they now only have 30-45 minutes to treat patients regardless of the need for x-rays, periodontal charting, exam, and other relevant procedures. To save time, often blood pressure will not be taken. Perhaps some dental hygienists or their employers do not value the procedure. The research indicated that there are risks associated with hypertension and that the general idea of the guidelines is that early detection and treatment of high blood pressure is associated with a better outcome than if the condition is detected late in its course. This indicates that early detection and treatment of high blood pressure is critical and dental hygienists can play a vital role.

While research provides insight into attitudes, beliefs, knowledge and practice behaviors of dental and medical professionals, there have been no recently published studies that assess dental hygienists' blood pressure screening practices. After exhausting the literature, data and information regarding current practices and screening procedures are outdated.

Consequently, the purpose of this study was to assess the practice behaviors and perceived barriers of Colorado dental hygienists.

Chapter Three: Methodology

Introduction

The purpose of this study was to examine blood pressure screening practices among dental hygienists. This was important because hypertension can lead to heart attack, stroke, heart failure, kidney disease, vision loss, diabetes, sexual dysfunction, angina, periodontal disease, and premature births (American Heart Association, 2016). This screening allows for early detection and prevention of these medical conditions. This chapter gives an outline of research methods including design, selection, instrumentation, procedures, collection, and analysis.

Research Questions

Dental hygienists were asked to complete the voluntary survey to answer the following research questions:

1. What is the prevalence of blood pressure screening practices among sampled dental hygienists?
2. At what frequency are sampled dental hygienists taking blood pressure readings?
3. For what procedures are blood pressure readings being taken by sampled dental hygienists?

4. What reasons are given by sampled dental hygienists for blood pressure screening?
5. What reasons are given by sampled dental hygienists for not doing blood pressure screening?
6. What do sampled dental hygienists currently perceive as barriers for blood pressure screening?

Research Design

The research design chosen was non-experimental in nature using a descriptive design. The research was descriptive and determined frequencies and prevalence of current blood pressure screening practices. According to Cottrell & McKenzie (2011), “descriptive research is designed to describe through the use of numbers, percentages, & averages, characteristics of a group of people or some other phenomena” (p 9). Since the survey research looked at characteristics of blood pressure screening practices among a group of dental hygienists, a descriptive design deemed the logical choice. Survey research was conducted using an online questionnaire generalizing a sample to a population.

Participants

The participants of this study were approximately 50-100 dental hygienists in the state of Colorado during spring of 2019. Dental hygienists represented were members of the Colorado Dental Hygiene Association (CODHA). These dental hygienists were working full or part-time, however, all dental hygienists

had to be actively practicing and not be retired or currently enrolled in dental hygiene school. All dental hygienists must have been 18 and older to participate. Participants also included all genders and ethnicities. No incentives were given to dental hygienists to participate in the survey.

Instrumentation

Data from the survey was used to assess what type of setting dental hygienists are working in, the length of time they have been practicing, whether blood pressure readings are taken, the type of procedures for which blood pressure readings are taken, reasons that readings may not be taken, and barriers to taking blood pressure readings. The survey questions had been evaluated for panel review by the researcher's MSUM faculty committee, and the chair of the dental hygiene department for content validity.

The survey consisted of twelve questions which focused on different variables of the research. The first question provided the anonymous/online survey consent form in which participants had to select whether they consented to participate or not. The next few questions included multiple choice questions that measured participant's background characteristics including what type of setting they worked in, how many years they had been practicing dental hygiene, and if they took blood pressure readings at all in their current practice. If the participant stated that they did not take blood pressure readings at all, they were skipped ahead to a question that asks why they did not take blood pressure

readings. If the participant chose that they did take blood pressure readings, they were to fill out select all that apply questions that measured why blood pressure readings are taken, what dental procedures blood pressure readings are taken for, visits blood pressure readings are taken for, and patients that blood pressure readings are taken on. In ending, participants were asked what they perceive as the most common barrier to blood pressure screening and if blood pressure screening was emphasized in his or her dental hygiene curriculum. Please see Appendix for survey used.

Data Collection

Surveys were distributed via email from CODHA to approximately 500 dental hygienists in Colorado. A board member from CODHA sent an email for the researcher, due to HIPAA requirements, with directions and a link to the survey, which was an online survey through *Qualtrics*®. Participants were required to be 18 years of age or older, actively practicing dental hygiene, and not be retired or currently enrolled in dental hygiene school in order to participate in this research. Dental hygienists were asked to voluntarily participate in the survey before information was collected. Dental hygienists were informed that their responses would remain confidential and anonymous and that their survey information would be used for research purposes only. Contact information was provided if participants had any questions or concerns.

Survey Procedure

Emails were sent via a board member from CODHA with directions and inclusion criteria to participate in the survey along with a link to the survey if the individual wished to participate. After clicking on the link, participants were directed to *Qualtrics*®, which is an online survey platform that allows the creator of the survey to configure the survey the researcher wants. This includes allowing the creator to collect strictly anonymous responses by not recording any personal information and removing contact association. By choosing an option to prevent ballot box stuffing, participants were kept from taking the survey more than once, and to prevent indexing, a tag was added to the survey to prevent search engines from indexing it. Files uploaded as responses could only be viewed by users with permission to view responses to ensure secure participant files. The surveys were completely anonymous, meaning there was no way of associating survey responses to the person who submitted the response. To confirm validity, only questions regarding blood pressure screening practices were asked. Participants were allowed fourteen days to take the survey. After fourteen days, the survey expired and closed. After seven days, potential participants received a reminder email from CODHA requesting to take the survey if they had not already.

When designing the survey questionnaire, attention was given to make the questions easy to comprehend and follow. Proper selection was given to wording

to formulate each question. It was important for the researcher that respondents did not have to spend too much time on the questions to ensure a higher response rate within a limited period of time. Once participants started the survey, they could opt out at any time. The questionnaire consisted of twelve questions that took on average no less than five minutes to complete. Participants completed multiple-choice, close-ended, and write-in questions. Once a survey had been completed, the researcher was sent a notification that an anonymous participant had completed the survey and the researcher could then view the results.

Data Analysis

Data collected was analyzed by *Qualtrics*® software. *Qualtrics*® produced frequency distributions of responses on all questions and items. This allowed to help break down information into meaningful and manageable data. After data was collected and analyzed, the researcher was able to reflect on current dental hygiene blood pressure screening practices.

Table 1

Table of Specifications

Research Question (RQ)	Survey items or methods used to assess RQ'S	Level of Data (Nominal, Ordinal, Interval/Ratio)*	Analysis needed to assess RQ
What is the prevalence of hypertension screening practices among sampled dental hygienists?	Survey question: Do you take blood pressure readings at all in your current	Nominal	Frequency distribution (frequency and percentage)

	practice? (close-ended)		
At what frequency are sampled dental hygienists taking blood pressure readings?	Survey questions: How often do you take blood pressure readings (multiple choice with an option for write-in), for what dental procedures do you take blood pressure readings (check all that apply with an option for write-in), and for what patients do you take blood pressure readings (check all that apply with an option for write-in)?	Nominal	Frequency distribution (frequency and percentage)
For what procedures are blood pressure readings taken by dental hygienists?	Survey question: For what dental procedures do you take blood pressure readings? (check all that apply with option for write-in)	Nominal	Frequency distribution (frequency and percentage)
What reasons are given by sampled dental hygienists for blood pressure screening?	Survey questions: For what dental procedures do you take blood pressure readings (check all that apply with an option for write-in), for what patients do you take blood pressure readings (check all that apply with an option for write-in), and if you do take blood pressure readings, why	Nominal	Frequency distribution (frequency and percentage)

	(check all that apply with an option for write-in)?		
What reasons are given by sampled dental hygienists for not doing blood pressure screening?	Survey question: If you do not take blood pressure readings, why? (Check all that apply with an option for write-in)	Nominal	Frequency distribution (frequency and percentage)
What do sampled dental hygienists currently perceive as barriers for blood pressure screening?	Survey question: What do you perceive as the most common barrier for blood pressure screenings? (Multiple-choice with an option for write-in)	Nominal	Frequency distribution (frequency and percentage)
	Other survey questions: In what type of setting do you practice? (Check all that apply)	Nominal	Frequency distribution (frequency and percentage)
	How long have you been practicing dental hygiene? (Multiple-choice)	Interval/Ratio	Mean/Standard Deviation
	What type of blood pressure cuff do you use? (Multiple-choice)	Nominal	Frequency distribution (frequency and percentage)
	Was blood pressure screening emphasized in your DH curriculum? (Close-ended)	Nominal	Frequency distribution (frequency and percentage)
* Indicates level of data for survey items or methods, not RQ's			

Chapter 4: Findings and Discussion

Introduction

The purpose of this study was to survey the current blood pressure screening practices among sampled dental hygienists in Colorado and assess the prevalence of blood pressure screenings among actively practicing dental hygienists. This chapter will present the findings and analysis derived from the online survey. The responses gathered from the online survey were analyzed using embedded tool from *Qualtrics*®. This chapter solely focuses on presenting the gathered data in a meaningful way to facilitate the discussion, which will be presented in Chapter Five. Data gathered through the questionnaire were subjected to frequency counts. Responses to the questions, which are quantified, are then presented in percentage forms. The research questions are listed as follows.

1. What is the prevalence of blood pressure screening practices among sampled dental hygienists?
2. At what frequency are sampled dental hygienists taking blood pressure readings?
3. For what procedures are blood pressure readings taken by sampled dental hygienists?
4. What reasons are given by sampled dental hygienists for blood pressure screening?

5. What reasons are given by sampled dental hygienists for not doing blood pressure screening?
6. What do sampled dental hygienists currently perceive as barriers for blood pressure screening?

Participants

Participants for this survey were dental hygienists actively practicing in the state of Colorado. Dental hygienists who were invited to participate in this research were members of CODHA. A board member sent an email to all active members for the researcher, due to HIPAA requirements, with directions and link to the survey, which was an online survey through *Qualtrics*®.

The email was sent out to approximately 500 dental hygienists. The dental hygienists were asked to voluntarily participate in the survey and informed that all information collected would remain confidential and anonymous. Contact information was provided in case participants had any questions or concerns. After clicking on the link, participants were directed to *Qualtrics*®, an online survey platform that allows the creator to collect strictly anonymous responses. Participants were kept from taking the survey more than once and a tag was added to the survey to prevent search engines from indexing it. Files uploaded as responses could only be viewed by users with permission to view responses to ensure secure participant files. The surveys were completely anonymous. To

confirm validity, only questions regarding blood pressure screening practices were asked. Once the survey started, participants could opt out at any time.

The questionnaire consisted of twelve questions that took on average no less than five minutes to complete. Participants were allowed fourteen days to take the survey, after which the survey expired and closed. After seven days, potential participants received a reminder email from CODHA requesting them to take the survey if they had not already.

Results

There was a total of 110 responses, with one participant refusing to respond and declining the informed consent. One hundred nine respondents gave consent and continued and completed the survey. This constituted a 21.8% response rate for the survey. However, some of these potential respondents could have been retired dental hygienists or currently enrolled in dental hygiene school, excluding them from participating.

Some of the questions on the survey allowed the participant to choose multiple answers or responses. Because of this, some of the percentages and findings will exceed the number of actual participants. The percentages will be reported from the number of responses for each question. For example, 77 respondents indicated they work in general dental practice = 63.11%, however, 77 out of 109 participants would be 70.6%. Since respondents could choose

more than one response to this question, the percentage was taken from how many respondents selected the answer.

From the demographic categories, 77 (63.11%) of respondents indicated they work in general dental practice, 24 (19.67%) in public health, six (4.92%) in a mobile clinic, five (4.10%) in an educational institution, two (1.64%) in periodontics, one (0.82%) in pediatrics, and one (0.82%) in a hospital-based clinic. Those who indicated “other”, six (4.92%) respondents listed independent hygiene clinics, implant center, and prosthodontics. No respondents indicated oral surgery, orthodontics, or correctional institution/facility as a place they currently practice. When asked how long the respondents had been practicing dental hygiene, 38 respondents (34.86%) indicated they have been practicing for 20 or more years, 24 (22.02%) indicated 11-20 years, 24 (22.02%) indicated 6-10 years, and 23 (21.10%) indicated 0-5 years. Please see *Table 2*.

Table 2

Number of Years Participants Have Worked as a Dental Hygienist

Number of Years Worked	n(%)
0-5 years	23(21.10)
6-10 years	24(22.02)
11-20 years	24(22.02)
More than 20 years	38(34.86)

Based on data collected in this study, the prevalence of sampled dental hygienists who currently screen for hypertension is as follows. Eight-nine (81.65%) of respondents indicated that they do take blood pressure readings in their current practice, while 20 (18.35%) respondents indicated they never take blood pressure readings in their current practice. When asked what type of blood pressure device is used, 55 (61.8%) specified digital wrist cuff, 17 (19.10%) digital arm cuff, eight (8.99%) manual aneroid, also known as a gauge and stethoscope, and nine (10.11%) specified other. Those who indicated “other”, listed that they used all the blood pressure devices, a combination of blood pressure devices, or indicated that it was dependent on the patient.

The frequency at which sampled dental hygienists take blood pressure readings coincides with the dental procedures for which they are taking blood pressure readings and the patients on whom they are taking blood pressure readings. The results are as follows. When analyzing how often blood pressure readings were being taken, 43 (48.31%) indicated at each recall visit whether it was three-four months or every six months, 24 (26.97%) indicated it was dependent on procedure, visit, patient, and other factors, three (3.37%) took it one time per year, and 19 (21.35%) indicated other. Those who indicated “other” listed they take it every visit, every appointment, and on all ages.

As indicated in *Table 3*, the majority of respondents (39.44%) indicated that blood pressure readings were taken for all dental procedures in their current

dental office. Respondents who chose “other” listed blood pressure readings taken at initial visits, all hygiene patients, all adults, if the patient doesn’t feel well, dependent on the patient’s health history, and case by case. 56 (39.44%) indicated they take blood pressure readings for all procedures, 21 (14.79%) procedures requiring anesthetic, 13 (9.15%) procedures requiring nitrous, 14 (9.86%) scaling and root planing, 14 (9.86%) invasive procedures, seven (4.93%) general restorative, and 17 (11.97%) reported “other”.

Table 3

Dental Procedures for Which Blood Pressure Readings are Taken

Dental Procedures	n(%)
All procedures	56(39.44)
Procedures requiring anesthetic	21(14.79)
Procedures requiring nitrous	13(9.15)
Scaling and root planing	14(9.86)
Invasive procedures	14(9.86)
General restorative	7(4.93)
Other	17(11.97)

When analyzing for whom patients blood pressure readings are taken, 16 (10.46%) indicated on patients who request it, 18 (11.76%) on patients with a

history of hypertension, 17 (11.11%) on new patients, 57 (37.25%) on all patients, 28 (18.30%) on hygiene patients, 13 (8.50%) on dentist patients, and four (2.6%) chose other. Those who chose “other”, respondents listed they took blood pressure readings on patients age 18 and older.

In response to why blood pressure readings are being taken, 29 (11.11%) stated it was required by their employer, 33 (12.64%) valued by patient, 74 (28.35%) valued by themselves, 43 (16.48%) valued by dentist or employer, 72 (27.59%) to prevent a medical emergency in the dental office, and ten (3.83%) chose the other option. The respondents who chose “other” listed they take it because it’s important, to educate patients, to screen for high blood pressure, and to integrate medical and dental by breaking down the barriers and allowing both professions to work together for the greater good.

As shown in *Table 4*, the most common reasons for not taking blood pressure readings were too little time in appointment and equipment not available or functional. Respondents that chose “other” listed that they forget, there is no state requirement, and there is no time allotted for blood pressure readings. Twelve (17.39%) reported it was not required by their employer, 14 (20.29%) too little time in appointment, ten (14.49%) not valued by patient, zero (0.00%) not valued by yourself (the dental hygienist), eight (11.59%) not valued by dentist or employer, three (4.35%) uncomfortable with personal skill to perform this task, 14

(20.29%) equipment not available or functional, and eight (11.59%) reported “other”.

Table 4

Reasons why Blood Pressure Readings are not being Taken

Reasons	n(%)
Not required by employer	12(17.93)
Too little time in appointment	14(20.29)
Not valued by patient	10(14.49)
Not valued by yourself	0(0.00)
Not valued by dentist/employer	3(4.35)
Uncomfortable with personal skill to perform task	3(4.35)
Equipment not available/functional	14(20.29)
Other	8(11.59)

When analyzing what dental hygienists perceived as barriers to blood pressure screenings, 37 (35.58%) indicated too little time in appointment, 19 (18.27%) equipment not available or functional, 13 (12.50%) not valued by patient, 22 (21.15%) not valued by dentist or employer, one (0.96%) not valued

by themselves, and 12 (11.54%) chose other. Respondents who chose “other” noted that there were no barriers to blood pressure readings. Others indicated patients did not take it seriously or cooperate, blood pressure devices were not accurate, and a combination of the choices given. Ninety-six (88.97%) of respondents indicated that blood pressure screening was emphasized in their dental hygiene curriculum, while 13 (11.93%) of respondents indicated that blood pressure screening was not emphasized in their dental hygiene curriculum.

Summary

Most respondents work in general dental practices and have worked for more than 20 years. With the high prevalence of hypertension in the United States, it is surprising that 20 of the respondents completing the survey reported not taking blood pressure readings at all in their current office. Respondents indicated that the blood pressure device most often used was the digital wrist cuff. Most dental hygienists reported taking blood pressure readings at each recall, either every three-four months or every six months, depending on the recall.

With most of the respondents indicating that blood pressure screening was emphasized in their dental hygiene curriculum, it is disturbing that only half of the respondents take blood pressure readings on all patients and for all dental procedures. Study participants reported having too little time in appointments to perform this task and lack of available or functional equipment as the biggest

reasons for not taking blood pressure readings. Respondents reported the most common reason for taking blood pressure readings is that it is valued by themselves. Dental hygienists indicated that they believe the most common barrier for not engaging in blood pressure screening practices is having too little time in appointments.

Chapter 5: Summary of Findings, Conclusion, and Recommendations

Summary

There was a total of 110 responses, with one participant refusing to respond and declining the informed consent. One hundred nine respondents gave consent and completed the survey. This constituted a 21.8% response rate for the survey. It should be kept in mind, however, that some of these potential respondents could have been retired dental hygienists or currently enrolled in dental hygiene school, excluding them from participating. Eighty-nine respondents reported taking blood pressure readings, while 20 never took them in their current practice. Half of respondents took blood pressure readings on all patients, at each recall appointment, and for all dental procedures. The most popular reasoning for taking blood pressure readings was that it was valued by the dental hygienists themselves. The most common reasonings for not taking blood pressure readings was having too little time in the appointment and equipment not being available or functional. Dental hygienists indicated that they believed the most common barrier for blood pressure screening as having too little time in the appointment.

Discussion

Participants in this study are not representative of all dental hygienists in the state of Colorado. The results should not be generalized to the entire

population. The results of this study support those found in a study by Collins et al., 2006. In the previous study, 15% of participants indicated taking blood pressure readings on all patients, compared to 37.25% in the current study. Fifty-five percent in this study reported rarely or never taking blood pressure readings, compared to 18.35% in the current study who never take blood pressure readings. The majority in both studies reported not having enough time in the appointment, while in the current study, lack of available or functional equipment is another major factor.

For the dental hygienists who do not take blood pressure readings, it seems there is too little time in the appointment, the equipment is not functional or available, or it is not valued or required by the dentist or employer. Too little time in appointment could be associated with dental appointments being shortened. According to Glasscoe-Watterson (2014), office managers are shortening 50-minute recall appointments to 40 minutes. Many hygienists still have a hard time completing everything that needs to be completed in 60-minute recall appointments. These time constraints could explain why blood pressure readings are only taken for certain dental procedures, at certain visits, or on certain patients.

A new classification of blood pressure readings has recently been released and assessing blood pressure is a considered standard procedure in patient care. The importance of assessing blood pressure has been emphasized

by the American Heart Association and is an ethical and legal responsibility supported in policies of the American Dental Hygienists' Association (ADHA Staff, 2016). This study shows the barriers to blood pressure screening and provides an understanding of how dental professionals can make necessary changes in the dental office to incorporate blood pressure readings.

Several limitations could have influenced the results. There were not as many responses as the researcher would have liked. First, the study utilized CODHA members only. This group possibly included many dental hygienists who were retired or currently enrolled in dental hygiene school, excluding them from participating in the study. This group could have potentially had the same practice habits because they may practice in the same geographic area. Furthermore, low participation rates could have been caused by using an online survey because there was no opportunity to clarify the meaning of the question. Respondents might have been unfamiliar with the online survey format or have had IT access issues.

Recommendations for Future Research

To improve the quality of this research, a larger response rate is needed. Another survey instrument could be utilized such as a written survey handed out at continuing education seminars or going to different dental offices. This would allow more in-depth information to be obtained and possibly have a better response rate. Questions could also be clarified in person, limiting confusion on

how to answer questions. Dental hygienists from other states or areas could be accessed or certain research questions could be further refined.

The need exists for conducting future studies exploring the relationships between barriers to blood pressure screenings and why blood pressure readings are or are not being taken. Additional research could also investigate whether more experienced dental hygienists are taking blood pressure readings or why digital wrist cuffs are the most popular device in the dental office. It would be interesting to know why only certain dental procedures require blood pressure readings, while others do not.

Recommendations for Practice

To incorporate blood pressure screenings into standard practice, dental offices need to have equipment readily available and functioning. Dental professionals need to value blood pressure screenings for the education of patients and early diagnose and treatment of hypertension. There is also a need to make time or extend appointments to include blood pressure readings. Readings could be taken while reviewing the health history at the beginning of the appointment. Patients may visit their dentist more frequently than they visit their primary medical provider. Dental professionals have an opportunity to screen, educate, and refer patients who may be at risk for hypertension.

With one in three Americans, or about 75 million people, having hypertension, the researcher believes it is confirmed that dental professionals

need to be on the forefront of helping to diagnose and treat this prevalent disease. The only way to ensure awareness of hypertension is to measure blood pressure. Blood pressure screenings are important because not being screened is a risk factor for chronic diseases and other significant, relative medical conditions among Americans. Because dental hygienists are well-positioned to conduct this procedure as part of a routine office visit or a therapeutic service, they have the means to be influential and educational. It is important to take blood pressure in order to screen for hypertension and reduce the increased risk for these conditions, as well as to prevent medical emergencies. If blood pressure is too high, treatment may be postponed or delayed.

Conclusions

With the data collected, dental and medical professionals may now have a better understanding of blood pressure screening practices among dental hygienists. These research findings may support efforts to increase or routinize scope and frequency of this preventative procedure or make it a standard of care. A continued effort must be made by educators and all dental professionals to reiterate the importance of providing this service to patients. Time for this procedure should be allowed in each patient appointment and blood pressure devices need to be readily available and functional. Dental hygienists should become confident with their skills in reading blood pressure and emphasize the value of this service to their patients. Additional research may be necessary to

determine if the findings of this study are indicative of just this dental hygiene population, or if these findings represent the norm among practicing dental hygienists.

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APPENDICES

APPENDIX A

Institutional Review Board Letter of Approval



February 6, 2019

Dear Dawn Larsen:

Re: IRB Proposal entitled "[1385636-4] Blood Pressure Screening Practices Among Dental Hygienists"
Review Level: Level [I]

Your IRB Proposal has been approved as of February 6, 2019. On behalf of the Minnesota State University, Mankato IRB, we wish you success with your study. Remember that you must seek approval for any changes in your study, its design, funding source, consent process, or any part of the study that may affect participants in the study (see <https://grad.mnsu.edu/irb/revision.html>). Should any of the participants in your study suffer a research-related injury or other harmful outcome, you are required to report them to the Associate Vice-President of Research and Dean of Graduate Studies immediately.

When you complete your data collection or should you discontinue your study, you must submit a Closure request (see <https://grad.mnsu.edu/irb/closure.html>). All documents related to this research must be stored for a minimum of three years following the date on your Closure request. Please include your IRBNet ID number with any correspondence with the IRB.

Cordially,

A handwritten signature in black ink, appearing to read "Bonnie Berg".

Bonnie Berg, Ph.D.
Co-Chair

A handwritten signature in black ink, appearing to read "Jeffrey Buchanan".

Jeffrey Buchanan, Ph.D.
IRB Co-Chair

A handwritten signature in black ink, appearing to read "Mary Hadley".

Mary Hadley, Ph.D.
IRB Coordinator

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Minnesota State University, Mankato IRB's records.

APPENDIX B

Survey Consent Form

Welcome to the research study!**Title: Blood Pressure Screening Practices Among Dental Hygienists**

Faculty Advisor: Dr. Dawn Larsen, Department of Health Science, Minnesota State University, Mankato

Student Investigator: Mariah Sullinger

ONLINE/ANONYMOUS SURVEY CONSENT

You are requested to participate in research supervised by Dr. Dawn Larsen on blood pressure screening practices among dental hygienists. This consent form gives you the information you will need to help you decide whether to participate in the study or not. Please read the form carefully. This survey should take about 5 minutes to complete. The purpose of this survey is to understand what actively practicing dental hygienists current blood pressure screening practices are and barriers associated with screenings. You will be asked to answer questions about that topic. If you have any questions about the research, please contact Dr. Dawn Larsen at (507) 389-2113 or dawn.larsen@mnsu.edu.

Participation is voluntary. You have the option to opt out at any time. You may stop taking the survey at any time by closing your web browser. You can stop at any time during the study and keep the benefits and rights you had before volunteering. The decision whether or not to participate will not affect your relationship with Minnesota State University, Mankato, and refusal to participate will involve no penalty or loss of benefits. If you have any questions about participants' rights and for research-related injuries, please contact the Administrator of the Institutional Review Board, at (507) 389-1242.

The information you provide during this research will be kept confidential and anonymous. To help protect your confidentiality, we will ensure that only the Principle Investigator and student investigator will have access to the completed surveys. Your name will NOT be attached to the survey or asked for nor will any other information capable of personally identifying you. Surveys will be stored in a secure location and all surveys will be destroyed within 5 years of completion of this study. We will take all reasonable steps to protect your identity. If the results of this project are published, your identify will not be made public. Responses will be anonymous. However, whenever one works with online technology there is always the risk of compromising privacy, confidentiality, and/or anonymity. If you would like more information about the specific privacy and anonymity risks posed by online surveys, please contact the Minnesota State University, Mankato Information and Technology Services Help Desk (507-389-6654) and ask to speak to the Information Security Manager.

The risks of participating are no more than are experienced in daily life.

There are no direct benefits for participating. It is hoped, however, that the information gained from this study will allow dental and health professionals to better understand current blood pressure screening practices among dental hygienists and barriers associated.

Submitting the completed survey will indicate your informed consent to participate and indicate your assurance that you are at least 18 years of age and are an actively practicing dental hygienist in the state of Colorado. Dental hygienists who are retired or are currently active in dental hygiene school are not permitted to take the survey.

This survey will be open for 14 days. After 7 days, a reminder email will be sent to take the survey. If you have already taken the survey, you will be asked to disregard this email.

Please print a copy of this page for your future reference.

Thank you for your time. Please note that this survey will be best displayed on a laptop or desktop computer. Some features may be less compatible for use on a mobile device.

MSU IRBNet ID# 13856361

APPENDIX C

Email for Recruitment

CODHA Members,

My name is Mariah Sullinger and I am a dental hygienist in Colorado. I am also a graduate student at Minnesota State University, Mankato. For my study, I am examining **Blood Pressure Screening Practices Among Dental Hygienists IRBNet ID Number: 1385636**. I am writing to request your participation in this study.

To be included in this research, I ask that you are at least 18 years of age and are an actively practicing dental hygienist in the state of Colorado. Dental hygienists who are retired or are currently active in dental hygiene school are not permitted to take the survey.

The survey questionnaire will take approximately 5 minutes to complete. If you choose to participate, please read all questions carefully. There is no compensation for completing the survey. The risks for participating are no more than experienced in daily life. There are no direct benefits for participating.

In order to ensure that all information will remain confidential, you will not be asked for any personal information and none of the responses will be connected to identifying information. All responses are anonymous.

If you choose to participate in this study, please follow the link below and answer all questions as honest as possible and submit questionnaires promptly. Participation is strictly voluntary, and you may refuse to participate at any time. The survey will be completed via Qualtrics, which is a web-based software.

The survey will be open for 14 days. After 7 days, a reminder email will be sent to take the survey. If you have already taken the survey, you will be asked to disregard this email.

Thank you for taking the time to assist me in my educational endeavors. The data collected will provide useful information regarding current blood pressure screening practices of dental hygienists in Colorado. Completion and submission of the questionnaire will indicate your willingness to participate in this study. If you require additional information or have questions, please contact me at mariah.sullinger@mnsu.edu or 218-841-1793 or Dr. Dawn Larsen (Principal Investigator) at dawn.larsen@mnsu.edu or 507-389-2113.

To participate, please click on the following link:

Link has been deleted for privacy purposes

Disclaimer: This email message has been approved by CODHA.

Sincerely,

Mariah Sullinger, RDH

APPENDIX D

Copy of Survey

1. In what type of setting do you practice? Check all that apply
 - General dental practice
 - Periodontics
 - Public Health
 - Oral Surgery
 - Orthodontics
 - Educational Institution
 - Pediatrics
 - Hospital-based clinic
 - Mobile Clinic
 - Correctional Institution/Facility
 - Other – write in
2. How long have you been practicing dental hygiene?
 - 0-5 years
 - 6-10 years
 - 11-20 years
 - More than 20 years
3. Do you take blood pressure readings at all in your current practice?
 - Yes
 - No
4. What type of blood pressure cuff do you use?
 - Manual aneroid (stethoscope & gauge)
 - Digital wrist cuff
 - Digital arm cuff
 - Other – write in
5. How often do you take blood pressure readings?
 - At each recall (example: 3-4 month recall or 6-month recall)
 - Once per year
 - Never
 - Depends on dental procedure, visit, patient, or other factors
 - Other – write in
6. For what dental procedures do you take blood pressure readings? Check all that apply
 - All procedures
 - Those requiring anesthetic
 - Those requiring nitrous
 - Scaling and Root Planing
 - Invasive procedures only (implant placement, periodontal surgery, extractions, endodontic therapy, etc.)

- General restorative (fillings, crowns, etc.)
 - Other – write in
7. For what patients do you take blood pressure readings? Check all that apply
- Patients who request it
 - Only on patients who report a history of hypertension
 - On new patients
 - On all patients
 - On hygiene patients
 - On dentist patients (doctor's side)
 - Other – write in
8. If you do take blood pressure readings, why? Check all that apply
- Valued by patient
 - Valued by yourself
 - Valued by dentist or employer
 - To prevent a medical emergency in the dental office
 - Other – write in
9. If you do not take blood pressure readings, why? Check all that apply
- Too little time in appointment
 - Procedure not valued by patient
 - Procedure not valued by yourself
 - Procedure not valued by dentist or employer
 - Not required by employer
 - Uncomfortable with personal skill to perform this task
 - Equipment not available or functional
 - Other – Write in
10. What do you perceive as the most common barrier for blood pressure screenings?
- Equipment not available or functional
 - Not enough time in appointment
 - Not valued by patient
 - Not valued by yourself
 - Not valued by dentist or employer
 - Other – write in
11. Was blood pressure screening emphasized in your DH curriculum?
- Yes
 - No