Use of Complementary and Alternative Medicine for Work–Related Pain Correlates With Career Satisfaction Among Dental Hygienists

Aubreé Chismark, RDH, MS; Gary Asher, MD, MPH; Margot Stein, PhD; Tabitha Tavoc, RDH, PhD; Alice Curran, DMD, MS

Abstract

Purpose: Chronic musculoskeletal pain (CMSP) is associated with work stress and burn–out among registered dental hygienists, with prevalence estimates ranging between 64 to 93%. Complementary and alternative medicine (CAM) therapies can be helpful in managing CMSP. The purpose of this study was to determine if dental hygienists who use CAM have greater career satisfaction compared to conventional therapy (CT) users.

Methods: ADHA members (n=2,431) in North Carolina (n=573) and California (n=1,858) were surveyed. Data were analyzed using univariate and bivariate analyses and logistic regression.

Results: A response rate of 25.3% (n=617) was obtained, revealing that 76.5% (n=472) suffered from CMSP. The use of CAM or CT was reported among 80.7% (n=381) of dental hygienists with CMSP. CAM users reported greater overall health (79.3% vs. 54.0%, $p<0.001$), career satisfaction (59.2% vs. 39.0%, $p<0.001$) and were able to work the hours they wanted (69.8% vs. 64.0%, $p<0.001$) compared to CT users. Of those with CMSP, 36.4% (n=172) considered a career change and 13.0% (n=59) reported having left dental hygiene. Those with CMSP were less likely to recall that ergonomics were taught or reinforced during clinical training.

Conclusion: CAM therapies may improve quality of life, reduce work disruptions and enhance career satisfaction for dental hygienists who suffer from CMSP. Ergonomics education may help reduce the number of hygienists who suffer from CMSP. Increased student awareness of CMSP risk is needed to reduce CMSP in the future by enhancing ergonomics education and incorporating CAM, such as yoga stretches, into the classroom and clinic routine.

Keywords: complementary and alternative medicine, chronic musculoskeletal pain, career satisfaction, dental hygienists

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Introduction

Physical stress is one of the leading etiologic factors in musculoskeletal disorders such as back pain, shoulder or neck tension, eyestrain, headaches or carpal tunnel syndrome.[1,2] Musculoskeletal disorders are an occupational risk for dental hygienists.[3] Ninety–three percent of dental hygienists recognize that their work causes and aggravates musculoskeletal pain.[2,4,5] In one study, 69.5% of dental hygienists reported musculoskeletal pain in the wrist/hand region, 68.5% in the neck region and 67.4% in the upper back.[2]

There are many factors that contribute to musculoskeletal disorders in dental hygienists, including repetitive motion, pinch–grasp, vibration, force and awkward positions.[2,5,6] Other factors leading to musculoskeletal disorders include sitting for a long period of time, operator position, poor posture, lack of flexibility and strength, poor ergonomics and insufficient work breaks.[2,3,6,7]

Musculoskeletal disorders may interfere with the tasks involved in performing dental hygiene services. Many dental hygienists continue to work in pain due to financial constraints and, as a result, must decrease the number of days they work.[4] Dental hygienists have reported work stress and burn–out caused by musculoskeletal disorders, long working hours and working without an assistant.[8] Some have chosen to leave the profession because of their musculoskeletal pain.[4,9] Many studies have reported complementary and alternative medicine (CAM) therapies, including yoga, massage and acupuncture, to be effective in managing chronic mus-

culoskeletal pain (CMSP) for the general population.[10–15] Since a large number of hygienists report work–related CMSP, this study was conducted to determine if dental hygienists are using CAM therapies to manage their CMSP and, if so, to determine if CAM therapies are associated with their career satisfaction and longevity.

CMSP and Work Disruptions

Musculoskeletal disorders cause work disruptions among dental hygienists, and most recognize that work causes or aggravates musculoskeletal symptoms.[4,16,17] Physical discomfort has been reported to occur more frequently after 10 years of clinical practice when compared to 5 years.[4] It has been reported that dental hygienists who complained of musculoskeletal disorders worked more clinical hours and treated more patients per day when compared to those who did not complain of pain symptoms.[16] Time pressures and lack of breaks have been reported to have a physical impact on dental hygienists, who often lack control in the schedule.[4]

In one study, 31% of dental hygienists reported they work less now compared to the past as a result of musculoskeletal discomfort caused by hand and neck pain.[4,17] Musculoskeletal discomfort caused 14.6% of dental hygienists to miss work, most frequently for lower back (7%) and hand discomfort (7%).[17] In another study, the median number of sick days taken among dental hygienists as a consequence of musculoskeletal discomfort was higher (5 days) compared to those who did not experience pain (2 days).[16]

Career Satisfaction and Career Longevity

Career satisfaction and job satisfaction are indicators that may have an influence on career longevity. Both have been studied among dental hygienists. Job satisfaction is a strong predictor of individual happiness, and experts believe that job satisfaction trends can influence work efficiency and effort, absenteeism and staff turnover.[18] It can also persuade an individual's decision to leave a profession.[19] In 2007, dental hygienists in the U.S. reported high job satisfaction, with 53.8% being very satisfied and 32.2% being somewhat satisfied in their current place of employment.[20] Dental hygienists were most commonly satisfied with patient interactions (94.5%) and overall work hours (90.6%), and least satisfied with benefits (55.8%), number of work breaks (30.3%) and management skills of the dentist (26.0%).[17]

Career satisfaction is an accomplishment that can be evaluated by an independent third party, such as compensation, promotion and work–related status.[21–23] Career satisfaction is also an assessment that an individual makes when reflecting on their own career, which may have an impact on career longevity for dental hygienists.[22] It has been reported that changes in the work environment may increase the career longevity of dental hygienists.[24] Other factors reported to influence career longevity for dental hygienists include professional membership in the American Dental Hygienists' Association, building relationships with patients, taking continuing education courses on advanced topics in dental hygiene and participating in activities outside of the office.[4] In one Texas study, dental hygienists were "primarily influenced by salary, followed by family responsibility, having a variety of duties, participation in decisions, professional collaboration, benefits and a safe work environment."[24] There are currently no reports that link musculoskeletal pain and career satisfaction among dental hygienists.

Strategies for Prevention of Chronic Pain

Many dental hygienists report that their dental hygiene training did not prepare them for the physical demands they face when working full–time.[4] Ergonomic training can reduce work related musculoskeletal disorders for dental hygienists.[5,25] Proper ergonomics can improve neck postures by improving equipment, proper patient positioning, stretching and technique training.[26]

In studies by Valachi et al, prevention strategies of musculoskeletal disorders among allied dental oral health care providers include proper use of ergonomic equipment, frequent stretch breaks, maintaining lower back curve to reduce low back pain, using magnification loupes, adjusting operator chair properly, avoiding static postures, core strengthening with 20 minutes of aerobic exercise and receiving education on musculoskeletal health and injury prevention.[3,7]

Conventional Therapies for Treatment of Chronic Pain

Dental hygienists often choose conventional therapies to help manage their CMSP. Conventional medicine is practiced by a medical doctor (MD) or doctor of osteopathy (DO) and allied health professionals, such as nurses or physical therapists.[27] The general population with chronic pain reported seeing their general practitioner (67.2%), hospital specialist (34.0%) and physical therapist (25.9%) for treatment. These individuals reported taking prescription medications (58.4%) and non–prescription medications (57.4%) as the severity of their pain increased.[28] In one study, dental hygienists reported

using medications and splints at night to help manage their chronic pain, although this study did not report its effectiveness.[4] There are currently no reports of conventional therapy use as effective treatments for chronic pain among dental hygienists.

Use of CAM Therapies for CMSP

CAM therapies are defined as "a group of diverse health care systems and practices that are not considered to be part of conventional medicine."[27] CAM therapies are commonly used among the general U.S. population for the treatment of musculoskeletal pain, including back pain, neck pain, joint pain or stiffness and arthritis.[29,30] Other reasons the general population may turn to CAM therapies is due to a lack of belief in conventional medicine (28%) and cost (13%).[30]

There are many different types of CAM therapies, including whole medical systems (homeopathic and naturopathic medicine), mind–body medicine (meditation, prayer and mental healing), biologically based practices (dietary supplements and herbal products), manipulative and body–based medicine (chiropractic care and massage) and energy medicine (Reiki and therapeutic touch).[27]

According to the 2007 National Health Interview Survey (NHIS), CAM therapy use varied by region. The 6 most commonly used CAM therapies in 2007 included natural products, deep breathing exercises, meditation, chiropractic care, massage and yoga.[29] The use of CAM therapies was highest in the western region (45%) and lowest in the southern region (33%). CAM use was more widespread among women (42.8%) versus men (33.5%) and among individuals aged 30 to 69 with advanced levels of education who are not underprivileged.[29]

Since CAM use is more prevalent among women,[29] one study looked at the different types of CAM therapies being used among the female population.[31] The study found that, among women 18 years of age or older living in the U.S, 26% used vitamins and 18% medicinal herbs/teas. Women with back pain (73.5%) took vitamins and nutritional supplements at the same time as prescription or over–the–counter medications. Women used acupuncture (84%), chiropractic care (54%) and homeopathy (52%) for conditions such as musculoskeletal pain. Sixty–two percent used yoga, tai chi and meditation to stay healthy.[31]

Many studies have reported CAM therapies to be effective in managing musculoskeletal pain among the general population. Yoga, acupuncture and massage have reported significant reductions in chronic low back pain.[10,11,13–15] Furthermore, massage has reported short term clinical benefits for the treatment of chronic neck pain.[12]

While studies have shown CAM therapies to be effective in managing chronic musculoskeletal pain for the general population, their effectiveness of managing pain has not been studied as extensively among dental hygienists. One study reported chiropractic care, massage therapy and acupuncture treatment use by dental hygienists, although this study did not survey pain improvement.

CAM in Health Education

CAM has been integrated into health professional schools, including physician assistant programs.[32] In 2001, 15 grants were awarded to health professional schools in the U.S. which were funded by the National Center for Complementary and Alternative Medicine. The programs included "11 medical schools, 2 nursing schools, the American Medical Association and 1 family practice residency program."[33] The goal was to teach conventional practitioners about CAM therapies in order to provide optimal patient care by promoting overall health and well–being.[33] CAM has been integrated into the curriculum of the first 2 years of medical school at the University of Minnesota. Students can also take an elective CAM rotation during their third and fourth years of medical school.[34] It was reported that medical students' attitudes toward CAM were positive, and the confidence in their knowledge about CAM also increased by the end of the course.[34]

Many dental professionals develop musculoskeletal disorders during their career. CAM therapies have been shown to reduce CMSP among the general population.[10–15] Dental hygienists' acceptance, utilization and effectiveness of CAM therapies are not known. The main objective of this study was to determine if CAM use among dental hygienists with reported CMSP is associated with greater self–reported career satisfaction and longevity when compared to conventional therapies. The current investigation was conducted to learn about the experiences of dental hygienists who use CAM therapies to manage their CMSP, whether CAM helps reduce work disruptions and whether CAM improves career satisfaction and longevity.

Methods and Materials

This cross–sectional study used a survey design with approval by the University of North Carolina (UNC) Biomedical Institutional Review Board. Registered dental hygienists in California and North Carolina who are current members of the Ameri-

can Dental Hygienists' Association (ADHA) were recruited to complete an 18 item questionnaire entitled "Does Use of Complementary and Alternative Medicine (CAM) Therapy for Management of Chronic Musculoskeletal Pain Improve Dental Hygienists' Career Satisfaction?" The questionnaire was administered between July 17 and August 31, 2009.

Development of Questionnaire

The questionnaire was developed based on a review of the current literature and consultation with CAM experts. The questionnaire was critically reviewed for readability and comprehension by colleagues at UNC.

A pilot study was conducted among registered dental hygienists in North Carolina and California attending continuing education courses in each state. Following these pilot tests, further modifications to the questionnaire were made, which included changes in how questions were phrased, the addition and removal of questions and the configuration of the questionnaire from paper into Qualtrics© software. The final questionnaire was approved by the Institutional Review Board prior to administration.

Administration of Questionnaire

Research Subjects: All dental hygienists who are current members of the ADHA in California and North Carolina were recruited to participate. These 2 states were chosen for variation of CAM use among these populations. It was anticipated that the subjects in California would report greater use of CAM therapies since more adults in the western U.S. use CAM therapies when compared to adults in the South,[29] thus assuring this study an adequate number of respondents with experience in the primary outcome measured.

Inclusion/Exclusion Criteria

This study included all registered dental hygienists who are members of the North Carolina Dental Hygienists' Association and California Dental Hygienists' Association with email addresses (n=2,431). Dental hygienists who participated in the pilot study, dental hygiene students, members of the general public, dentists, dental assistants and others who are not registered dental hygienists were excluded.

Contents of Questionnaire

The questionnaire consisted of 6 domains:

1. Personal Experience with Chronic Pain and Pain Management
2. Use of Conventional Therapies
3. Use of CAM Therapies
4. Opinions about CAM Therapies
5. Career Satisfaction
6. Respondent Demographics

On–Line Questionnaire

The final version of the questionnaire was formatted using Qualtrics© for electronic distribution. One week before sending the link to the survey, subjects were sent an individual invitation to participate in the web–based survey in order to prevent emails from being identified as spam. One week later, individuals were sent a second email that directed them to a website to complete the questionnaire. As individuals responded, Qualtrics© logged–in respondents so that reminder emails were sent only to non–respondents. This also prevented participants from responding more than once. A first reminder email was sent 10 days after the first mailing, with the addition of a second reminder 2 weeks later. A final email reminder was sent 1 week before closing the study on August 31, 2009.

Data Capture and Analysis

Data was transferred to an Excel spreadsheet and stored in a local, secure computer for data analysis and management. Statistical analyses were conducted using SAS 9.2. Univariate and bivariate analyses were performed to determine demographic information, the most frequently reported locations of pain, number of respondents that used CAM or conventional therapies, types of CAM or conventional therapies most frequently used, work disruption caused by CMSP and career satisfaction.

Career satisfaction was assessed using dependent sample t–test. Dependent sample t–tests were also used to determine career longevity between respondents who used CAM or conventional therapies. Independent sample t–tests were used to determine the opinions about CAM and conventional therapies for CMSP management. Chi–square analysis was used to investigate the relationship between having CMSP and using CAM therapies and to compare the use of CAM therapies between dental hygienists in California and North Carolina. To control for multiple comparisons, a Bonferroni correction was used when investigating the opinions of dental hygienists toward CAM therapies.

Age, education, year degree was earned and

number of years working as a registered dental hygienist were used in the logistic regression analyses. Logistic regressions were performed to assess the relationship between having pain in relation to respondents' acceptance and opinions about CAM use for CMSP management, to investigate the relationships between the type of therapy used and the effect of pain on career satisfaction, to predict CAM use by age, health status, gender, race, type of degree and number of years practicing and to predict whether or not ergonomics were reinforced in their dental hygiene school clinic based on pain, age, education and number of years practicing.

Results

A total of 2,431 surveys were sent electronically with a response rate of 25.3% (n=617). Each state had equivalent percentages of respondents (California=25.2%, North Carolina=25.1%).

Demographics: Findings showed that a majority of the study population was female (97.7%), non–Hispanic (87.2%) and work primarily in general dental offices (72.3%). A total of 76.5% (n=472) reported having CMSP. The mean duration of pain was 6.1 years (median= 3.5). Other demographic characteristics of respondents are found in Table I.

Reported Location of Pain: Figure 1 shows the most frequently reported locations of pain among dental hygienists. Neck and shoulder were the most common sites, with hip and leg the least common.

Effect on Work Schedule and Career: Figure 2 shows career disruption among dental hygienists as a result of CMSP. About 23.5% of respondents who reported chronic pain either called in sick or missed work as a result of their pain. After accounting for conventional therapy users, individuals who used CAM therapies alone, when compared to individuals who used both CAM and conventional therapies, had 5 times lower odds of temporarily quitting work for longer than 1 month (OR=4.9, 95% CI =1.2 to 20.9).

CAM Use to Manage CMSP: Figure 3 shows reported CAM use among dental hygienists. Respondents most frequently reported using both CAM and conventional therapies to manage work–related CMSP (80.7%, n=381). Of the 472 individuals who reported work–related pain, 14.2% (n=67) used CAM therapies alone, 3.6% (n=17) used conventional therapies alone and 1.5% (n=7) did not use any therapies.

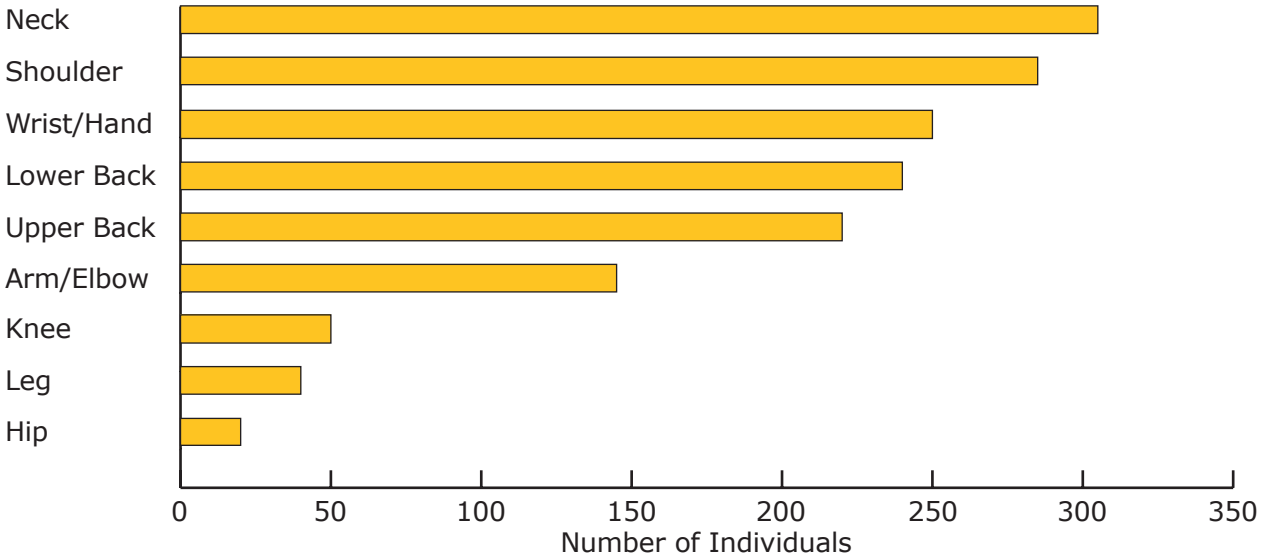
Opinions About CAM for CMSP: Dental hygienists' musculoskeletal pain symptoms improved significantly when using CAM therapies versus conventional therapies (t(367) =3.19, p=0.002). Table II shows dental hygienists who reported pain had significantly higher levels of agreement with the CAM–related opinion statements in the questionnaire. When dental hygienists who reported work–related pain were asked for their opinions about using CAM for CMSP management, these individuals were 3 times more likely to agree that CAM therapies were acceptable for CMSP management (OR=3.1, 95% CI=2.1 to 4.5) than those with no pain, and were 2 times more likely to use CAM therapies for CMSP management (OR=2.3, 95% CI=1.6 to 3.3) when controlling for age, education, year the degree was earned and years practicing as a dental hygienist.

Table I: Demographics

Variable (n=620)	n	Percent
Age		
21–30	95	15.3
31–45	171	27.6
46–55	180	29.0
≥56	167	26.9
Race		
White	499	80.5
Non–White	96	15.5
Ethnicity		
Hispanic	25	4.0
Non–Hispanic	541	87.2
Gender		
Female	603	97.7
Male	14	2.3
Education		
Associate or Certificate	357	57.9
Bachelor's	209	33.9
Beyond Bachelor's	51	8.3
Year Degree Earned		
Before 1975	86	13.9
1975–1999	291	46.9
2000–2008	223	36.0
Years Employed as RDH		
<1	18	2.9
1–5	137	22.1
6–10	60	9.7
11–20	112	18.1
>20	273	44.1
Practice Type		
General	444	72.3
Other	170	27.7
General Health		
Excellent/Good	600	96.8
Fair/Poor	17	2.7

*Missing values are not included in this table

Figure 1: Frequency of Reported Pain by Location (n=472)



CAM Use for CMSP and Reported Career Satisfaction: Table III shows respondents agreement about CAM therapies and conventional therapies in relation to their effect on career satisfaction. Individuals who used CAM therapies alone had significantly higher odds of agreeing they were satisfied with their career as a dental hygienist when compared to users of conventional therapies (OR=2.0, 95% CI=1.0 to 4.0).

Difference between California and North Carolina Dental Hygienists: There were no statistically significant differences in use of CAM therapies between respondents in California (n=285, 61%) and North Carolina (n=86, 59.7%), p=0.78. Therefore, results for CAM use are expressed as the total sample of registered dental hygienists and is homogeneous regardless of state with the exception of 2 variables: North Carolina dental hygienists were more likely to leave clinical practice due to CMSP versus dental hygienists in California (x^2=11.0, p<0.001), and North Carolina dental hygienists were more likely to report compromising patient comfort due to CMSP than California dental hygienists (x^2=6.3, p=0.012).

Effects of Age, Self–Reported Health Status, Gender, Race, Type of Degree and Number of Years Practicing on the Use of CAM to Manage CMSP: Investigators looked at the reported use of CAM therapies and found older individuals were more likely to use CAM when compared to younger individuals (OR=1.03, 95% CI=1.001 to 1.055). CAM users were more likely to report poorer health status when compared to non–CAM users (OR=1.8, 95% CI=1.3 to 2.4). There were no statistically significant differences when controlling for gender, race, type of degree earned and number of years practicing.

Education/Ergonomics: Thirty percent (30.6%) of respondents reported their dental hygiene education included classroom lectures on ergonomics. Investigators also looked at whether respondents recalled that the principles of ergonomics were reinforced in the clinic, and found that individuals who reported pain were less likely to recall that ergonomics were reinforced in the clinic (OR=0.64, 95% CI=0.45 to 0.92). Older individuals and individuals who had been practicing longer were less likely to recall that ergonomics were reinforced in the clinic (OR=0.97, 95% CI=0.95 to 0.99) when controlling for pain, age, number of years practicing and education.

Discussion

Musculoskeletal pain is associated with work stress and burn out among dental hygienists.[3] CAM therapies have been shown to be effective for reducing the risk of and managing CMSP.[10–15] To date, no studies have examined the use of CAM for CMSP among dental hygienists, a population at increased risk for work–related CMSP. Dental hygienists recognize that their work causes and aggravates musculoskeletal pain, which decreases their ability to work.[2,4,5] In this study, 472 (76.5%) individuals reported work–related pain, causing 23.5% of them to call in sick or miss work. This data differs from those of a previous study that found musculoskeletal discomfort caused 14.6% of dental hygienists to miss work.[17] In our study, individuals who used CAM therapies alone were less likely to report temporarily quitting work for longer than 1 month. Therefore, dental hygienists who use CAM therapies may reduce work interruptions caused by musculoskeletal pain.

The present study sought to investigate if CMSP

Figure 2: Work and Career Disruption Among Registered Dental Hygienists Due to CMSP (n=472)

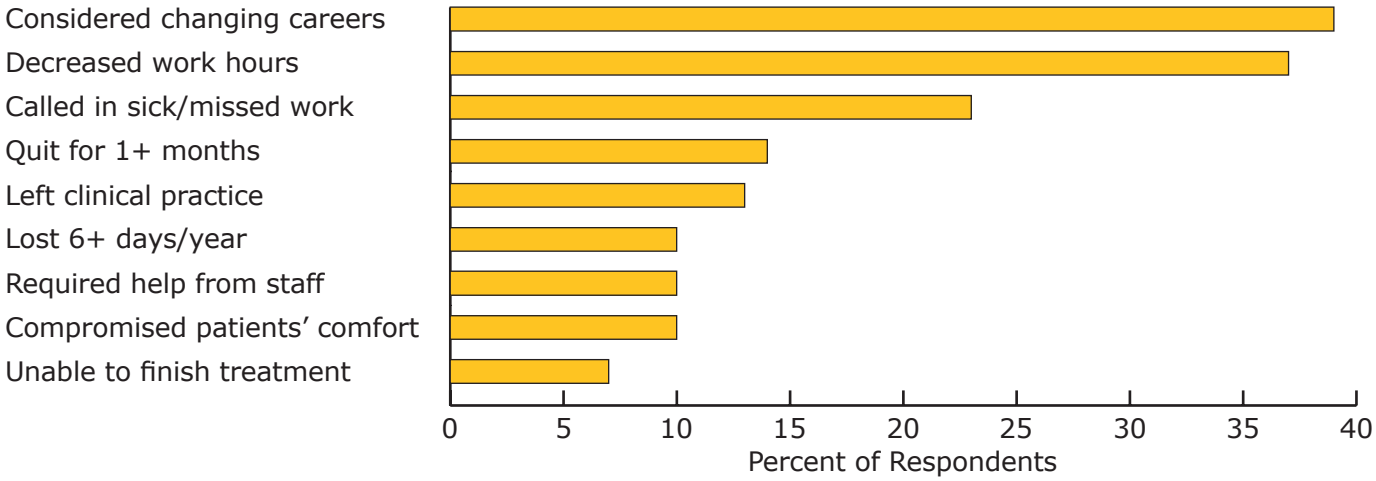
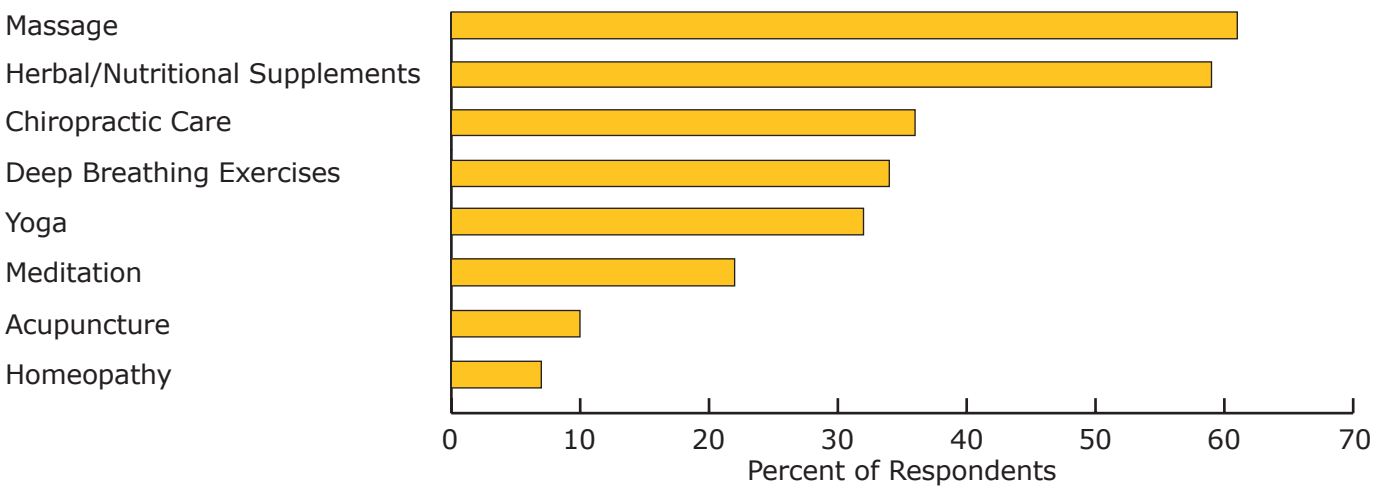


Figure 3: Reported CAM Use Among Respondents with Chronic Pain in the Past 12 Months (n=472)



is associated with reduced career satisfaction and longevity. In a 2007 study, 53.8% of dental hygienists reported high career satisfaction, even though some aspects of the job were found to be dissatisfying.[20] The present study reports similar findings in that respondents reported high levels of career satisfaction. Based on these findings, dental hygienists who do not suffer from musculoskeletal pain experience higher career satisfaction when compared to those who suffer from CMSP (p=0.001). Those with CMSP reported that it had a negative impact on career longevity. Of those with CMSP, 36.4% (n=172) considered a career change and 13% (n=59) reported having left dental hygiene. Respondents who used CAM therapies alone were more likely to be satisfied with their career as a dental hygienist compared to those who used conventional therapies alone. Therefore, dental hygienists who use CAM therapies for the prevention and management of CMSP may experience higher career satisfaction and longevity compared to using conventional therapies.

The present study demonstrated some variation when comparing our CAM users to CAM users in the general U.S. population. Based on the findings of a NHIS report, dental hygienists are more likely to utilize CAM therapies (80.7%) when compared to the general public (38.3%).[29] The most favored CAM therapies used by the general public include non–vitamin, non–mineral, natural products (17.7%), deep breathing exercises (12.7%), meditation (9.4%), chiropractic care (8.6%), massage (8.3%) and yoga (6.1%).[29] The most favored CAM therapies among participants in the current study were massage, herbal supplements and chiropractic care. One possible reason for the variation in the types of CAM therapies being used between the 2 groups may be the fact that investigators asked specifically about work–related CMSP and not about other conditions for which CAM may be utilized. If investigators had asked respondents about uses of CAM for other than work–related CMSP, they may have found closer agreement. Therefore, the variation that was found may be artificial.

The sample was predominantly female. Therefore, no gender comparison can be produced.[29] The sample of CAM users was similar in age (83.5%≥31 years of age) to CAM users in general (30 to 69 years).[29] The 2007 NHIS reported a significant difference in CAM use between individuals in the western region of the U.S. (45.0%) compared to those in the southern region (33.0%).[29] Therefore, the investigators were surprised to find no statistically significant difference in CAM use between respondents in California and North Carolina. The survey questions did not produce any firm conclusions about this finding. However, one may conclude that since the CMSP experience among dental hygienists is similar regardless of where they live, and CAM therapies are known to be effective for CMSP, hygienists may seek out CAM therapy regardless of local customs. Alternately, the investigators did not take into account CAM use between rural and urban settings. For example, CAM use is high among rural Appalachians.[35] The investigators did not ask respondents if they lived in a rural or non–rural area. Therefore, it is possible that dental hygienists in rural Appalachian North Carolina may have been oversampled, accounting for greater use of CAM therapies than expected in North Carolina. Therefore, if the investigators had compared rural versus non–rural dental hygienists, they may have seen a difference in CAM use between states.

Table II: Opinions about CAM Therapies for Chronic Musculoskeletal Pain Management between Respondents who Reported Pain vs. No Pain

Opinions about CAM Therapies	Difference in Opinion**	SD	t(df)
I would use CAM for chronic pain management	0.33	0.74	4.71(609)*
I would recommend CAM to a friend/family member	0.41	0.78	5.51(605)*
CAM therapies are acceptable for chronic pain management	0.48	0.75	6.67(606)*
I would use CAM in addition to conventional medicine for pain	0.20	0.75	2.76(609)
I would use CAM as an alternative to conventional medicine	0.34	1.03	3.51(610)*
CAM should be covered by medical insurance	0.32	0.71	4.75(610)*

*Indicates $p<0.005$
**Respondents from both groups were averaged and the difference between means was compared. A Likert scale was used ranging from 1=strongly agree and 5=strongly disagree.
Note: The mean difference is between respondents who reported pain compared to no pain. Values indicate stronger agreement about use of CAM therapies for those who reported pain.

Table III: Association between CAM and Conventional Therapy Use on Career Satisfaction

Career Variables	CAM vs. Conventional Mean Difference**	t(df)
Contributed to my overall career satisfaction	0.49	8.31(365)*
Contributed to my career longevity	0.52	7.75(366)*
Contributed to my overall health and well–being	0.64	9.62(368)*
Helped me work the hours I want	0.28	4.71(367)*
Helped me feel more secure and happy in my job	0.47	7.72(366)*

*Indicates $p<0.001$
**Respondents from both groups were averaged and the difference between means was compared. A Likert scale was used ranging from 1=strongly agree and 5=strongly disagree.
Note: The mean difference is between respondents who used CAM therapies compared to conventional therapies. Values indicate stronger agreement for those who used CAM therapies vs. conventional therapies.

In one study, 69% of individuals reported using CAM plus conventional therapies.[36] Another study reported that 67% of patients who saw an alternative practitioner for pain saw a conventional practitioner as well.[28,37] In addition, 52% of primary care patients reported current or prior use of CAM therapies for pain management.[38] The majority of dental hygienists in our study (80.7%) reported using both CAM and conventional therapies in a complementary fashion for the treatment of CMSP. Therefore, based on our findings, dental hygienists are similar to the general population who use both CAM and conventional therapies for CMSP.

It has been suggested that improvements in the work environment may help reduce the risk of developing musculoskeletal disorders.[2,5,9,25,26,39] Im-

proving the work environment may contribute to a reduction in musculoskeletal disorders and work disruptions for dental hygienists. The investigators found that there is a relationship between ergonomics education in dental hygiene school and CMSP. Many respondents recalled receiving classroom lectures on ergonomics, but fewer recalled that the principles of ergonomics were reinforced in the clinic. Those who recalled that ergonomics were reinforced were less likely to report experiencing CMSP. This suggests that reinforcement of proper operator positioning and other ergonomic principles can have long term health effects on practicing dental hygienists. Dental hygiene educators should consider reinforcing good postural habits, along with basic CMSP prevention strategies, as an essential part of the dental hygiene curriculum. Further research is needed on the most effective strategies for incorporating CAM methodologies for prevention of CMSP into the dental hygiene curriculum.

Strengths and Limitations of this Study

One of the strengths of this study is that ADHA members who were surveyed represent the general population of ADHA members and, to a great degree, dental hygienists in general.[20] Therefore, the results may reflect the attitude, opinions and practices of a large number of ADHA member hygienists.

This study has several limitations. The low response rate may have been due to several factors: time of year the survey was sent (some individuals may have been on summer vacation), inaccurate email addresses, questionnaire may have been too long, title of questionnaire may have influenced individuals without pain not to participate and using an electronic questionnaire versus paper (studies have shown a higher response rate with paper questionnaires).[40–42] Therefore, the investigators speculate that a higher response rate may have been obtained using a paper questionnaire with a more neutral title administered at a different time of year.

Biases to this study include sampling bias – only ADHA members were surveyed. The general dental hygiene population may have different opinions about CMSP and CAM use. There was also a geographical bias – the researchers surveyed dental hygienists in California and North Carolina only, whereas a national sample across 50 states may have different results. Therefore, a national sample of non–member as well as member dental hygienists may have different opinions about CAM use for CMSP.

New Discoveries and Impact on Dental Hygiene Profession

In this study, dental hygienists with work–related pain who used CAM therapies reported they had greater overall health, career satisfaction, were able to work the hours they wanted and felt more secure and happy in their jobs when compared to conventional therapy users. The findings also demonstrated that dental hygienists who used CAM therapies alone had lower odds of quitting work for longer than 1 month compared to those who used both CAM and conventional therapies together. Therefore, dental hygienists with CMSP who use CAM therapies may be less likely to call in sick or miss work, and may have increased career satisfaction as well as career longevity.

The research respondents expressed the opinion that CAM should be covered by insurance. Therefore, if more insurance companies cover the cost of CAM therapies, then dental hygienists may be more likely to use CAM therapies to manage and even prevent musculoskeletal pain.

Incorporating CAM education into the dental hygiene curriculum can increase students' awareness of developing CMSP. Future research that looks at incorporating CAM therapies, such as yoga, into dental hygiene programs can assess their effectiveness by evaluating dental hygienists' musculoskeletal pain once they are in private practice. Incorporating ergonomic education and reinforcing it in the clinic also may be successful in preventing CMSP from occurring. Continuing education courses for practicing dental hygienists can be used to educate those who have not had the advantage of learning ergonomics in dental hygiene school.

CAM practitioners may be in need of information relating to the work–related pain issues of their dental hygiene clients. Therefore, the results of this study will be helpful to CAM practitioners who treat dental hygienists. Future research should consider the needs of dental hygienists and the types of CAM therapies they will benefit from the most to manage their musculoskeletal pain.

Conclusion

This study found that using CAM therapies for CMSP is associated with greater career satisfaction and longevity among dental hygienists. The investigators suggest that CAM practitioners may benefit from information on work–related pain issues for their dental hygienist clients. The effects of increasing student awareness of CMSP risk, enhancing ergonomics education and incorporating CAM therapies into the classroom and clinic routine should be investigated.

Aubreé Chismark is currently a Dental Hygiene Instructor at West Coast University, Anaheim, CA. At the time of this study, she was a candidate in the Dental Hygiene Education Master of Science Degree Program at the University of North Carolina at Chapel Hill School of Dentistry; Gary Asher, MD, MPH, is an assistant professor in the Department of Family Medicine; Department of Physical Medicine and Rehabilitation; Margot Stein, Ph.D. is a Pediatric Psychologist and Clinical Associate Professor in the Department of Dental Ecology, UNC School of Dentistry; she is also an Adjunct Clinical Associate Professor of Psychiatry, UNC School of Medicine; Tabitha Tavoc, RDH, Ph.D. is a former Clinical Associate Professor in the Department of Dental Ecology, Division of Dental Hygiene and currently is the Director of Dental Hygiene, Fortis College, Landover, MD. Alice Curran, DMD, MS, is an Associate Professor of Oral and Maxillofacial Pathology, Department of Diagnostic Sciences and General Dentistry, UNC School of Dentistry.

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