# Barriers and Facilitators of Implementing Injury Prevention Practices by Massage Therapists

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**Objective:** Massage therapy involves pervasive ergonomic hazards with the majority of massage therapists (MTs) experiencing adverse musculoskeletal health issues. A variety of barriers and facilitators exist that can impact the efficacy of safety programs. **Methods:** A longitudinal study to characterize individual and organizational barriers and facilitators that influence the implementation of self-care techniques designed to reduce musculoskeletal health issues. **Results:** MTs who reported time as abarrier implemented 0.9 fewer selfcare items despite wanting to make these changes ($P = 0.003$) and 1.4 fewer self-care items when management was identified as a barrier ($P < 0.001$). Almost 20% of the MTs reported switching jobs which was associated with implementing 1.1 fewer self-care items ($P = 0.002$). **Conclusions:** Our findings show that organizational factors plays a critical role in workplace safety which can be used to improve working conditions faced by MTs.

**Keywords:** body mechanics, ergonomics, massage therapy, occupational musculoskeletal injury, self-care

In the United States, 15% to 20% of adults receive at least one massage annually from an estimated 360,000 licensed massage therapists (MTs).[1,] Massage therapy involves substantial ergonomic hazards—awkward postures, overextension, continual bending, frequent force, repetitive motion, and occasional vibration—all of which pose a risk for developing musculoskeletal health issues.[3–5] Work-related musculoskeletal disorders in MTs are common with some studies estimating 50% of therapists experiencing pain in the past 30 days[6] and 71.4% experiencing a work-related musculoskeletal disorder in the past year,[7] predominately affecting the upper extremities, back, and neck.[6–8]

However, an individual's risk of musculoskeletal injury at work is modified by various organizational factors. Workload is strongly associated with earnings[9] which is largely a function of the fee-per-client rate in massage therapy.[1] For massage therapists, while average hourly rates charged per customer are relatively high ($72/h),[1] earned hourly rates vary widely across the industry[1] with an adjusted gross earned hourly rate of $21.41 for all MTs.[2] This relates to recognized occupational risk factors for increased musculoskeletal injury among MTs including work duration, amount of daily client contact, lack of self-care practices, and fatigue.[6,7,10] In addition, employment in massage therapy has many of the attributes of precarious employment,[11,12] given the lower gross wages,[2] high rate of underemployment (persons working part-time but are seeking full-time employment),[1,13] low employee benefits (ie, sick leave, paid time off, insurance),[1] high risk of sexual harassment at work,[14] and the large proportion of MTs employed as independent contractors.[1,2] Precarious work is directly associated with lower job satisfaction, psychological stress, and higher work-related injury rates.[11,15–21]

Employees, health and safety personnel, and management often attempt to jointly address ergonomic hazards to improve workplace safety, but different barriers and facilitators exist at the organizational level that can impact the efficacy of safety programs.[22–26] To complicate matters further, at the individual level MTs have varying degrees of personal control over known risk factors such as client type, equipment, hours of work, frequency and duration of breaks, and time off between shifts.[1] Research has demonstrated that when employees work in settings characterized by low decision authority, lack of autonomy, and unsupportive management, they have higher job stress, dissatisfaction, absenteeism, job turnover, and increased physical complaints.[11,21,27–31]

Currently, there is very limited research that evaluates barriers and facilitators of workplace safety specific to massage therapists. Most of the previous research has focused on manufacturing and nursing occupations, both of which differ substantially from the working conditions experienced by MTs. The aim of this study was to better characterize individual and organizational barriers and facilitators that influence the implementation of self-care techniques designed to reduce musculoskeletal complaints in MTs.

## METHODS

We conducted a longitudinal study on a sample of massage therapists participating in two continuing education (CE) courses. The American Massage Therapy Association (AMTA) hosted the continuing education courses free of cost to therapists for the duration of the recruitment period. One course addressed recommended approaches to prevent work-related injuries among massage therapists, and the second course addressed proper body mechanics to improve the musculoskeletal health of massage therapists. The survey instruments did not collect personal identifiable information, except for e-mails that were used to contact subjects for the follow-up survey. Data from the initial survey was linked with the follow-up survey using the e-mail

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**TABLE 1.** Characteristics of Respondents Participating in Follow-up Survey of Massage Therapists, 2018 to 2019: Self-Care Strategies to Reduce Risk of Musculoskeletal Signs and Symptoms

| | Follow-Up Respondents ($N = 209$) | Original Sample From CE Modules ($N = 8,305$) |
|---|---|---|
| Mean age in years (SD) | 41.1 (SD = 11.8) | 39.0 (SD = 11.9) |
| Gender | | |
| Female | 181 (86.6%) | 7158 (86.2%) |
| Male | 25 (12.0%) | 972 (11.7%) |
| Unspecified | 3 (1.4%) | 175 (2.1%) |
| Mean years working as a massage therapist | 8.2 (SD = 8.3) | 7.0 (SD = 6.9) |
| Mean hours per week working in a massage business | 29.4 (SD = 13.1) | 27.9 (SD = 14.3) |
| Mean hours per week giving massages | 17.8 (SD = 8.8) | 15.7 (SD = 10.3) |
| Primary practice setting | | |
| Your own practice (your home or office, etc) | 69 (33.0%) | 2375 (28.6%) |
| Spa/Salon/Franchise settings (spa, salon, massage franchise or chain, etc) | 60 (28.7%) | 2861 (34.4%) |
| Medical settings (hospital, chiropractic office, hospice, nursing home, etc) | 42 (20.1%) | 1403 (16.9%) |
| Outcalls (travel to client home, office, hotel, corporate events, etc) | 16 (7.7%) | 781 (9.4%) |
| Athletic settings (gym, fitness center, sports organization, etc) | 10 (4.8%) | 294 (3.5%) |
| Other | 12 (5.7%) | 591 (7.1%) |
| How would rate your overall health? | | |
| Very good | 47 (22.5%) | 1983 (23.9%) |
| Good | 109 (52.2%) | 4413 (53.1%) |
| Moderate | 43 (20.6%) | 1702 (20.5%) |
| Bad | 0 (0.0%) | 110 (1.3%) |
| Very bad | 0 (0.0%) | 14 (0.2%) |
| Choose not to answer | 10 (4.8%) | 83 (1.0%) |

CE, continuing education.

addresses, which were deleted after the data linkage was completed. National University of Health Sciences IRB approved the study (#H-1703).

## Subject Recruitment

The recruitment and data collection procedures were identical for both internet-based CE courses which provided CE credit required by state licensing bodies. Recruitment for the study occurred from February 2018 through and July 2019. Prior to the beginning of the course, subjects were asked to complete questions regarding demographic information, current self-care behaviors, current signs and symptoms, and an initial assessment of baseline knowledge related to the CE course content. At the completion of the CE course, each participant completed a quiz relating to the course content, planned self-care changes, and if they consented to participate in the follow-up study. No compensation was provided for participating in the initial survey.

Additionally, those who consented to participate in a followup survey were initially contacted 90 days after completing the CE course. Each subject was contacted once per month, up to three times, between 90 and 150 days from the date of completing the initial CE course. Subjects were not contacted further after the third e-mail reminder. The follow-up survey was delivered through SurveyMonkey. Participants had the option to claim a $20 gift card as compensation for completing the follow-up survey. For this analysis, we only included professionally active massage therapists at the time of the initial survey, which was defined as MTs providing 5 hours or more per week giving massages. Of the 8035 subjects who participated in the initial survey, 783 consented to be contacted for the follow-up survey. A total of 209 subjects completed the follow-up survey. Despite the overall low response rate, the demographic characteristics, professional attributes, warm-up and cooldown injury prevention activities, and musculoskeletal health complaints did not significantly differ between the overall study population ($n = 8035$) and the 209 follow-up respondents (Table 1).

## Survey Instruments and Description of Variables

Both the initial and follow-up surveys were developed using questions from existing national surveys used by US federal agencies, the AMTA annual survey, and other studies, with or without modifications when appropriate.[6,7,32–34] The survey instrument contained a combination of predetermined answer choices and short-answer questions to glean both quantitative and qualitative dimensions.

Demographic and professional practice information was collected in both the initial and follow-up surveys. Within-rater consistency between responses on the initial survey and follow-up surveys was very high across all variables as measured by Pearson coefficient and Cronbach $\alpha$, with the exception of reported mean hours per week giving massages and mean minutes to warmup or cool-down when giving massages. For these latter variables, correlation coefficients were high (0.70 to 0.87) at 3 months follow-up, but declined among MTs who did not respond until the sixth month of follow-up (3rd reminder group; 0.41 to 0.64), which coincided with reported employment turnover (see Results).

Information on age, gender, hourly wage, mean years working as a massage therapist, mean hours per week working in a massage business, mean hours per week giving massages, and type of primary practice setting was collected. In the follow-up survey, MTs were asked to characterize the type of employment arrangement at their primary practice setting—hourly, salaried, independent contractor, self-employed, or other. Respondents were also asked if they changed their primary practice setting since completing the initial survey and the reasons for this change. These data were used to describe turnover rates among the MTs.

Subjects were also asked to provide information on frequency and duration of both warmup and cool-down activities and

 

selfreported musculoskeletal complaints (type, body part affected, frequency, duration, severity, and treatment). The focus of this analysis was on barriers and facilitators massage therapists experienced when attempting to implement self-care changes at their primary practice setting during the follow-up period. The survey included questions on the degree different injury prevention changes were implemented during the period of follow-up, self-identified barriers and facilitators for implementing these changes, and attributed level of control over making these self-care changes.

## Statistical Analysis

For the descriptive analysis, we present data on respondent characteristics, employment arrangements, self-care changes implemented during the follow-up period, barriers and facilitators for implementing self-care changes, and self-reported level of control over different aspects of their practice. Appropriate parametric (Pearson chi-square) and nonparametric tests (Kruskal-Wallis rank sum test) were used to evaluate categorical variables, and ANOVA Tukey's pairwise comparison were used to compare mean differences in continuous variables across multiple groups.

We built two multivariable models. The first model evaluated factors that predicted not implementing self-care tactics despite the MT reporting that they wanted to make changes with these elements (self-reported option ''No, despite wanting to make change''). We focused on the seven self-care items that can be adversely impacted by a lack of time caused by external factors such as scheduling intensity, administrative work, and client behavior (eg, lingering, late for appointments). These seven items were increased warm-up frequency, increased warm-up length, change in warm-up activities, increased cool-down frequency, increased cool-down length, change in cool-down activities, and increased time between massages. The dependent variable was the sum of the seven elements that respondents reported not making a change to despite wanting to.

The second model evaluated factors that predicted implementation of all 11 self-care tactics. The dependent variable was the sum of the 11 elements that respondents reported implementing ''for most of'' or ''partially'' during the follow-up period. For both models, statistical evaluation of covariates, as well as a priori knowledge, was used to determine inclusion of covariates in the final models. A two-sided $P$-value $<0.05$ was considered statistically significant. No evidence of multicollinearity among the final independent variables was indicated in any of models based on evaluation of standard errors, and evaluation of variance of inflation and tolerance tests. We used SAS software for all statistical analyses (v.9.4; Cary, NC).

# RESULTS

A total of 209 individuals completed the follow-up surveys. The demographic and professional characteristics of the follow-up respondents were nearly identical to the 8305 participants in the CE modules from which they were recruited (Table 1). The follow-up respondents were predominately women (86.6%), were practicing as massage therapists for an average of 8.2 years, worked 29.4 hours a week in a massage business on average, of which they spent an average of 17.8 hours per week giving massages.

## Work Conditions

The largest proportion of massage therapists reported working in the following three professional settings: (1) personal private practice ($n = 69$; 33.0%), (2) spa, salon, massage franchise or chain ($n = 60$; 28.7%), and (3) a medical setting ($n = 42$; 20.1%; Table 1). Based on open ended responses, private practice included a variety of self-employed individuals and independent contractors (IRS 1099). While most appeared to have private practices (solo or shared group practices), many reported working on commission at corporations/spas or as independent contractors in shared space facilities (fee split, rental fee).

During the follow-up period, 38 massage therapists (18.2%) changed their primary practice setting (ie, job turnover). The turnover rates were highest among those employed by outcall services (43.8% turnover), spas, salons, massage franchises or chains (25.0% turnover), and medical settings (16.7%); the turnover rates were lowest among those working in personal private practice (11.6%) and athletic settings (10.0%). Among the massage therapists who reported a change in primary practice setting, $n = 11$ moved into spas, salons, massage franchises or chains, $n = 8$ changed employers within the same setting type, $n = 8$ switched to outcalls or private practice, $n = 7$ moved into the medical setting, and $n = 4$ moved into the athletic setting.

The majority of massage therapists reported that they were employed as independent contractors or self-employed ($n = 131$; 62.7%), followed by hourly employees ($n = 58$; 27.8%) and salaried employees ($n = 11$; 5.3%). The largest proportion of hourly and salaried employees were employed in the following settings: spas, salons, massage franchises, or chains ($n = 40$; 66.7%), the medical setting ($n = 23$; 54.7%), and athletic setting ($n = 4$; 40%).

The average hourly wage reported by all massage therapists was \$57.90 (SD = \$61.00; interquartile range = \$28.75, \$70.0). Massage therapists with average hourly wages in the lowest quartile (lowest wages) reported working slightly more hours per week giving massages on average (19.2 vs 17.1 h/wk) but reported the lowest overall mean hours working when including administrative tasks (27.7 vs 30.3 h/wk). Furthermore, those reporting employment arrangements as hourly or salaried reported the lowest average hourly wages of \$34 and \$31 respectively, as compared with independent contractors (\$60/h mean) and self-employed (\$76/h mean).

## Level of Control Over Work Practice Elements by Massage Therapists

Table 2 presents aspects of massage therapy predominately under the control of the massage therapists or management. The aspects most under the control of the massage therapists included the techniques used (86.6%), length of shift (68.4%), and breaks (64.1%); the aspects most under the control of management were the rates charged (46.9%), type of equipment (36.8%), type of clients (28.2%), and session length (28.2%). For the 69 hourly and salaried employees, management reportedly controlled the rates in nearly all cases ($n = 68$). Nearly all MTs reported that management had some level of control over the type of clients they cared for in athletic (80%), medical (74%), and spas, salons, massage franchises or chains settings (78%). However, women MTs reported the highest level of sole control over the type of clients they cared for (49.2% vs 32.0% for men). Also, MTs reporting they controlled the timing and duration of breaks varied by setting of employment: medical (42.9%), spa/salon (50.0%), athletic (60.0%), outcalls (81.3%), and personal practice (94.2%).

## Implementation of Self-Care Practices and Workplace Controls

Table 3 presents the self-care practices that massage therapists implemented during the follow-up period. A greater proportion of massage therapists reported implementing self-care practices that were more directly under their personal control, including table height, change in body position during massage, improved nutrition, and improved hydration (Table 3). The elements that were more likely impacted by external factors associated with a lack of time were reported to have been implemented by a lower proportion of massage therapists. On average, MTs reported implementing 6.8 self-care items (standard deviation [SD] = 2.8), and not implementing 1.9 self-care tactics despite wanting to do so (SD = 2.1).

 

**TABLE 2.** Level of Control Over Specific Work Practice Conditions in the Primary Practice Setting as Reported by Massage Therapists, 2018 to 2019: Self-Care Strategies to Reduce Risk of Musculoskeletal Signs and Symptoms

| Who Has Control Over the Following Aspects at Your Primary Practice Setting? | Management | Self | Shared | Not Applicable |
|---|---|---|---|---|
| Techniques used | 5 (2.4%) | 181 (86.6%) | 13 (6.2%) | 10 (4.8%) |
| Tip split | 15 (7.2%) | 82 (39.2%) | 2 (1.0%) | 110 (52.6%) |
| Length of shift | 25 (12.0%) | 143 (68.4%) | 31 (14.8%) | 10 (4.8%) |
| Breaks | 38 (18.2%) | 134 (64.1%) | 22 (10.5%) | 15 (7.2%) |
| Number of clients per day | 52 (24.9%) | 110 (52.6%) | 38 (18.2%) | 9 (4.3%) |
| Session length | 59 (28.2%) | 105 (50.2%) | 34 (16.3%) | 11 (5.3%) |
| Types of clients | 59 (28.2%) | 98 (46.9%) | 39 (18.7%) | 13 (6.2%) |
| Equipment | 77 (36.8%) | 100 (47.8%) | 22 (10.5%) | 10 (4.8%) |
| Rates charged | 98 (46.9%) | 92 (44.0%) | 9 (4.3%) | 10 (4.8%) |

## Barriers to Implementation Self-Care Practices

Table 4 shows the different facilitators and barriers to implementing changes to self-care practices at an MT's primary practice setting during the follow-up period. More than half of the MTs ($n = 121$; 57.9%) reported time as a barrier to implementing selfcare practices, and 20.6% ($n = 43$) reported that management was a barrier to implementing self-care changes (Table 4). Time was reported to be a barrier in equal proportions by massage therapists across all practice settings, employment arrangements, gender, age, and years practicing.

Massage therapists reporting that management was a barrier disproportionately were employed in the medical setting ($n = 12$; 28.6%) or spas, salons, massage franchises, or chains ($n = 18$; 30%). Massage therapists who identified management as a barrier reported implementing self-care changes that were less impacted by external business factors—table height, body position, nutrition, and hydration—at the same proportions as those who did not report management as a barrier. However, for items more impacted by external business factors, if they did report management as a barrier, a substantially greater proportion reported not implementing self-care changes despite wanting to do so (mean number not implemented among those reporting management as barrier vs not barrier: 3.3 vs 1.6); this was observed for the following self-care tactics: cooldown activities, cool-down time, cool-down frequency, and time between sessions. Warm-up was less impacted among MTs reporting management as a barrier.

In a multivariable model, massage therapists who reported time as a barrier implemented 0.9 fewer self-care items despite wanting to make these changes (standard error [SE]: 0.29; $P = 0.003$) and 1.4 fewer self-care items when management was identified as a barrier (SE = 0.35; $P < 0.001$). MTs who reported turnover in their jobs also reported implementing an average of 1.1 fewer self-care items despite wanting to make these changes (SE = 0.35; $P = 0.002$). Neither knowledge nor personal interest, if identified as barriers, were significantly associated with implementing fewer self-care tactics despite wanting to implement them. This multivariable model controlled for age, gender, average weekly hours giving massages, average hourly wage, type of CE course completed, primary practice setting, and reporting moderate to extreme musculoskeletal discomfort. There was no evidence of a significant interaction between time and management as barriers.

## Facilitators to Implementation Self-Care Practices

In contrast, knowledge and personal interest were reported as facilitators for implementing self-care strategies by the majority of massage therapists (Table 3). Massage therapists that reported time as a facilitator of change implemented more of the self-care items reported in Table 2 (average of 8.6 items implemented among MTs reporting time as a facilitator vs 6.4 items among those not reporting time as a facilitator; $P < 0.001$); those who reported management as a facilitator of change also reported implementing more self-care items on average (7.8 vs 6.3; $P < 0.001$). Simply reporting that management

**TABLE 3.** Degree to Which Massage Therapists Implemented Self-Care Changes at Their Primary Practice Setting During the Follow-up Period, 2018 to 2019: Self-Care Strategies to Reduce Risk of Musculoskeletal Signs and Symptoms

| | Degree Implemented: Yes, for Most of the Past 3 Months | Degree Implemented: Yes, Partially Over the Past 3 Months | Degree Implemented: No, Despite Wanting to Make Change | Degree Implemented: No, But I Did Not Want to Make Changes |
|---|---|---|---|---|
| Elements less impacted by external business factors (eg, time, scheduling) | | | | |
| Change external factors such as table height | 95 (45.5%) | 40 (19.1%) | 9 (4.3%) | 65 (31.1%) |
| Change body position during massage | 110 (52.6%) | 72 (34.4%) | 5 (2.4%) | 22 (10.5%) |
| Improve nutrition | 62 (29.7%) | 89 (42.6%) | 27 (12.9%) | 31 (14.8%) |
| Improve hydration | 89 (42.6%) | 84 (40.2%) | 8 (3.8%) | 28 (13.4%) |
| Elements more impacted by external business factors (eg, time, scheduling) | | | | |
| Increase warm-up frequency | 46 (22.0%) | 117 (56.0%) | 30 (14.4%) | 16 (7.7%) |
| Increase warm-up length | 37 (17.7%) | 94 (45.0%) | 56 (26.8%) | 22 (10.5%) |
| Change warm-up activities | 39 (18.7%) | 111 (53.1%) | 32 (15.3%) | 27 (12.9%) |
| Increase cool-down frequency | 27 (12.9%) | 70 (33.5%) | 73 (34.9%) | 39 (18.7%) |
| Increase cool-down length | 23 (11.0%) | 53 (25.4%) | 84 (40.2%) | 49 (23.4%) |
| Change cool-down activities | 25 (12.0%) | 54 (25.8%) | 78 (37.3%) | 52 (24.9%) |
| Increase time between massages | 35 (16.7%) | 49 (23.4%) | 47 (22.5%) | 78 (37.3%) |

**TABLE 4.** Barriers and Facilitators for Implementing Self-Care and Injury Prevention Tactics in the Primary Practice Setting for Massage Therapists, 2018 to 2019: Self-Care Strategies to Reduce Risk of Musculoskeletal Signs and Symptoms

| | Facilitator | No Impact | Barrier | Not Applicable |
|---|---|---|---|---|
| Time | 39 (18.7%) | 34 (16.3%) | 121 (57.9%) | 15 (7.2%) |
| Knowledge | 139 (66.5%) | 51 (24.4%) | 6 (2.9%) | 13 (6.2%) |
| Personal interest | 145 (69.4%) | 38 (18.2%) | 11 (5.3%) | 15 (7.2%) |
| Management | 69 (33.0%) | 50 (23.9%) | 43 (20.6%) | 47 (22.5%) |

was in control of an aspect of the business was not correlated with the number of self-care items implemented in Table 3.

In the second multivariable model, factors that were significantly associated with implementing more of the self-care elements (all 11 items) were massage therapists who identified time as a facilitator of change ($\beta = 2.1$ items more on average, SE = 0.48, $P < 0.001$) and management as a facilitator of change ($\beta = 0.8$ items more on average, SE = 0.40, $P < 0.036$). Interestingly, for each 10year increase in experience working as an MT, 0.6 fewer items were implemented (SE = 0.22; $P = 0.01$). Hourly wage was also modestly negatively associated with implementing self-care practices ($\beta = -0.08$ items per $10 increase in hourly wage, SE = 0.03, $P = 0.006$). This multivariable model controlled for gender, type of CE course completed, and number of musculoskeletal complaints at follow-up. There was no evidence of a significant interaction between time and management as facilitators.

## DISCUSSION

During the short follow-up period, the MTs in this study reported implementing a substantial number of self-care tactics discussed in both CE courses. While the MTs in this study worked in diverse settings with varying employment conditions, time and management were broadly reported to be both facilitators and barriers for implementing self-care tactics to reduce work-related musculoskeletal injuries. In both adjusted models, the level of control MTs reported having over aspects of their practice was unrelated to implementing self-care tactics. While the follow-up period for this study was short, almost 20% of the MTs reported turnover in their primary place of employment which was also associated with implementing fewer self-care items despite wanting to make changes. Interestingly, both years of experience as an MT and hourly wage were modestly associated with implementing fewer of the 11 self-care items, but these MTs may simply have already consistently implemented self-care practices which might explain the modest negative correlation.

Management plays a critical role in workplace safety.[35–37] In this study, management was reported by some MTs to be a facilitator of implementing self-care practices to reduce work-related musculoskeletal injuries, while other MTs reported management as a barrier. As shown in other work settings, a safety culture fostered and supported by management is associated with more efficient implementation of safety policies and increased participation by workers,[36,38–42] higher employee satisfaction, and lower injury rates and associated costs.[36,40–46] In the current study, implementation of these self-care practices was unaffected by whether management controlled any aspect of an MTs work such as session length, length of shift, or number of clients. Only when management was reported as a barrier to implementing self-care tactics was it negatively associated with implementing these injury prevention tactics. This demonstrates that management can act adversely on employees who want to implement safety changes in the workplace. Research demonstrates that negative relations with management and a management that does not promote workplace safety are associated with higher injury rates at work, higher turnover, absenteeism, and presenteeism.[11,21,40,41,47,48]

As with most jobs, but particularly with contingent work that involves working with multiple clients during a shift (ie, gigs), time availability is a recurring issue raised by employees.[49–51] Time was a critical factor related to implementing self-care practices across all MTs, both as a facilitator and barrier. Based on the regression models, when time was a facilitator, it was associated with implementing an average of 2.1 more self-care practices; in contrast, when time was identified as a barrier it was associated with implementing 0.9 fewer self-care items despite wanting to make these changes. Research demonstrates that in professions that reduce client volume and workload pressures, musculoskeletal complaints decline,[52–56] while job and client satisfaction increases[50,51,57–59]

### Limitations

There are several limitations to the current study. Recruitment for this study may not be generalizable to the overall MT workforce, but only reflect the working conditions and attitudes of MTs who chose to take these CE modules, particularly those who work in states or with employers that require licensure and continuing education. It is possible that MTs working in unregulated, unlicensed employment conditions differ substantially from the MTs included in this analysis. However, the demographic and employment characteristics of the MTs that participated in this study were nearly identical to those reported in the annual survey conducted by the AMTA, which includes MTs from nearly all US states. Second, the survey does not include persons who have stopped working as MTs as a result of developing work-related musculoskeletal conditions. Different sampling designs are needed to better understand the association of musculoskeletal conditions and attrition, as well as identify effective mitigation strategies to prevent attrition in the workforce. Third, the CE courses may have ''primed'' the respondents to over-report implementation of selfcare practices at work on the follow-up survey. However, there was a high level of agreement in the responses between what was planned to be implemented at the time of the initial CE course and what was actually implemented 3 to 6 months later. Fourth, the small sample size in the follow-up survey limited the depth of the analysis and affected the precision of the parameter estimates. Larger follow-up studies are needed to validate these initial findings and to allow for more detailed exploration of the association between working conditions and adoption of safety practices to reduce musculoskeletal injuries among massage therapists.

## CONCLUSIONS

Massage therapy involves pervasive ergonomic hazards, and prior research has demonstrated that the majority of MTs in a given year experience musculoskeletal health issues.[6,7] It is important that employers, MTs, massage schools, and trade associations actively engage with each other to develop effective policies to reduce the high prevalence of adverse musculoskeletal conditions. Specifically, industry standards addressing duration and frequency of massage

 

sessions could help improve implementation of injury prevention practices between sessions. Similar to organizational, industrywide, and legislative policies developed in other healthcare professions, these policies can directly address the high prevalence of musculoskeletal health conditions among MTs and may subsequently reduce attrition and turnover.[60–64] Time was the consistent barrier associated with not implementing self-care practices, but when identified as a facilitator, it was also a strong predictor of implementing more self-care practices. However, as long as the financial pressures experienced by MTs to work longer hours persist, along with attitudes that deemphasize safety in the workplace, addressing time-related factors alone will likely have limited efficacy in reducing musculoskeletal conditions among MTs.

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