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# Research utilization and evidence-based practice among Saskatchewan massage therapists

**Abstract:** While massage therapy (MT) is an increasingly used health care service with a growing evidence base, there is insufficient information about the extent to which MT practice is evidence-based. The purpose of this study was to provide a comprehensive view of Saskatchewan MT's research utilization to inform the development of evidence-based massage therapy practice. The main objectives of the study were to describe MT's perceptions of research, their appraised self-efficacy in research literacy and to identify the characteristic of practitioners who use research. Using a survey design all 815 registered members of the Massage Therapist Association of Saskatchewan were invited to complete a mail-out questionnaire. A total of 333 questionnaires were completed and returned for a 41% response rate. Univariate and logistic regression analysis was conducted using SPSS 17.0. While overall perceptions of research were positive, self-efficacy in research literacy was low and research utilization was limited. Characteristics associated with research use included referring to online research databases and peer-reviewed journals, belief that practice should be based on research, and 20 or greater hours per week of practice. Provincial regulatory status may be the first step to quality service delivery and research literacy training and support is needed for practitioners.

**Keywords:** massage therapy, research utilization, evidence-based practice, complementary medicine

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## Introduction

Massage therapy (MT), the most common Complementary & Alternative Medicine (CAM) modality used in Canada [1], is an ancient practice currently experiencing rapid growth and maturation as a health care profession [2]. Increasing proportions of the population are seeking MT care for a wide spectrum of issues from general wellness and health promotion to treatment of specific conditions and disabilities [3, 4]. A search of research databases such as Medline reveals a dramatic increase in the volume of published peer-reviewed MT research in the last two decades and a mounting evidence base regarding the safety and effectiveness of MT. Compared to other health care professions, the culture of evidence-based MT is a relatively new innovation in MT. As MT is an emerging component of health care services accessed by an increasing proportion of the population, there is a need to establish the extent to which MT practice is based on sound evidence including research.

In evidence-based practice (EBP), evidence to support care decisions comes from the clinical expertise of the provider, information from research, and the preferences of individual patients when provided with options [5]. EBP has been adopted by a broad spectrum of health and social care disciplines as the best model to maximize the potential for positive health outcomes [6]. Research can be used not only instrumentally or directly as in the application of research findings, but also conceptually or indirectly in informing the way one thinks about or understands an issue related to practice, and symbolically to persuade or influence policy [7]. However, common barriers to research use and EBP include negative attitudes toward research, lack of time to find and read research, lack of confidence in appraisal and understanding research, lack of peer and organizational support, lack of access, lack of awareness of research reports, and lack of evidence [8–12].

A survey of massage therapists and chiropractors in Alberta, Canada revealed that overall perceptions of the

role of research were positive but confidence in research-related skills and self-reported application of research was limited [13]. Suter et al. examined the influence of personal and practice characteristics and found that endorsement of the belief that research adds credibility to one's discipline and frequent referral to peer-reviewed journals predicted the application of research in practice for both professional groups.

MT educational and training preparation, degree of regulation of practice, and inclusion within the extended health care system differs greatly within and between Canadian provinces and therefore research that allows for interprovincial comparison is important. Further, answering questions about research use would allow the informed development of educational interventions and organizational support strategies to facilitate the use of research in MT practice and education.

In response to this need, a mixed-methods study was conducted among Saskatchewan massage therapists with quantitative data collection utilizing a survey followed by semi-structured interviews in a small sample of selected participants. This paper reports on the main findings of the survey phase. The purpose of the study was to provide a comprehensive view of MT's research utilization in order to inform the development of evidence-based MT practice. Thus this study had two main objectives: (1) to describe MT's perceptions of research and their appraised self-efficacy in research literacy and (2) to identify the characteristic of practitioners who use research.

## Materials and methods

### Overview of study design and population

A cross-sectional survey of the demographic, professional, and practice characteristics of members of the Massage Therapist Association of Saskatchewan (MTAS) was conducted. A self-administered questionnaire was mailed by MTAS office staff to all 815 registered members following ethics approval by the University of Saskatchewan Behavioral Research Ethics Board. Dillman's methods of multiple contacts [14] were used in an attempt to improve response rate with one pre-study notice sent in advance of the initial survey package, followed by a reminder message and lastly a replacement survey sent to all non-responders. Each survey mailing was accompanied with a self-addressed, stamped envelope. The first questionnaire was mailed in September, 2009 and replacement surveys were mailed approximately six weeks later.

Comparison data was available from the MTAS for age and year of graduation only. Most of the survey respondents (62%) had graduated within the 10 years prior to the survey with half (31%) within the last 5 years, slightly lower than the proportions tabulated from the membership data available from the MTAS (68% and 34%, respectively). Most of the survey respondents (68%) were 40 years of age or under, a proportion slightly lower than the MTAS data (72%).

### Study definitions and main outcome of interest

Our main outcome of interest was a measure of overall research utilization (overall RU). We asked participants to self-report how often in the past year they utilized any kind of research finding (MT or non-MT), in any kind of way, in some aspect of their work as a Registered Massage Therapist. This definition is an adaptation of the definition used in a tool developed to investigate research utilization in other professional health care disciplines [15].

The following definition of research was provided to survey participants to help ensure common understanding of what constitutes "research:"

Knowledge generated through the scientific or systematic process of inquiry by a trained student researcher, practitioner-researcher, or academic researcher. To count as research, scholarly work would be peer-reviewed (scrutinized and screened for quality by other experts) and published in a journal or book, or online in a collection like the Cochrane Library, or presented at a research conference or symposium. Some examples of research would include clinical case reports, case studies, surveys, case-control and cohort studies, clinical trials, randomized controlled trials, systematic reviews and meta-analyses.

### Survey instrument

The questionnaire content was developed using items from two existing instruments [13, 15]. The draft survey was reviewed by an expert panel of seven researchers, educators, and clinicians representing multiple health disciplines, and the content was revised in light of their comments. The survey was then pilot tested by 28 out-of-province MTs and final revisions were made to content and layout. The final questionnaire consisted of 21 questions with four-point Likert scales or check boxes and a brief demographic section.

The questionnaire comprised sections pertaining to perceptions of research, use of research, self-appraised

knowledge, and skill related to research literacy and capacity, research education, and research experience. Checkboxes were provided for demographic and practice variables. The other main sections of the survey comprised statements: 10 on perceptions of research, 15 on use of research and research-based resources, and 11 on self-appraisal of skills and knowledge. For most items pertaining to perceptions and use, respondents were asked to indicate their agreement with each statement on a four-point Likert-type scale with response options of “strongly agree,” “disagree,” “agree,” “strongly agree,” and a checkbox for “don’t know.” For other items, respondents were asked to select a response from options of “never,” “rarely,” “sometimes,” or “always;” or in some items “never have,” “within the last year,” “within the last month,” or “within the last week” as the best description of their practice in relation to statements of use of research and resources. For the items regarding skills and knowledge, respondents were asked to select from the following response options: “know nothing, and have no practical experience,” “know some theory, but have no practical experience,” “know some theory and have practical experience, but have not mastered,” “know quite a bit, would not need assistance” as the best description of their knowledge and skill level.

## Statistical analysis

Data were analyzed using PASW Statistics GradPack 17.0 for Windows. Descriptive statistics were computed (means and standard deviations where possible) and data were summarized as counts and percentages occurring in the various response categories to report the participants demographic and practice characteristics, perceptions of research, self-appraised research literacy skills, and use of research and research resources. Further descriptive analysis (chi-square) was used to explore the relationship between these variables and overall research utilization. Prior to examining univariate associations among variables, categories were combined to produce binary variables for use in cross-tabulations. Responses to questions regarding perceptions were combined to create two variables: “overall agree” and “overall disagree.” Responses to questions about use of research-based resources were combined as “have never referred to” and “have referred to.” Responses to questions related to skills and knowledge were combined to form the categories “know nothing, and have no practical experience/know some theory, but have no practical experience” and “know some theory and have practical

experience, but have not mastered/know quite a bit, would not need assistance.” Age responses were combined as “40 and under” or “over 40,” year of graduation was combined as “in the last 10 years” and “more than 10 years ago,” number of hours worked per week was combined as “20 hours or less” and “more than 20 hours,” practice orientation as “treatment of musculoskeletal complaints” or “other,” and research experience and research education as “yes” or “no.”

As well as age and sex, variables for which the univariate test of association with the outcome (overall RU) resulted in a p-value <0.25 were considered as candidates for a multivariable model. These included the year of graduation, practice orientation, research experience, research education, use of various evidence-based resources, several literacy skills, number of practice hours per week, and several statements about research perceptions. The assumption of independence was met and multicollinearity diagnostic tests were performed.

Logistic regression analysis was used to explore what variables, if any, predict RU or non-utilization as reflected by responses to the question, “overall, in the past year, how often have you used research in some aspect of your Massage Therapy practice:” “never/rarely” or “sometimes/always.” The Enter method of model building [16] in which all of the predictor variables are placed into the regression model in one block and parameter estimates calculated for each block was used to estimate odds ratios of “sometimes/always” utilizing research.

## Results

### Characteristics of the study participants

A total of 333 questionnaires were completed and returned, for a response rate of 40.9%. Table 1 represents respondents’ demographic characteristics. Most of the respondents (68%) were 40 years of age or under and 87% were women. The number of years in practice ranged from new graduates to 40 years of practice experience with a mean of 8.5 years (SD=6.328). Twenty-two percent had completed a research literacy or methods course and most (79%) had never participated in a Massage Therapy research project.

Table 2 represents the reported practice characteristics of the respondents. The majority (58%) practice more than 20 hours per week with 52% reporting being a “sole practitioner” and 85% describing their practice as the treatment of musculoskeletal complaints.

**Table 1** Respondent characteristics.

Characteristic	n	% <sup>a</sup>
Age (y), n=332		
<30	119	36
31–40	105	32
41–50	53	16
51–60	46	14
>60	9	3
Sex, n=333		
Male	45	14
Female	288	87
Years of experience, n=333		
<5	106	32
5–10	118	35
11–20	92	28
>20	17	5
Highest education, n=333		
Diploma	297	89
Bachelor's Degree	25	8
Master's Degree	0	0
Doctorate Degree	1	0.3
Other <sup>b</sup>	10	1

Notes: <sup>a</sup>Percentage values are rounded up to the next decimal point;

<sup>b</sup>Respondents reported certificates or some University classes.

**Table 2** Practice characteristics.

Characteristic	n	% <sup>a</sup>
Hours of work per week, n=327		
<10	51	16
11–20	88	27
21–30	79	24
31–40	91	28
>40	18	6
Practice setting, n=330		
Sole practitioner	173	52
MT clinic	60	18
Chiropractic clinic	33	10
Physiotherapy clinic	4	1
Multidisciplinary clinic	18	6
Spa	11	3
Other <sup>b</sup>	27	8
Not currently practicing	4	1
Practice orientation, n=330		
Relaxation therapy	5	2
Treatment of musculoskeletal complaints	280	85
Other <sup>c</sup>	45	14

Notes: <sup>a</sup>Percentage values are rounded up to the next decimal;

<sup>b</sup>Respondents reported working in fitness centres, esthetics salons, medical clinics, or working in more than one location; <sup>c</sup>Respondents reported both relaxation and treatment of musculoskeletal complaints or a specialized focus on pregnancy massage, sports massage, lymphatic drainage, or craniosacral therapy.

## Research attitudes, perceptions, and beliefs

Table 3 provides the distribution of responses regarding beliefs about the role of research in MT practice. The great majority agreed or strongly agreed that research adds credibility to their discipline (97%), leads to improved client/patient care (94%), and helps evaluate existing treatments in their discipline (93%). Up to 10% of practitioners in the sample were not clear about their beliefs regarding research as indicated by a response of “don’t know” when asked what best represents their belief. The majority (58%) agreed or strongly agreed that MT practice should be based on research with 87% agreeing or strongly agreeing that MT practice should be informed by research.

### Willingness to change current beliefs or practices in accordance with research

Figure 1 represents the percentage distribution of participants’ willingness to suspend belief in prior knowledge if contradicted by new research evidence. Few respondents were never or rarely willing to change beliefs or practice when research contradicts information obtained prior to or in massage school or from practice experience.

## Self-reported research skills

### Research literacy skills

Thirty-four percent of the respondents reported having experience in conducting a literature search. Less than 15% acknowledge some experience and confidence with critically appraising quantitative research such as randomized controlled trials. Twenty-seven percent reported some experience and confidence with critically appraising qualitative research such as clinical case reports. Table 4 shows the results with respect to research literacy skills.

## Research use

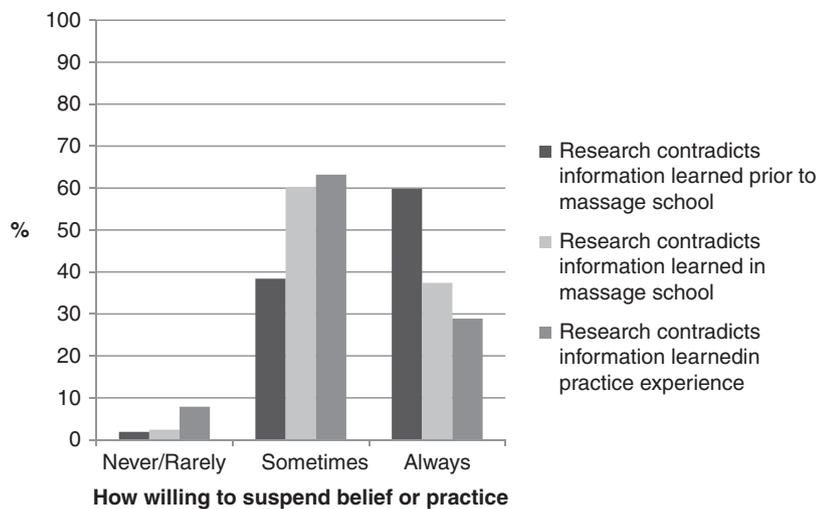
### Types of research use

More than half (64%) of the respondents report overall utilization of research in their practice (in some aspect of their work in the last year). Most (68%) reported direct or

**Table 3** Participants’ attitudes, perceptions, and beliefs about research and EBP.

Perception statements <sup>a</sup>	Strongly disagree n (%)	Disagree n (%)	Agree n (%)	Strongly agree n (%)	Don’t know n (%)
Research adds credibility to my discipline	3 (0.9)	1 (0.3)	115 (34)	207 (63)	5 (2)
Research leads to improved client/patient care in my discipline	4 (1)	9 (3)	147 (45)	163 (49)	7 (2)
Research helps evaluate existing treatments in my discipline	2 (0.6)	12 (4)	214 (65)	93 (28)	10 (3)
MT practice should be informed by research	1 (0.3)	16 (5)	196 (59)	94 (28)	24 (7)
Education in finding, critically evaluating and applying research should be a mandatory component of training	6 (2)	78 (24)	162 (49)	57 (17)	29 (9)
MT practice should be based on research	18 (6)	92 (28)	149 (45)	41 (13)	29 (9)
Education in conducting research should be a mandatory component of training in my discipline	13 (4)	120 (36)	135 (41)	33 (10)	32 (10)

Notes: <sup>a</sup>Respondents were asked what best represents their belief.



**Figure 1** Percentage distribution of answers to the question: “How willing are you to change your beliefs or practices when information from research contradicts something you a) learned prior to massage school, b) learned in massage school, c) learned in your practice experience”.

**Table 4** Survey participants appraised self-efficacy in research literacy.

Research literacy skills	Know nothing and have no practical experience n (%)	Know some theory but have no practical experience n (%)	Know some theory and have practical experience but have not mastered n (%)	Know quite a bit, would not need assistance n (%)
Using the library to find research information	37 (11)	91 (28)	156 (48)	44 (13)
Conducting a literature search	116 (36)	101 (31)	80 (25)	28 (9)
Reading and critically appraising quantitative research (such as randomized controlled trials)	177 (54)	100 (31)	44 (13)	7 (2)
Analyzing/interpreting data (example statistics)	133 (40)	117 (36)	67 (20)	12 (4)
Reading and appraising qualitative research (such as clinical case reports)	116 (36)	123 (38)	75 (23)	14 (4)
Identifying bias in research	193 (59)	99 (30)	32 (10)	5 (2)

instrumental research utilization of research by applying research findings to their practice, at least sometimes, or by seeking research findings for specific client problems (54%). Approximately one-half reported sometimes utilizing research indirectly or conceptually by discussing research findings with clients (53%) or with colleagues (49%). Only 32% reported sometimes or always using research persuasively (in an attempt to change conditions or policies relevant to the practice of MT). Table 5 represents the results of self-reports of kinds of research utilization.

**Table 5** Self-reported kinds of research utilization.

Kinds of research utilization	Never/ rarely %	Sometimes %	Always %
Overall			
Utilized research in some aspect of MT work in the past year	36	53	11
Direct			
Applies research findings in practice	21	68	11
Seeks research findings for client problems	31	54	15
Indirect			
Discusses research with clients	31	53	16
Discusses research with colleagues	38	49	10
Persuasive			
Uses research to attempt to change policy	63	28	5

research, working more than 20 hours per week, and reference to peer-reviewed journals were statistically significantly associated with overall research utilization while controlling for other variables in the logistic regression model.

The odds of utilizing research were 5.2 times greater for those who reported referring to PubMed/Medline/other online databases as compared to those who reported never having done so. The odds of utilizing research were 3.9 times greater for those who endorsed the belief that MT practice should be based on research as compared to those who disagreed. Compared to those who worked less hours per week, the odds of utilizing research were 2.9 times greater for respondents who reported working more than 20 hours per week. The odds of utilizing research were 2.8 times greater for those who reported having referred to peer-reviewed journals as compared to those who reported that they never do.

Completion of a research literacy or methods course, graduating within the last 10 years, and being willing to suspend belief in information learned in practice experience when contradicted by research were not statistically significant but enhanced the model fit (Table 6). Sex, age, practice orientation, research experience, willingness to suspend belief in information obtained in massage school, knowledge and experience in conducting a literature search, knowledge and experience in appraising quantitative research, knowledge and experience in appraising qualitative research, and reference to Association publications were also not statistically significantly associated with research utilization.

## Factors influencing research utilization

The sample for the logistic regression analysis consisted of 253 cases. Table 6 shows that reference to online research databases, the belief that MT practice should be based on

## Discussion

This study provides an in-depth examination of Saskatchewan massage therapists' perceptions of research, their self-appraised confidence in research

**Table 6** Factors associated with overall research utilization.

	B	S.E.	Wald	df	Sig.	Exp (B)	95% C.I. for EXP (B)	
							Lower	Upper
MT practice should be based on research	1.366	0.326	17.591	1	0.000	3.918	2.070	7.417
Reference to peer-reviewed journals	1.034	0.312	10.959	1	0.001	2.813	1.525	5.190
Reference to PubMed/Medline/other online research databases	1.657	0.417	15.786	1	0.000	5.242	2.315	11.868
Number of practice hours per week	1.075	0.321	11.243	1	0.001	2.931	1.563	5.496
Completed research literacy or methods course	0.725	0.402	3.253	1	0.071	2.065	0.939	4.541
Year Received diploma	0.572	0.314	3.312	1	0.069	1.772	0.957	3.280
Willingness to suspend belief in information from practice experience	-0.654	0.351	3.480	1	0.062	1.924	0.967	3.826
Constant	-2.443	0.479	25.984	1	0.000	0.087		

literacy, their current utilization of research in their work and the personal and practice characteristics that appear to influence their use of research. The study findings allow for comparison between provinces and with other health care providers development of EBP. The study findings provide valuable information to direct improvements in education and organizational support to encourage the utilization of research evidence.

## Attitudes and beliefs

The results of the survey suggest that massage therapists in Saskatchewan have a strongly positive regard for research consistent with the attitudes found among diverse conventional, allied, and CAM groups [9–13, 17–20], including members of the Massage Therapist Association of Alberta and British Columbia Registered Massage Therapists [13, 21]. The survey findings are in contrast with the less consistent or more negatively oriented attitudes toward research found in qualitative studies, including Ontario homeopaths and Reiki practitioners [19] and Alberta therapeutic massage and bodywork (TMB) practitioners [22]. Some authors have suggested CAM groups with greater organization and institutionalization value research more [19]. MT as a discipline is not a government regulated health care profession in Saskatchewan in contrast to Ontario, British Columbia, Newfoundland, and Labrador. However, MTAS membership eligibility requirements include the successful completion of written and practical qualifying examinations and a diploma from a school of MT with no less than a 2,200 hour curriculum. Perhaps, the positive perceptions of research found among participants in the present survey reflect an enculturation of the value of research consistent with uniformity and institutionalized preparation for practice among Saskatchewan MTs who are members of the MTAS.

## Self-efficacy in research literacy

Our finding that participants lacked confidence, as indicated by reported self-efficacy, in their skills and abilities to find and critically evaluate research is consistent with the low levels of confidence among MTs in Alberta [13]. This lack of adequate research literacy among Canadian CAM practitioners, including MTs has been previously noted in the literature [23–25]. Early studies in other health care professions similarly demonstrated low levels of confidence in finding and

critically appraising research [17, 26]. However, more recent studies show higher confidence amongst practitioners in both allied and some CAM groups [11, 12]. The low levels of confidence likely reflect insufficient training in EBP skills both at the pre-service and post-graduation levels of education in MT. In the Canadian provinces where MT regulation has been legislated, several forces may act to positively influence MT research education. For example, in British Columbia funding for research infrastructure far exceeds that of the unregulated province of Saskatchewan. In regulated provinces, MT schools must achieve accreditation unlike Saskatchewan schools of MT. Together, MT regulators have created and continue to develop inter-jurisdictional competencies that specifically require an evidence-based approach to treatment planning.

## Research use

Limited research utilization in current MT practice was noted in this study as was the case among Alberta therapists [13]. Unique to our study was the finding that when research was utilized by MTAS members, it was largely in the form of direct or instrumental utilization such as applying research findings to practice or seeking solutions to client problems and indirect or conceptual research utilization such as discussing research with clients and peers. There was little evidence of persuasive or symbolic research utilization such as the use of research to change conditions, policies, or practices relevant to the MT field. The finding of relatively low levels of research use in practice is consistent with early studies in conventional and allied fields. In 1998, McColl et al. reported that the median self-rated estimate of the percentage of GP respondents' practice that was evidence-based was 50%. Oliveri et al. [27] found that 20% of the hospital doctors in their study reported "always" practicing EBM. Studies of EBP in PTs have demonstrated that greater than 80% of survey participants agreed that they need to increase their use of evidence in daily practice [9, 17].

## Influence of personal and practice characteristics on research utilization

In this study, we found that the odds of utilizing research were five times greater for those who used online research databases as compared to those who did not and twice as

great among those who referred to peer-reviewed journals compared to those who did not. The influence of peer-reviewed journal use was also shown among Alberta MTs and chiropractors [13]. These findings suggest that research utilization depends, at least in part, on the activity of seeking out and reading empirically derived information.

As have others [13, 28], we found that perception about research significantly influenced research utilization. Specifically, the odds of utilizing research were three times greater among those who endorsed the view that MT practice should be based on research as compared to those who did not hold this belief. Similar to our findings Salbach et al. found that the odds of PTs endorsing the value of EBP in improving client care was greater among those who practiced more than 20 hours per week than those engaged in more part-time care. Perhaps, these results are a reflection of increased contact with client problems driving the search for and use of new information to help them.

Our finding that having completed a research methods course was not associated with RU is consistent with the results among Alberta MTs and chiropractors [13]. In addition, inconclusive findings have been shown in a review of the influence of educational meetings (small interactive group sessions) with a focus on research design and literature appraisal training in post-graduate education for nurses [29]. Coomarasamy and Khan [30] conclude from their review of post-graduate learning interventions in medicine that while both stand-alone courses (such as teaching critical appraisal skills) and clinically integrated learning opportunities (such as rounds, journal clubs, and case discussions) improve knowledge, the clinically integrated methods may be superior in improving skills and behaviors.

Consistent with a review from nursing [28] and the study of Alberta MTs and chiropractors, age was not found to be an important factor in research use in this study. In contrast, McEnvoy et al. found that older CAM practitioners scored higher on an EBP profile and younger physiotherapists reported greater self-efficacy in Salbach et al.'s study. Sex of practitioner was not associated with research use in our study, a finding consistent with that among nurses [28], but in contrast to greater reported self-efficacy among male physiotherapists [9].

Practice orientation was not found to be important in research utilization among MTs in this study. Specifically, there was no statistically significant association with overall research utilization when comparing respondents who reported a focus of treatment of musculoskeletal complaints to those who reported focusing on, for example, relaxation or a specialization such as sports massage. In contrast, role characteristics such as specialization and

leadership have been determined to be associated with RU in nursing [28]. The diversity of responses recorded in this study of MTs suggest that role differentiation and practice orientation are not as clearly delineated as in conventional types of care and thus may form a more loosely defined variable for study.

Consistent with the results of other studies involving MTs, nurses, and PTs [13, 18, 28] number of years of practice experience was not a significant predictor of use of research. Among Saskatchewan MTs little difference was shown regarding research use between those entering practice within the last 10 years as compared to those who have been working in the field for more than 10 years. The degree of focus on research in education and training curricula is considered important for EBP [12, 13, 31], and the association between years of practice experience and exposure to EBP skills training has been demonstrated [9]. For example, Salbach et al. found that the odds of reporting having learned about EBP foundations in the PT program were over 30 times greater for newer graduates (less than 5 years practice experience) as compared to those with greater than 15 years of practice experience. Newer graduates were 99% more likely to report having critical appraisal skills training and were significantly more confident in EBP skills.

In this study we assessed whether or not level of educational attainment (diploma only compared to diploma plus other education) influenced research utilization and found no significant association. This contrasts with the demonstrated association between level of educational attainment and EBP among naturopaths, traditional Chinese medicine practitioners, acupuncturists, homeopaths, and Western herbalists [12]. Contrasting findings are also seen in a study of Canadian rehabilitation professionals that revealed speech-language pathologists having the highest ratings of research use and the highest level of education as compared to the OTs and PTs in the study [32]. Level of education as a determinant of RU in nurses has been demonstrated but only between those who hold a Master's degree or above and those with a Bachelor's degree; not between those who hold a Bachelor's degree in nursing and those with a diploma in nursing [28]. In the study by Suter et al., chiropractors were three times more likely to report applying research in practice than MTs and difference in education and training program length and content has been suggested as a potential explanation. It has been suggested that higher levels of education typically include critical thinking provided within an EBP learning context and that this may be conducive to higher levels of research utilization and EBP [12]. Currently in Saskatchewan, and the rest of

North America, the highest possible level of educational preparation for MT practice is diploma qualification. In contrast, the Southern Institute of Technology in New Zealand offers a Bachelor of Therapeutic and Sports Massage degree program. Fewer than 10% of our study sample reported having a University degree in any field in addition to their MT diploma.

## Limitations

The low response rate (41%) obtained in the survey of members of the MTAS is a limitation of the study as it introduces the possibility of a response bias whereby those with more favorable views of research may have been more likely to respond. Additionally, the limitation of self-report in assessing attitudes, knowledge, skills, and behaviors must be acknowledged. However, it can be argued that both a response and social desirability response would support rather than refute the findings that confidence in research skills and the use of evidence in practice was overall low [13]. The lack of comparison data from the MTAS threatens the external validity of our findings. Further, differences in regulatory status, pre-service education and training program length and content make it unclear whether these results would generalize to MTs in other provinces, internationally, or even within Saskatchewan where MTs can choose not to belong to the MTAS.

## Conclusion

MT in Saskatchewan sits at the cusp of change and progress in its development of evidence-based MT practice. As attitudes toward research are positive but confidence in skills to use research is low, what is needed is improved research literacy education and support. Instruction on how to access and search online research databases and how to find and understand peer-reviewed journal articles should be part of curriculum in MT schools and professional continuing education for practicing MTs. Further, regulation of MT in Saskatchewan would ensure accordance with the national standards in education and practice held in regulated provinces. Future research should investigate the specific self-reported barriers to research utilization among massage therapists. Educator's and organizational leader's perceptions of the value of research, their self-efficacy in research literacy, and their research utilization should be studied. With evidence-based MT practice as a professional goal, more research is needed to explore the impact on client outcomes. Successful implementation of these initiatives to grow evidence-based MT practice will support continuing improvement in quality MT care in Saskatchewan for the growing number of people who use it for their health care needs.

Received July 22, 2012; accepted June 7, 2013

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