



COVID-19 Infectious Disease Prevention and Mitigation Practices by Chiropractic Physicians and Licensed Massage Therapists in Mississippi: A Needs Assessment to Inform Health Education and Promotion

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ABSTRACT

Objective: The purpose of this study was to assess self-reported infection prevention processes and their effect on businesses of chiropractic doctors (DCs) and licensed massage therapists (LMTs) in Mississippi during the COVID-19 pandemic.

Methods: We developed a survey that was electronically delivered to all licensed DCs and LMTs in Mississippi between August and September 2020. Assessments were made using Qualtrics software, with data management and subsequent analysis including Pearson's χ^2 test.

Results: Responses were based on 32 of 323 DCs and 69 of 934 LMTs that were still seeing patients through the pandemic ($n = 101$, response rate 8%). The DC and LMT practitioners (94%) used treatment table and/or surface sanitizing (91.8%) and hand washing and/or sanitizing (89.8%) between all patients. Female practitioners reported practicing handwashing for at least 20 seconds, whereas male practitioners reported practicing handwashing for at least 15 seconds ($P < .001$). DCs were more likely to report using gloves for personal protective equipment, and LMTs were more likely to report using face masks ($P < .001$). Other COVID-19 procedures included limiting practice to acute care (82.5%), checking all patient temperatures (62.9%), sign-in and wait in the car (53.2% LMT vs 6.5% DC, $P < .001$), and prohibiting all nonpatient visitors (87.7% LMTs vs 9.4% DCs, $P < .001$). DCs (96.9%) and LMTs (89.9%) reported making referrals for COVID-19 testing or treatment when indicated. LMTs (82.3%) reported seeing fewer patients ($P = .03$), and older practitioners reported the most economic impact ($P = .003$) by the pandemic. Patient concerns and LMTs needing more time to perform infection control ($P = .04$) were reasons cited by practitioners for the reduced number of visits seen.

Conclusion: Most respondents had moderate to high compliance with guidelines on recommended infection prevention processes during fall 2020 of the COVID-19 pandemic. This assessment of compliance may be used to help guide future health education and promotion research of disease prevention and mitigation as well as physical and economic burdens faced by DCs and LMTs in Mississippi during a pandemic. (*J Chiropr Med* 2022;21:233-240)

Key Indexing Terms: *Infection Control; Coronavirus Infections; Chiropractic; Massage Therapy*

INTRODUCTION

In 2021, Mississippi was the most multiply-comorbid state in the United States (US) and consistently ranked at or near the bottom of Centers for Disease Control and Prevention (CDC) health report rankings.¹ As of the week ending January 9, 2021, the total number of COVID-19 deaths reached 835 150 of 333.94 million across the US (2.5 in 1000 Americans),² whereas by January 12, 2021, fatalities included 10 527 of 2.96 million from Mississippi (3.5 in 1000).³ High blood pressure, ischemic heart disease, cardiac arrest, cerebrovascular disease, diabetes, obesity, and other comorbidities are listed by the CDC as “conditions contributing to deaths where COVID-19 was

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listed on the death certificate.”² Some reports estimate 38% of Mississippi residents have at least 1 of these comorbidities.³ For example, with Mississippi being in the stroke belt in the US, after 9 months, the pandemic had already accounted for more than 3 times as many deaths than are attributed to stroke in any recent year.^{1,3}

By March 2020, chiropractic doctors (DCs) but not licensed massage therapists (LMTs) were listed as “essential health providers” by the US Department of Homeland Security,⁴ and this guidance was subsequently adopted by the State of Mississippi when an executive order by the governor locked down many businesses. Guidelines e-mailed to LMTs by the Mississippi Board of Massage Therapy were more restrictive than guidelines e-mailed by the Mississippi Board of Chiropractic Examiners to licensed DCs,^{5,6} with the former group required to wear gowns and other personal protective equipment that were not available owing to limited supply. Hence, it is likely that many LMTs in Mississippi stopped practicing for longer periods than did chiropractic physicians. Both of these manual therapy groups historically advocate health and wellness and support nearly all our nation’s public health goals espoused by the CDC’s Healthy People.⁷ Prior chiropractic research on table sanitization procedures and education was endorsed by the American Chiropractic Association.^{8,9} However, public health measures, such as immunization and antimicrobial therapy, are less uniformly supported by some manual therapists, prompting a call for support from the chiropractic scientific community.¹⁰ The level of support manual therapists have for guidelines regarding prevention of infectious disease beyond hand and table sanitization, such as masking and social distancing, has not been previously reported for the state of Mississippi. A report of utilization in Australian practices¹¹ and a qualitative descriptive assessment of 18 chiropractors across the world generally suggested compliance with guidelines by practitioners.¹²

In light of Mississippians’ increased relative risk for COVID-19 mortality, increased exposure as a result of more time spent in the offices of manual therapy practitioners during routine treatments, and lack of prior research regarding infectious disease prevention strategies used by these practitioners, we decided to perform a needs assessment of chiropractic and massage therapy practitioners during COVID-19. Therefore, the purpose of this survey was to assess reported infection control measures utilized and business impacts of COVID-19 on DCs and LMTs in Mississippi. A secondary aim was to identify reported compliance with guidelines published by the Mississippi State Department of Health and Mississippi state licensing boards.^{5,6,13}

METHODS

Ethics

This study was deemed exempt from review by the institutional review board of Mississippi State University (IRB-20-207). Respondents consented to participating in this study.

Survey

We developed a survey to explore changes in provider behaviors and business practices (eg, reduced hours, fewer appointments to foster social distancing), as well as infectious disease mitigation practices (temperature checks, hand and/or table sanitization, masking) in response to the COVID-19 pandemic. Face validity was established by forwarding an initial instrument prepared by 1 of us to 2 chiropractic clinicians in private practice, 1 LMT, and 1 coauthor and research scientist. The survey contained no questions that would have placed the respondent in a position to reveal personally identifiable information. Respondents were informed that participation was voluntary and the survey would take no longer than 10 to 15 minutes. There was no requirement to finish the survey once it started (see [Supplementary Data](#) for the survey).

We aimed to electronically deliver the survey to all licensed DCs and LMTs in Mississippi. Subsequently, e-mail and postal addresses were obtained from the Mississippi State Board of Chiropractic Examiners and the Mississippi State Board of Massage Therapy for all currently licensed practitioners, regardless of their current domicile. Of 380 e-mails to DCs, only 323 currently listed a Mississippi address, with the remainder practicing in other states. It is not known how many of the 323 were practicing prior to the pandemic as opposed to holding a license but not having an active practice. Similarly, of a list of 997 e-mails sent to massage therapists holding a license to practice in Mississippi, 63 lived outside the state, leaving 934 with a Mississippi address, although it is not known how many were maintaining their license but not actually practicing prior to the start of the pandemic. E-mails were sent on August 13, August 27, and September 10, 2020, to all respondents, with subsequent initial assessments made using Qualtrics software (Qualtrics XM, Provo, Utah).

Statistical Analysis

The responses were imported into Statistical Analysis Software (SAS Institute Inc, Cary, North Carolina) for data management and analysis. All survey responses were captured as nominal categorical variables except age, which was recoded as binary categorical (≤ 40 vs > 40). The Pearson’s χ^2 test (or Fisher exact test, for small expected cell

count) was used to assess the distribution of survey responses between DCs and LMTs as well as between sex and age groups, with statistical significance assessed at the 5% level of significance. For the purpose of subsequent reportage below, we rated compliance with CDC guidelines as low (<50% reporting compliance), moderate (50%-74% reporting compliance), or high (75% or more reporting compliance).

RESULTS

There were 101 respondents out of 1257 surveys (8% response rate) for data analysis (Table 1). Of those, 32 were DCs, and 69 were LMTs. A total of 146 initially responded; however, 45 respondents were eliminated from further data reduction since they no longer practiced through the early phase of the pandemic. Most respondents were women (75.8%) under the age of 40 (68.4%) who reported having both an academic and professional degree (72.2%). More than half the DCs and nearly one-third of the LMTs responding to the survey were members of their Mississippi state professional association, and a few more were members of more than 1 professional organization.

Of the 101 practitioners still practicing through the early phase of the pandemic, almost all (94%) reported following guidelines using various forms of personal protective equipment: gloves (25.8%), face mask (59.8%), hand washing and/or sanitizing (89.8%), treatment table and/or surface sanitizing (91.8%), or all of the above (8.3%) (Table 2). DCs were more likely to wear gloves, while LMTs were more likely to wear face masks ($P < .001$).

More LMTs than DCs reported washing or sanitizing their hands between each patient (98.5 MT vs 71.9 DC, $P < .001$), and 80.7% of DC and 95.4% of LMT respondents reported handwashing at least 20 seconds as recommended by CDC guidelines ($P = .02$), women significantly more so than men ($P < .001$). Both professions appeared to heed regulatory guidance for the most part limiting practices to acute care, with less than 20% of practice involving patients without pain being seen reported by 87.5% of DCs and 79.7% of LMTs. Additional COVID-19–related procedures used in practice included sanitizing chairs and/or other surfaces (84.5% of respondents reported cleaning surfaces in addition to treatment tables between all patients) and checking all patient temperatures (62.9%). Procedures used significantly more by LMTs included sign-in and wait in the car (53.2% LMT vs 6.5% DC, $P < .001$) and prohibiting all visitors (87.7% LMTs vs 9.4% DCs, $P < .001$). Both DCs (96.9%) and LMTs (89.9%) stated they made referrals for COVID-19 testing or treatment when indicated. Although both professions had a high degree of compliance with sanitizing of treatment tables all of the time, the rate was higher for LMTs than for DCs (96.9% vs 81.3%, $P < .001$).

Among respondents, 31 DCs and 69 LMTs continued seeing patients through the pandemic (Table 3). The majority of both practitioner groups reported large reductions in patient numbers, but the drop was significantly greater for LMTs (83.1% LMTs vs 62.5% DCs, $P = .03$) and included 1 in 10 no longer seeing patients because of the pandemic. DCs reported lower numbers of visits, primarily because they reported that fewer of their patients wanted to be seen

Table 1. Demographic Distribution of Survey Respondents Based on Provider Type

Characteristic	Total ^a 101/1257	DC32 (31.7%)	LMT69 (68.3%)	P Value	
DC education, n (%)	DC only	9 (30.0)	9 (30.0)		
	DC and other degree	21 (70.0)	21 (70.0)		
LMT education, n (%)	MT only	8 (25.8)	8 (25.8)		
	MT and other degree	23 (74.2)	23 (74.2)		
Sex, n (%)	Male	24 (24.2)	12 (41.4)	61 (89.7)	<.001
	Female	75 (75.8)	17 (58.6)	7 (10.3)	
Age (y), n (%)	≤40	67 (68.4)	18 (62.1)	47 (70.2)	.23
	>40	31 (31.6)	11 (37.9)	20 (29.8)	
Association, n (%)	MS Chiro	18 (25.0)	18 (85.7)	0 (0.0)	<.001
	MS MT	22 (30.6)	0 (0.0)	22 (44.0)	
	Other	32 (44.4)	3 (14.3)	28 (56.0)	

DC, Doctor of Chiropractic; LMT, licensed massage therapist; MS, Master of Science; MT, massage therapist.

^a There were in total 101 respondents to the survey who were still practicing in the early phase of the COVID-19 pandemic. However, not everyone answered every question. The percentages reported are valid percentages (ie, based on only those who responded to the specific questions).

Table 2. Compliance With COVID-19 Guidelines Among Survey Respondents Based on Provider Type, Sex, and Age Group

Characteristic	Total ^a 101/1257	DC32 (31.7)	MT69 (68.3)	P Value	Male24 (24.2)	Female75 (75.8)	P Value	Age ≤40 y	Age >40 y	P Value	
Using PPE at this time	Yes	94 (94)	29 (90.6)	64 (95.5)	.34	22 (95.7)	67 (93.1)	.66	30 (96.8)	58 (92.1)	.38
	No	6 (6)	3 (9.4)	3 (4.5)		1 (4.3)	5 (6.9)		1 (3.2)	5 (7.9)	
Type of PPE used	Gloves	25 (25.8)	11 (34.4)	14 (21.9)	<.001	7 (30.4)	16 (23.2)	.03	9 (30.0)	13 (21.3)	.644
	Face mask	58 (59.8)	14 (43.8)	44 (68.8)		12 (52.2)	44 (63.8)		16 (53.3)	41 (67.2)	
	Hand washing/sanitizing	6 (6.2)	6 (18.8)	0 (0.0)		4 (17.4)	2 (2.9)		2 (6.7)	3 (4.9)	
	All	8 (8.3)	1 (3.1)	6 (9.4)		0 (0.0)	7 (10.1)		3 (10.0)	4 (6.6)	
How often using PPE	New per patient	53 (55.8)	9 (31.0)	43 (66.2)	.002	8 (38.1)	43 (62.3)	.05	17 (58.6)	33 (54.1)	.69
	Not new for each patient	42 (44.2)	20 (69.0)	22 (33.8)		13 (61.9)	26 (37.7)		12 (41.4)	28 (45.9)	
	Not using any	9 (9.5)									
How often sanitize hands	In between each patient	88 (89.8)	23 (71.9)	64 (98.5)	<.001	20 (87.0)	64 (91.4)	.53	26 (86.7)	58 (93.6)	.27
	No	10 (10.2)	9 (28.1)	1 (1.5)		3 (13.0)	6 (8.6)		4 (13.3)	4 (6.5)	
Percentage of patients with no pain	≤20	80 (82.5)	28 (87.5)	51 (79.7)	.34	17 (73.9)	58 (84.1)	.28	23 (76.7)	51 (83.6)	.42
	>20	17 (17.5)	4 (12.5)	13 (20.3)		6 (26.1)	11 (15.9)		7 (23.3)	10 (16.4)	
Temperature check	All patients	61 (62.9)	20 (64.5)	40 (61.5)	.78	16 (69.6)	41 (58.6)	.35	19 (63.3)	39 (62.9)	.97
	Not all/never	36 (37.1)	11 (35.5)	25 (38.5)		7 (30.43)	29 (41.4)		11 (36.7)	23 (37.1)	
Social distancing	Sign in and wait in car	35 (37.7)	2 (6.5)	33 (53.2)	<.001	3 (13.0)	31 (47.0)	.004	12 (41.4)	21 (35.6)	.60
	Wait inside	58 (63.3)	29 (93.6)	29 (46.8)		20 (87.0)	35 (53.0)		17 (58.6)	38 (64.41)	
Surface sanitizing before/after patients	All the time	82 (84.5)	26 (81.3)	56 (86.2)	.53	18 (78.3)	60 (85.7)	.40	25 (83.3)	53 (85.5)	.79
	Not all the time	15 (15.5)	6 (18.8)	9 (13.9)		5 (21.7)	10 (14.3)		5 (16.7)	9 (14.5)	
Handwashing	At least 20 s	87 (90.7)	25 (80.7)	62 (95.4)	.02	15 (68.2)	68 (97.1)	<.001	28 (93.3)	55 (90.2)	.62
	<20 s	9 (9.4)	5 (19.3)	3 (4.6)		7 (31.8)	2 (2.9)		2 (6.7)	6 (9.8)	

(continued)

Table 2. (Continued)

Characteristic	Total ^a 101/1257	DC32 (31.7)	MT69 (68.3)	P Value	Male24 (24.2)	Female75 (75.8)	P Value	Age ≤40 y	Age >40 y	P Value
Allowing family member with patient										
Never	60 (61.9)	3 (9.4)	57 (87.7)	<.001	6 (26.1)	53 (75.7)	<.001	16 (53.3)	42 (67.7)	.18
At least some time	37 (38.1)	29 (90.6)	8 (12.3)		17 (73.9)	17 (24.3)		14 (46.7)	20 (32.3)	
Refer patients if need to										
Yes	94 (64.1)	31 (96.9)	62 (89.9)	.22	23 (95.8)	67 (89.3)	.34	30 (96.8)	60 (89.6)	.22
No	52 (35.6)	1 (3.1)	7 (10.1)		1 (4.2)	8 (10.7)		1 (3.2)	7 (10.45)	
Sanitize treatment tables										
All the time	89 (91.8)	26 (81.3)	63 (96.9)	<.001	19 (82.6)	66 (94.3)	.08	28 (93.3)	57 (91.9)	.81
Not all the time	8 (8.2)	6 (18.8)	2 (3.1)		4 (17.4)	4 (5.7)		2 (6.7)	5 (8.1)	

DC, Doctor of Chiropractic; MT, Massage Therapist; PPE, personal protective equipment.

^a The percentages reported are valid percentages (ie, based on only those who responded to the specific questions).

due to COVID-19 concerns, while LMTs saw fewer patients to better perform infection control between clients. The reduction in patients and/or clients seen was significantly different between the professions ($P = .04$). The second most cited reason for fewer visits was shared equally by respondents from both professions, which was to reduce their appointment schedule and maintain physical distancing in the office. Both LMTs (70.2%) and DCs (56.3%) reported that COVID-19 had an economic impact on their business, but the pandemic reportedly most affected the income of older practitioners ($P = .003$).

DISCUSSION

This study is, to our knowledge, the first to assess both infection control and mitigation procedures used, as well as business impacts reported by licensed DCs and LMTs in Mississippi during the COVID-19 pandemic. As an initial exploration and health education and promotion needs assessment, it may further our understanding of strengths and limitations of current processes and help guide further research into COVID-19 and disease mitigation practices by these manual therapists.

The majority of respondents included in our survey had moderate to high compliance with CDC recommendations and state guidelines,¹³ although compliance varied by procedure and profession. Hardships included a reduction in numbers of patients seen, especially by LMTs and older therapists, and in limiting numbers of acute care patients seen, by both DCs and LMTs, causing reported economic hardship. Consistent with prompt appropriate public health advocacy and support of CDC guidance by large national chiropractic organizations and boards of licensure for DCs and LMTs in Mississippi,^{5,6,14} there was high compliance with table sanitizing and hand sanitization procedures between all patients and referrals for COVID-19 testing and treatment when indicated. However, confusion regarding use and lack of full public support for such procedures as masking, the effectiveness and availability of personal protective equipment, and distancing may have undermined practitioner confidence in these and some other mitigation protocols where compliance was only moderate.¹⁵⁻¹⁷

Limitations

This study evaluated practitioners in Mississippi and therefore is limited to this region; thus, studies of other regions would be needed to assess practitioners in other locations. Another limitation was the return rate of only 8%, thus limiting generalizability of our findings to the other manual therapy practitioners in Mississippi. Further, conclusions should be met with caution since results may be biased toward the inclusion of respondents inclined to provide information, possibly even reflecting therapists and

Table 3. Perceptions of COVID-19 Impact on Respondents' Practices Based on Provider Type, Sex, and Age Group

Characteristic		Total ^a 101/1257	DC32 (31.7)	MT69 (68.3)	P Value	Male 24 (24.2)	Female 75 (75.8)	P Value	Age≤40 y	Age >40 y	P Value
See patients	Yes	101 (85.6)	31 (96.9)	60 (88.2)	.12	23 (95.8)	64 (86.5)	.21	30 (96.8)	56 (84.9)	.08
	No	17 (14.4)	1 (3.1)	8 (11.8)		1 (4.2)	10 (13.5)		1 (3.2)	10 (15)	
Effect of "shelter in place" order	More patients	10 (8.9)	6 (18.8)	2 (3.1)	.03	2 (8.7)	6 (8.3)	.44	2 (6.5)	5 (7.9)	.68
	Same number	10 (8.9)	5 (15.6)	5 (7.7)		3 (13.0)	6 (8.3)		5 (16.1)	5 (7.9)	
	Fewer patients	82 (72.6)	20 (62.5)	54 (83.1)		18 (78.3)	53 (73.6)		22 (71.0)	48 (76.2)	
	Not seeing patients	11 (9.7)	1 (3.1)	4 (6.2)		0 (0.0)	7 (9.7)		2 (6.5)	5 (7.9)	
Why seeing fewer patients	To maintain social distance	28 (28.3)	6 (25.0)	18 (29.5)	.04	6 (28.6)	17 (27.9)	.22	10 (40.0)	13 (22.8)	.32
	Better infection control	27 (27.3)	2 (8.3)	23 (37.7)		4 (19.1)	21 (34.4)		8 (32.0)	17 (29.8)	
	Fewer patients want to be seen	34 (34.3)	13 (54.2)	16 (26.2)		8 (38.1)	18 (29.5)		6 (24.0)	20 (35.1)	
	Seeing only those with acute pain	6 (6.1)	2 (8.3)	3 (4.9)		3 (14.3)	2 (3.3)		0 (0.0)	5 (8.8)	
	Cannot get needed PPE	4 (4.0)	1 (4.2)	1 (1.6)		0 (0.0)	3 (4.9)		1 (4.0)	2 (3.5)	
Effect on business	Significantly	65 (65.7)	18 (56.3)	47 (70.2)	.17	14 (60.9)	48 (66.7)	.61	13 (43.3)	48 (75)	.003
	Not a lot	34 (34.3)	14 (43.7)	20 (29.8)		9 (39.1)	24 (33.3)		17 (56.7)	16 (25.0)	

DC, Doctor of Chiropractic; MT, massage therapist; PPE, personal protective equipment.

^a The percentages reported are valid percentages (ie, based on only those who responded to the specific questions).

chiropractors more likely to follow Federal and Mississippi guidance regarding infection control practices. For example, some practitioners not following guidance may not have completed the survey.

Surveys were sent only by e-mail and not by postal mail, which may have limited the response rate. In a prior study here in Mississippi, we had a response rate of 42%, but that was after distributing surveys at a fall meeting of the state association, followed up with postal surveys.⁷ There may be a number of older practitioners who do not respond to e-mail surveys. Finally, despite our attempt at developing face validity for our survey, some may not have completed all questions because practitioners were confused by the questions. For example, the question about table sanitization may have been confused with the question regarding sanitization of all surfaces. During some weeks of the pandemic, social distancing and “waiting in cars” may have been in place, but those restrictions removed later, yielding inconsistent survey responses.

Future Research

We suggest that further research is warranted to determine whether health education addressing the rationale behind mitigation procedures, such as hand washing between patients and the use of a face mask when in close quarters with a patient, may improve compliance and further mitigate the spread of COVID-19 in DC and LMT practices in Mississippi and elsewhere. Health education and health promotion aimed at furtherance of efforts to mandate masking of all patients and staff, enforcing social distancing within practices, and teaching these to patients by example may further enhance efforts in infection control in Mississippi. Further studies may also explore the stresses placed on bodywork practices associated with seeing fewer patients and include assessment of the physical and economic burden especially reported by older practitioners. Research into the use of alternative practice methods, such as the implementation of virtual care, may also help these practices to be successful while employing mitigation practices in the future.¹⁸

CONCLUSION

Of those who participated in this study, the majority of DC and LMT respondents had high compliance with most CDC and state recommendations. This assessment of compliance may be used to help guide future health education and promotion research of disease prevention and mitigation and explore the stresses placed on DCs and LMTs associated with seeing fewer patients, such as the physical and economic burdens they face during a pandemic.

SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found in the online version at <https://doi.org/10.1016/j.jcm.2022.02.016>.

FUNDING SOURCES AND CONFLICTS OF INTEREST

No funding sources or conflicts of interest were reported for this study.

CONTRIBUTORSHIP INFORMATION

Concept development (provided idea for the research): R.A.L.

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Supervision (provided oversight, responsible for organization and implementation, writing of the manuscript): R.A.L.

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Critical review (revised manuscript for intellectual content, this does not relate to spelling and grammar checking): R.A.L., J.K.

Practical Applications

- We surveyed chiropractic doctors and licensed massage therapists in Mississippi.
- We found high compliance with sanitization recommendations, which suggests state and federal guidance were followed.
- Our findings might be used to identify economic burdens faced by chiropractic doctors and licensed massage therapists in Mississippi during a pandemic.

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