Feasibility Using Amazon Mechanical Turk for Online Surveys of Attitudes and Perceptions of Chiropractic Health Care in the United States

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Abstract

Objective: The purpose of this study was to determine the feasibility and utility of using Amazon Mechanical Turk (MTurk) for online surveys of US adults about their perceptions of chiropractors and to report differences between people who have positive versus negative attitudes toward chiropractic care.

Methods: A 74-item, unvalidated survey was developed through iterative review to assess attitudes of respondents to chiropractic, including a query stratifying respondents based on previous and future use of chiropractic (have used, would consider; have used, would not consider; have not used, would consider; have not used, would not consider). The electronic survey was delivered using Qualtrics; respondents were recruited using MTurk, a crowdsourcing website. Descriptive statistics, including frequencies and cross tabulations, were performed.

Results: A total of 1300 responses were obtained. Consistent with previous reports, 32.2% of the respondents reported having seen a chiropractor in the past. Chiropractic care was perceived as being effective for musculoskeletal complaints. Respondents who would not consider future chiropractic care shared a common set of beliefs related to training of chiropractors, scope of chiropractic practice, and safety and reputation of chiropractic. These respondents reported increased likelihood of chiropractor use with the recommendation of a primary care physician.

Conclusion: Recruiting survey participants using MTurk is feasible, affordable, and quick and offers high utility to academic researchers. Using this resource, we ascertained preliminary data about attitudes and perceptions from individuals who would or would not consider chiropractic, stratified by their previous use. (J Manipulative Physiol Ther 2019;42:96-103)

Key Indexing Terms: *Chiropractic; Manipulation, Spinal; Surveys and Questionnaires; Attitude; Adult; United States*

Introduction

The prevalence of chiropractic care utilization varies in different regions of the country with ranges from 16.4% in the West North Central region of the United States to 5.9% in the West South Central region.[1] In the United States, members of racial or ethnic minority groups are less likely to use complementary and alternative health care than are white people, and elevated income is also to be a strong predictor of complementary and alternative medicine (CAM) use.[2]

Limited studies have been published in relation to public perceptions of chiropractors and the care they provide. A previous study, however, identified patient attitudes and trust in doctors of chiropractic among the independent predictors of patients' likelihood to seek chiropractic care for low back pain.[3] These findings are consistent with the first report that retrospectively evaluated effectiveness of chiropractic compared with traditional medical treatment for patients with occupation-related neck injuries in 1974. This study, although limited in size, found that chiropractic treatment was similar to medical treatment in this sample, as measured by a functional status ratio.[4] Further, chiropractic patients reported significantly greater patient satisfaction by 2 measures: ability of the practitioner to make the patient feel welcome (100% vs 93.5%, $P < .05$) and ability of the practitioner to explain the problem

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Table 1. *Description of Group Designation by Previous Use*

Group	Previous Use Response
Group A	I have been to a chiropractor in the past and would go to one in the future if needed.
Group B	I have been to a chiropractor in the past but would not go to one again.
Group C	I have never been to a chiropractor in the past but would consider going to one in the future if needed.
Group D	I have never been to a chiropractor in the past and would not consider going to one.

and treatment (94.8% vs 84.3%, $P < .05$).[4] A second report found that patients with low back pain who sought chiropractic care were more likely to report being satisfied with the care they received compared with patients who sought medical care (66% vs 22%).[5] Notably, the patients who sought chiropractic care were more likely to report satisfaction with the perceived level of provider concern, the diagnosis and treatment-related information given by the provider, and the perceived provider comfort with managing lower back pain.[5] More recently, a large survey of US adults demonstrated that chiropractic care is commonly used by US adults for back and neck pain and that most respondents felt that chiropractic care was safe.[6] They also found that where there is a higher per-capita supply of chiropractors in the local health care market, utilization and positive perceptions were higher.[6] Together, these data suggest a positive perception of chiropractors among current and former chiropractic patients; the perceptions among those who have never used chiropractic (particularly those who would not consider treatment) have yet to be fully understood.

One interesting observation among US patients who used alternative therapies for a principal condition and who also saw a medical doctor during a 12-month time span is a failure to disclose use of alternative treatment to the medical doctor (1990 survey: 39.8%; 1997 survey: 38.5%).[7] In a follow-up study, US patients disclosed the perception that using both conventional and alternative therapies was better than using either one alone, but were again unlikely (nondisclosure ranged from 63% to 72%) to discuss their use of CAM with their medical doctor.[8] Data from these and other studies[9,10] demonstrate the hesitation of patients to discuss complementary and alternative therapies with their medical physicians and may highlight the need for improved communication strategies both between medical providers and patients and among interdisciplinary health care providers.

The purpose of this study was to identify the feasibility of performing a survey using Amazon Mechanical Turk (MTurk) in a sample of US adults related to their perceptions of chiropractors and to report differences between people who have positive vs negative attitudes toward chiropractic care.

Methods

The topics of the survey and the survey items designed to address these topics were compiled by the lead author based in part on previous studies[3,11] to assess attitudes and perceptions of US respondents concerning chiropractic health care. A review panel of 3 chiropractors and 1 PhD research coordinator (the coauthors) performed 5 iterative reviews of the survey to ensure readability and clarity and to confirm the appropriateness of questions and relevance to each subtopic (eg, training, effectiveness, scope, safety, and reputation). The review panel includes the director of research with over 20 years of combined clinical practice and academic research experience, a chiropractor with over 20 years of private practice experience and lead author on one of the largest surveys of chiropractors in North America, a chiropractic faculty member with over 10 years of experience in private practice and 20 years of experience in teaching and administrative roles at a chiropractic college, and a PhD scientist with more than 10 years of experience in design and implementation of cancer research. The unvalidated survey included questions concerning chiropractic education, perceived effectiveness, scope of practice, cost and reimbursement, perceived safety, and ethical issues (Appendix 1). In addition, data were collected regarding lifestyle and demographics of the respondents. The survey consisted of 1 consent question, 8 demographic questions, and 74 study questions. Among the study questions, 61 were Likert-type, 5 were multiple choice, 3 were dichotomous, and 2 were open-ended. In addition, 3 attention check questions were included to decrease "straight-line" responses. Further, a 4-part question that queried previous use of chiropractic and whether future use would be considered (see Table 1) was ordered at the end of the survey to decrease question order bias. To reduce bias among potential respondents, the word *chiropractic* was not used in the first hyperlink to the survey; however, chiropractic was included in the description of the survey, which was reviewed by respondents before agreeing to complete the survey.

The study was deemed exempt from review by the institutional review board of Cleveland University Kansas City. The electronic survey was delivered using Qualtrics and respondents were recruited using MTurk, a crowdsourcing website commonly used in survey recruitment.[12] The MTurk survey methods have been used extensively in other areas of research, including health care studies.[12,13] The sample attained using MTurk is as, or more, representative of the US population compared with more traditional pools (convenience, in-person, student samples) used in academic research.[14-17] Respondent demographics are slightly less representative of, but compare

Table 2. *Respondent Characteristics, Census Estimates, and the Percent Difference Between the Sample and US Population*

Respondent Characteristics	Sample (%)	Census (%)	Difference (%)
Sex			
Female	48.7	50.8	-2.1
Male	51.3	49.2	+2.1
Age			
18-29	40.5	22.2	+18.3
30-59	55.3	53.9	+1.4
60 and older	4.2	23.9	-19.7
Race			
American Indian or Alaskan Native	0.5	1.6	-1.1
Asian	7.2	5.8	+1.4
Black or African American	6.6	13.7	-7.1
Native Hawaiian or other Pacific Islander	0.2	0.3	-0.1
White or Caucasian	82.6	76.3	+6.3
Other	2.8	2.3	+0.5
Ethnicity			
Hispanic	6.5	16.9	-10.4
Non-Hispanic	93.5	83.1	+10.4
Highest education completed			
Less than high school	0.4	13.2	-12.8
High school graduate or equivalent (eg, GED)	10.0	30.0	-20.0
Some college	33.5	28.6	+4.9
College graduate	41.9	18.4	+23.5
Postgraduate degree	14.2	9.8	+4.4
Annual household income			
Less than $25 000	22.0	24.4	-2.4
$25 000-$50 000	32.7	24.2	+8.5
$50 001-$75 000	22.6	18.0	+4.6
$75 001-$100 000	12.6	11.9	+0.7
More than $100 000	10.1	21.6	-10.5

favorably to, the US population relative to internet panels or national probability samples.[14,15] The low compensation levels commonly used in MTurk studies do not appear to affect data quality, and test–retest reliabilities have been shown to be very high.[16] For years, publications in the field of social sciences have relied heavily upon MTurk for survey recruitment,[12] and more recently, quality health care journals publish studies using this recruitment method.[18-21]

Table 3. *Geographic Distribution of Survey Respondents*

US Region	2016 US Census Data (%)	Survey Respondents (%)
Northeast	56 470 581 (17.6)	240 (18.5)
Midwest	68 179 351 (21.3)	240 (18.5)
West	77 410 622 (23.5)	302 (23.2)
South	123 658 624 (37.6)	420 (32.3)
Unknown	n/a	98 (7.5)
	Total	1300 (100.00)

Table 4. *Margin of Error for Subgroups and Nested Subgroups*

Group	Number of Respondents (%)	95% Confidence Intervals
Group A	334 (25.7)	23.3-28.1
Group B	85 (6.5)	5.2-7.8
Group C	732 (56.3)	53.6-59.0
Group D	149 (11.5)	9.8-13.2
Total	1300	–
Groups A and C	1066 (82.0)	79.9-84.1
Groups B and D	234 (18.0)	15.9-20.1

Table 5. *Adult Perceptions of Chiropractic Scope*

Scope	Number of Respondents (%)
Back pain	1162 (89.4)
Neck pain	1132 (87.1)
Muscular pain of extremities	927 (71.3)
Joint pain of extremities	988 (76.0)
Headaches	729 (56.1)
Allergies	87 (6.7)
Asthma	99 (7.6)
Colic	126 (9.7)
Ear infections	85 (6.5)
High blood pressure	198 (15.2)
Obesity	56 (4.3)

Multiple quality checks including attention and timing checks were employed to reduce response biases and to improve the quality of the study data.[22,23] Amazon Mechanical Turk and Qualtrics both track internet protocol addresses, and this information was used to verify the geographic location of the respondents.

Potential respondents were provided an electronic written informed consent explaining the nature of the survey. Agreement to a statement of informed consent was a prerequisite to participation. Respondents were compensated 50 cents. This study was approved by the university institutional review board.

The electronic survey was administered to 100 participants to optimize technical use of the MTurk platform (eg, ensuring survey settings were correct). After this survey trial, the study was fully administered over the course of approximately 7 hours on August 31, 2015, to 1200 additional respondents. All 1300 survey responses were collected and analyzed in this manuscript. Survey data were exported from Qualtrics into SPSS version 20 (released 2011; IBM Corp, Armonk, New York). Data were exported directly to the SPSS program, which circumvents data entry errors. Descriptive statistics including frequencies and cross tabulations were performed. To support the purpose of this study, which was to present the attitudes and perceptions concerning chiropractic health care, it was necessary to contrast opinions from the 4 groups previously mentioned. Nesting the data from groups A and C (groups that would see a chiropractor), and comparing those data with nested data of groups B and D (those who would not see a chiropractor) provided useful information. Cross tabulations were

Table 6. *A Selection of Beliefs More Likely to Be Held by the Groups Who Would Not See a Chiropractor in the Future (Groups B and D)*

	% of Each Group Who Selected Given Response			
Characteristics	Group A	Group C	Group B	Group D
Training				
Felt training to be a physical therapist was more difficult	12.3	12.0	24.7	29.5
Felt training to be a physician assistant was more difficult	21.0	18.3	38.8	38.3
Felt training to be a registered nurse was more difficult	24.0	24.0	45.9	48.3
Did not think DCs are required to pass national board exams	4.2	5.6	14.1	14.8
Did not think DCs are required to license with state boards	3.3	4.2	14.1	11.4
Did not think DCs are required to attend continuing education	8.4	12.3	27.1	19.5
Effectiveness				
Did not think DCs successfully treat a variety of diseases with SMT	15.3	13.3	54.1	49.7
Did not feel regular care would help prevent future back pain	9.6	10.0	57.6	48.3
Did not feel regular care would improve overall health	12.3	17.5	63.5	65.1
Considered chiropractic not effective for back pain	0.9	2.0	22.4	17.4
Considered chiropractic not effective for neck pain	2.1	2.9	28.2	21.5
Considered chiropractic not effective for headaches	15.3	26.2	43.5	51.7
Considered chiropractic not effective for upper extremity joint pain	6.9	7.8	42.4	27.5
Considered chiropractic not effective for lower-extremity joint pain	6.0	7.9	36.5	28.2
Scope				
DC's role best described as an alternative health care provider	51.5	45.6	67.1	68.5
DC's role best described as a spine care specialist	32.9	39.8	18.8	21.5
Did not consider a lifetime of periodic care appropriate	32.9	36.3	75.3	74.5
Did not think chiropractic should be an option at most doctor's offices	15.6	16.4	56.5	65.1
Did not believe DCs have a role to play in hospitals	15.6	15.8	50.6	48.3
Did not consider diet and general nutrition in DC scope of practice	33.2	41.4	58.8	62.4
Did not consider exercise and fitness in DC scope of practice	5.4	9.4	31.8	24.8
Did not consider nutritional supplementation in DC scope of practice	33.8	37.7	55.3	59.7
Did not consider OTC medication in DC scope of practice	36.5	31.4	50.6	51.0
Did not consider stress reduction in DC scope of practice	12.0	9.8	30.6	34.9
Safety & Reputation				
Did not think chiropractic is a safe method of healthcare	3.6	4.8	36.5	35.6
Would prefer not to have SMT performed on neck	24.6	36.7	75.3	81.2
Did not think a child may need chiropractic care	7.2	14.2	49.4	48.3
Did not believe chiropractic care is guided by scientific evidence	6.3	8.5	54.1	56.4
Did not believe DCs are respected by other healthcare providers	33.5	30.3	64.7	69.8
Did not think DCs were ethical in their business practices	4.5	5.9	29.4	32.9

DC, doctor of chiropractic; *OTC*, over the counter; *SMT*, spinal manipulative therapy.
All results are statistically significant at $P < .01$.

Table 7. *Likelihood of Physician-Referred Future Chiropractic Use by Subgroup*

Group	Would See Chiropractor With Physician Referral (%)
Group A	99.4
Group B	56.5
Group C	94.4
Group D	24.8

completed using these "previous use" groups (Table 1) and all other survey questions. Margins of error for each group (A, B, C, D) were calculated using a sample proportion calculation: $z * \sqrt{(\rho(1-\rho) \div n)}$, where ρ is the sample proportion, n is the sample size and z* is the appropriate value for level of confidence in standard normal distribution (for 95% CI, z* = 1.96). Where indicated, *P* values were calculated using Pearson χ-square tests.

Results

A total of 1300 responses were obtained, representing a convenience sample of respondents. The demographic profile of the respondents was similar to other surveys using MTurk for recruitment.[24,25] Respondents were more likely to be white, younger, and more highly educated than the US population (Table 2). Groups that were under-represented include persons age 60 and older, black or African American, Hispanic, and those less educated. Internet protocol addresses were collected to ensure all respondents were in the United States; in addition, internet protocol address distribution confirms the sample is representative of the geographic distribution of the US population (Table 3).

The margin of error for the study was ±3% at a 95% confidence level when the overall sample was used. Overall, 32.2% of the respondents reported having seen a chiropractor in the past, with 67.8% having never seen a chiropractor (Table 4). Eighty-two percent of respondents would consider going to a chiropractor in the future if needed, and 18.0% would not consider going to a chiropractor in the future. Respondents were grouped into 1 of 4 categories based on the answer to a specific survey question. The 4 groups included group A (25.7%), people who had seen a chiropractor in the past and would be willing to see one in the future; group B (6.5%), people who had seen a chiropractor in the past but would not be willing to see one in the future; group C (56.3%), people who had never seen a chiropractor but would be willing to see one in the future; and group D (11.5%), people who had never seen a chiropractor and would not be willing to see one in the future (Table 4). Of 1300 respondents, 1066 (82%) would see a chiropractor; 234 of those surveyed responded that they would not see a chiropractor (Table 4). To understand patient perceptions of the usefulness of chiropractic care, we queried respondents about use of chiropractic to treat several medical conditions. Chiropractic care was perceived as being effective for back pain (89.4%), neck pain (87.1%), muscular and joint pain of the extremities (71.3-76.0%), and headaches (56.1%). It was not considered effective for allergies (6.7%), asthma (7.6%), colic (9.7%), ear infections (6.5%), high blood pressure (15.2%), or obesity (4.3%). Most responded that making recommendations in the following areas was within the scope of practice for a chiropractor: posture (94.9%), exercise and fitness (82.3%), and stress reduction (76.4%; Table 5). Respondents who, based on their response to the 4-part question, reported that they would not seek treatment from a chiropractor in the future were significantly more likely to consider chiropractic training as less difficult than training in physical therapy, medicine, and nursing (Table 6). More among this group also reported unawareness of board exams, licensure, and continuing education requirements for chiropractors (Table 6). Further, those who reported not considering chiropractic in the future were more likely to consider chiropractic ineffective for all conditions queried, more likely to consider chiropractic unsafe, and more likely to choose responses reflecting a limited scope of chiropractic practice (Table 6). When asked if they would consider chiropractic care if recommended by a physician, the respondents in groups who were open to future care responded overwhelmingly in agreement (group A: 99.4%; group C: 94.4%). Among the 2 groups who would not consider future chiropractic care, a physician recommendation for chiropractic care increased their potential likelihood to see a chiropractor (group B: 56.5%; group D: 24.8%; Table 7).

Discussion

Recruiting survey participants for this study using MTurk was feasible, affordable, and quick and may offer high utility to academic researchers. The collected data offer information about a small sample of the general population's perceptions of chiropractic care. Understanding the negative attitudes can inform chiropractic professionals and enable changes in policy that improve utilization of chiropractic services. Data from this study could improve chiropractors' understanding of how to best serve the US patient population.

A large percentage of responders (82% overall) would seek chiropractic care if recommended by their primary care physicians. Interestingly, among respondents who reported that they had seen a chiropractor and would not consider future visits (group B), physician recommendation increased their likelihood of future use 2.2-fold compared with the number of respondents who have previously used and would consider future use (eg, group A; 25.7% vs 56.5%). Similarly, physician recommendation improved the likelihood of future chiropractic use among respondents who had never used chiropractic and were unwilling to consider it (group D; 24.8%). This finding supports an increased focus on collaboration with doctor of medicine/doctor of osteopathy physicians. Previous

research[8,26,27] has shown that most CAM users do not disclose their use to primary physicians. In one study, 63.0% of respondents (831 surveyed) did not disclose the use of at least 1 CAM therapy to their physician.[8] Further, of the respondents who reported use of both conventional and CAM therapy, the amount of confidence in the providers was similar (81% and 77% perceived "total" or "a lot" of confidence in CAM providers and medical doctors, respectively).

Among the nested groups of respondents (eg, those who would or would not consider chiropractic care), responses concerning training of doctors of chiropractic, effectiveness of chiropractic, scope of chiropractic practice, and the safety and reputation of chiropractic reveals a high degree of agreement on items within each subset and low agreement between the 2 subsets. For instance, when asked if they believe doctors of chiropractic do not have a role in hospitals, members of groups A and C agreed 15.6% and 15.8%, respectively. Among members of groups B and D, 50.6% and 48.3% agreed, respectively, to the same question. Although not surprising, these results may provide important information for the chiropractic profession.

In addition, several of the survey questions were sufficiently open-ended to result in a large number of comments that will be beneficial to a future analysis using qualitative methods to report those findings.

Limitations

This study used an unvalidated survey. The number of surveys received was small, thus limiting the interpretation of findings relevant to the population as a whole. Sampling across groups within the population was also limited and thus some groups were under-represented. Participants were more likely to be white, younger, and more highly educated than the US population. Groups that were underrepresented include older adults, black or African American, Hispanic, and those less educated. This nonrepresentative, convenience sample limits the generalizability of our study to the United States as a whole.

Future Studies

Continued exploration into attitudes and perceptions about chiropractic health care is essential to ensuring chiropractors provide maximum benefit to patients. Particularly, research in large heterogeneous populations will ensure the profession can address the concerns of potential patients and those who may have previously had negative experiences with chiropractic therapy. An overarching goal for the chiropractic profession is to increase the number of people who choose to add chiropractic services to their health care. As a means to enhance this important aspect of health, clear delineation of both positive and negative attitudes toward and perceptions of chiropractic care is a valuable resource. Future studies should include validated surveys and larger samples to make the findings more meaningful.

Conclusion

The MTurk for our study demonstrated feasibility and may offer utility to other academic researchers. This tool represents a method for chiropractic researchers to investigate important questions about the chiropractic profession.

Funding Sources and Conflicts of Interest

The study was funded by Cleveland University Kansas City. No conflicts of interest were reported for this study.

Contributorship Information

Concept development (provided idea for the research): J.W., M.T.P.
Design (planned the methods to generate the results): J.W., R.J.W., M.T.P
Supervision (provided oversight, responsible for organization and implementation, writing of the manuscript): J.W., R.J.W.
Data collection/processing (responsible for experiments, patient management, organization, or reporting data): J.W.
Analysis/interpretation (responsible for statistical analysis, evaluation, and presentation of the results): J.W., R.J.W., R.S., W.P.M., M.T.P.
Literature search (performed the literature search): J.W., R.J.W., R.S., W.P.M., M.T.P.
Writing (responsible for writing a substantive part of the manuscript): J.W., R.J.W., R.S., W.P.M., M.T.P.
Critical review (revised manuscript for intellectual content, this does not relate to spelling and grammar checking): J.W., R.J.W., R.S., W.P.M., M.T.P.

Practical Applications

- This study highlights Amazon MTurk as both a cost-effective and expedient method to obtain a large number of responses for survey studies.
- Use of Amazon MTurk may present a feasible method for collecting important research data, regardless of the size of the chiropractic practice or academic institution.
- Data obtained in this survey of a sample of the US population reveals that most respondents, whether they would currently consider chiropractic care or not, would consider chiropractic treatment if referred by a medical physician.
- Chiropractic can benefit greatly from increased communication with and education of medical doctors.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jmpt.2018.10.001.

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