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Doctor–patient relationships are a perceived barrier to chiropractic use by non-Hispanic Black Americans

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Despite decades of targeted effort, the disparity in access to and utilization of health care remains high in minority populations. Not excluded is the field of chiropractic, where there is an ongoing effort to increase both non-Hispanic black (NHB) practitioners and patients in the United States. In this study, we sought to identify which barriers prevent NHB access to chiropractic care. We utilized Qualtrics® (Qualtrics, Provo, UT) and MTurk® (Amazon Mechanical Turk, Inc.) to administer an online survey to 3814 U.S. respondents. Among non-Hispanic blacks, and compared with whites, participants were more likely to consider chiropractic care if the doctor shares their racial identity (37.6% vs. 17.1%) or if referred by a family member or friend (83.1% vs. 72.2%). NHB respondents were more likely to report barriers such as communication, transportation, or not being understood by their care provider compared with their white counterparts. Interestingly, there were no significant differences between NHB and white respondents on cost-related barriers (e.g., too expensive, insurance does not cover chiropractic). These findings highlight a need for increasing the number of practicing NHB chiropractors, through improved minority recruitment to chiropractic colleges. Further, chiropractor-driven community outreach may also begin to address the disparities in access to care for the non-Hispanic black population.

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Introduction

The United States Census Bureau projects that by the year 2044, whites will no longer be the majority racial group in America (Colby and Ortman, 2015). Despite decades of targeted effort, the disparity in access and utilization of health care remains high in minority populations (Gulley et al., 2014). Not excluded is the field of chiropractic, in which increasing minority representation (both in the patient and provider populations) remains a challenge in the United States (Brown et al., 2007).

Complementary and alternative medicine (CAM) is used with similar frequency among racial and ethnic groups: white 43.5%, African American 42.6%, Latino 40.7%, Asian American 39%, and Native American 39.6% (Mackenzie et al., 2003). However, African Americans (also referred to as non-Hispanic blacks (NHB) and defined as a person having origins in any of the black racial groups of Africa (State Council of Higher Education for Virginia, 2021)), are less likely than their white counterparts to utilize chiropractic care (3.05% versus 10.72%, respectively; Sui and Li, 2011). Further, based on analysis of combined data from 88,962 respondents to the 2002 and 2012 National Health Interview Surveys, the use of CAM exhibits a significant, linear decrease from 22.9% in 2002 to 19.3% in 2012 among non-Hispanic black adults (Clarke et al., 2015). The same study reports significant quadratic trends for non-Hispanic white adults (34.4% in 2002, 40.2% in 2007, and 37.9% in 2012). Additional studies have similarly found less use of CAM in NHB communities compared with their white counterparts (Kronenberg et al., 2006; Cui et al., 2012; Whedon and Song, 2012), but limited literature specifically evaluates the frequency of use of chiropractic among NHB and/or what barriers exist for this population.

Several studies have sought to determine differential chiropractic use among older persons who self-identify as NHB or white and to better characterize chiropractic care users. One small study of 183 rural older adults (>50 years) sought to compare CAM use between African Americans and Caucasian Americans by asking 3 research questions: (1) is there a difference in CAM use between African American and Caucasian American older adults; (2) is there a difference in satisfaction of CAM use between AA and CA older adults; and (3) overall, what CAM modalities are being used by rural older adults (Cuellar et al., 2003). This study reports higher use of CAM products among Caucasian Americans (19%, $n = 27$), who were younger and more educated compared with their African American counterparts (7.5%, $n = 3$) and reported no difference in satisfaction of CAM use between groups. Chiropractic medicine was among the sixth most commonly used CAM products across all respondents. An investigation of CAM and prayer use among 5849 mid-life women (age 40–59) similarly found higher CAM use among white women compared with black women (48.6% vs. 34.7%, $p \leq 0.001$) and more reported use of chiropractic among white women compared with black women (11.2% vs. 3.1%, $p \leq 0.001$). Interestingly, this study found no association between educational attainment and chiropractic use. However, chiropractic was again among the most commonly used CAM methodologies across all respondents (Upchurch et al., 2010).

Two studies queried a large national dataset, from the Assets and Health Dynamics Among the Oldest Old (AHEAD) survey, to understand the use of chiropractors by older American adults and to characterize these older American adults based on their health status and modifiable risk behaviors stratified by the provider (chiropractor vs. medical doctor), respectively (Weigel et al., 2010; Wolinsky et al., 2007). In a longitudinal study of chiropractic use among 5510 respondents to the AHEAD survey

(1993–1994) and their Medicare claims (1993–2007), Weigel et al. (2010) sought to understand factors associated with chiropractic use versus nonuse. The overall prevalence of chiropractic use among respondents is 14.6%, with an average annual prevalence of 4.8% (range 4.1–5.4%) consistent with observations made by Wolinsky et al. (2007) and others. African Americans were significantly less likely to use chiropractic treatment (AOR 0.268, 95% CI: 0.163–0.439) compared with whites. Although together these studies suggest there may be barriers that selectively affect chiropractic use among NHB individuals, there is little reported on perceived barriers to chiropractic care through the lens of the patient.

In this study, we sought to identify and compare barriers to patient access to chiropractic care between white and NHB respondents. Based upon recent work identifying barriers to chiropractic utilization among U.S. adults at large, we queried respondents on barriers including, but not limited to, transportation, communication, and attitude towards chiropractic treatment efficacy (Wilson et al., 2019). Specific to this study, we queried patients on whether doctor–patient race concordance, defined as a patient and doctor sharing an ethnic or racial identity (Meghani et al., 2009), is a barrier to accessing care. We also collected qualitative responses to more broadly understand what barriers exist for NHB access to chiropractic care.

Methods

A 16-question (6 demographic, 2 attention checks, 8 surveys), electronic survey was developed to query respondents about their perceived barriers, if any, to accessing chiropractic care. Demographic information collected included self-reported gender, age, race, ethnicity, annual household income, and geographical location (e.g., rural, urban, suburban). In the survey instrument, the term ‘Black or African American’ is used in alignment with the language used in the United States Census survey. In this publication, the term ‘non-Hispanic Black’ (NHB) is used to describe respondents who self-reported racial identity as Black or African American.

To develop the instrument questions, a survey of the literature was performed to identify common categories of barriers to chiropractic care (Weigel et al., 2010; Graham et al., 2005; Xu and Farrell, 2006; Ward et al., 2015; Barner et al., 2010; Goldstein et al., 2005). Based on this review, the following options were provided for respondents to communicate their perceived barriers relative to each category: financial (too expensive, insurance does not cover chiropractic), physical access (no available transportation, too far from your home or job), disability (problems with communication due to hearing or speech disability), doctor/patient relationship (lack of trust for the doctor, the doctor does not understand me, prefer to see my primary care physician, cannot find a doctor that shares my ethnic/racial background), and personal circumstances, beliefs and skepticism (too busy, no need for chiropractic care, chiropractic treatment does not work, religious or cultural beliefs, problems with communication because English is not my first language). To capture any perceived barriers not captured in these categories, an ‘Other’ option was provided with a space for respondents to enter text. To ascertain health behaviors among the study population, respondents were queried on regular exercise, attention to diet, and regular visits to healthcare providers.

To establish face and content validity, the survey instrument was reviewed by an 8-member panel with diverse racial and ethnic backgrounds (including 2 NHB, 1 Hispanic, and 1 Vietnamese American). The panel used a 14-point rubric for

validation (VREP®; Simon and White, 2016) which is designed to measure face validity, construct validity, and content validity (Supplemental File; Brandon et al., 2014). Changes suggested by the panel were incorporated into the survey, and the instrument was sent back to the panel for final review before administration to study participants (Supplemental File). The survey instrument was not piloted, a limitation of this study, prior to being opened to respondents.

As described previously (Wilson et al., 2019), the instrument was delivered using the Qualtrics survey platform. Participants (the U.S. only) were recruited using Amazon's Mechanical Turk (MTurk) platform (Bohannon, 2011) and were required to agree to a statement of consent before completing the survey. Participation in the survey was voluntary, and all results were anonymous. Participants were compensated \$0.10 for completing the survey, which is consistent with the literature on the use of MTurk (Bardos et al., 2015).

Statistical analysis. To determine the number of responses needed from non-Hispanic black participants, we used the following criteria: 95% confidence level, 5% margin of error, 12.6% population proportion (based on 2015 U.S. Census data), 320.7 million population size (based on 2015 U.S. Census data). We calculated a sample size of 170 NHB study participants. Based on previous observations in Wilson et al. (2019), we calculated that a minimum of 3800 total survey responses would be necessary to achieve our desired sample size and thus the survey remained open until at least 3800 surveys were successfully completed. Results were exported from Qualtrics into SPSS version 26 (released 2019; IBM Corporation, Armonk, NY) for analysis. Cross-tabulation was performed using self-identified race (self-reported as Black or African American or white) and each barrier was interrogated. The independent, unpaired observations were analyzed using Pearson Chi-Square; 2-sided, asymptotic significance is reported (significance indicated by $p > 0.05$). To address our specific research question about what barriers may affect chiropractic use by NHB, only responses from those self-identifying as Black or African American or white, based on the United States Census Bureau's defined racial categories, are reported. For clarity, respondents who selected Black or African American but did not select "Hispanic" are hereafter referred to as non-Hispanic Black (NHB). Descriptive statistics were calculated, and p -values are reported.

This study was reviewed and approved by the University Institutional Review Board.

Results

Using Qualtrics® (Qualtrics, LLC) and Amazon Mechanical Turk® (Amazon.com, Inc.), we administered an IRB-approved, online survey to national respondents over 59 days. Of the 3846 respondents who began the survey by agreeing to the consent statement, 3814 successfully completed the survey (as indicated by their correct response to the final attention check question) for a response rate of 99.2%. We collected self-reported racial identity, based upon the United States Census categories of race (American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or other Pacific Islander, White or Other). Among the respondents, 45 (1.2%) identified as American Indian or Alaska Native, 214 (5.6%) identified as Asian, 510 (13.4%) identified as Black or African American, seven (0.2%) identified as Native Hawaiian or other Pacific Islander, 2939 (77.1%) identified as White, 98 (2.6%) identified as other (Table 1). Respondents who did not self-identify race were excluded from the analysis. Demographic information for the filtered

dataset (white, Black/African American, non-Hispanic; described in the "Methods" section) is summarized in Table 2.

First, we sought to determine attitudes towards chiropractic care by querying the respondents on their attitudes in the context of previous use (Table 3) with the following response options: (A) I have been to a chiropractor, and would go back; (B) I have been to a chiropractor, and would not go back; (C) I have never been to a chiropractor, but would consider going; or (D) I have never been to a chiropractor, and would not consider going. Less non-Hispanic blacks (NHB) than whites have previous experience with chiropractic (36.0% NHB vs. 44.3% W); however, NHB respondents were less likely to choose not to consider going to a chiropractor if they had never been (9.4% NHB vs. 13.5% W) or to express that they would not go back to a chiropractor if they had previously been (4.7% NHB vs. 8.4% W), compared with white respondents.

Next, we sought to determine respondents' overall attitude towards chiropractic as a health care option. Just over 90% (90.4%) of non-Hispanic black respondents, compared with 79.6% white respondents, considered chiropractic care to be an effective health care option (Table 4; $p < 0.001$). Although white respondents were more likely to have a friend or relative currently under the care of a chiropractor (90.2% W vs. 75.7% NHB; $p < 0.001$), NHB respondents were more likely to consider a chiropractor if referred by a family member or friend (Table 4; 83.6% NHB vs. 71.8% W; $p < 0.001$). Among NHB respondents, and compared with whites, respondents were more likely to consider chiropractic if they shared race concordance with the doctor (Table 4; 22.8% NHB vs. 9.1% W; $p < 0.001$).

Next, we queried respondents on whether any of the following would prevent them from seeing a chiropractor for care: too expensive; no available transportation; too far from home or job; too busy; lack of trust for the doctor; no need for chiropractic care; the doctor does not understand me; chiropractic treatment does not work; insurance does not cover chiropractic; religious or cultural beliefs; prefer to see my primary care doctor; cannot find a doctor that shares my ethnic/racial background; problems with communication because English is not my first language; problems with communication due to hearing or speech disability (Supplemental File). Overall, NHB respondents were more likely to have concerns about communication compared with white respondents. More NHB respondents were concerned about communication either due to language barrier (Table 5; 2.6% NHB vs. 0.4% W; $p < 0.001$) or a hearing or speech disability (Table 5; 2.3% NHB vs. 0.9% W; $p < 0.05$). Over 10% of NHB respondents believe the doctor generally would not or does not understand them, compared with 4.89% white respondents (Table 4; $p < 0.001$). Respondents who identified as NHB were significantly more likely than white respondents to report an inability to find a doctor that shares their ethnic/racial background (3.5% NHB vs. 0.4% W, $p < 0.001$). NHB respondents were also more likely to identify lack of transportation as a barrier to chiropractic use (14.6% NHB vs. 8.2% W; $p < 0.001$). More white respondents reported a preference for their primary care physician (17.2% W vs. 11.4% NHB; $p < 0.01$) or a belief that chiropractic care does not work (22.5% W vs. 17.8% NHB, $p < 0.05$) compared with their black counterparts. There were no significant differences between black and white respondents for the other barriers listed (e.g., too expensive, $p = 0.079$; too far from home or job, $p = 0.132$; too busy, $p = 0.799$; lack of trust for the doctor, $p = 0.719$; no need for chiropractic care, $p = 0.525$; insurance does not cover chiropractic, $p = 0.416$; religious or cultural beliefs, $p = 0.110$).

In addition to the pre-determined barrier options, we included a box for qualitative, "other" responses. These responses were generally sorted into one of eight categories:

Table 1 Demographic information for all survey respondents.

Respondent demographics—all respondents, n (%)						
Gender	Male	Female	Neither	Prefer not to answer	No response	
	1266 (33.2)	2526 (66.2)	12 (0.3)	6 (0.2)	4 (0.1)	
Age	<21 Years	21-25	26-30	31-35	36-40	>40 Years
	106 (2.8)	607 (15.9)	769 (20.2)	653 (17.1)	469 (12.3)	1208 (31.7)
Race	American Indian/ Alaska Native	Asian	African American or Black	Native Hawaiian or Pacific Islander	White	Other
	45 (1.2)	214 (5.6)	510 (13.4)	7 (0.2)	2939 (77.1)	98 (2.6)
Ethnicity	Hispanic, Latino or Spanish	Not Hispanic	No response			
	264 (6.9)	3497 (91.7)	53 (1.4)			
Annual household income	<\$25,000	\$25-49,999	\$50-99,999	\$100,000 or more	No response	
	829 (21.7)	1241 (32.5)	1282 (33.6)	457 (12.0)	6 (0.2)	
Geography	Urban	Suburban	Rural	No response		
	1158 (30.4)	1629 (42.7)	1026 (26.9)	2 (0.1)		

Table 2 Demographic information for selected respondents who identified racially as white or Black/African American and identified ethnically as non-Hispanic.

Respondent Demographics, White and NHB	White respondents, n (%)	NHB respondents, n (%)	Combined
Gender			
Female	1878 (66.2)	257 (75.1)	2135 (67.1)
Male	944 (33.3)	82 (23.3)	1026 (32.3)
Neither	9 (0.3)	1 (0.3)	10 (0.3)
Prefer not to answer	5 (0.2)	1 (0.3)	6 (0.2)
No response	2 (0.1)	1 (0.3)	3 (0.1)
Age			
<21 Years	53 (1.9)	12 (3.5)	40 years and under, combined: 2079 (65.4)
21-25	387 (13.6)	62 (18.1)	
26-30	555 (19.6)	72 (21.1)	
31-35	474 (16.7)	59 (17.3)	
36-40	358 (12.6)	47 (13.7)	
>40 Years	1011 (35.6)	89 (26.0) (0.3)	1100 (34.6)
No response	-	1 (0.3)	1 (0.03)
Annual Household Income			
<\$25,000	593 (21.0)	94 (27.5)	687 (21.6)
\$25-49,999	916 (32.3)	125 (36.5)	1041 (32.7)
\$50-99,999	969 (34.1)	96 (28.1)	1065 (33.5)
\$100,000+	356 (12.5)	26 (7.6)	382 (12.0)
No response	4 (0.1)	1 (0.3)	5 (0.2)
Geography			
Urban	873 (30.8)	59 (17.3)	932 (29.3)
Suburban	750 (26.4)	142 (41.5)	892 (28.1)
Rural	1214 (42.8)	141 (41.2)	1355 (42.6)
No response	1 (0.04)	-	1 (0.03)
Total	2838	342	3180 (100)

Table 3 Survey respondents were queried on their prior experience with chiropractic care with four response options: 'I have been to a chiropractor, and would go back'; 'I have been to a chiropractor, and would not go back'; 'I have not been to a chiropractor, but would consider going'; 'I have not been to a chiropractor, and would not consider going'.

Previous use response	White respondents, n (%)	NHB respondents, n (%)
I have been to a chiropractor in the past, and would go to one in the future if needed.	1019 (35.9)	107 (31.3)
I have been to a chiropractor in the past, but would not go to one again.	239 (8.4)	16 (4.7)
I have never been to a chiropractor in the past but would consider going to one in the future if needed.	1198 (42.2)	187 (54.7)
I have never been to a chiropractor in the past, and would not consider going to one.	382 (13.5)	32 (9.4)
Total	2838 (100)	342 (100)

Table 4 Percent of respondents who replied affirmatively to queries on their attitudes towards chiropractic.

Attitudes towards chiropractic care	Responded "Yes"		
	White respondents, n (%)	Non-Hispanic Black respondents, n (%)	p-value
Do you think chiropractic is an effective health care option?	2258 (79.6)	309 (90.4)	<0.001
To your knowledge, have any of your friends or relatives ever seen a chiropractor?	2559 (90.2)	259 (75.7)	<0.001
Would you be more likely to see a chiropractor if a friend or relative suggested doing so?	2039 (71.8)	286 (83.6)	<0.001
Would you be more likely to consider seeing a chiropractor if s/he shares your racial/ethnic background?	257 (9.1)	78 (22.8)	<0.001

Table 5 Summary of reported perceived barriers to chiropractic use among white and non-Hispanic black respondents.

Perceived barrier to chiropractic care	White respondents, n (%)	Non-Hispanic Black respondents, n (%)	p-value
<i>Financial</i>			
Too expensive	1839 (64.8)	238 (69.6)	0.079
Insurance doesn't cover chiropractic	1576 (55.5)	182 (53.2)	0.416
<i>Physical access</i>			
No available transportation	234 (8.2)	50 (14.6)	<0.001
Too far from your home or job	480 (16.9)	69 (20.2)	0.132
<i>Disability</i>			
Problems with communication due to hearing or speech disability	25 (0.9)	8 (2.3)	<0.05
<i>Doctor/patient relationship</i>			
Lack of trust for the doctor	630 (22.2)	73 (21.3)	0.719
The doctor doesn't understand me	136 (4.8)	37 (10.8)	<0.001
Prefer to see my primary care physician	487 (17.2)	39 (11.4)	<0.01
Can't find a doctor that shares my ethnic/racial background	10 (0.4)	12 (3.5)	<0.001
<i>Personal circumstances, beliefs, skepticism</i>			
Too busy	715 (25.2)	84 (24.6)	0.799
No need for chiropractic care	1079 (38.0)	124 (36.3)	0.525
Chiropractic treatment doesn't work	639 (22.5)	61 (17.8)	<0.05
Religious or cultural beliefs	19 (0.7)	5 (1.5)	0.110
Problems with communication because English is not my first language	11 (0.4)	9 (2.6)	<0.001

Fig. 1 Self-reported perceived barriers to chiropractic use. Responses to a qualitative question on perceived barriers to chiropractic use are tallied and reported.

(1) previous negative experience, (2) chiropractic is ineffective, (3) fear or skepticism, (4) medical reason for avoiding chiropractic, (5) no medical need for chiropractic, (6) doctor unavailable, (7) cost, and (8) inconvenience. NHB respondents' write-in barriers were assigned to 4 of those 8 categories (listed in order of prevalence among NHB respondents): cost, fear and/or skepticism, unavailability of a doctor, or negative experience (Fig. 1).

Discussion

Based on the changing demographics of American adults and in consideration of the ongoing conversation on the role of chiropractic treatment (Qaseem et al., 2017; Parkin-Smith et al., 2015) as a mainstream treatment for musculoskeletal disorders, we sought to identify barriers to adult, non-Hispanic Black (NHB) patient access to chiropractic care in the United States. Our goal is to add to the body of chiropractic research knowledge that may

improve access to and utilization of chiropractic treatment by non-Hispanic blacks who tend to utilize chiropractic at a lower rate when compared with their white counterparts (Sui and Li, 2011).

To achieve this goal, a survey was administered to a representative sample of U.S. adults on their attitudes towards chiropractic and barriers that may hinder their decision to seek chiropractic care. To specifically address the question about which, if any, barriers may prevent black/African Americans from seeking chiropractic care, respondents were requested to select their self-identified race. Self-identified race distribution of survey respondents was comparable to the United States population's race distribution suggesting that our sample population is racially representative of U.S. citizens. Next, total responses were filtered based on self-selected race, and responses between non-Hispanic black (NHB)/African American respondents and white respondents were compared. Similar to other studies (Brown et al., 2007; Sui and Li, 2011; Barner et al., 2010; Weeks et al., 2016), we found that non-Hispanic black respondents were less likely than their white counterparts to have previous experience with chiropractic treatment. Interestingly, NHB respondents were more likely to consider chiropractic in the absence of prior experience and were more likely to return to a chiropractor if they did had prior experience, compared with their white counterparts.

Among respondents to this survey, women were over-represented (66.2% compared with 33.3% male respondents). Several previous studies have also reported higher use of CAM among women in comparison with men. One study (Honda and Jacobson, 2005) performed multiple logistic regression analyses on a dataset produced through the administration of the Midlife Development in the United States Survey (MIDUS). This instrument (a 3-minute phone interview, followed by 2 mailed questionnaires) was administered to 4242 adults (aged 24–75) residents of the contiguous United States. Among 1640 respondents who reported having used any CAM modality within 12 months prior to query, 62.5% of women compared with 37.5% of men reported any use of CAM. Findings within this publication related to psychological factors influencing the use of CAM among U.S. adults, while outside the scope of this discussion, are interesting and worthy of review. A different comparison, of CAM use among a convenience sample of 183 white and African American elders residing in rural communities in Mississippi, similarly reported higher use of any CAM modality in women compared with men (76% vs. 24%). However, since the study does not report demographic data of those who did not report CAM use ($n = 195$; total respondents = 378) it is unclear whether the difference is due to querying a nonrepresentative sample (Cuellar et al., 2003).

A California Health Interview Survey 2001 (CHIS 2001) follow-up survey to reassess respondents' health and illness status and query CAM use (CHIS-CAM) found an increased prevalence of any CAM use among women compared with men (OR 1.39; 1.15, 1.67 95% CI; $p < 0.001$). However, there was no difference in the prevalence of chiropractic use between the groups (OR 1.08; 0.85, 1.37 95% CI). More recently, an analysis of the 2012 National Health Interview Survey (NHIS) of 34,525 participants reported that women were more to report being a CAM users compared with men (59.1% vs. 40.0%). Further, female CAM users were more likely to use CAM for perceived benefits to overall wellness and preventive care while men were more likely to report using CAM modalities to improve physical or athletic performance (Chao and Wade, 2008). These and others' conclusions (Kronenberg et al., 2006; Huff and Tingley, 2015) highlight the complexities of gender and other socioeconomic factors on health decisions and the need for further study to further clarify the impact of gender on chiropractic use.

Additionally, the dataset discussed here reflects an over-sampling of respondents under 40 years of age compared with the U.S. population. The use of age groups that are biased towards those under 40 and not aligned with commonly used aged groups (e.g. United States Census Bureau) also renders a nuanced evaluation of these data difficult. This observation is unsurprising and represents a limitation of administering online surveys previously observed in the literature (Huff and Tingley, 2015; Sheehan, 2017). Furtherance of this work will leverage these findings to refine study sample selection.

Considering our and others' finding that NHB respondents were less likely to have prior experience with chiropractic compared with white respondents (Whedon and Song, 2012; Wilson et al., 2019; Weeks et al., 2016), we queried all respondents on a number of barriers to access to chiropractic are including barriers related to doctor-patient race concordance, healthcare costs (including transportation or lack thereof), trust/mistrust of chiropractic treatments and/or personal beliefs, and communications-related barriers. Among the seven barriers where white and NHB responses differed significantly, five were barriers that NHB respondents were more likely to report as preventing their access to chiropractic care compared with their white counterparts: doctor-patient race concordance, communication (due to language barriers), communication (due to disability), transportation, or lack of understanding on the part of the doctor. Although doctor-patient race concordance, that is sharing of racial and/or ethnic background of the doctor and patient, has been well studied in medicine there is a dearth of literature on the subject in chiropractic. One review has comprehensively reviewed gaps in both cultural competences across chiropractic doctors of all backgrounds and gaps in minority representation in the chiropractic workforce (Johnson and Green, 2012). Addressing these areas may lead to an increase in chiropractors who identify as racial and/or ethnic minorities, providing greater patient access to race concordant doctors. Further, the increased representation of underrepresented minorities may increase patient access to multilingual chiropractors.

Over 10% of NHB respondents selected "The doctor doesn't understand me" as a barrier to accessing chiropractic care. The language chosen intended to represent patients who may not feel heard by their doctor, as opposed to patients who feel they are not understood due to a language barrier; however, it is possible that ambiguity in the phrasing leads to misinterpretation and incorrect selection (or lack of selection) of this barrier. It is important to note that while 10.4% of NHB respondents selected this barrier, only 2.7 of NHB respondents selected the "Communication (English not primary language)" barrier. This suggests respondents understood the context of this barrier and selected it appropriately based on their perceptions. Some patients may hold cultural and/or religious beliefs, questions, and fears and feel a lack of empathy for said concerns. As noted above, two approaches to resolving these barriers are incorporating cultural competence training into all stages of chiropractic education and training a more diverse chiropractic workforce (Callender, 2006; Christensen et al., 2015).

Socioeconomic and disability-related barriers commonly prevent patient access to health care leading to worse outcomes, and elimination of such barriers has been postulated as a contributing mechanism to eliminate disparities in health (Andrulis, 1998; Arpey et al., 2017). Our findings suggest transportation is one socioeconomic barrier to access to chiropractic care by NHB patients; chiropractors may seek community resources to aid patients with transportation to and from appointments. Adoption and implementation of processes to aid in communicating and providing service for patients with disabilities (e.g., hearing, eyesight) and accessible equipment and facilities may also

improve access to care for these patients (Harmer, 1999; Yee and Breslin, 2010).

Limitations. The survey instrument presented in this study was reviewed for face, content, and construct validity using expert review panel methodology; criterion validity requires further study. The survey instrument was not piloted prior to administration to respondents. Sampling across groups was limited, and subsequently, some groups were represented disproportionately. Participants were more likely to be white and non-Hispanic, younger, and female with a moderate household income.

Conclusion

The chiropractic profession is the largest CAM profession and one of the largest licensed health care professions in the United States (Meeker and Haldeman, 2002; Cooper and McKee, 2003). Chiropractic providers render a large amount of care to underserved and rural populations (Smith and Carber, 2002). Yet, chiropractors see minority patients at less than half the rate of whites which raises concerns; reasons for this discrepancy are unknown. Further, whether the chiropractic profession is prepared (e.g., have a diverse workforce that is providing culturally competent care) to meet emerging demographic changes remains a topic of discussion (Johnson and Green, 2012). Lack of publications that address issues of diversity in the chiropractic profession demonstrate that there is significant room for growth and understanding (Johnson et al., 2012). The chiropractic profession has an obligation to increase the number of minority faculty and students within their programs. The profession should also make a concerted effort to reach out to minority communities about access to care and provide evidence-based information about benefits, costs, and safety of conservative, non-drug interventions for common, disabling spine-related problems.

Data availability

The datasets generated during and/or analyzed during the current study are available in the Harvard Dataverse repository, <https://doi.org/10.7910/DVN/WL5LTM>.

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Competing interests

The authors declare no competing interests.

Ethical approval

The questionnaire and methodology for this study was reviewed by the Institutional Review Board of Cleveland University - Kansas City and determined it exempt on the basis of it being an anonymous survey.

Informed consent

Informed consent was obtained from each participant prior to accessing the survey instrument.

Additional information

Supplementary information The online version contains supplementary material available at <https://doi.org/10.1057/s41599-021-00936-1>.

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