

Differences in Function and Comorbidities Between Older Adult Users and Nonusers of Chiropractic and Osteopathic Manipulation: A Cross-sectional Analysis of the 2012 National Health Interview Survey



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ABSTRACT

Objective: The purpose of this cross-sectional study was to compare functional limitations and comorbidity prevalence between older adult users and nonusers of chiropractic and osteopathic (DC/DO) manipulation to inform provider training.

Methods: We conducted a secondary analysis of the 2012 National Health Interview Survey data. Adults age 65 or older who responded to the survey were included. Descriptive statistics are reported for adults who used DC/DO manipulation (vs nonusers) regarding function, comorbidities, musculoskeletal complaints, and medical services. Weighted percentages were derived using SAS and compared with χ^2 tests.

Results: The DC/DO users were more often female, overweight or obese, and of white race than nonusers. More DC/DO users reported arthritis (55.3% vs 47.0%, <0.01) or asthma (15.0% vs 10.0%, $P < .01$) than nonusers; hypertension (61.9% vs 55.5%, $P = .02$) and diabetes (20.3% vs 15.7%, $P = .02$) were more prevalent in nonusers; and other comorbidities were comparable. The DC/DO users reported more joint pain/stiffness (55.7% vs 44.8%), chronic pain (19.8% vs 14.2%), low back pain (27.8% vs 18.4%), low back with leg pain (18.8% vs 10.6%), and neck pain (24.2% vs 13.1%) than nonusers (all $P < .01$). Functional limitations affected two-thirds overall, but DC/DO users reported more difficulties stooping and bending; other limitations were comparable. One in 9 reported activities of daily living or instrumental activities of daily living limitations; nonusers were more affected. Surgery was more common among DC/DO users (26.1% vs 19.3%, <0.01); emergency room visits were comparable.

Conclusion: Differences existed between older adult manipulation users and nonusers, especially surgical utilization, musculoskeletal complaints, and comorbidities; functional differences were modest. Our findings highlight areas for provider training and awareness regarding comorbidity burden and management needs in older patients who may simultaneously use manipulation and medical care for musculoskeletal complaints. (*J Manipulative Physiol Ther* 2019;42:450-460)

Key Indexing Terms: *Aged; Manipulation, Chiropractic; Manipulation, Osteopathic*

Americans age 65 and older comprise the largest segment of the US population.¹ Reducing chronic disease, mitigating disease risk, maintaining function, and support-

ing healthy aging are public health goals of increasing priority across a broad health care workforce.²⁻⁵

Chiropractic manipulation continues to be the most used provider-delivered complementary and alternative medicine (CAM) therapy among adults in the United States.^{3,6-8} Recent studies estimate that 14% to 16% of adults who use chiropractic or osteopathic (DC/DO) manipulation are age 65 or older, and this proportion has increased over time.^{3,9-12} Little is known about differences between older adults who use DC/DO manipulation and those who do not because studies do not separately report adults 65 years of age or older, and prior studies do not differentiate manipulation from general CAM users.^{3,13-15}

Adults who use CAM are purportedly healthier than adults who do not use CAM therapies.^{9,11,14} However, it is

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unknown whether this health status assumption applies to adults age 65 and older. Specifically, it is unknown how function and comorbidities differ between users and nonusers of DC/DO manipulation among adults age 65 or older in the United States.^{9,14} Because chiropractic students and practicing chiropractors receive limited geriatric clinical education, population-based functional and comorbidity information about older adult DC/DO users will better inform chiropractic practice and provider education needs surrounding comorbidity or chronic disease assessment and management in this age group and common functional limitations in a population-based study.

The purpose of this study was to compare functional limitations and comorbidities reported by adults 65 years of age or older by DC/DO manipulation status using a population-based survey sample.

METHODS

We conducted a secondary analysis of the 2012 National Health Interview Survey (NHIS) data. The NHIS is a nationwide, multistage household interview survey of noninstitutionalized US citizens regarding their health status and health care utilization.¹⁶ Supplemental questions on alternative medicine (CAM) use are asked of the NHIS sample adults every 5 years; 2012 was the most recent CAM survey for which data are available. Weights are provided for each record so that national estimates can be made.¹⁶ The NHIS data are deidentified and publicly available. Our institutional review board approved this study as exempt category 4 research.

Study variables were obtained from 3 2012 NHIS data files: Adult Sample (ADULT), Person (PERSON), and Adult Alternative Medicine (ADULTCAM). We obtained self-reported demographic, comorbidity, function, health status, health habit, and significant medical service utilization information from the PERSON and ADULT files. The type of provider(s) seen for manipulation was obtained from the ADULTCAM file. Variables selected for inclusion had documented or plausible effects on health status, function, and medical or chiropractic service use in older adults.^{3,9-11,17-19} In addition, we included survey items that indirectly identified the severity of health conditions or impairments, such as Activities of Daily Living (ADL) limitations,²⁰ the use of assistive devices, emergency room use, and surgery, because direct condition severity indicators are not reported in the NHIS. Data files were merged into 1 analytic file per NHIS instructions.¹⁶

We focused our analysis on adults aged 65 years or older; we refer to this sample as *older adults*. We divided this sample into those who reported using DC or DO manipulation in the past 12 months (DC/DO users), compared with a combined group of older adults who either had never used manipulation or had not received DC/DO manipulation in the past 12 months (nonusers).

Sample characteristics on age, sex, race, and highest level of education were obtained from the PERSON file. We used the continuous body mass index (BMI) variable to categorize individuals as underweight or normal ($BMI < 25$), overweight ($25 \leq BMI < 30$), obese ($BMI \geq 30$), or unknown if not reported.²¹ Cigarette smoking status (current, former, or never smoked) was determined from the variable *ever smoked 100 cigarettes* and by recoding the smoking frequency variable (everyday, some days, not at all) to account for “no” responses from the prior question. We report alcohol consumption status for lifetime abstainer, current moderate, or current heavier drinkers, which represent select responses that were directly identified by a single NHIS question. Respondents also rated their health status compared to 12 months ago as better, worse, or about the same.

Questions regarding comorbidities, health status, and health complaints were identified in the ADULT file using a variety of look-back periods. For comorbid conditions, adults were asked whether they had ever been told by a doctor or health provider professional that they had conditions such as a heart attack, stroke, cancer, or other medical or mental health conditions. For musculoskeletal conditions commonly seen by manipulation providers (such as sprains and strains), the survey identified adults who *reported having (condition) in the past 12 months*. Questions on spinal complaints were identified by questions such as, “During the past 3 months did you have...low back pain, low back pain with pain down leg/below knee, neck pain, or severe headache/migraine”; a 30-day look-back was used for a question on the presence of joint pain, aching, or stiffness.

We included major medical service utilization and days in bed in the past 12 months to better estimate the health status of respondents than can be determined from dichotomous comorbidity responses alone. Specifically, we identified the proportion of older adults who reported 1 or more visits to an emergency room (ER) in the past 12 months, the overall proportion who had an ER visit and were admitted to the hospital from the ER, the proportion of adults who reported having 1 or more surgical procedures, and each respondent’s estimated total number of days in bed owing to illness or injury, including days in the hospital, during the past 12 months.

Functional limitations were identified through a number of questions on general and specific tasks. For general limitations, adults indicated whether they had any functional limitation (all conditions), an overall functional limitation due to a chronic condition, a health problem that required special equipment, difficulty walking without equipment, or visual limitations, or used a hearing aid. Level of difficulty with specific functional tasks, such as walking one-quarter mile, climbing 10 steps, or lifting or carrying 10 pounds without special equipment, were rated by respondents from “not limited at all” to “can’t (or don’t) do

this activity.” We included 2 questions that identified adults who reported needing help with personal care (such as bathing, dressing, toileting, etc), which identified ADL limitations,²⁰ and those who needed help with routine tasks (such as shopping or household chores), which identified limitations in instrumental activities of daily living (IADL).²²

Further information on the NHIS question formats can be found in the 2012 NHIS data dictionaries.¹⁶

Statistical Analysis

Analyses were conducted using SAS software (version 9.4, SAS Institute Inc, Cary, North Carolina) to account for the complex sampling structure of the NHIS.¹⁶ We report descriptive statistics as the weighted percent of adults aged 65 years or older with the attribute (or yes response) who also reported DC/DO manipulation in the past 12 months vs nonusers; 95% CIs were calculated for estimates. Proportions of comorbidities and functional limitations per group were compared with χ^2 tests; *P* values of 0.05 or less were considered significant.

RESULTS

Of the 33 592 US adults who answered both the 2012 NHIS ADULT and ADULTCAM surveys, 7185 records were from individuals aged 65 years or older, which represents a weighted sample of 40.6 million older adults for this study. The remainder of this section reports proportions based on weighted results.

Among adults aged 65 years or older, 7.80% (95% CI 6.91%-8.69%) reported having seen a chiropractor or osteopathic physician for manipulation in the prior 12 months (Table 1). Another 18.67% (95% CI 17.46%-19.88%) had used DC/DO manipulation previously but not within the past 12 months, and 73.53% (95% CI 72.11%-74.96%) had never used DC or DO manipulation.

The overwhelming majority of older adult manipulation users saw only chiropractors (96.32%); 2.38% saw both a chiropractor and an osteopathic physician (DO), and only 1.31% received manipulative services exclusively by a DO. Therefore, we aggregated the category of manipulation users to include any adult aged 65 years or older who reported having seen a DC, DO, or both within the past 12 months (DC/DO users).

Sample Characteristics

More than half of older adult manipulation users were female (58.08%), and this proportion was similar among nonusers (55.87%, Table 1). Race and ethnicity differed between DC/DO users and nonusers, with older adult DC/DO users being of white race (91.18% vs 78.57% nonusers). Manipulation users were somewhat more educated than nonusers; fewer DC/DO users reported having a high school education or less.

The DC/DO users were more likely to be overweight or obese than nonusers (67.39% vs 62.12%, respectively; Table 1) and overall, 1 in 4 older adults was obese (BMI \geq 30, data not shown). Only 5.40% of DC/DO users aged 65 years or older currently smoked compared with 9.19% of nonusers. Less than 1 in 20 adults in both groups identified themselves as current heavier alcohol drinkers. Most older adults reported their health status as “about the same” as 12 months prior (69.73% DC/DO users, 75.27% nonusers).

Comorbidities and Musculoskeletal Complaints

Comorbidities were prevalent in DC/DO users and nonusers (Table 2). A higher proportion of DC/DO users than nonusers reported having ever been told that they had arthritis (55.34% vs 47.00%, *P* < .01) or asthma (15.02% vs 9.95%, *P* < .01); heart disease bordered on significantly higher in users (20.07% vs 15.83%, *P* = .06). Reports of hypertension (55.54% vs 61.90% nonusers, *P* = .02) and diabetes (15.67% vs 20.26% nonusers, *P* = .02) were significantly lower among DC/DO users. There were no significant differences between DC/DO users and nonusers in having ever been told that they had cancer, depression, heart attack, stroke, chronic obstructive pulmonary disease, or nondepression mental health disorders (Table 2).

Over the previous 12 months, DC/DO users more often reported muscle or bone pain (37.13% vs 27.55%, *P* < .01), other chronic pain (19.79% vs 14.19%, *P* < .01), and severe sprains or strains (10.54% vs 4.59%, *P* < .001) than nonusers (Table 2).

Spinal complaints within the past 3 months were significantly more common among older adult DC/DO users than nonusers (Table 2). Low back pain, low back with leg pain below the knee, and neck pain were more frequently reported by DC/DO users than nonusers (all *P* < .001). Almost half of DC/DO users (46.55%) reported low back pain with or without leg pain compared with 28.94% of nonusers (Table 2); nearly 1 in 5 older adult DC/DO users (18.81%) reported low back with leg pain below the knee as compared with 1 in 10 nonusers (10.57%, *P* < .001).

Reports of joint pain, aching, or stiffness in the past 30 days affected significantly more DC/DO users than nonusers (55.72% vs 44.80%, *P* < .001; Table 2).

Medical Service Utilization

Surgical procedures and ER visits were common among DC/DO users and nonusers (Table 2). Significantly more DC/DO users reported having had surgery in the past 12 months, compared with nonusers (26.05% vs 19.27%, *P* < .01). More than 1 in 4 older adults had at least one ER visit in the past 12 months, and this proportion was not significantly different between manipulation users and nonusers (23.01% vs 22.11%, respectively). One in 10 older adults were admitted to the hospital from an ER visit

Table 1. Characteristics of US Adults Age 65 or Older by Chiropractic or Osteopathic Manipulation Utilization Status^a

Variable	Used DC/DO Manipulation Past 12 Mo % ^b	Never Used or No DC/DO Manipulation Past 12 Mo % ^b
Age 65 years or older	7.80	92.20
Sex	-	-
Female	58.08	55.87
Race	-	-
White, non-Hispanic	91.18	78.57
Black, non-Hispanic	2.42	9.08
Hispanic	3.89	7.83
Asian, non-Hispanic	2.33	3.92
Non-Hispanic, all other races	0.19	0.60
Highest level of school completed	-	-
High school or less	42.68	49.41
Body mass index (BMI) ^c	-	-
Underweight or normal (BMI <25)	29.62	34.73
Overweight (25 ≤ BMI < 30)	42.64	38.26
Obese (BMI ≥ 30)	24.75	23.86
Unknown	3.00	3.16
Cigarette smoking status	-	-
Current smoker	5.40	9.19
Former smoker	44.33	40.67
Never smoked	50.26	50.14
Alcohol drinking status ^d	-	-
Lifetime abstainer	20.07	25.84
Current moderate	13.65	12.20
Current heavier	4.29	3.51
Health, compared to 12 mo ago	-	-
Better	19.73	14.17
Worse	10.18	10.49
About the same	69.73	75.27

BMI, body mass index; DC/DO, chiropractor and/or osteopathic physician.

^a 2012 National Health Interview Survey.

^b Column percentages based on the weighted group size estimate (except age). The overall weighted sample of adults age 65 or older was 40 564 566 (7185 surveys), of which 543 adults represent an estimated 3 163 932 DC/DO users. Frequencies are not shown with percentage estimates because of the size of the national estimates.

^c BMI categories as per the Centers for Disease Control and Prevention in kg/m²: https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html.

^d Select response categories shown.

Table 2. Comorbidities, Musculoskeletal Complaints, and Major Medical Services Used by Adults Age 65 or Older, by Chiropractic and/or Osteopathic Manipulation Utilization Status^a

Variable	Used DC/DO Manipulation Past 12 Mo %	Never Used or No DC/DO Manipulation Past 12 Mo %	P Value
Comorbidities (ever ^b)	-	-	-
Hypertension	55.54	61.90	.02
Arthritis ^c	55.34	47.00	<.01
Cancer (any type)	23.48	24.01	.82
Heart condition/disease	20.07	15.83	.06
Diabetes	15.67	20.26	.02
Asthma	15.02	9.95	<.01
Depression	14.49	13.30	.53
Heart attack	8.46	10.28	.29
Stroke	7.98	8.21	.88
Chronic obstructive pulmonary disease	7.54	7.61	.97
Other mental health disorder (excludes bipolar)	2.05	1.84	.72
Reported having, past 12 mo	-	-	-
Muscle or bone pain	37.13	27.55	<.01
Other chronic pain	19.79	14.19	<.01
Severe sprain(s) or strain(s)	10.54	4.59	<.01 ^e
Memory loss	8.80	10.27	.42
Neurologic problems	7.51	5.25	.05
Recurring headache	7.50	6.56	.49
Spinal complaints, past 3 mo	-	-	-
LBP ^d	27.74	18.37	<.01 ^e
LBP with pain down leg/below knee ^d	18.81	10.57	<.01 ^e
Neck pain	24.22	13.13	<.01 ^e
Severe headache/migraine	6.55	5.48	.35
Joint pain/aching/stiffness, past 30 d	55.72	44.80	<.01 ^e
Medical services, bed days, past 12 mo	-	-	-
Had surgery/surgical procedure(s)	26.05	19.27	<.01
Had ER visit(s) ^d	23.01	22.11	.72
Had ER visit/was admitted to hospital ^d	9.81	11.10	.44

(continued on next page)

Table 2. (continued)

Variable	Used DC/DO Manipulation Past 12 Mo %	Never Used or No DC/DO Manipulation Past 12 Mo %	P Value
None	69.69	70.53	-
1-7	19.29	20.18	-
8-14	4.18	2.28	-
15-365	6.22	6.09	-
Don't know/refused	0.64	0.91	-

DC/DO, chiropractor and/or osteopathic physician; LBP, low back pain.

^a 2012 National Health Interview Survey. Unless otherwise noted, adults who reported more than one comorbidity, complaint, or health service under each subheading are reflected in proportions for each condition/service.

^b Comorbidities: Ever been told by doctor/provider that you had any of these conditions?

^c Arthritis in the NHIS includes osteoarthritis, rheumatoid arthritis, lupus, and fibromyalgia.

^d Recoded to these mutually exclusive categories.

^e $P < .001$.

in the past 12 months; this proportion did not significantly differ between groups ($P = .44$).

Days spent in bed owing to illness or injury, including inpatient hospital days, were similar between groups ($P = .36$, Table 2).

Functional Limitations

Functional limitations were common. More than 6 in 10 older adult DC/DO users (65.67%) and nonusers (63.00%) reported having a functional limitation owing to at least 1 chronic condition, 1 in 5 had a health problem that required special equipment, and 1 in 6 reported difficulty walking without equipment (Table 3). Although a significantly higher proportion of DC/DO users reported visual impairments than nonusers (trouble seeing even with glasses or lenses, 17.83% vs 12.20%, $P < .01$), there were no significant differences between manipulation users and nonusers in the proportion of adults who reported having difficulty walking without equipment, needing special equipment for a health problem, using a hearing aid (data not shown), and having an overall functional limitation owing to at least 1 chronic condition (Table 3).

Overall, less than 1 in 9 older adults needed help with daily tasks (Table 3). Nonusers more often needed help with ADL (6.12% vs 2.23% users, $P = .001$) and IADL (11.48% vs 6.89% users, $P < .01$) than did DC/DO users. Post hoc exploratory analysis of adults who reported ADL limitations identified a low back pain prevalence of 73.27% among DC/DO users (42.46% nonusers), a neck pain prevalence of 43.43% in DC/DO users (20.61% nonusers), and at least 1 surgery in the past 12 months in 25.13% of DC/DO users (27.93% nonusers, data not shown elsewhere). Post hoc analysis of those who reported IADL limitations found a low back pain prevalence of 69.67% in

DC/DO users (45.24% nonusers), a neck pain prevalence of 40.31% in DC/DO users (23.56% nonusers), and at least 1 surgery in the past 12 months in 20.25% of DC/DO users (24.78% nonusers, data not shown elsewhere).

Specific functional and mobility limitations were prevalent in both groups, but differences between DC/DO users and nonusers varied in only a limited number of tasks. Overall, 2 in 5 older adults (19.59%) reported great difficulty or inability to walk one-quarter mile without special equipment. Significantly more DC/DO users reported difficulties trying to stoop, bend, or kneel (somewhat, very, or can't do at all) compared with nonusers (40.48% vs 33.79%, $P = .001$; Table 3). However, more nonusers reported having difficulties lifting or carrying 10 pounds than did DC/DO users ($P = .023$; Table 3). There were no significant differences between the groups in their reported ability to walk one-quarter mile, climb 10 steps, stand or be on their feet for 2 hours, or sit for 2 hours without special equipment (all $P > .05$; Table 3). The most prevalent functional limitations without the use of special equipment were stooping, bending, and kneeling, followed by standing or being on your feet for 2 hours and walking one-quarter mile. Among those who reported having specific task limitations, more DC/DO users mentioned that a back or neck problem (22.38% vs 13.08% nonusers) or a fracture, bone, or joint injury (8.26% vs 4.70% nonusers) caused difficulty with activity (data not shown).

DISCUSSION

In contrast to prior studies,^{9,23} our results suggest that older DC/DO users as a group may not be healthier than older nonusers in frequency of comorbidities, but that the types of comorbidities, surgical utilization, and musculoskeletal complaints differ between groups. Functional

Table 3. Functional Limitations in Adults Age 65 or Older by Manipulation Utilization Status^a

Limitation	Used DC/DO Manipulation ^b %	Never/No Manipulation %	P Value
I. General	-	-	-
Health problem requires special equipment	16.56	20.34	.07
Difficulty walking without equipment	14.67	17.62	.13
Trouble seeing even with glasses/lenses	17.83	12.20	<.01
Any functional limitation, all conditions	65.67	63.00	.33
Overall functional limitation due to chronic condition	63.73	61.09	.25
II. ADL	-	-	-
Needs help with routine tasks (instrumental ADL)	6.89	11.48	<.01
Needs help with personal care (ADL)	2.23	6.12	<.01 ^b
III. Specific tasks: without special equipment	-	-	-
Walk one-quarter mile	-	-	.22
Not at all difficult	63.71	57.83	-
Only a little difficult	9.48	8.48	-
Somewhat difficult	6.49	7.78	-
Very difficult	4.56	5.87	-
Can't do at all	11.15	14.04	-
Do not do this activity	4.62	6.00	-
Climb 10 steps	-	-	-
Not at all difficult	73.24	67.41	.11
Only a little difficult	8.98	8.01	-
Somewhat difficult	4.59	6.37	-
Very difficult	4.95	5.93	-
Can't do at all	6.47	9.36	-
Do not do this activity	1.77	2.92	-
Lift/carry 10 lbs.	-	-	.02
Not at all difficult	79.99	74.13	-
Only a little difficult	5.46	6.22	-
Somewhat difficult	6.10	4.90	-
Very difficult	2.49	3.49	-
Can't do at all	4.60	7.85	-

Table 3. (continued)

Limitation	Used DC/DO Manipulation ^b %	Never/No Manipulation %	P Value
Do not do this activity	1.38	3.41	-
Stoop, bend, or kneel	-	-	<.01 ^b
Not at all difficult	48.73	50.56	-
Only a little difficult	9.66	13.31	-
Somewhat difficult	19.29	11.47	-
Very difficult	11.89	10.18	-
Can't do at all	9.30	12.14	-
Do not do this activity	1.13	2.35	-
Stand/be on your feet for 2 hours	-	-	.10
Not at all difficult	54.27	54.20	-
Only a little difficult	11.37	9.63	-
Somewhat difficult	10.81	7.44	-
Very difficult	5.94	6.81	-
Can't do at all	13.63	17.04	-
Do not do this activity	3.98	4.89	-
Sit for 2 hours	-	-	.71
Not at all difficult	84.04	85.24	-
Only a little difficult	7.59	5.80	-
Somewhat difficult	3.95	4.08	-
Very difficult	2.53	2.25	-
Can't do at all	1.44	1.92	-
Do not do this activity	0.45	0.71	-

ADL, activities of daily living; DC/DO, chiropractor and/or osteopathic physician.

^a 2012 National Health Interview Survey.

^b $P \leq .001$.

differences were modest, except that ADL and IADL limitations were more prevalent among nonusers. Although arthritis, joint pain, back and neck pain, and other chronic pain were more prevalent among DC/DO users, these factors do not appear to translate into substantially different activity limitations between groups.²⁴

Surgery was more common among DC/DO users than nonusers. The higher prevalence of musculoskeletal pain, arthritis, joint pain or stiffness, overweight, and difficulty

stooping, bending, and kneeling among DC/DO users compared with nonusers suggests that these factors may be associated with degenerative conditions or with common elective surgeries used to treat degenerative conditions, such as hip or knee arthroplasty or spinal decompression or fusion.²⁵⁻³¹ However, it is not possible to determine the type or timing of surgery relative to DC/DO services from the NHIS.

There were more overweight or obese older adults among DC/DO users, yet a significantly lower reported prevalence of

diabetes among users. Because obesity is a risk factor for diabetes, the significance of this finding is unclear. In the absence of compelling functional differences from a relatively small number of functional variables, we cannot determine whether the DC/DO users were potentially more active than nonusers²⁴ or if diabetes may have been underdiagnosed or under-reported among DC/DO users.

Several findings are similar to results of other studies that reported on older adult DC/DO manipulation^{9,11} or general CAM users.^{14,24,32} We found that DC/DO users were more likely to be of white race,^{9,11,14} have arthritis,^{11,24} be overweight or obese,⁹ and report spinal or other pain^{9-11,24,32} compared with nonusers. We also found that back pain, arthritis or joint disorders, headaches, and cardiovascular conditions were more prevalent among older adult DC/DO users.^{10,33}

Maintaining functional mobility and managing musculoskeletal conditions are important to healthy aging in general, and for the primary and secondary prevention of other noncommunicable diseases among older adults.³⁴ Our study adds important population-based information about the health and functional status of older adults who use chiropractic (DC/DO) care and can be used to inform and improve chiropractic provider and student training. Chiropractic programs have limited academic and hands-on clinical training with older adults.³⁵ Current chiropractic geriatric care recommendations are based upon consensus and limited clinical trials⁵ or lower-quality data (case series/reports). The few existing geriatric clinical trials of chiropractic manipulation^{36,37} have enrolled generally healthy and rather high-functioning older adults, leaving a common generalizability gap between research study and clinical practice patients. Therefore, our findings can be used to increase provider and trainee awareness of the complexity of caring for older adults and for enhancing educational programs for manipulation providers and students.

Given these findings, it is important for chiropractic and osteopathic providers to inquire about surgeries, medical conditions, and concomitant medical treatments, including the status of routine health screening tests among their patients. A prior study found that only 6 in 10 adults report DC/DO manipulation to their primary care provider³⁸; it is plausible that reporting by adults aged 65 years and over may differ. Given the high prevalence of comorbidities, low back pain with or without leg pain, and surgical utilization in DC/DO users, care approaches may differ across disciplines, be duplicative, or be contraindicated for specific conditions.

Limitations and Future Research

The timing of major medical service utilization relative to DC/DO visits and its impact on survey responses cannot be determined. Neither the type of surgical intervention nor the elective vs nonelective nature of surgical procedures is

available in the NHIS; this information would better elucidate the health status of surveyed adults. Comorbidity information in the NHIS is limited to the presence or absence of select self-reported medical and psychiatric conditions within indeterminate look-back time frames. Because comorbidity summary scales were not suitable or developed for the NHIS, we instead reported group prevalence estimates of specific comorbidities by manipulation utilization status. In addition, we included major health service utilization, days in bed, and ADL and IADL limitations to better estimate the health status of respondents than can be determined from dichotomous comorbidity responses alone. The NHIS includes noninstitutionalized persons only, thereby omitting adults in residential care facilities (eg, nursing homes). Although this sampling practice is not expected to bias our description of older adult DC/DO users who are typically community-dwelling, impairments may differ in DC/DO nonusers if surveys of institutionalized older adults had been conducted. This study is descriptive; causal inferences are not possible. The NHIS provides cross-sectional data; alternative data sources could provide stronger, more detailed information on comorbidities, health service timing, and outcomes. As is common with surveys, self-reported information is subject to reporting and recall bias, although we do not expect such potential biases to differ between groups. We only evaluated 1 year of data, so the findings are limited to 2012.

Future research linking claims with survey data could better identify comorbidity severity, event outcomes, and health service utilization differences between DC/DO users and nonusers that would provide more detailed information for provider training.

CONCLUSION

For the 2012 NHIS data, differences existed in the types of medical comorbidities, musculoskeletal complaints, and frequency of recent surgery between users and nonusers of chiropractic or osteopathic manipulation among older adults in the United States. Functional differences were generally modest. Our findings highlight areas for chiropractic provider awareness given the high prevalence of treatable or preventable comorbid conditions. Knowledge of these differences can better inform chiropractic or manipulative provider training needs regarding comorbidity and functional assessment and management to improve the health care of older adults in the United States.

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Concept development (provided idea for the research): M.L.F., M.M.

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Data collection/processing (responsible for experiments, patient management, organization, or reporting data): M.L.F.

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Practical Applications

- In this study, most older adults who used manipulation saw doctors of chiropractic.
- Manipulation users more often reported arthritis, asthma, chronic pain, and spinal pain than nonusers.
- Functional limitations affected two-thirds of older adults; limitations were comparable between manipulation users and nonusers.

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