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Acupuncture and Chiropractic Care: Utilization and Electronic Medical Record Capture

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Acupuncture and chiropractic care are popular among patients, especially those who suffer from chronic musculoskeletal pain.¹ Caring for this population has become an increasingly important and visible challenge for the healthcare system. Pharmaceuticals are commonly used for managing pain, yet the use of such agents on a chronic basis is of questionable efficacy, and can be associated with high costs and significant adverse effects.^{2,3} For example, nonsteroidal anti-inflammatory drugs can cause gastrointestinal toxicity or renal failure, while use of narcotic analgesics can be associated with somnolence, constipation, addiction, diversion of medications, and other problems.

Although many health insurers cover acupuncture and chiropractic care for pain management, such coverage is often limited in scope, and integration of acupuncture and chiropractic care with conventional practice may be piecemeal or nonexistent.⁴⁻¹⁰ Health insurance providers may allow patients to self-refer for acupuncture and chiropractic care, or may require patients to first obtain a referral from a primary care physician. Which mechanism is optimal in terms of patient satisfaction, inter-clinician communication, and clinical outcomes has not been explored.

Ultimately, better integration may require a more robust evidence base toward identifying the optimal clinical context for acupuncture and chiropractic use. In developing such an evidence base, attention is turning to analyses of data from clinical and administrative electronic medical records (EMRs) to enhance both conventional and innovative study designs.¹¹ EMRs contain potentially useful information on large numbers of patients that is already being collected in the context of routine care delivery. It is unclear, however, to what extent such electronic databases contain information about acupuncture and chiropractic utilization that is accurate or complete.

We recently surveyed chronic musculoskeletal pain patients in a large health maintenance organization (HMO) to ascertain the extent to which EMRs are capturing acupuncture

ABSTRACT

Objectives: To describe acupuncture and chiropractic use among patients with chronic musculoskeletal pain (CMP) at a health maintenance organization, and explore issues of benefit design and electronic medical record (EMR) capture.

Study Design: Cross-sectional survey.

Methods: Kaiser Permanente members meeting EMR diagnostic criteria for CMP were invited to participate. The survey included questions about self-identified presence of CMP, use of acupuncture and chiropractic care, use of ancillary self-care modalities, and communication with conventional medicine practitioners. Analysis of survey data was supplemented with a retrospective review of EMR utilization data.

Results: Of 6068 survey respondents, 32% reported acupuncture use, 47% reported chiropractic use, 21% used both, and 42% used neither. For 25% of patients using acupuncture and 43% of those using chiropractic care, utilization was undetected by the EMR. Thirty-five percent of acupuncture users and 42% of chiropractic users did not discuss this care with their health maintenance organization (HMO) clinicians. Among chiropractic users, those accessing care out of plan were older ($P < .01$), were more likely to use long-term opioids ($P = .03$), and had more pain diagnoses ($P = .01$) than those accessing care via clinician referral or self-referral. For acupuncture, those using the clinician referral mechanism exhibited these same characteristics.

Conclusions: A majority of participants had used acupuncture, chiropractic care, or both. While benefit structure may materially influence utilization patterns, many patients with CMP use acupuncture and chiropractic care without regard to their insurance coverage. A substantial percentage of acupuncture and chiropractic use thus occurs beyond detection of EMR systems, and many patients do not report such care to their HMO clinicians.

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ture and chiropractic utilization among their membership. In particular, we address the following questions:

1. **Description of acupuncture and chiropractic use.** What is the prevalence of self-reported acupuncture and chiropractic use among chronic musculoskeletal patients at the HMO? Which types of patients use acupuncture? Chiropractic care? What are the perceived barriers to such use? How often do acupuncture and chiropractic users communicate such use to their HMO clinicians?

2. **Medical record capture.** To what extent is acupuncture and chiropractic utilization captured by the HMO's EMR?

3. **Utilization and benefit coverage.** How, if at all, do patients who access acupuncture and chiropractic care through various mechanisms differ from one another?

METHODS

Setting and Coverage Policies

Kaiser Permanente Northwest (KPNW) is a group model HMO serving approximately 500,000 members in Oregon and Washington. KPNW members can be referred by an HMO clinician for acupuncture and chiropractic care based upon locally developed evidence-based referral guidelines.^{12,13} In brief, for chiropractic care, referrals are approved for acute nonradicular back or neck pain. Acupuncture referrals can be approved for most chronic pain conditions. Acupuncture and chiropractic care are provided by clinicians affiliated with Complementary Health Plans (CHP), a network of credentialed acupuncturists and chiropractors with which KPNW contracts. CHP acupuncturists and chiropractors bill KPNW directly for services provided under this mechanism. We describe this mechanism for accessing care as "clinician referral."

In addition, many KPNW members or their employers have purchased a self-referral insurance rider, which allows patients to directly access a CHP acupuncturist or chiropractor for any indication, up to annual utilization limits. Payment for these benefits is made on a capitated basis from KPNW to CHP, and acupuncture and chiropractic clinicians thus bill CHP for office visits and services provided. Approximately one-third of KPNW patients reside in southwest Washington, where some coverage of acupuncture and chiropractic services is mandated by the state, while the remainder live in Oregon, where there is no such mandate. All KPNW Washington members have a self-referral benefit for chiropractic care, paid for on a

Take-Away Points

- A majority of health maintenance organization (HMO) participants with chronic musculoskeletal pain had used acupuncture, chiropractic care, or both.
- While benefit structure may materially influence utilization patterns, many patients with chronic pain use acupuncture and chiropractic care without regard to their insurance coverage.
- A substantial percentage of acupuncture and chiropractic use occurs beyond detection of electronic medical record systems, and many patients do not report their acupuncture and chiropractic utilization to their HMO clinicians.
- Better acupuncture and chiropractic integration offers opportunities for improved management algorithms and more efficient utilization of resources.

capitated basis. We describe this mechanism for accessing care as "self-referral."

KPNW infrastructure includes a comprehensive EMR used for all patient encounters. This EMR allows for tracking of patient demographics, diagnoses, referrals, billing, and utilization. We are thus able to capture acupuncture and chiropractic services billed and received through the "clinician referral" mechanism electronically with the KPNW EMR. For this analysis we accessed EMR data for the years 2009 to 2011.

CHP also maintains an electronic database, tracking visits, diagnoses, and procedures for "self-referral" patients. Electronic data from the CHP database were available for this analysis for the year 2011.

Participants

We developed a comprehensive *International Classification of Diseases, Ninth Revision, Clinical Modification* code list to identify patients whose pattern of clinical diagnoses in their EMR was consistent with chronic musculoskeletal pain.¹⁴ The sample was operationally defined as including KPNW members aged at least 18 years at the time of their first medical visit with a pain-related diagnosis, with ≥ 3 outpatient (ie, emergency department, ambulatory visit, e-mail, or telephone) encounters evident in the EMR, spanning at least 180 days but no more than 18 months. We required appropriate diagnostic codes indicating: 3 occurrences of musculoskeletal pain diagnoses; or first diagnosis of musculoskeletal pain and 2 subsequent diagnoses of nonspecific chronic pain; or first diagnosis of musculoskeletal pain with 1 additional musculoskeletal pain diagnosis and 1 nonspecific chronic pain diagnosis. These eligibility criteria are described in more detail elsewhere.¹⁴

Survey Methods

Patients meeting the criteria for chronic musculoskeletal pain described above between 2009 and 2011 were invited to complete a survey online, by mail, or by phone. The invitation emphasized a broad interest in

identifying treatment and self-care activities to manage persistent pain, framed as “We want to know what works for you.” The survey included questions related to self-identified presence of chronic pain, self-reported use of acupuncture and chiropractic care, use of ancillary self-care modalities (ie, yoga, tai chi/qigong, supplements, massage, meditation, physical activity, diet, other), and communication with conventional medicine practitioners about acupuncture and chiropractic use. Where patients indicated through survey response that they had utilized acupuncture or chiropractic care without using their HMO insurance, we designated such access to care as “out of plan.”

Prior to survey implementation, we pretested the survey with 5 patients with chronic musculoskeletal pain identified from participants in a psycho-educational program for pain patients offered through the KPNW pain clinic. From this group, we selected for interview patients who, upon completing the draft survey, either had self-identified using out-of-plan complementary/alternative medicine (CAM) services or those whose response patterns evidenced confusion regarding survey questions. The goal of the interviews was to obtain patient feedback regarding important points missed and to tailor wording to enhance acceptability and avoid ambiguity.

Members meeting chronic musculoskeletal pain criteria were contacted by mail with a postcard inviting them to log on to a website to complete the survey online. The initial online response rate to the post card was 4% (N = 1731). After 2 weeks, those who did not respond were contacted by e-mail (N = 4885) or were sent a paper copy of the survey by US mail (N = 34,211). Finally, 10% of nonresponders—selected based upon the date they had been mailed the survey—were called and invited to complete the survey by phone. Ultimately, of the surveys completed, approximately 5% were completed by phone, 18% were completed online, and 77% were completed on paper and mailed back.

Analysis

Chi-square tests were used for comparisons on categorical variables. ANOVA was used for continuous variables. As our purpose was to generate, rather than test, hypotheses, we did not correct for multiple comparisons.

RESULTS

Description of Acupuncture and Chiropractic Use

Of 49,426 patients invited to participate, 8264 (16.7%) participants responded. Of these, 6068 (73.4%) self-reported chronic musculoskeletal pain and as such, the focus of

this manuscript. These 6068 participants were predominantly Caucasian (94%) and female (71%), with a mean age of 61 years (SD = 13). Thirty-two percent reported acupuncture use for pain, while 47% reported chiropractic use for pain. The number reporting both acupuncture and chiropractic use was 21%. Forty-two percent of respondents used neither acupuncture nor chiropractic care.

The 4 usage groups differed significantly in age and gender (Table 1). In addition, the percentage of participants self-reporting back pain, neck pain, muscle pain, headache, fibromyalgia, or abdominal/pelvic pain was highest in the group using both acupuncture and chiropractic services.

Barriers. Among the 4113 individuals who reported never having used acupuncture services, the most commonly cited reasons were: never considered doing so, cost, and didn't know a reputable provider (Table 2). Among the 3211 individuals who reported never having used chiropractic services, the most commonly cited reasons were: never considered, didn't think it would help, and cost.

Communication. Of those using only acupuncture, 35% did not discuss their acupuncture use with their primary care provider, while 42% of those using only chiropractic services did not discuss their chiropractic use (Table 3). However, most of these individuals indicated that they would do so if asked about such use.

Medical Record Capture

Figures 1 and 2 describe the distribution of utilization for acupuncture and chiropractic care across different referral mechanisms for the year 2011.

For acupuncture, data were captured for 667 patients. Of these, 168 (25%) utilized acupuncture entirely out of plan, and were not captured by the EMR. Overall, 229 (34%) users of acupuncture were treated with some acupuncture out of plan. More than half (55%) of patients using acupuncture in 2011 did so entirely based upon clinician referral, while 9% of patients used acupuncture entirely based upon a self-referral benefit. Of 428 patients who used a clinician referral, 52 (12%) supplemented their health plan benefit with additional out-of-plan utilization.

For chiropractic care, data were captured for 887 patients. Of these, 381 (43%) utilized chiropractic services entirely out of plan, and thus were not captured by the EMR. Overall, 478 (54%) participants used at least some type of chiropractic care out of plan; 323 patients (36%) utilized a chiropractor based solely upon self-referral benefit coverage; and only 78 patients (9%) did so based solely upon clinician referral. Of the 408 patients who used chiropractic care in 2011 using a self-referral benefit, 77 (19%)

■ **Table 1.** Participant Demographics and Reported Pain Diagnoses

	Total Sample N = 8264	Respon- dents n = 6068	Used Chiro Only n = 1579	Used Acu Only n = 677	Used Both n = 1278	No Acu/ Chiro Use n = 2534	P ^a N = 6068
Female (%)	69	71	68	75	76	68	<.0001
Age (mean ± SD)	61 ± 14	61 ± 13	59 ± 13	61 ± 14	58 ± 13	64 ± 13	<.0001
Caucasian (%)	93	94	95	94	94	94	.6374
Self-reported diagnoses from survey (%)							
Back pain	–	64	75	62	76	51	<.0001
Joint pain	–	57	57	56	57	57	.9719
Arthritis	–	54	54	56	49	56	.0018
Extremity pain	–	56	55	57	56	56	.6739
Neck pain	–	38	47	36	53	26	<.0001
Muscle pain	–	31	32	31	41	25	<.0001
Headache	–	23	26	22	33	15	<.0001
Fibromyalgia	–	15	16	17	22	11	<.0001
Abdomen/pelvis	–	10	12	9	13	9	<.0001
Other	–	10	9	13	11	9	.0190

Acu indicates acupuncture; chiro, chiropractic care.
^aTwo-tailed *P* for comparing 4 usage groups based on 1-way ANOVA (continuous data) or Pearson χ^2 test (proportions).

supplemented their self-referral health plan benefit with additional out-of-plan utilization.

Thus, for acupuncture, most utilization was based upon clinician referral. In contrast, for chiropractic care, relatively little utilization was based upon clinician referral, with the great majority of patients accessing care out of plan only, through self-referral, or both.

Utilization and Benefit Coverage

For this set of analyses, data are included for the subset of patients indicating 2011 utilization. “Out of plan only” describes participants in area C of the Venn diagrams of Figures 1 and 2. “Clinician referral” describes participants in areas A + F of the Venn diagrams: those who used the clinician referral mechanism for at least some of their care. “Self-referral” describes participants in areas B + G of the Venn diagrams: those who used the self-referral mechanism for at least some of their care. The small number of patients in areas D and E were dropped.

There were no differences among the 3 groups (ie, out-of-plan only, clinician referral, and self-referral) with respect to gender, ethnicity, or smoking status. For chiropractic, there was a tendency for those accessing care out of plan only to be older (mean age = 58 years; SD = 13; *P* <.01), to use long-term opioids (16%; *P* = .03), and to have more pain diagnoses (mean = 4.2; SD = 2.1; *P* = .01). For acupuncture, there was a tendency for those using a clinician referral mechanism to exhibit these same characteris-

tics (mean age = 59 years, SD = 13, *P* <.01; long-term opioid use = 21%, *P* = .02; mean number of pain diagnoses = 4.0, SD = 2.1, *P* = .01). Acupuncture patients receiving clinician referral care were also less educated compared with those using self-referral or out-of-plan only care (high school/GED or less = 20%, some college = 44%, college graduate or more = 36%; *P* <.01).

For chiropractic users, the most commonly used additional CAM modality was massage (55% for out-of-plan only, 57% for clinician referral, and 53% for self-referral). However, there were no significant differences among the 3 utilization groups with respect to self-reported use of any of the additional CAM modalities, including massage, yoga, tai chi/qigong, supplements, meditation, physical activity, diet, or other. For acupuncture users, the most commonly used additional CAM modality was also massage (52% for out-of-plan only, 46% for clinician referral, and 56% for self-referral). Acupuncture users accessing care through self-referral were more likely than clinician referral or out-of-plan only users to report use of dietary (23%; *P* = .02) or other (24%; *P* = .03) modalities.

Participants accessing acupuncture via clinician referral were significantly more likely than those accessing acupuncture via self-referral or out of plan only to self-report pain in the back (73%; *P* = .01), muscles (41%; *P* = .03), or pain due to arthritis (54%; *P* <.01). For chiropractic care, those obtaining care out-of-plan only were significantly more likely to report extremity pain (59%; *P* = .02).

Table 2. Reasons for Not Seeking Acupuncture or Chiropractic Services

	Never Used Acupuncture (n = 4113)		Never Used Chiropractic (n = 3211)	
	Prev (%)	95% CI	Prev (%)	95% CI
Cost	28	26.3-29.0	17	15.3-17.9
Don't know reputable provider	18	17.1-19.4	10	8.6-10.6
Discomfort with or fear of the procedure	8	7.4-9.1	15	13.9-16.4
Safety concerns	5	4.2-5.5	14	12.7-15.1
Don't think it will help	13	11.7-13.8	23	21.3-24.2
Never considered	45	43.3-46.4	31	29.1-32.3

Prev indicates prevalence.

Table 3. Patterns of Reporting Acupuncture and Chiropractic to Provider

N = 2200	Used Only Acu (n = 668) ^a	Used Only Chiro (n = 1532) ^a
	Prev (%)	Prev (%)
No, I would never do this	1	2
No, but would tell if asked	34	40
Shared some info	27	25
Shared everything	30	26
Other	7	7

Acu indicates acupuncture; chiro, chiropractic care; prev, prevalence.
^aExcludes those missing responses to the question (acu only, n = 9; chiro only, n = 47), 2-tailed $P = .048$ based on Pearson χ^2 .

DISCUSSION

The use of acupuncture and chiropractic care among HMO chronic pain patients responding to our survey was substantial. Those using neither acupuncture nor chiropractic care (42%) were in the minority. The data also suggest that a substantial percentage of acupuncture and chiropractic use is not documented by the EMR, and/or is not reported by patients to their HMO clinicians.

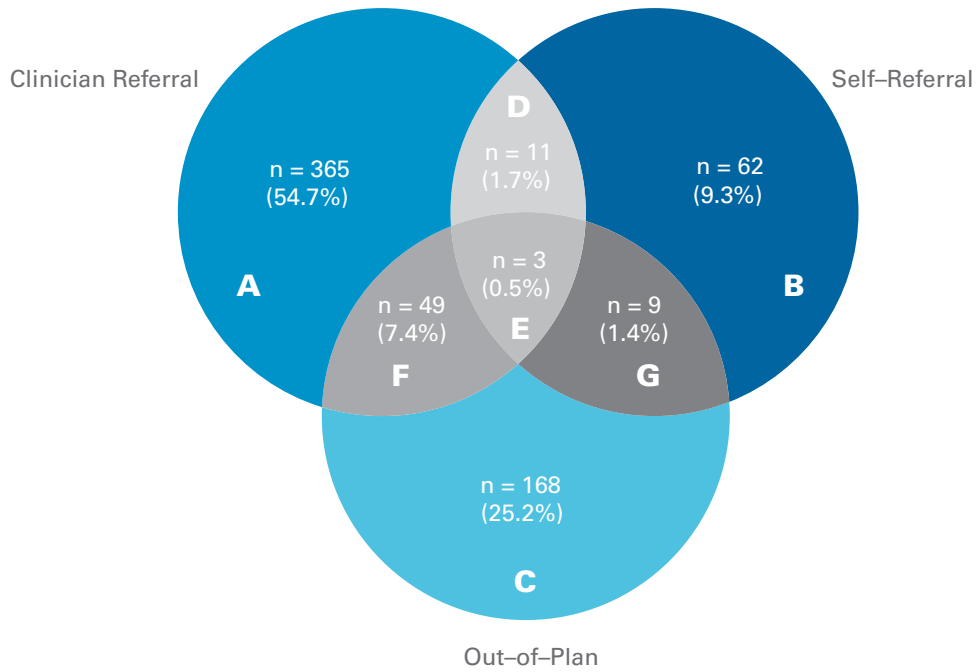
While investigators may use clinical and administrative databases to enhance study design, results suggest that EMR data fail to detect a substantial percentage of acupuncture and chiropractic utilization, even in an integrated delivery system with allowable referrals to acupuncture and chiropractic care, as well as a state-of-the-art EMR system. Any EMR-based analysis of acupuncture and chiropractic use would require additional survey or other data collection to capture the full spectrum of care.

Clinicians should assume that a substantial percentage of their patients with chronic musculoskeletal pain are receiving acupuncture and chiropractic care. For both acupuncture and chiropractic users, the most commonly endorsed answer to the question, “Did you share information about acupuncture/chiropractic use with your

HMO clinician?” was “No, but would tell if asked.” This finding serves to emphasize the importance of clinicians raising this topic in routine encounters with chronic pain patients. Engaging the patient in a discussion about acupuncture and chiropractic use can provide information for optimizing care. Such discussions can reinforce a patient’s self-management efforts and potentially provide insight into the types of patients who may be, or should be, using acupuncture and/or chiropractic services. Clinicians should also consider direct communication with acupuncturists and chiropractors about patients they are co-managing. This may allow better coordination of care and will potentially improve outcomes.

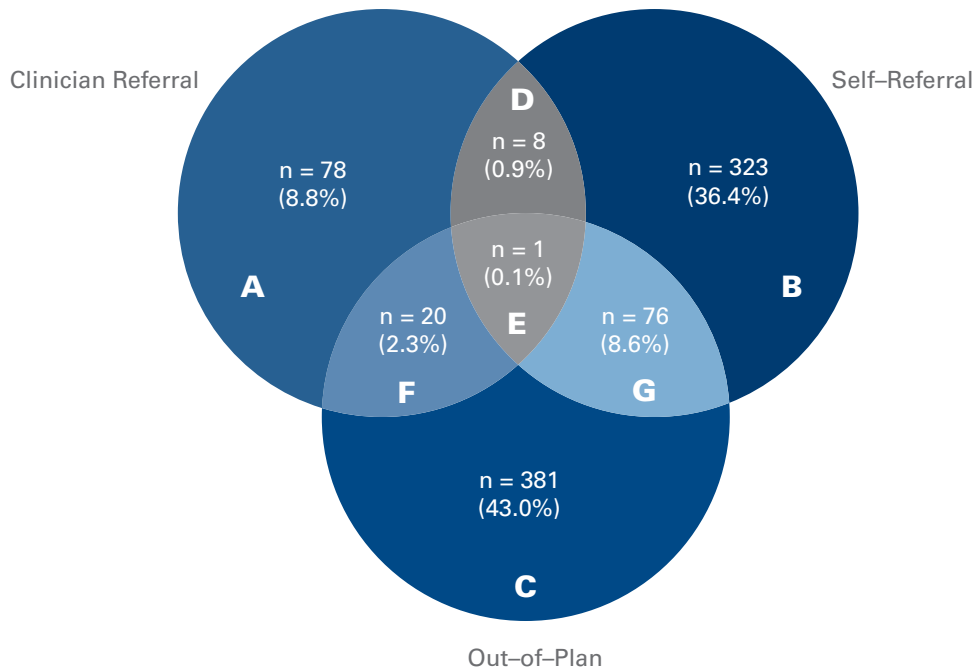
Our data suggest that, to a substantial extent, insurance benefits influence who uses acupuncture and chiropractic care, and under what circumstances. For acupuncture, the majority of utilization was based upon clinician referral. In contrast, for chiropractic care, relatively little utilization was based upon clinician referral, with the great majority of patients accessing care out of plan (with no insurance coverage), through self-referral, or both. Chiropractic care may be commonly used for chronic pain by patients, but at KPNW, medical necessity criteria limit clinician referrals for chiropractic care to acute pain. In

■ **Figure 1. Acupuncture Use in 2011**



Those who responded to the survey met our definition for chronic musculoskeletal pain at the time of the survey, and self-reported chronic pain on the survey (N = 667).

■ **Figure 2. Chiropractic Use in 2011**



Those who responded to the survey met our definition for chronic musculoskeletal pain at the time of the survey, and self-reported chronic pain on the survey (N = 887).

addition, Washington patients all have a self-referral insurance rider for chiropractic care, but not for acupuncture, making it easier for Washington members to access chiropractic services by self-referral. At the same time, patients seeking chiropractic care may be dissuaded from using HMO benefits when the fee per visit for obtaining chiropractic care out of plan is only marginally higher than their HMO co-pay.

For chiropractic services, there is a tendency for “out-of-plan only” users to be older, to use long-term opioids, and to have more pain diagnoses. For acupuncture, there is a tendency for those using the clinician referral mechanism to exhibit these same characteristics. This is consistent with the acupuncture referral guidelines, which allow for care only in the setting of chronic, as opposed to acute, pain. Chiropractic benefits for self-referral are limited in the dollar amount allowed, and for clinician referral, are constrained by referral guidelines allowing use only for acute pain. Those who desire ongoing maintenance treatments will go out of plan due to necessity.

The substantial percentage of participants indicating out-of-plan use suggests that many chronic pain patients are determined to use acupuncture and chiropractic care, regardless of their insurance coverage. In this context, and in the face of the high prevalence of acupuncture and chiropractic use, policy makers may need to consider better ways of covering and integrating acupuncture and chiropractic care into conventional delivery systems.^{15,16} Many chronic pain patients may consider acupuncture and chiropractic coverage important when selecting a health insurance plan. In addition, better acupuncture and chiropractic integration could offer potential opportunities for improved management algorithms and more efficient utilization of resources.^{17,18} The potential for these 2 types of care to serve as noninvasive alternatives to pharmacologic and procedural interventions, or as tools to facilitate the reduction of chronic pharmacotherapy, would seem to warrant further investigation.^{19,20}

Strengths and Limitations

The study’s strengths include a large sample size, as well as the availability of a comprehensive EMR system. Multiple pathways to acupuncture and chiropractic care exist within the HMO, which we were able to electronically track and compare. In addition, we were able to supplement EMR data with survey data to gain a more complete picture of overall acupuncture and chiropractic utilization. Limitations include a relatively low survey response rate. We did not attempt to contact nonresponders to determine possible reasons for this. Furthermore, survey re-

sponders may not accurately represent the broader group of patients who suffer from chronic pain. Comparing survey responders who self-reported chronic pain with non-responders, using EMR demographic and diagnostic data (6 comparisons), we found that responders were more likely to be female or Caucasian and were less likely to smoke, and more likely to have had an acupuncture referral (P for all $<.01$). It is likewise unclear to what extent any findings or conclusions may be applicable to other healthcare venues beyond an HMO setting, or beyond KPNW.

CONCLUSIONS

In our analyses, a majority of HMO participants with chronic musculoskeletal pain have used acupuncture, chiropractic care, or both. While benefit structure may materially influence utilization patterns, many patients with chronic musculoskeletal pain use acupuncture and chiropractic care without regard to their insurance coverage. A substantial percentage of acupuncture and chiropractic use thus occurs beyond detection of EMR systems, and many patients do not report their acupuncture and chiropractic utilization to their HMO clinicians.

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Authorship Information: Concept and design (CE, LD, CR, WV, LK, RAD); acquisition of data (CE, LD, JD); analysis and interpretation of data (CE, LD, CR, WV, JD, RAD); drafting of the manuscript (CE, LD, CR, RAD); critical revision of the manuscript for important intellectual content (CE, LD, CR, WV, RAD); statistical analysis (CE, WV, JD); provision of patients or study materials (LK); obtaining funding (LD, CR, WV); administrative, technical, or logistic support (LK).

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