Chiropractic Observation and Analysis Study (COAST): providing an understanding of current chiropractic practice

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Abstract

Objectives: COAST (Chiropractic Observation and Analysis Study) aimed to describe the clinical practices of chiropractors in Victoria, Australia.

Design: Cross-sectional study using the BEACH (Bettering the Evaluation and Care of Health) methods for general practice.

Setting and participants: 180 chiropractors in active clinical practice in Victoria were randomly selected from the list of 1298 chiropractors registered on Chiropractors Registration Board of Victoria. Twenty-four chiropractors were ineligible, 72 agreed to participate, and 52 completed the study.

Main outcome measures: Each participating chiropractor documented encounters with up to 100 consecutive patients. For each chiropractor–patient encounter, information collected included patient health profile, patient reasons for encounter, problems and diagnoses, and chiropractic care.

Results: Data were collected on 4464 chiropractor–patient encounters from 52 chiropractors between 11 December 2010 and 28 September 2012. In most (71%) encounters, patients were aged 25–64 years; 1% of encounters were with infants (age < 1 year; 95% CI, 0.3%–3.2%). Musculoskeletal reasons for encounter were described by patients at a rate of 60 per 100 encounters (95% CI, 54–67 encounters) and maintenance and wellness or check-up reasons were described at a rate of 39 per 100 encounters (95% CI, 33–47 encounters). Back problems were managed at a rate of 62 per 100 encounters (95% CI, 55–71 encounters). The most frequent care provided by the chiropractors was spinal manipulative therapy and massage.

Conclusions: A range of conditions are managed by chiropractors in Victoria, Australia, but most commonly these conditions are musculoskeletal-related. These results can be used by stakeholders of the chiropractic profession in workforce development, education and health care policy.

There are about 4400 registered practising chiropractors in Australia,[1] making chiropractic the eighth largest registered health profession (out of 10).[2] During 2005, 16% of Australians, over 3 million people, consulted a chiropractor at least once[3] at an out-of-pocket cost of $905 million.[4]

Despite the large number of people who receive chiropractic care, very little is known about why people seek this care and what care chiropractors provide. With the increased attention, and criticism, directed at the chiropractic profession, it is important to have reliable up-to-date information about what is actually happening in chiropractic clinical practice.[5]

Previous attempts to document this practice in Australia are now outdated.[6-13] Worldwide, systematic approaches to gathering information about chiropractic practice have been limited by study design, including chart abstraction, patient recall surveys, practitioner recall surveys and reviews of administrative databases.[14-22]

The Chiropractic Observation and Analysis Study (COAST) aimed to describe the clinical practices of chiropractors in Victoria, Australia. COAST used methods developed by the Bettering the Evaluation and Care of Health (BEACH) program. BEACH is a continuous, rigorous, national study of Australian general medical practice clinical activity and has been running since 1998.[23,24] COAST documented the following:

- demographic characteristics of chiropractors;
- characteristics (demographic and health profile) of the people who sought chiropractic care;
- the reasons people sought chiropractic care (reasons for encounter);
- the problems and diagnoses chiropractors identified; and
- the care chiropractors provided.

Methods

COAST was a cross-sectional observational study of chiropractic practice in Victoria, Australia.

Recruitment

A random sample of 180 chiropractors from the list of 1298 chiropractors registered on the Chiropractors Registration Board of Victoria were invited to participate, using a modified tailored design method.[25] BEACH investigators have determined that a minimum sample of 40 health care practitioners is required to ensure reasonable precision for more frequent events; on this basis, and given the resources available to complete this study, we approached 180 chiropractors, anticipating a 30% response rate.

Selected chiropractors were sent a primer postcard, followed 1 week later by an invitation letter and a reminder letter after a further 2 weeks. Non-responders were contacted by telephone for a further 4 weeks. Incentives for participation were continuing professional development points (12.5 formal learning activity hours) and an honorarium ($200 gift voucher). Chiropractors were included if they were currently in clinical practice in Victoria. Locum chiropractors were excluded.

Consecutive patients were invited to provide encounter data until 100 encounters were recorded per chiropractor, or when 4 weeks of recording had elapsed.

Data collection

Chiropractors recorded anonymous patient encounter data by hand on paper encounter recording forms, with items in free text or check box format (Appendix 1; online at mja.com.au). A pad of 106 forms was

1 Characteristics of 52 chiropractors participating in COAST

Characteristics	Chiropractors*
Chiropractor characteristics	
Mean age in years† (range; SD)	42.3 (24–64; 9.3)
Mean years in practice‡ (range; SD)	16.3 (1–39; 8.5)
Female†‡	14
Graduated in Australia	44
Holds postgraduate qualification	18
Involved in teaching	8
Membership	
Chiropractors Association of Australia	37
Chiropractic and Osteopathic College of Australasia	12
Practice characteristics	
Mean no. of clinic sessions worked per week (range; SD)	6.4 (2–11; 2.3)
Mean no. of patient care hours worked per week (range; SD)	27.0 (3–48; 10.3)
Mean no. of patients seen per week (range; SD)	86.4 (13–220; 48.2)
Solo practitioner	22
Imaging services available at same premises	8
Other non-chiropractic health care practitioner available at same premises	35
Consults in a language other than English	6
Practice in urban region‡	35
Paper-only clinical records	31

COAST = Chiropractic Observation and Analysis Study. * No. of chiropractors, unless otherwise indicated. † The age distribution and proportion of female practitioners do not differ significantly from these parameters in all Australian chiropractors (χ^2 goodness-of-fit test for age ranges, 7.66; $P = 0.053$; t test for sex $P = 0.173$). ‡ These proportions do not differ significantly from that of all Victorian chiropractors (t test for years in practice $P = 0.675$; t test for sex $P = 0.105$; t test for practice in urban region $P = 0.687$). ◆

supplied to each chiropractor, with extra forms provided in case of mistakes. The encounter recording form was based on the BEACH study encounter form and was modified to reflect chiropractic practice. The forms were first piloted with five chiropractors with varying practice styles who each collected data on 10 consecutive patients. The data collection form is available on request.

Chiropractors recorded terms on the encounter form that they believed most accurately described the encounter. These terms were then entered and classified by a coder according to the *International classification of primary care*, 2nd edition (ICPC-2) using the Australian ICPC-2 PLUS general practice terminology.[26,27] For example, for the patient reason for encounter (RFE) or the problem and diagnosis, the research team anticipated that terms would be recorded by the chiropractors to describe patients who presented with little or no symptoms at the time of the encounter. Terms used to describe such visits would be related to well-being, wellness, health maintenance and check-up.[28,29] Such wellness-related terms were coded to the ICPC chapter "general and unspecified".

Where an RFE, a problem and diagnosis, or process of care was documented that had no corresponding ICPC-2 PLUS term, a new term (and code) was created. A detailed explanation of the coding, process for generating new terms relevant to the chiropractic profession, and subsequent coding and grouping system has been previously published.[30]

Data analysis

Descriptive statistics were used to summarise chiropractor, patient and encounter characteristics. RFEs were reported by ICPC chapter, and chiropractor-identified problems and diagnoses were reported by groups of related ICPC-2 PLUS terms. For each chiropractor, patients attending more than once during the 100 encounters recorded were identified by date of birth, sex and postcode. Analyses were undertaken using Stata version 12 (StataCorp) and 95% CIs were calculated for all relevant estimates. The survey estimator procedures in Stata were used to adjust for the clustering effect and to calculate the design effect (D_{eff}). The intracluster correlation coefficient (ICC) was then calculated from the D_{eff} using the formula $ICC = (D_{eff} - 1)/(k - 1)$, where k is the average number of consultations across all chiropractors.[31]

We compared participating chiropractors' sex and years in practice, and the proportion practising in a rural setting, with data on all practising Victorian chiropractors provided by the Chiropractors Registration Board of Victoria. We also compared chiropractor characteristics with available data (age and sex only) from the Australian Health Practitioner Regulation Agency.[1] We used one-sample t tests using population mean (years in practice) and population proportion (sex, rural practice setting), along with the χ^2 goodness-of-fit test for age ranges (with recoding of COAST data to ensure ranges were uniform across the two datasets).

The project was approved by the University of Melbourne Human Research Ethics Committee (HREC 0931651: Chiropractic in Australia), and all participants (chiropractors and patients) provided informed consent.

Results

Of the original 180 chiropractors approached, 24 were ineligible. Of those who were eligible, 72 agreed to participate (46% response rate); 20 of these withdrew and did not provide any data, and 52 (33%) completed the study. Participating chiropractors provided information on 4464 chiropractor–patient encounters between 11 December 2010 and 28 September 2012. Appendix 2 (online at mja.com.au) shows the flow of chiropractor participants through the study. Not all chiropractors provided information on 100 encounters: 33 out of 52 provided information on at least 100, 13 provided information on 50–100, and six provided information on less than 50 encounters.

Box 1 shows the characteristics of participating chiropractors. Compared with all registered chiropractors in Victoria, those who participated in COAST had similar mean time since graduation (16 years), and a similar proportion worked in an urban location (35/52 [67%] compared with 626/894 [70%]). However, a smaller pro-

portion of COAST participants were women (14/52 [27%] compared with 399/1050 [38%]), but this difference was not statistically significant. Similarly, compared with all Australian chiropractors, participating chiropractors were of similar age, but there was a non-statistically significant underrepresentation of women in this study (14/52 [27%]) compared with national data (1679/4664 [36%]).

Box 2 shows the demographic details of patients who sought chiropractic care and the source of payment for encounters. In most chiropractor–patient encounters (71%), patients were aged 25–64 years. In 9% of encounters, patients were younger than 15 years old, and in 13%, patients were aged 65 years and older. In 81% (95% CI, 76%–86%) of encounters, patients paid for some or all of the consultation fee. For 13% of encounters, it was a repeat visit where a patient presented at least twice during the 100 recorded encounters.

There were 5188 RFEs reported. Ninety-nine per cent of patients' RFEs were coded to two ICPC chapters, "musculoskeletal" chapter and "general and unspecified". RFEs were coded to the "musculoskeletal" chapter at a rate of 60 per 100 encounters (95% CI, 54–67 per 100 encounters), and to "general and unspecified" at a rate of 39 per 100 encounters (95% CI, 33–47 per 100 encounters). RFEs were coded to the "neurological" chapter at a rate of 9 per 100 encounters (95% CI, 8–11 per 100 encounters). RFEs were coded to all other ICPC chapters only occasionally, including "psychological" at a rate of 3 per 100 encounters (95% CI, 2–7 per 100 encounters) and "digestive" at a rate of 1 per 100 encounters (95% CI, 0.5–3 per 100 encounters). All other chapters were coded in fewer than 1 per 100 encounters (full results available on request).

The distribution of problems and diagnoses managed in the encounters, as identified by the chiropractors, is shown in Box 3. Spinal problems, including chiropractor-recorded terms such as "chiropractic subluxation" (a term used by some chiropractors to describe a perceived dysfunction detected in a joint segment[32]), and joint dysfunction were the most commonly identified problems and diag-

2 Characteristics of patients in encounters recorded by participating chiropractors

Patient characteristics	No. (%) of recorded encounters* (*n* = 4464)	95% CI
Sex		
Female	2429 (55.74%)	(53.06%–58.54%)
Missing data	106	—
Age in years		
< 1	44 (1.00%)	(0.32%–3.19%)
1–4	152 (3.47%)	(1.72%–7.01%)
5–14	182 (4.16%)	(3.05%–5.66%)
15–24	335 (7.65%)	(6.59%–8.88%)
25–44	1543 (35.24%)	(31.58%–39.32%)
45–64	1560 (35.62%)	(32.56%–38.98%)
65–74	371 (8.47%)	(7.08%–10.14%)
⩾ 75	192 (4.38%)	(3.23%–5.96%)
Missing data	85	—
New patient		
Yes	212 (6.13%)	(4.72%–7.97%)
Missing data	1008	—
Language		
Non-English speaking background	35 (1.07%)	(0.34%–3.40%)
Missing data	1191	—
Identifies as Aboriginal or Torres Strait Islander		
Yes	5 (0.15%)	(0.07%–0.35%)
Missing data	1192	—
Occupation		
Managers	481 (12.06%)	(9.99%–14.54%)
Professionals	876 (21.95%)	(18.67%–25.82%)
Technicians and trades workers	378 (9.47%)	(8.09%–11.10%)
Community and personal service workers	259 (6.49%)	(5.49%–7.68%)
Clerical and administrative workers	352 (8.82%)	(7.53%–10.34%)
Sales workers	182 (4.56%)	(3.74%–5.57%)
Machinery operators and drivers	102 (2.56%)	(1.84%–3.54%)
Labourers	107 (2.68%)	(1.94%–3.71%)
Home duties	312 (7.82%)	(6.56%–9.33%)
Retired	556 (13.93%)	(11.41%–17.02%)
Student	362 (9.07%)	(0.74%–11.11%)
Unemployed	23 (0.58%)	(0.33%–0.99%)
Missing data	474	—
Source of payment†		
Workers compensation	83 (1.86%)	(0.85%–4.06%)
Transport Accident Commission	17 (0.38%)	(0.19%–0.78%)
Department of Veterans' Affairs	41 (0.92%)	(0.52%–1.61%)
Medicare	82 (1.84%)	(0.90%–3.77%)
Private health insurance	2034 (45.56%)	(38.39%–54.08%)
Patient paid	3604 (80.73%)	(75.50%–86.33%)
No charge	195 (4.37%)	(3.15%–6.06%)

* Missing values not used in calculations. † Multiple payment options allowed, so total not 100%. ◆

3 Distribution of problems managed (20 most frequent problems), as reported by chiropractors

Problem group	No. (%) of recorded diagnoses* (*n* = 5985)	Rate per 100 encounters (*n* = 4417)	95% CI	ICC
Back problem	2757 (46.07%)	62.42	(55.24–70.53)	0.312
Neck problem	683 (11.41%)	15.46	(11.23–21.30)	0.233
Muscle problem	434 (7.25%)	9.83	(6.64–14.55)	0.207
Health maintenance or preventive care	254 (4.24%)	5.75	(3.24–10.22)	0.251
Back syndrome with radiating pain	215 (3.59%)	4.87	(2.91–8.14)	0.165
Musculoskeletal symptom or complaint, or other	219 (3.66%)	4.96	(2.39–10.28)	0.350
Headache	179 (2.99%)	4.05	(2.87–5.71)	0.053
Sprain or strain of joint	167 (2.79%)	3.78	(2.30–6.22)	0.115
Shoulder problem	87 (1.45%)	1.97	(1.37–2.83)	0.022
Nerve-related problem	62 (1.04%)	1.40	(0.72–2.75)	0.072
General symptom or complaint, other	51 (0.85%)	1.15	(0.22–6.06)	0.407
Bursitis, tendinitis or synovitis	47 (0.79%)	1.06	(0.71–1.60)	0.011
Kyphosis and scoliosis	47 (0.79%)	1.06	(0.65–1.75)	0.023
Foot or toe symptom or complaint	48 (0.80%)	1.09	(0.41–2.87)	0.123
Ankle problem	46 (0.77%)	1.04	(0.40–2.69)	0.112
Osteoarthrosis, other (not spine)	39 (0.65%)	0.88	(0.51–1.53)	0.023
Hip symptom or complaint	35 (0.58%)	0.79	(0.53–1.19)	0.006
Leg or thigh symptom or complaint	35 (0.58%)	0.79	(0.49–1.28)	0.012
Musculoskeletal injury	33 (0.55%)	0.75	(0.45–1.24)	0.013
Depression	29 (0.48%)	0.66	(0.10–4.23)	0.288

ICC = intracluster correlation coefficient. * Excludes repeat problem group managed at encounter. ◆

noses. Box 4 shows the techniques and care provided by the chiropractors. The most frequent were manual adjustments (manipulation) and soft tissue therapy. Other care provided by chiropractors during the encounters included (reported as rates per 100 encounters): therapeutic exercise prescription (52; 95% CI, 44–61), advice about exercises in general (21; 95% CI, 15–29), advice about posture (21; 95% CI, 10–18), and recommendations to use ice packs (11; 95% CI, 7–18), heat therapy (8; 95% CI, 4–18) and supplements (5; 95% CI, 3–8). Other recommendations were coded at a rate of less than four per 100 encounters (full results available on request).

The median duration of all encounters was 15 minutes (interquartile range, 11–20 minutes). Chiropractors indicated that the patient required a follow-up appointment in 85 per 100 encounters (95% CI, 81–90). Patients had been referred to the chiropractor by another patient in 52 per 100 encounters (95% CI, 43–64). Patients had been referred to a chiropractor by a GP in four per 100 encounters (95% CI, 2–10), and chiropractors referred patients to a general practitioner in three per 100 encounters (95% CI, 2–7).

Discussion

People who present to chiropractors are mostly adults with a musculoskeletal condition. People also commonly consult a chiropractor for "maintenance and wellness" or check-ups. The most frequent care provided by the chiropractors during the study period was spinal manipulative and soft tissue therapy. This is the first comprehensive profiling of chiropractic practice undertaken in Australia using BEACH methodology to describe who seeks chiropractic care, why patients seek care, the diagnoses and problems chiropractors identify, and the care that they provide.

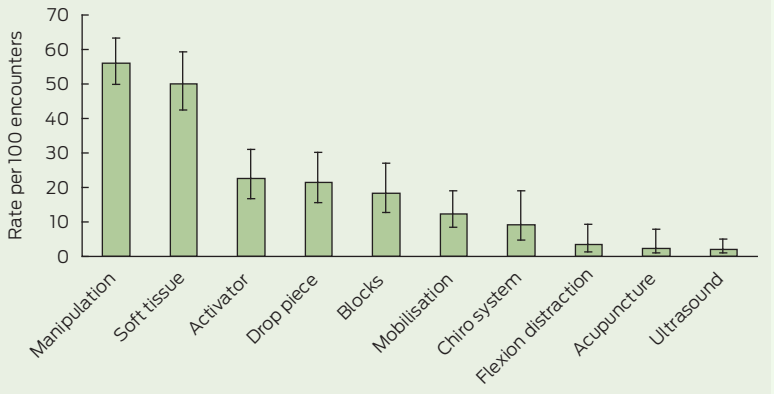
There is evidence of patient referral between GPs and chiropractors, albeit in only a small proportion of encounters. In the general population, most people who see a chiropractor, and other complementary and alternative practitioners, also consult a medical practitioner.[3] Further research is required to maximise the patient benefit that can be gained through a team approach to primary care.

The common use of maintenance and wellness-related terms reflects current debate in the chiropractic profession. "Chiropractic wellness care" is considered by an indeterminate proportion of the profession as an integral part of chiropractic practice,[28] with the belief that regular chiropractic care may have value in maintaining and promoting health, as well as preventing disease.[29] The definition of wellness chiropractic care is controversial, with some chiropractors promoting only spine care as a form of wellness, and others promoting evidence-based health promotion, eg, smoking cessation and weight reduction, alongside spine care.[28] A 2011 consensus process in the chiropractic profession in the United States emphasised that wellness practice must include health promotion and education, and active strategies to foster positive changes in health behaviours.[28]

Compared with all other practising chiropractors in Australia, COAST chiropractors were similar in age, years in practice and proportion in a rural location. However, COAST participants had an underrepresentation of female chiropractors. For variables other than age, years in practice and female sex, we were limited in determining non-response bias in this study because of the limited data available from all practising chiropractors in Australia. Also, because it was too difficult for locum chiropractors to undertake the study, only chiropractors who practised in their own practice were included. A larger sample size and more representative chiropractors would provide more robust findings. However, this is the largest study using BEACH methods in the chiropractic profession in Australia, the first of its kind in the world, and a first step to providing robust information about chiropractic practice.

The response rate for this study, 33% of the eligible chiropractors approached, is higher than that achieved in the BEACH study in 2011

4 Distribution of techniques and care provided by chiropractors, with 95% CI



Activator = hand-held spring-loaded device that delivers an impulse to the spine. Drop piece = chiropractic treatment table with a segmented drop system which quickly lowers the section of the patient's body corresponding with the spinal region being treated. Blocks = wedge-shaped blocks placed under the pelvis. Chiro system = chiropractic system of care, eg, Applied Kinesiology, Sacro-Occipital Technique, Neuroemotional Technique. Flexion distraction = chiropractic treatment table that flexes in the middle to provide traction and mobilisation to the lumbar spine. ◆

(27%).[23] The response rates for two recent Australian national surveys of the chiropractic profession, one about workforce and one about low back pain, were 23%[33] and 37%,[34] respectively. The response rate for this study was similar to that obtained in the first general practice morbidity and prescribing survey conducted from 1969 to 1974 (29%).[35,36] For simple postal surveys of health professionals, response rates have been declining over the past 10 years.[37] The burden on practitioners to participate in this study may have affected response rates, further compounded by 28% of chiropractors withdrawing after initially agreeing to participate, some of whom withdrew when they realised the amount of work involved. However, of those who did complete the study, 78% indicated they would recommend participating in COAST to other chiropractors. Ideally, data obtained in this study would be routinely collected in chiropractic practice, but infrastructure is not in place to facilitate this, with two-thirds of chiropractors who participated using paper-only clinical records; hence clinical data cannot be easily captured.

This study provides valuable information in an under-researched area of Australian health care. A range of conditions are managed by chiropractors in Victoria, but most of these conditions are musculoskeletal problems. In workforce development, education can be aligned with health conditions commonly managed by chiropractors. Health care policy can be guided to ensure that provision of services is directed to areas of greatest need. Future research relevant to the chiropractic profession can be guided to ensure it is directed towards the most common presentations, so it can potentially help the most people.

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