CONSUMER CHARACTERISTICS AND PERCEPTIONS OF CHIROPRACTIC AND CHIROPRACTIC SERVICES IN AUSTRALIA: RESULTS FROM A CROSS-SECTIONAL SURVEY

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ABSTRACT

Objective: The purpose of this study was to describe patient characteristics and summarize their perceptions of chiropractic in Australia.

Methods: This study is part of a broader study aiming to extend the knowledge of the role of chiropractic within the current health care environment. A 33-item, paper-based, cross-sectional survey of a sample of patients from 100 systematically sampled chiropractic clinics from all the states and territories of Australia was conducted. The survey focused on patient demographics, socioeconomic status, perceived health status, and perceptions of chiropractic and chiropractic services.

Results: A total of 486 responses were received (24.3% response rate). Respondents were predominantly female patients (67.1%) of the 45- to 64-year age group. Approximately half of the respondents reported a pretax annual income exceeding $40,000. Most patients sought chiropractic services because of musculoskeletal disorders (68.7%) and for general health (21.2%), and personal beliefs motivated most respondents (70.2%) to visit a chiropractor. Most respondents would seek the chiropractic services again (97.5%) and were satisfied with the service received.

Conclusions: The results of this study show that the typical chiropractic patient in Australia is a middle-aged woman with a moderate to high income. Although only a small proportion of the Australian population sees a chiropractor, this group seems to be satisfied with the service. (J Manipulative Physiol Ther 2014;xx:1-11)

Key Indexing Terms: Chiropractic; Patients; Social Perception; Health Services

Australia is a country made up of 6 states and 2 mainland territories and is home to more than 22 million people. The health care system in
complementary therapies, between 52.2% and 68.9% of Australians visit some type of CAM therapist each year.\textsuperscript{7,8} Australian data regarding the distribution of health services between metropolitan and rural areas place approximately 75% of health services in capital city and suburban regions.\textsuperscript{9} It is known that there is a higher distribution of CAM practitioners in rural area compared with urban areas in Australia.\textsuperscript{10,11} Using rural New South Wales (NSW) as an example, CAM practitioners make up a significant portion of the health care system, to the extent that the number of CAM practitioners is almost equal to that of general practitioners (GPs) in rural NSW.\textsuperscript{10} A recent study of 1427 Australian women highlighted that chiropractors were the most commonly consulted CAM practitioners after massage therapists.\textsuperscript{12}

Although these studies in conjunction with ABS data regarding the chiropractic profession have been useful, there is a need for more detailed studies about chiropractic in Australia. Much of the recent research that has been conducted in this area has focused on single gender groups or groups from small geographic areas. Samples derived from all states and territories, which include both male and female respondents, are required for a more comprehensive understanding of the patients who visit chiropractors in Australia. The purpose of this study was to describe the characteristics of chiropractic patients in Australia and their perceptions of chiropractic and chiropractic services based on data from a paper-based survey questionnaire.

METHODS

This study is part of a larger study aiming to inform decisions regarding supply and demand, and accessibility to chiropractic services in Australia. This document uses the suggestions of Bennet et al\textsuperscript{13} regarding the reporting of results from survey-based research.

A novel, paper-based, 33-item, survey questionnaire (Work Force Study Survey Questionnaire: http://chiro.mq.edu.au/Research/projects) was issued to individual adult patients under chiropractic care during the period of December 2010 to January 2011. Ethics approval for this study was granted by the Macquarie University human ethics committee on August 2, 2010 (Approval Number: 5201000729).

To obtain a representative sample of chiropractic patients, with 95% confidence and a margin of error of ±5%, a sample of 384 was required. This calculation was based on the conservative estimate that approximately 5% of the Australian population use chiropractic services, which equates to 1 117 100 individuals based on the 2010 census data.\textsuperscript{14} Selection of 100 chiropractic clinics was determined from a national membership list from the Chiropractors’ Association of Australia National (CAAN). Using the membership list, geographical areas were defined by the research team so that the areas contained a similar number of chiropractic clinics. Queensland was treated as single geographic area; NSW and the Australian Capital Territory were grouped together. Victoria (VIC) and Tasmania were grouped together, as were South Australia, Western Australia, and the Northern Territory. Systematic sampling was then used to select clinics for inclusion in the study. The method used is described as follows. The size of the sequence was defined by dividing the number of practitioners in the relevant geographical area by 25. For example, if a geographical area contained 100 practitioners, dividing this list by 25 would result in a figure of 4. In this example, every fourth clinic location would have been selected from the list and invited to participate. All consenting patients, up to a total of 20, within the participating clinics were surveyed. To be included in the study, the chiropractic clinics had to be located within Australia and to be open for consultation during the study period. A survey packet was prepared by the research team and mailed out by administrative staff at CAAN to participating clinics. The survey packet contained information regarding the study, consent forms, and 20 survey questionnaires. No further contact was made with the participants or the associated clinics after the initial mail-out. Each completed survey was mailed back directly to the researchers by the respondent using a postage-paid envelope that was supplied by the research team.

Response rate calculations were based on the number of survey questionnaires that were completed (>80% completion) and returned during the data capture period divided by the number of potential responses (n = 2000). These recommendations are provided by the American Association for Public Opinion Research.\textsuperscript{15} Potential respondents (patrons of the chiropractic clinics) were introduced to the anonymous survey questionnaire by either administrative staff or notices placed at the relevant clinics. Patients were eligible to take part in the survey if they were at least 18 years of age, had a chiropractic appointment during the study period, and were proficient with the reading, writing, and comprehension of English. Questionnaires were not made available in other languages. Patients were excluded if they were younger than 18 years or did not seek chiropractic care during the data collection period. After consenting to participate in the study, each participant completed one single survey and then forwarded it to administrative staff for collection and return to the research team using postage-paid envelopes. There were no incentives offered to participants or clinics for participation in the study.

The research tool was designed to capture information on a variety of categories: participant demographics, participant perceptions regarding accessibility of chiropractic services, participant perceptions regarding their personal health, participant perceptions of chiropractic health care, and participant perceptions of their current chiropractic care (Appendix 1; online only, available at www.jmptonline.org). Several steps
were taken by the research team to increase the validity of the survey instrument. Researchers attempted to draft questions that were clear, simple, and specific to the research aims. Special attention was paid to the length, wording, and order of the questions included in the survey to reduce the impact of nonresponse or misinterpretation. Parenthetical probes and double-barrel questions were avoided along with complex terms and potentially confusing definitions. The questionnaire was reviewed, for content and face validity, by members of the chiropractic faculty, a linguist, anthropologist, educators, and social scientists, as well as the Board of Directors at CAAN. Important to note is that several members of the research team were also practitioners. After consensus among the relevant experts was achieved, the instrument was finalized and tested. Pilot testing of the questionnaire indicated that the survey took approximately 15 minutes to complete.

Responses to the survey questionnaire were recorded using a variety of methods: bipolar; 5-point, Likert-type verbal scales; tick-box options; and short-answer format. The answer “Don’t Know” was included and recorded as a response item for the questions that required Likert-type scale responses. All responses were collated and arranged as 1-way frequency tables and frequency or relative frequency histograms for interpretation. Further $\chi^2$ analysis (or Fisher exact test when small expected values were encountered) was undertaken to determine whether (i) the same proportions of responses to question items were seen when analyzing 1 question or (ii) a relationship existed between the responses from 2 questions. Tests were deemed significant if the $P$ value was less than .05.

Returned surveys were included in the analysis only if they had been completed in full. An a priori stopping rule was built into the research plan to allow for the complete analysis and write-up of the study data. The reporting of the results to the funding body was also incorporated into the study schedule. This stopping rule meant that surveys that were not returned during the data collection period were not included in the final analysis. All data were screened and checked for errors prior to analysis. The data were then compiled and analyzed by members of the research team.

RESULTS

Of a potential 100 clinics in the random sample, 96 agreed to participate in the survey. From these clinics 486 patients successfully completed the questionnaire during the data collection period. This represents a 24.3% response rate to the survey based on the 100 clinics from the original sample. Four clinics (80 potential survey questionnaires) did not return any surveys during the data collection period. Of the 96 participating clinics 965 survey questionnaires were not returned to researchers, which when combined with the nonparticipating clinics resulted in 1045 missing survey questionnaires. There were 429 surveys that were only partially completed (372 returned blank) or returned after the data collection period. These questionnaires were not included in the subsequent analyses (Fig 1).
To aid in the interpretation, the survey data have been grouped into 6 categories: (1) patient demographics, (2) patient perceptions of chiropractic health care, (3) reasons for seeking chiropractic care, (4) patient perceptions regarding their personal health, (5) patient perceptions regarding the accessibility of chiropractic services, and (6) patient perceptions regarding their current health care.

### Patient Demographics

The patient demographics are presented in Table 1. Female patients comprised 67.1% of the sample. Three patients did not answer the gender question. Individuals aged between 45 and 64 years were the largest patient group in the sample. The main country of origin was Australia (84.9%), and 98.5% of survey respondents reported that they spoke English as their primary language at home. Thirty percent of patients reported that they held university-level qualifications. With regard to location type, 64.1% of patients reported living in metropolitan areas, with the remainder coming from rural or remote areas. As expected, only a very small percentage (3.3%) of patients were classified as being located in remote areas. This pattern was similar when examined from the state level. For example, a large proportion of the respondents from the state of VIC resided in metropolitan areas as opposed to rural areas.

Of those surveyed, 39.5% reported that their average annual pretax income was between $40 000 to $90 000 per annum, 24.7% of patients reported earning less than $40 000 per annum, and 25.5% of patients described earning in excess of $90 000 per annum, with the remainder of respondents refusing to answer that question. The $40 000 to $90 000 income bracket was most common regardless of location type (Fig 2). There was no evidence of a difference between income level and location type ($P = .154$) or home state ($P = .259$) of patients.

### Perceptions of Chiropractic Health Care

In the survey questionnaire, patients were questioned about how they would best describe chiropractic health care. The options available were CAM, allied health care, or mainstream health care. The sample was divided in their classification of chiropractic health care between the 3 options (Fig 3), with proportions in each group differing significantly ($P < .001$). Most believed that chiropractic health care belonged to the CAM group.

Patients were surveyed about their views regarding the role of chiropractic care in their current health management, encompassing concurrent care from orthodox medicine and

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### Table 1. Patient Demographics (Questions 1-8)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Frequency</th>
<th>Relative Frequency (%)</th>
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<tr>
<td>Sex</td>
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<td></td>
<td>Female</td>
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<td>32.5</td>
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<tr>
<td></td>
<td>45-64</td>
<td>219</td>
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</tr>
<tr>
<td></td>
<td>Declined to answer</td>
<td>49</td>
<td>10.3</td>
</tr>
</tbody>
</table>

NSW, New South Wales; p.a., per annum; QLD, Queensland; VIC, Victoria.

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Fig 2. Patient income by location type (questions 6 and 8).
the perceived importance of chiropractic care (Table 2). With reference to the use of orthodox medicine, 64.2% of patients reported that they used orthodox medicine or GP consultation concurrently with chiropractic care, whereas 30.3% stated that they did not use orthodox medicine in the management of their current condition(s). The proportions reporting use (or lack of) concurrent orthodox medicine differed significantly ($P < .001$). Chiropractic care was described as the first choice in the management of health issues by a large proportion (44.0%) of respondents ($P < .001$). Moreover, when asked if chiropractic was perceived as a “last resort,” most (81.7%) patients either disagreed or strongly disagreed with this statement ($P < .001$). Patients were also questioned regarding the use of chiropractic care for purely symptomatic relief. More than a quarter (26.5%) of respondents were concerned primarily with symptomatic relief, whereas most (63.7%) patients indicated that they expected more than just symptom relief from their chiropractic consultation ($P < .001$). There was no significant relationship between income level and any of the questions relating to perceptions of chiropractic health care ($P = .122$, results not presented).

**Reasons for Seeking Chiropractic Care**

There were several reasons that patients in the respondent group reported for seeking chiropractic care. Importantly, it was common for a patient to be consulting a chiropractor for multiple complaints. For this reason, proportions of the total number of responses have been included in Fig 4 to aid in the interpretation. Musculoskeletal complaints were the most common reasons for seeking chiropractic care. The second largest proportion of reasons for treatment was the maintenance of general health and well-being. Headaches made up a small proportion of reasons for seeking care, followed closely by nonmusculoskeletal complaints. The proportions of each reason for seeking care were significantly different ($P < .001$).

Patients were surveyed regarding the influence of family tradition in their decision to seek chiropractic care. Sixty-seven percent of patients reported that family tradition had not influenced their decision to consult with a chiropractor (Table 2; $P < .001$). Personal beliefs seemed far more salient in the decision-making process, with most (70.2%) respondents stating that it was their personal philosophy that influenced their decision to seek chiropractic care ($P < .001$).

Most patients had been referred to their current chiropractic practice by a friend or family member ($P < .001$). Only 6.9% of referrals had come from advertising such as Yellow Pages or Internet sites. Similarly, referrals from medical doctors made up only 5.2% of the total referrals.
Patient Perceptions Regarding Their Personal Health

Patients were questioned about their perceptions of their current health status. Here significantly more patients (95.8%, \( P < .001 \)) felt that their current health was average or better, with 16.0% of the sample describing their health as “excellent” (Table 2). Only 4.1% of the respondent group described their health as being below average. There was no relationship between perception of current health status and location type \( (P = .590) \) or income level of the patients \( (P = .530) \).

Patient Perceptions Regarding Their Current Chiropractic Health Care

Several questions in the survey were aimed at eliciting information about patient perceptions of their current chiropractic care. These particular questions alluded to the educational role of the care provider, patient perceptions of chiropractic as a tool/guiding force for the maintenance of general health and well-being, and the perceived role of medical practitioners in the patient’s current care.

Table 3 shows that patients in the respondent group had mixed responses when asked about their previous knowledge of chiropractic. Forty-two percent of patients either agreed or strongly agreed that they had little prior knowledge of chiropractic before consulting with their current chiropractor \( (P < .001) \). This implies either that either a large proportion of respondents did not have well-defined understanding of chiropractic prior to their initial consultation with the chiropractor or that their understanding of chiropractic was redefined or more concisely defined through their consultation with the chiropractor. Most respondents perceived that chiropractic care was helpful for their general health and well-being \( (96.6\%, P < .001) \) or helped them take more responsibility for their health \( (91.6\%, P < .001) \). When asked about whether or not they felt a medical practitioner could help with their current problem, fewer patients \( (29.5\%) \) than expected agreed that a medical practitioner could help, whereas more than expected \( (48.8\%) \) perceived that a medical practitioner

Fig 4. Reasons for seeking chiropractic care (question 10). GH, general health and well-being; HA, headaches; MS, musculoskeletal; NMS, nonmusculoskeletal complaints.
would not be of benefit ($P < .001$). Interestingly, 21.7% of respondents answered “Don’t Know” to this particular question. Perceptions of current chiropractic health care were not related to the location type of the patient ($P > .185$, results not presented).

**DISCUSSION**

Many of the recent studies of chiropractic patients in Australia have been based on single-gender samples. The results from this study are novel in the sense that data were obtained from a mixed-gender group from a diverse range of metropolitan, rural, and remote locations across Australia. In summarizing the results from this broad sample, a profile of the typical Australian chiropractic patient can be constructed. The type of patient most commonly encountered in the study sample was as follows: female, born in Australia, aged between 45 and 64 years, who spoke English at home. The findings from this study regarding sex are in alignment with ABS statistics, with female patients making up 62% of the individuals who visited CAM therapists in 2004 to 2005. In fact, females make up most chiropractic patients worldwide. This finding relates not only to CAM therapies but also to orthodox medicine because women in Australia are also more likely than men to consult with GPs.
This finding is not surprising because women typically experience poorer health than men.23–27 Although the reasons for this are varied and not fully understood, differences in biological, behavioral, psychological, and social factors are thought to be contributing factors to this disparity.25,28,29 Regarding age, the most well-represented age group of CAM users throughout the world is typically in the 30- to 55-year age group.15,30,31

Most respondents were from metropolitan areas. This is in keeping with the geographic distribution of both the Australian population13,32 and the associated health care services.9 Interestingly, there were substantially more respondents from metropolitan areas than rural and remote areas in VIC. Given that in 2006 almost equal numbers of chiropractors worked in metropolitan (49.9%) and rural areas (50.1%),33 this difference in locations may be due, by chance, to sampling more chiropractors from metropolitan areas than rural and remote areas of VIC. Despite this difference, characteristics of patients generally did not differ significantly by location.

In a recent survey of 11 143 Australian women, Sibbritt et al16 found that women who consulted chiropractors and osteopaths tended to have lower levels of education compared with those who did not consult with these care providers. The results from this study regarding education levels of the entire respondent group are in alignment with these findings, with only 30% reporting that they held university-level qualifications.

Recent (February 2012) data from the ABS highlight that the average Australian income, based on full-time adult total earnings (seasonally adjusted), is $73 054.34 The typical patient in this study earned between $40 000 and $90 000 per annum. The proportion of respondents reporting earning less than $40 000 per annum was 24.7%. These results differ slightly with the findings from Xue et al8 regarding the socioeconomic profiles of CAM users in Australia, with 38.8% of those surveyed earning less than $40 000. This may indicate a slight difference between the income profiles of chiropractic patients vs CAM users in general, with a greater proportion of chiropractic patients reporting higher incomes. However, additional data and further analysis are necessary to substantiate this inference.

Most patients considered chiropractic care to be the first choice for what were primarily musculoskeletal complaints. This finding is not unexpected based on the fact that reports from the ABS describe “arthritis” as one of the most commonly reported conditions among individuals who consult CAM practitioners.17 In fact, most patients who make use of practitioners specializing in spinal manipulative therapy do so for musculoskeletal complaints.18,30,35 Furthermore, patients in the sample expected more from chiropractic care than purely symptomatic relief and tended to have chosen chiropractic based on personal beliefs. However, these patients were generally not opposed to the concurrent use of orthodox medicine. This particular stance may have been influenced by the fact that many chiropractors espouse an understanding of chiropractic that incorporates exercise, nutrition, wellness, and lifestyle modification36 and recommend regular chiropractic checkups and lifestyle consultations.37

Word-of-mouth advertising is considered the leading source of new customers for many organizations.38,39 Furthermore, this form of referral is reported to be the prime source of patient referral among chiropractic job analyses throughout the world.18,19,31 The study results, presented here, were no different in this respect.

With regard to ease of accessibility to chiropractic services, most patients in the respondent group felt that it was easy to get an appointment with their chiropractor despite the perception that their chiropractor was relatively busy. Neither practice location nor proximity to public transport was a relevant factor in a patient’s decision to consult with a chiropractor. Most patients felt that the waiting and consultation times at their current clinic were satisfactory and were happy to return to the clinic if required to do so. However, the question relating to this issue may have been interpreted by respondents in several ways: an intention to continue until their problem was resolved or an intention to follow the chiropractor’s recommendations, which may not equate to symptom resolution in the case of “wellness-type” care.

Interestingly, patients from rural areas were less likely to consult, or consider consulting, alternative care providers such as an osteopath or physiotherapist, instead of another chiropractor, if their chiropractor was no longer available. This may indicate a loyalty to certain modalities or a lack of understanding of the role of other musculoskeletal care providers. This last point is plausible because many patients in this respondent group reported that they did not have a clear understanding of chiropractic before receiving treatment. However, most of the sample believed that chiropractic care contributed to their general health and well-being and encouraged them to take more responsibility for their health. Furthermore, when asked to classify chiropractic into “CAM,” “allied health care,” or “mainstream health care,” the sample was relatively divided, although significantly more patients than expected classified chiropractic as CAM. These findings are noteworthy because they may highlight an inconsistent understanding of chiropractic by new patients. It may also be the case that the profession’s “identity” is not clear in the eye of the consumer or that the definitions of the response categories for this particular question were not well understood by respondents.

“Health and wellness” was one of the main reasons given by respondents for consulting a chiropractor. In the United States, 44.6% of individuals who used chiropractic or osteopathic services reported that they did so for general wellness and prevention.30 Interestingly, patients of Australian CAM therapists are more likely to engage in healthier lifestyle choices such as exercise and increased fruit and vegetable consumption.17
With regard to health status, only a minority of patients in the sample reported their health status to be below average. The figures from this study are somewhat lower than self-reports from the ABS, with around 18% of individuals who consulted CAM therapists in the previous fortnight reporting “fair” to “poor” health status. This may indicate a difference between the types of patients who visit chiropractors vs the types of patients who visit other CAM therapists, a finding that was also highlighted in socioeconomic profiling of respondents.

Limitations

The sampling strategy used in this study may have resulted in a sample that was not entirely representative of all the states and territories in Australia. By arbitrarily grouping geographical regions and then sampling from these groupings, it is possible that the smaller regions, that is, Tasmania, Australian Capital Territory, and the Northern Territory, may not have been adequately represented in the final sample. The make-up of each clinic sample was dependent on the clients who had made an appointment for consultation with the chiropractor during the data collection period. The data collection period was December 2010 to January 2011. This typically coincides with the summer holidays in Australia. As a result, some patients may have been away or too busy to attend the chiropractic clinics because of factors such as looking after school-aged children who were off on school holidays. Only respondents with an appointment during the data collection period had the opportunity to participate in the survey. Although data collection took place over a 2-month period, it is possible that a large proportion of a clinic’s clientele were not surveyed. The type of respondent and the associated responses may therefore have differed if the survey was conducted at a different time. The defined data collection period and the associated reporting schedule meant that surveys returned after the closure of the collection period could not be included in the final analysis. Researchers did not make contact with the participating clinics during the data collection period, which made it impossible to identify clinics that were likely to submit data late or more importantly identify clinics that did not intend on participating in the research. No attempts were made by the researchers to impute missing data or replace the participants from the clinics that had chosen not to participate. These factors may have influenced the representativeness of the sample, especially if the data were missing from clinics from some of the smaller states or territories.

Unlike $P$ values, there are no universally accepted standards for evaluating response rates. Johnson and Wislar state that 60% is the “rule of thumb” for acceptable response rates. These authors also discuss the importance of nonresponse bias and point out that one way to assess the impact of this type of bias is to compare the study results with the results from total population data. Therefore, although the response rate to this survey was relatively low (24.3%), the results aligned well overall with ABS reports regarding Australian CAM users. This does not, however, negate the possible influence of nonresponse bias created by the low response rate in this study.

Response rates in epidemiologic studies have been declining in the last 3 decades. Researchers are revealing some of the reasons for declining response rates: difficulty locating eligible participants, decreased interest for participation from eligible participants, decreased social participation and volunteerism, disillusionment with science and research, an increase in the complexity of life, increasingly invasive and time-consuming assessment procedures, and an increased intricacy of privacy laws and ethical considerations.

Surveys that rely on self-completion often have lower response rates than telephone or face-to-face interviews because the respondent is required to fill in the questionnaire and return it without assistance. Therefore, the response rate to the patient survey may have been improved if a different delivery system was used. It may be the case that the waiting room of a chiropractic clinic is not a setting that is conducive to strong participation and response rates. Furthermore, monetary incentives/reimbursements were not used in this study. Provision of some incentive may have led to improved response rates of clinics and their associated patrons.

Furthermore, the response rate to this survey was determined by dividing the number of actual respondents by the number of potential respondents from the participating clinics. It is important to note that if the clinics that did not participate in the survey were excluded from these calculations, the response rate would be slightly higher. In acknowledging the low response rate in this study, it must also be understood that although response rate can affect study validity, response rate in itself is not a direct proxy to study validity. The results of this study should, however, due to the low response rate, be interpreted with caution.

The authors did not compare responders and non-responders or late respondents, which may have provided more information regarding this form of bias. Further research is required to determine the most effective way to access and extract information from chiropractic patients for research purposes. This type of research would also be helpful in identifying the differences between respondents and nonrespondents.

Conclusions

This study contributes to the body of literature on the profile of chiropractic patients in Australia and their perceptions regarding chiropractic and chiropractic services. This study has reinforced the main findings from ABS reports and other job analysis studies with regard to patient demographics and socioeconomic data of chiropractic patients. The results of the study suggest that the
accessibility of chiropractic services in metropolitan, rural, and remote regions of Australia is adequate based on the perceptions of the consumers surveyed. Consumers are, in general, satisfied with regard to waiting and consultations times at their chiropractic clinics. The survey has highlighted that patients consult with chiropractors for predominantly musculoskeletal conditions; however, many expect more than just symptom management.

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.jmpt.2014.01.001.

**Funding Sources and Potential Conflicts of Interest**

### Practical Applications

- Most patients sought chiropractic treatment musculoskeletal complaints and the maintenance of health and well-being.
- Word-of-mouth referral was the key source of patient referral for chiropractors.
- Most patients were satisfied with the service that they receive at chiropractic clinics.

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**Contributorship Information**

Concept development (provided idea for the research): BTB, RB, RFC, SE, PLG, HG.

Design (planned the methods to generate the results): BTB, RB, RFC, SE, PLG, HG.

Supervision (provided oversight, responsible for organization and implementation, writing of the manuscript): BTB, RB, RFC, SE, PLG, HG.

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

Analysis/interpretation (responsible for statistical analysis, evaluation, and presentation of the results): HG.

Literature search (performed the literature search): BTB, RB, RFC, SE, PLG, HG.

Writing (responsible for writing a substantive part of the manuscript): BTB.

Critical review (revised manuscript for intellectual content, this does not relate to spelling and grammar checking): BTB, RB, RFC, SE, PLG, HG.

**References**


