

Attitudes Toward Chiropractic: A Survey of Canadian Obstetricians

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Abstract

We assessed the attitudes of Canadian obstetricians toward chiropractic with a 38-item cross-sectional survey. Ninety-one obstetricians completed the survey, for a response rate of 14% (91 of 659). Overall, 30% of respondents held positive views toward chiropractic, 37% were neutral, and 33% reported negative views. Most (77%) reported that chiropractic care was effective for some musculoskeletal complaints, but 74% disagreed that chiropractic had a role in treatment of non-musculoskeletal conditions. Forty percent of respondents referred at least some patients for chiropractic care each year, and 56% were interested in learning more about chiropractic care. Written comments from respondents revealed concerns regarding safety of spinal manipulation and variability among chiropractors. Canadian obstetricians' attitudes toward chiropractic are diverse and referrals to chiropractic care for their patients who suffer from pregnancy-related low back pain are limited. Improved interprofessional relations may help optimize care of pregnant patients suffering from low back pain.

Keywords

low back pain, chiropractic, complementary therapies, manipulation, spinal manipulation, obstetric, pregnancy

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Back pain affects up to 90% of pregnant women,^{1,2} is debilitating for 10% of sufferers,³⁻⁵ and is a common reason for attending a primary health care provider.¹ The etiology of back pain during pregnancy is uncertain but may be associated with physiological changes that occur during pregnancy, including alterations in circulation, biomechanics, and endocrinology.^{2,6,7} Chiropractic care, a complementary and alternative medicine therapy, is frequently pursued by women seeking to alleviate back pain during pregnancy.^{5,8-11}

Wang and colleagues explored attitudes of 168 nurse educators, nurse midwives, and obstetricians from New Haven, Connecticut, toward complementary and alternative medicine therapies for lower back pain treatment in pregnant women.¹² One hundred and four participants (62%) returned the survey, and 93% of nurse midwives, 64% of obstetricians, and 57% of prenatal nurse educators reported that they recommended complementary and alternative medicine therapies for lower back pain during pregnancy. Chiropractic accounted for almost 37% of all complementary and alternative medicine therapies recommended by prenatal health care providers for lower back pain treatment during pregnancy. In another survey, 120 certified nurse-midwives from North Carolina were surveyed (68% response rate) and almost all respondents (94%) recommended

complementary and alternative medicine to their pregnant patients, and 57% specifically recommended chiropractic.¹³

In Canada, approximately 60% of pregnant women attend an obstetrician at some point during their pregnancy,¹⁴ and the majority will experience back pain during pregnancy. Despite the common use of chiropractic care by pregnant women there have been no studies regarding the attitudes of Canadian obstetricians toward chiropractic. This lack of information complicates efforts to optimize interprofessional collaboration and improve care of shared patients. The purpose of the current study was to survey attitudes of Canadian obstetricians toward chiropractic.

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Methods and Procedures

Questionnaire Development

We modified an existing survey that was designed to assess attitudes toward chiropractic among orthopedic surgeons.¹⁵ The final survey was a 38-item, English language questionnaire that examined the attitudes of obstetricians toward chiropractic care for pregnant patients with low back pain (LBP). The survey consisted of 18 items related to demographic information and knowledge of chiropractic and a 20-item section, the Chiropractic Attitude Questionnaire (CAQ) (Appendix A). The CAQ assesses respondents' attitudes toward various topics related to chiropractic care using a 5-point Likert-type scale, ranging from 0 to 4. The responses are then summed to arrive at a total score ranging from 0 (most negative attitude toward chiropractic) to 80 (most positive attitude toward chiropractic). We also included an option for obstetricians to provide written comments regarding chiropractic.

We pretested the final questionnaire on a group of 5 staff obstetricians at an urban hospital. This group was asked to review the survey to evaluate if it appeared to adequately measure attitudes toward chiropractic overall, and if the individual questions adequately reflected the domains of formation of attitudes, referral practices, and impressions toward chiropractic assessment and treatment. The pretest participants also commented on the clarity and comprehensiveness of the questionnaire. Feedback from 4 obstetricians resulted in minor revisions to some survey items.

Questionnaire Administration

We used Survey Monkey (<http://www.surveymonkey.com>) to facilitate online completion of our questionnaire. We approached the Society of Obstetricians and Gynecologists of Canada (SOGC) who agreed to send a request to complete our survey to their members who had indicated a willingness to receive surveys (46% of their members). The SOGC includes all Canadian obstetric residents, obstetricians in active practice, and some retired practitioners. On November 11, 2013, a representative from the SOGC sent a link to our online survey to 659 of their 1433 members. Participants who accessed the link were provided with a disclosure letter detailing the intent of the survey and explicit instructions that participation was voluntary and that they could withdraw from the study at any time. The survey was available to potential respondents for 2 months. Nakash and colleagues have shown that 3 reminders maximize the number of respondents taking part in surveys¹⁶; however, SOGC's policy regarding surveys allowed for only one e-mail reminder to be sent 2 weeks later. No compensation was offered for participation in the study.

Data Analysis

We generated frequencies for all collected data. Two authors (KS, JN) reviewed written comments independently and in duplicate in order to establish common themes and resolved discrepancies by discussion.¹⁷ Based on the findings from administration of the same survey to Canadian orthopedic surgeons¹⁵ and family physicians,¹⁸ we hypothesized the following associations of respondents' attitudes toward chiropractic: (a) older obstetricians would hold a more negative opinion toward chiropractic; (b) obstetricians who indicated being moderately or highly knowledgeable about chiropractic would hold a more positive opinion toward chiropractic; (c) obstetricians endorsing patient feedback, a relationship with a specific chiropractor, personal

treatment experience, or feedback from family and friends as sources of information regarding chiropractic would hold more positive attitudes; and (d) obstetricians endorsing the scientific literature as sources of information regarding chiropractic would hold more negative attitudes.

These variables were entered into a generalized linear model. The dependent variable, attitude toward chiropractic, was defined as the aggregate score of the CAQ. We confirmed normality of CAQ scores with the Kolmogorov-Smirnov test. We calculated that we would require at least 70 completed surveys to ensure that our regression model was reliable (10 respondents for each independent variable considered).¹⁹

All comparisons were 2-tailed, and a variable was considered statistically significant if it had a *P* value of $\leq .05$ in the final multivariable model. We reported the unstandardized regression coefficient and 95% confidence interval (CI) for each significant variable in the analysis. The value of the unstandardized regression coefficient represents the change in response score on the CAQ. We plotted residuals from the regression analyses to ensure that their distributions were reasonably normal. Multicollinearity was deemed concerning if the variance inflation factor for any independent variable was greater than 5.²⁰ All analyses were performed using IBM SPSS statistics software (version 20).

Results

Characteristics of Respondents

Ninety-six (response rate of 15%) obstetricians agreed to participate in the study; however, 5 respondents provided incomplete information resulting in 91 completed surveys that were used for analysis (14% complete response rate). Most respondents were female (63.7%), and the majority of respondents (78.1%) had been in practice for ≥ 5 years. Over half of the respondents practiced in hospitals (54.9%) and most endorsed general obstetrics (82.4%) as their area of clinical interest (Table 1).

Attitudes Toward Chiropractic

Overall, 30.0% of respondents held a positive view of chiropractic, 36.7% were neutral, and 33.3% reported negative views (Table 2). Forty percent (40%) of respondents referred at least some patients for chiropractic care each year, primarily due to patient request (31.9%) or lack of response to medical treatment (20.9%; Table 3). Respondents indicated their opinion of chiropractic was formed primarily from patient feedback (48.4%), family and friends (39.6%), personal treatment experience (26.4%), or a relationship with a specific chiropractor (20.9%; Table 4). Most respondents (56%) were interested in learning more about chiropractic care (Table 5).

The mean CAQ score among respondents was 41.2 (standard deviation [SD] = 11.7), with values ranging from 0 to 69, and scores were normally distributed (*P* = .06). Among respondents who endorsed positive views toward chiropractic, the average CAQ score was 52.7 (SD = 7.2), neutral respondents had a mean CAQ score of 42.3 (SD = 4.1), and obstetricians with negative views had a mean CAQ score of 29.6 (SD

Table 1. Demographic Characteristics of Respondents (N = 91).

Age, mean (SD)	46.7 (11.6)
Gender, n (%)	
Male	33 (36.3%)
Female	58 (63.7%)
Province of practice	
Ontario	45 (49.5%)
Alberta	14 (15.4%)
British Columbia	13 (14.3%)
Manitoba	4 (4.4%)
Nova Scotia	4 (4.4%)
Quebec	4 (4.4%)
Saskatchewan	4 (4.4%)
New Brunswick	2 (2.2%)
Years in practice, n (%)	
<5 years	20 (22.0%)
5-10 years	23 (25.3%)
11-20 years	20 (22.0%)
>20 years	28 (30.8%)
Practice environment, n (%) ^a	
Hospital-based	50 (54.9%)
Community	35 (35.8%)
Academic	33 (36.3%)
Private practice	32 (35.2%)
Multidisciplinary	5 (5.5%)
Clinical area, n (%) ^a	
General obstetrics	75 (82.4%)
High-risk pregnancies	44 (48.4%)
Late maternal age	34 (37.4%)
Multiple birth	31 (34.1%)
Endocrine disorders	26 (28.6%)
Fertility problems	16 (17.6%)

^aTotal percentage is >100% as respondents could choose more than one option.

= 9.5). An important change in continuous outcome measures can be estimated as half a SD of the aggregate score for a given population,²¹ and by this standard, a 6-point difference on the CAQ would be considered meaningful.

Response data to specific CAQ items are provided in Table 2. The majority of respondents strongly agreed or agreed that chiropractors provide effective therapy for some musculoskeletal conditions (76.6%), that chiropractors provide a patient-centered approach (57.7%), and that chiropractic care is a useful supplement to conventional medicine (60.0%). Most respondents disagreed (32.2%) or strongly disagreed (42.2%) that chiropractors can provide effective therapy for non-musculoskeletal conditions, and 54.4% of respondents disagreed or strongly disagreed that chiropractic manipulation of the neck is a safe therapy. Thirty-nine percent of respondents indicated that chiropractic therapy is effective for pregnant patients with LBP whereas 51.1% were uncertain.

In an unadjusted analysis, obstetricians reporting personal treatment experience with chiropractic scored an average of 6.1 points higher on their total CAQ score (95% CI = 1.0 to 11.2) than those without personal treatment experience; however, in our adjusted model this association did not remain significant ($P = .09$). Other hypothesized factors also failed to

show a significant association with obstetricians' attitudes toward chiropractic in our adjusted analysis (Table 6). Our adjusted regression model accounted for 12% in the variability of respondents' attitude scores ($R^2 = 0.12$).

Written Comments

Of those who responded, 31 (34.1%) provided written comments. Thematic coding revealed 5 distinct themes: (a) lack of knowledge regarding chiropractic; (b) concerns regarding variability among chiropractors; (c) effectiveness of chiropractic care for musculoskeletal complaints; (d) preference for other professions to manage patient's musculoskeletal complaints; and (e) concerns regarding the safety of chiropractic treatment. The 2 most commonly endorsed themes by obstetricians who provided written comments were safety regarding certain treatments provided by chiropractors (7 of 31) and diversity (6 of 31) in the chiropractic profession. For example:

Safety

1. "I do not feel that pregnant patients should have manipulation due to the ligament instability, which puts their joints at higher risk of injury. The trouble is that I do not trust that chiropractors will avoid manipulation in those patients, so I am uncomfortable to refer. They may do other nonmanipulative treatments that will help—my concern is with the safety of the patients."
2. "My one concern with chiropractic in obstetrics is fetal manipulation—this is something that obstetricians do with much monitoring and backup, so should not be attempted in a chiropractic office."

Diversity

1. "I realize that there may be many chiropractors who provide safe effective treatment for musculoskeletal issues and do not manage things such as asthma beyond the bounds of their training. So sadly those that promote unsafe practice end up painting the entire profession in a bad light!"

Discussion

Our survey of Canadian obstetricians found that attitudes toward chiropractic are approximately evenly divided between positive (30%), neutral (36.7%), and negative (33.3%) views. However, most obstetricians reported that chiropractic treatment is effective for some musculoskeletal complaints and that chiropractic was a useful supplement to conventional medical care. Forty percent of respondents referred at least some patients for chiropractic care each year, predominantly in response to patient request or failure to resolve with medical treatment. A majority of respondents disagreed that chiropractic care was effective for

Table 2. Responses to the Chiropractic Attitude Questionnaire Items (N = 90).

Item	Strongly Agree, n (%)	Agree, n (%)	Undecided, n (%)	Disagree, n (%)	Strongly Disagree, n (%)
Chiropractors promote unnecessary treatment plans	6 (6.7%)	24 (26.7%)	43 (47.8%)	14 (15.6%)	3 (3.3%)
Chiropractors provide effective therapy for some musculoskeletal conditions	21 (23.3%)	48 (53.3%)	16 (17.8%)	3 (3.3%)	2 (2.2%)
Chiropractors make excessive use of radiographic imaging	5 (5.6%)	12 (13.3%)	51 (56.7%)	19 (21.1%)	3 (3.3%)
Chiropractors provide a patient centered approach	12 (13.3%)	40 (44.4%)	33 (36.7%)	3 (3.3%)	2 (2.2%)
I have to spend time correcting erroneous information patients have received from chiropractors	7 (7.8%)	13 (12.7%)	30 (33.3%)	37 (41.1%)	3 (3.3%)
Chiropractic manipulation of the neck is generally a safe therapy	2 (2.2%)	7 (7.8%)	32 (35.6%)	31 (34.4%)	18 (20.0%)
Chiropractors can provide effective therapy for some non-musculoskeletal conditions (eg, asthma, colic, etc)	0	4 (4.4%)	19 (21.1%)	29 (32.2%)	38 (42.2%)
Obstetricians may risk professional liability if they refer a patient to a chiropractor	5 (5.6%)	11 (12.2%)	35 (38.9%)	35 (38.9%)	4 (4.4%)
Chiropractors can reduce patient overload for obstetricians for patients with musculoskeletal complaints	3 (3.3%)	22 (24.4%)	29 (32.2%)	28 (31.1%)	8 (8.9%)
Chiropractors provide patients with misinformation regarding vaccination	15 (16.7%)	19 (21.1%)	50 (55.6%)	6 (6.7%)	0
Chiropractic provides effective therapy for pregnant patients with low back pain	6 (6.7%)	29 (32.2%)	46 (51.1%)	7 (7.8%)	2 (2.2%)
Chiropractors lack sufficient clinical training	5 (5.6%)	7 (7.8%)	39 (43.3%)	37 (41.1%)	2 (2.2%)
Chiropractic care is a useful supplement to conventional medicine	6 (6.7%)	48 (53.3%)	24 (26.7%)	10 (11.1%)	2 (2.2%)
Chiropractors engage in overly aggressive marketing	5 (5.6%)	16 (17.8%)	39 (43.3%)	30 (33.3%)	0
Chiropractic includes ideas and methods from which conventional medicine could benefit	1 (1.1%)	40 (44.4%)	39 (43.3%)	6 (6.7%)	4 (4.4%)
The results of chiropractic manipulation are due to the placebo effect	3 (3.3%)	8 (8.9%)	45 (50.0%)	31 (34.4%)	3 (3.3%)
Chiropractors treat in accordance with evidence-based practices	1 (1.1%)	13 (14.4%)	57 (63.3%)	16 (17.8%)	3 (3.3%)
Chiropractic has no role in the routine care of obstetric patients	9 (10.0%)	19 (21.1%)	33 (36.7%)	23 (25.6%)	6 (6.7%)
Chiropractic breeds dependency in patients on short-term symptomatic relief	3 (3.3%)	17 (18.9%)	36 (34.4%)	31 (34.4%)	3 (3.3%)
Overall, my impression of chiropractic is favorable	6 (6.7%)	21 (23.3%)	33 (36.7%)	26 (28.9%)	4 (4.4%)

Table 3. Obstetrician's Referral Practices for Chiropractic Care (N = 91).

	Number of Responses (%)
Percentage of pregnant patients that present with back pain ^a	
0% to 20%	10 (11.1%)
21% to 40%	20 (22.2%)
41% to 60%	26 (28.9%)
61% to 80%	23 (25.6%)
>80%	11 (12.2%)
Frequency of patient referral for chiropractic treatment	Number of responses (%)
Weekly	5 (5.5%)
Monthly	17 (18.7%)
Every year	14 (15.4%)
Never	55 (60.4%)
Number of patients referred for chiropractic care annually	Number of responses (%)
1 to 10	19 (20.9%)
11 to 25	12 (13.2%)
26 to 50	1 (1.1%)
>50	4 (4.4%)
None	55 (60.4%)
Reason for chiropractic referral	Number of responses (%) ^b
Patient request	29 (31.9%)
Nonresponse to medical treatment	19 (20.9%)
Personal experience as a chiropractic patient	10 (11.0%)
Literature supports chiropractic care	5 (5.5%)
Relationship with a specific chiropractor	5 (5.5%)
I do not refer for chiropractic care	41 (45.1%)

^aDenominator for this item is 90.^bTotal percentage is >100% as respondents could choose more than one option.

Table 4. Obstetricians' Sources of Information on Chiropractic (N = 91).

Sources and Type of Information on Chiropractic	Favorable, n (%) ^a	Neutral Opinion, n (%) ^a	Unfavorable, n (%) ^a
Patient feedback	44 (48.4%)	33 (36.3%)	7 (7.7%)
Family and friends	36 (39.6%)	27 (29.7%)	12 (13.2%)
Personal treatment experience	24 (26.4%)	29 (31.9%)	10 (11.0%)
Relationship with a specific chiropractor	19 (20.9%)	37 (40.7%)	7 (7.7%)
Research literature	3 (3.3%)	42 (46.2%)	19 (20.9%)
Residency	3 (3.3%)	43 (47.3%)	14 (15.4%)
Professors/supervisors/mentors	1 (1.1%)	36 (39.6%)	25 (27.5%)
Media	1 (1.1%)	49 (53.9%)	18 (19.8%)
Medical school	0	47 (51.6%)	24 (26.4%)

^aTotal percentage is >100% as respondents could choose more than one option.

Table 5. General Views of Respondents Regarding Chiropractic Care (N = 91).

Rate your knowledge of chiropractic, n (%)	
None	14 (15.38)
Little knowledge	58 (63.74)
Moderate knowledge	17 (18.68)
Very knowledgeable	2 (2.20)
When were your opinions of chiropractic formed?, n (%)	
Before medical school	23 (25.27)
During medical school	18 (19.78)
After medical school	44 (48.35)
No opinion	6 (6.59)
Did medical school expose you to chiropractic, n (%)	
Yes and it was favorable	2 (2.20)
Yes and it was neutral	9 (9.89)
Yes and it was negative	11 (12.09)
No	69 (75.82)
Are you comfortable discussing chiropractic with patients?, n (%)	
Yes definitely	18 (19.78)
Somewhat comfortable	28 (30.77)
Unsure	10 (10.98)
Probably not	22 (24.18)
No	13 (14.29)
Interested in learning more about chiropractic?, n (%)	
Yes	51 (56.04)
No	23 (25.27)
Unsure	17 (18.68)
Should chiropractic be involved in primary health care settings?, n (%)	
Yes, by primary access	9 (9.89)
Yes, by physician referral	14 (15.38)
No	37 (40.66)
Unsure	31 (34.07)

non-musculoskeletal complaints, and were concerned about adverse events associated with neck manipulation.

Strengths and Limitations

Strengths of our study include use of a previously validated instrument to elicit attitudes toward chiropractic and piloting of our survey prior to administration. Our study does have limitations, primarily related to generalizability. The SOGC sent surveys to those members who agreed to participate in surveys (46% of their membership), and of these, only 14% provided a

completed survey. The response is considerably lower than the mean physician response rate of 54% reported by Asch and colleagues' systematic review of postal surveys.²² The results of the current study may be affected by selection bias and generalizability of our findings to Canadian obstetricians' attitudes toward chiropractic in general is uncertain.

Relevant Literature

One of us (JWB) previously examined Canadian orthopedic surgeons' attitudes toward chiropractic using the CAQ (49%

Table 6. Variables Associated With Obstetricians' Attitudes Toward Chiropractic (N = 90).

Variable	Unstandardized Regression Coefficient From Univariable Analysis (95% CI)		Unstandardized Regression Coefficient From Multivariable Analysis (95% CI)	
		P Value		P Value
Age (for each 10-year increment)	1.23 (−0.92 to 3.37)	.26	1.01 (−1.03 to 3.32)	.39
Knowledge of chiropractic	0.33 (−3.44 to 4.10)	.86	0.60 (−3.20 to 4.40)	.76
Information source for chiropractic ^a				
Patient feedback	2.55 (−6.09 to 11.19)	.56	2.08 (−7.35 to 11.51)	.66
Relationship with a specific chiropractor	1.95 (−3.36 to 7.26)	.47	1.27 (−5.81 to 8.34)	.72
Research literature	−1.30 (−6.67 to 4.07)	.63	−6.21 (−13.65 to 1.23)	.10
Personal treatment experience	6.10 (1.04 to 11.16)	.02	6.12 (−1.03 to 13.26)	.09
Family and friends	6.02 (−0.30 to 12.34)	.06	3.24 (−4.90 to 11.38)	.43

Abbreviation: CI, confidence interval.

^aAs respondents could endorse multiple categories, each subcategory was entered individually into our generalized linear model. (1) Older obstetricians would hold a more negative opinion toward chiropractic; (2) Obstetricians who indicated being moderately or highly knowledgeable about chiropractic would hold a more positive opinion toward chiropractic; and (3) Obstetricians endorsing patient feedback, a relationship with a specific chiropractor, the scientific literature, personal treatment experience, or feedback from family and friends as sources of information regarding chiropractic would hold more positive attitudes.

response rate; 244 of 500).¹⁵ A comparison of the average CAQ scores between the respondents from the previous and current surveys revealed that Canadian orthopedic surgeons report significantly more positive attitudes toward chiropractic versus Canadian obstetricians (mean difference = 7.15; 95% CI = 4.28 to 10.03). Assessment of response patterns between these groups of surgeons reveals that obstetricians were more likely to endorse uncertainty for many of the CAQ items, and rated their knowledge of chiropractic significantly lower than orthopedic surgeons (mean difference for this question = −0.37; 95% CI = −0.20 to −0.55).

Most obstetricians (51%) were uncertain as to whether chiropractic care was effective for pregnant women with LBP. Many medical practitioners believe that pregnancy-related back pain is a temporary and normal occurrence that often resolves following birth,²³ and only one quarter of pregnant women who present with LBP to their primary health care provider are given any recommendations for symptom management.¹² A 2013 Cochrane review identified 2 randomized controlled trials that explored the effectiveness of spinal manipulation for LBP among pregnant women.²⁴ One was a feasibility study that was underpowered to explore for difference in treatment effects,²⁵ while the other randomized 144 pregnant women with LBP and found that, compared with usual obstetric care, manipulative treatment slows or halts the deterioration of back-specific functioning during the third trimester of pregnancy.²⁶ A randomized controlled trial that randomized 169 pregnant women with LBP, published since the Cochrane review, found that chiropractic care (ie, spinal manipulation, stabilization exercises, and education) resulted in significant pain reduction and functional improvement versus standard obstetric care.²⁷ In addition, a prospective, cohort outcomes study on 115 patients up to 1 year following their initial chiropractic treatment found that 52% had clinically relevant improvements at 1 week, 70% at 1 month, 85% at 3 months, 90% at 6 months, and 88% at 1 year.²⁸ Statistically significant reductions in numeric pain rating scales and Oswestry scores were reported at all time points. Current evidence regarding spinal manipulation and chiropractic

care for pregnancy-related LBP is limited, but suggests these interventions are effective in reducing pain and promoting function.^{2,28,29}

Most obstetricians that responded to our survey (54%) disagreed that chiropractic manipulation of the neck is generally a safe therapy. Similarly, Busse and colleagues found that 47% of orthopedic surgeons surveyed in their study reported that cervical manipulation was not a safe practice.¹⁵ This impression may stem from previous research that suggested a causal relationship between cervical spinal manipulation and vertebrobasilar artery stroke, a theory that was sensationalized in the popular media.^{30–32} However, subsequent research with improved methodology has failed to confirm an association between increased risk of stroke from chiropractic care.³³ In the literature that was available up to 2011, regarding manipulation and pregnant women, Stuber and colleagues found only 5 articles (4 case studies and 1 prospective observational cohort study) that identified possible adverse events in 7 pregnant or postpartum women following spinal manipulation.³⁴ In one of the case studies, the pregnant patient reported an increase in pain and paravertebral swelling, and in the other, the pregnant patient reported short-term numbness and pain in the neck and arms during treatment along with several seconds of transient upper extremity paralysis and lower extremity numbness following cervical spinal manipulation.³⁴ Magnetic resonance imaging scans revealed that one of these patients had a pathological type II odontoid fracture with ventral displacement producing spinal cord compression (a tumor was also identified in the C2 vertebral body) and the other patient had an epidural hematoma with associated mass effect on the spinal cord. The prospective cohort study reported an increase in pain for 3 out of 78 subjects (3.8%) following manual therapy for lumbopelvic pain, all of which resolved within 7 days.

Similar to the attitudes of Canadian orthopedic surgeons, almost all obstetricians who responded to our survey rejected the notion that chiropractic treatment was effective for non-musculoskeletal conditions (eg, asthma, colic), and current systematic reviews provide little evidence to challenge to this assertion.^{35–39} As with Canadian orthopedic surgeons and

family physicians who responded to our previous surveys,^{18,40} obstetricians raised concerns regarding diversity of treatment approaches within the chiropractic profession. A 2011 survey of 630 members of the Ontario Chiropractic Association within the Greater Toronto Area (23% response rate) that inquired about treatment provided to pregnant patients provides support for these impressions.⁴¹ Although inquiring about management of pregnant women in general, the survey found that the 143 chiropractic respondents endorsed 30 different chiropractic techniques, 13 adjunctive treatments, 5 types of exercises, and 20 different recommendations for nutritional supplementation they employed when treating pregnant women.

Implications and Future Research

Since most pregnant women will suffer from LBP and attend their obstetricians regularly, and current evidence supports a role of chiropractic care of LBP among pregnant women,^{24,27} improving working relationships between chiropractors and obstetricians may help facilitate appropriate referrals. Over half of the respondents to the current survey wanted to know more about chiropractic care, which suggests a role for

interprofessional education in this area.⁴²⁻⁴⁴ Themes for education may include recent studies on safety and efficacy of chiropractic care, clinical training of chiropractors,¹⁵ as well as strategies to improve documentation and sharing of clinical information.⁴⁵ Münstedt et al have suggested development of interprofessional working groups that focus on creating evidence-based resources such as clinical practice guidelines to help improve relationships between obstetricians and complementary and alternative medicine providers.⁴⁶ Better understanding of the concordance between evidence-based practices and practical management of pregnant women with LBP by chiropractors would be helpful to address obstetricians' concerns and/or identify targets for improving chiropractic care of this population.

Conclusion

Obstetricians' attitudes toward chiropractic are diverse and referrals to chiropractic care for their patients who suffer from pregnancy-related LBP are limited. Improved interprofessional relations may help optimize care of pregnant patients suffering from LBP.

Appendix A



Obstetrician's Attitudes Towards Chiropractic

Dear Dr. _____ ,

We are conducting a research study to gain a better understanding of Obstetrician's perceptions of chiropractic. Dr Jon Barrett is the primary investigator in this project. We are kindly asking for your cooperation in completing the survey that follows this letter. Please answer each of the 38 questions listed in this survey. It will take you **less than 10 minutes** to respond by checking the **one box** (unless otherwise stated) that best reflects your answer to each question. The report of the results will be in an aggregate format without identifying information. All responses will be kept confidential and the surveys themselves will on secured survey that is only accessible to the study investigators.

There may not be any direct benefit to you by participating in this survey. You can choose whether to complete this survey or not, by choosing the "I agree to participate" button or the "I do not wish to participate" button following this information letter. If you volunteer to be in this study, you may withdraw your completed survey at any time without consequences. You may also refuse to answer any questions you don't want to answer and still remain in the study.

We plan to send out this survey a total of three times to all intended participants, unless we receive a completed survey or an indication that a participant does not wish to participate. If you prefer, we can send the survey as an e-mail attachment and you can fill it out and return it by e-mail; please communicate this request by e-mail (kstuber@cmcc.ca).

You are not waiving any legal claims, rights or remedies because of your participation in this research study. This study has been reviewed and received ethics clearance through the both Sunnybrook and the Canadian Memorial Chiropractic College Research Ethics Boards (REB). Either REB can be contacted by phone:

- Dr. Philip C. Hébert, Chair of the Sunnybrook REB at (416) 480-4276 **OR**
- Mark Fillery, Research Administrator of the Canadian Memorial REB at at 416-482-2340 ext. 267

We greatly appreciate your time and cooperation.

Sincerely,

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Research Scientist
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- Gender:

<input type="checkbox"/> Female	<input type="checkbox"/> Male
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- Age: _____
- Province/territory you practice:

<input type="checkbox"/> British Columbia <input type="checkbox"/> Manitoba <input type="checkbox"/> Saskatchewan <input type="checkbox"/> Nova Scotia <input type="checkbox"/> Prince Edward Island <input type="checkbox"/> Yukon <input type="checkbox"/> Nunavut	<input type="checkbox"/> Alberta <input type="checkbox"/> Ontario <input type="checkbox"/> Newfoundland/Labrador <input type="checkbox"/> Quebec <input type="checkbox"/> New Brunswick <input type="checkbox"/> Northwest Territories
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- Type of practice (**please check all that apply**):

<input type="checkbox"/> Community
<input type="checkbox"/> Hospital-based
<input type="checkbox"/> Multidisciplinary
<input type="checkbox"/> Private practice
<input type="checkbox"/> Academic
- What best describes your area of clinical interest: (**please check all that apply**)

<input type="checkbox"/> Obstetrical care/pregnancy
<input type="checkbox"/> High-risk pregnancy
<input type="checkbox"/> Multiple births
<input type="checkbox"/> Endocrinological disorders
<input type="checkbox"/> Late maternal age
<input type="checkbox"/> Fertility issues (infertility, IVF, artificial insemination, donor insemination, etc)
<input type="checkbox"/> Other _____
- Years in practice:

<input type="checkbox"/> Less than 5 years
<input type="checkbox"/> 5 to 10 years
<input type="checkbox"/> 11 to 20 years
<input type="checkbox"/> More than 20 years
- How would you rate your knowledge of chiropractic?

<input type="checkbox"/> I have no knowledge
<input type="checkbox"/> A little knowledgeable
<input type="checkbox"/> Moderately knowledgeable
<input type="checkbox"/> Very knowledgeable

8. When were your opinions of chiropractic predominantly formed?

- ☐ Before medical school
☐ During medical school
☐ After medical school

9. Did your medical training expose you to information about chiropractic?

- ☐ Yes, and the information was overall favorable
☐ Yes, and the information was overall neutral
☐ Yes, and the information was overall unfavorable
☐ No

10. Should medical training include exposure to information about chiropractic?

- ☐ Yes, definitely
☐ Possibly
☐ Unsure
☐ Probably not
☐ No, definitely not

11. How has your opinion of chiropractic been formed? How did you regard this information (**Please check all that apply**)

	Favourable	Neutral	Unfavourable
<input type="checkbox"/> Personal treatment experience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Family and friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Research Literature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Media	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Medical school	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Patient feedback	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Professors/supervisors/mentors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Relationship with chiropractor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Residency	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> I have no opinion on chiropractic			

12. Do you feel comfortable discussing chiropractic care with your patients?

- ☐ Yes, definitely
☐ Somewhat
☐ Unsure
☐ Probably not
☐ No, definitely not

13. Are you interested in learning more about chiropractic?

- ☐ Yes
☐ No
☐ Unsure

14. Should chiropractic care be available in a hospital setting?

- ☐ Yes, by primary access
☐ Yes, by physician referral only
☐ No
☐ Unsure

15. How frequently do you refer your patients for chiropractic care?

- ☐ Daily
☐ Weekly
☐ Monthly
☐ Every year
☐ Never

16. How many patients do you refer for chiropractic care in a typical year?

- ☐ None
- ☐ 1 to 10
- ☐ 11 to 25
- ☐ 26 to 50
- ☐ More than 50

17. If you do refer patients for chiropractic care, what drives your referrals (**please check all that apply**)?

- ☐ Patient request
- ☐ Non-response to medical treatment
- ☐ Literature supports chiropractic care for certain conditions
- ☐ Relationship with specific chiropractor
- ☐ My own positive experience as a chiropractic patient
- ☐ I do not refer patients for chiropractic care
- ☐ Other _____

18. Chiropractors promote unnecessary treatment plans:

Strongly Agree ☐ Agree ☐ Undecided ☐ Disagree ☐ Strongly Disagree ☐

19. Chiropractors provide effective therapy for some musculoskeletal conditions:

Strongly Agree ☐ Agree ☐ Undecided ☐ Disagree ☐ Strongly Disagree ☐

20. Chiropractors make excessive use of radiographic imaging:

Strongly Agree ☐ Agree ☐ Undecided ☐ Disagree ☐ Strongly Disagree ☐

21. Chiropractors provide a patient centered approach:

Strongly Agree ☐ Agree ☐ Undecided ☐ Disagree ☐ Strongly Disagree ☐

22. When I see patients who have attended a chiropractor, I often have to spend time correcting erroneous information that they have received:

Strongly Agree ☐ Agree ☐ Undecided ☐ Disagree ☐ Strongly Disagree ☐

23. Chiropractic manipulation of the neck is generally a safe therapy for patients:

Strongly Agree ☐ Agree ☐ Undecided ☐ Disagree ☐ Strongly Disagree ☐

24. Chiropractors can provide effective therapy for some non-musculoskeletal conditions (e.g. asthma, infantile colic):

Strongly Agree ☐ Agree ☐ Undecided ☐ Disagree ☐ Strongly Disagree ☐

25. Obstetricians may risk professional liability if they refer a patient to a chiropractor:

Strongly Agree ☐ Agree ☐ Undecided ☐ Disagree ☐ Strongly Disagree ☐

26. Chiropractors can reduce patient overload for obstetricians for patients with musculoskeletal complaints:

Strongly Agree ☐ Agree ☐ Undecided ☐ Disagree ☐ Strongly Disagree ☐

27. Chiropractors provide patients with misinformation regarding vaccination:

Strongly Agree ☐ Agree ☐ Undecided ☐ Disagree ☐ Strongly Disagree ☐

28. Chiropractic provides effective therapy for the pregnant patient with low back pain:

Strongly Agree ☐ Agree ☐ Undecided ☐ Disagree ☐ Strongly Disagree ☐

29. Chiropractors lack sufficient clinical training:

Strongly Agree ☐ Agree ☐ Undecided ☐ Disagree ☐ Strongly Disagree ☐

30. Chiropractic care is a useful supplement to conventional medicine:

Strongly Agree ☐ Agree ☐ Undecided ☐ Disagree ☐ Strongly Disagree ☐

31. Most chiropractors engage in overly aggressive marketing:

Strongly Agree ☐ Agree ☐ Undecided ☐ Disagree ☐ Strongly Disagree ☐

32. Chiropractic includes ideas and methods from which conventional medicine could benefit:

Strongly Agree ☐ Agree ☐ Undecided ☐ Disagree ☐ Strongly Disagree ☐

33. The results of chiropractic manipulation are due to the placebo effect:

Strongly Agree ☐ Agree ☐ Undecided ☐ Disagree ☐ Strongly Disagree ☐

34. Chiropractors treat in accordance with evidence-based practice:

Strongly Agree ☐ Agree ☐ Undecided ☐ Disagree ☐ Strongly Disagree ☐

35. Chiropractic has no role in the routine care of obstetric patients:

Strongly Agree ☐ Agree ☐ Undecided ☐ Disagree ☐ Strongly Disagree ☐

36. Chiropractic breeds dependency in patients on short-term symptomatic relief:

Strongly Agree ☐ Agree ☐ Undecided ☐ Disagree ☐ Strongly Disagree ☐

37. Overall, my impression of chiropractic is:

Very Good ☐ Good ☐ Undecided ☐ Poor ☐ Very Poor ☐

Please share with us any other thoughts you may have on chiropractic.

Feedback:

Would you like a summary of the study when it is completed?

☐ Yes

☐ No

If yes, please provide your e-mail in the space provided: _____

Thank You for Your Time

Author Contributions

Carol Ann Weis: Co-supervisor to students, responsible for study design, reviewed and edited REB application for both the academic institution and hospital, supervised the student's contribution to the study, wrote and edited each draft of the manuscript, and coordinated the editing contributions from each author.

Kent Stuber: Co-supervisor to students, responsible for study design, reviewed and edited REB application for both the academic institution and hospital, supervised the student's contribution to the study, analyzed qualitative data, and edited each draft of the manuscript.

Jon Barrett: Reviewed and edited REB application for both academic institution and hospital, administered the questionnaire for the pilot data, and reviewed and edited manuscript.

Alexandra Greco (student investigator): REB preparation for academic institution, data collection, and initial manuscript writing.

Alexander Kipershlak (student investigator): REB preparation for academic institution, data collection, and initial manuscript writing.

Tierney Greco (student investigator): REB preparation for academic institution, data collection, and initial manuscript writing.

Ryan Desjardins (student investigator): REB preparation for academic institution, data collection, and initial manuscript writing.

Jennifer Nash: Analyzed qualitative data.

Jason W. Busse: Study design, quantitative data analysis, and editing of final manuscript.

Declaration of Conflicting Interests

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Ethical Approval

Canadian Memorial Chiropractic College (Approval Number 1308X05). Sunnybrook Health Sciences Centre (Approval Number 309-2013).

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