

Attitudes toward vaccination: a survey of Canadian chiropractic students

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Abstract

Background: Although the Canadian Chiropractic Association and the Canadian Memorial Chiropractic College (CMCC) endorse vaccination, the prevalence of anti-vaccination attitudes among Canadian chiropractors is unknown. This study describes the prevalence of anti-vaccination attitudes among Canadian chiropractic students.

Methods: An 11-item questionnaire about attitudes toward vaccination was distributed to students enrolled at CMCC during the 1999/2000 academic year. The responses for the 11 items were then summed to arrive at a total score ranging from 0 (most negative attitude toward vaccination) to 22 (most positive attitude toward vaccination). Respondents' perceptions of sources of vaccine information were also investigated.

Results: Over 75% of the students (467 of 621) completed the questionnaire. Most students (53.3%) reported that in general they agreed with vaccination. This was especially true among first-year students (60.7%). However, among fourth year students, only 39.5% agreed with vaccination. The proportion of respondents who stated that they were against vaccination in general was 5 (4.5%) of 112 first-year students, 10 (8.3%) of 121 second-year students, 16 (13.9%) of 115 third-year students and 35 (29.4%) of 119 fourth-year students. The mean scores on the questionnaire were progressively lower with each higher year of study at the College. The mean survey scores for each year of study were first year, 15.9 (95% confidence interval [CI] 15.2–16.6); second year, 16.1 (95% CI 15.3–17.0); third year, 14.5 (95% CI 13.5–15.4); and fourth year, 12.8 (95% CI 11.7–13.9). The mean scores varied among year of study and were statistically significant using one-way ANOVA ($p < 0.0001$). Among students who relied primarily on informal sources of vaccine information, such as the chiropractic literature and informal talks at CMCC, anti-vaccination attitudes were more prevalent in later years.

Interpretation: Most CMCC students reported pro-vaccination attitudes, but there appeared to be an increase in anti-vaccination attitudes as students progressed through the CMCC program. This pattern was seen almost exclusively among students who relied primarily on informal sources of vaccine information rather than on core CMCC lectures or prior lectures at university.

Chiropractic is the third-largest regulated health care profession in North America, after allopathic medicine and dentistry, and it is growing rapidly.^{1,2} A 1997 Angus Reid poll revealed that 25% of all Canadians use, or have made use of, chiropractic.³ Additional studies have reported a substantial pediatric sample within this population.⁴⁻⁶ Chiropractors are therefore likely to play an increasingly influential role in the formulation of societal perceptions on public health issues such as vaccination. Vaccination, however, remains a contentious issue for a vocal subpopulation of the Canadian chiropractic profession,⁷⁻⁹ despite the positive official stance of the Canadian Chiropractic Association (CCA).¹⁰

Currently there are approximately 5000 practising chiropractors in Canada, of whom 4000 are members of the CCA.¹¹ Furthermore, approximately 80% of Cana-

Research

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β See related article page 1544

dian chiropractors are graduates of the Canadian Memorial Chiropractic College (CMCC),⁶ the only English-language chiropractic college in Canada. It is possible that attitudes formed during the 4-year program at CMCC will be indicative of attitudes held by practising chiropractors.¹² This study reports the findings of a survey of students attending CMCC during the 1999/2000 academic year, which was designed to investigate their attitudes toward vaccination.

Methods

In December 1998, with the approval of the CMCC Institutional Review Board, a pilot survey was distributed to students in all 4 years of study at CMCC. The survey was administered after a mandatory examination session and was collected immediately. The focus of the survey was an 11-item questionnaire about attitudes toward vaccination in general, about its utilization and about its safety. Most of the 11 items required a response of either "agree" or "disagree;" no response and noncommittal responses were scored as "unsure." Each response was scored as 0, 1 or 2, which represented a progressively more positive attitude toward vaccination. The responses were then summed to arrive at a total score ranging from 0 (most negative attitude toward vaccination) to 22 (most positive attitude toward vaccination).

In December 1999, with the approval of the CMCC Institutional Review Board, the questionnaire was administered again, in a similar fashion, to CMCC students in all 4 years. The survey was nearly identical with the pilot survey, with 2 modifications. First, an explicit option for "unsure" was added for each of the main 11 items. Second, a series of items were added to elicit respondents' perceptions of core CMCC lectures (given by faculty) and of speakers in informal settings as sources of information about vaccination. The informal settings are primarily student club meetings, held within the college, to which speakers are invited. Students were also asked to rank the relative importance of the following potential sources of vaccine information: formal sources (defined as core curriculum lectures at CMCC and university lectures) and informal sources (defined as chiropractic literature and informal talks at CMCC given by invited speakers).

The test-retest reliability of the survey was calculated as an intraclass correlation coefficient of the total score by means of repeated-measures analysis of variance. Both subject and time effects were taken as random. Cronbach's α coefficient was used to establish the internal consistency of the survey. The mean scores were compared between groups with a one-way analysis of variance. For the December 1999 survey, a linear regression model was used to assess the relation of the independent variables to the score on the questionnaire.

Results

The response rate for the pilot survey was 81.4% (504 of 619). Cronbach's α coefficient (internal consistency), for all 504 respondents, was 0.88. The last item on the survey asked about the respondent's general attitude toward vaccination. The Spearman correlation coefficient between responses to that question and the total score on the questionnaire (excluding that question) was 0.69 ($p < 0.001$), which provides preliminary evidence of the construct validity of the questionnaire.

For the survey administered to students in the 1999/2000 academic year, the response rate was 75.2% (467 of 621). Cronbach's α coefficient, for all 467 respondents, was 0.89. The intraclass correlation coefficient (test-retest reliability) for both surveys was 0.95.

The remainder of the results presented here are from the survey administered to students in the 1999/2000 academic year. The mean score on the questionnaire was 14.8 (95% confidence interval 14.0–15.6). The aggregate responses are presented in Table 1. The mean survey scores for each year of study were first year, 15.9 (95% CI 15.2–16.6); second year, 16.1 (95% CI 15.3–17.0); third year, 14.5 (95% CI 13.5–15.4); and fourth year, 12.8 (95% CI 11.7–13.9). The mean scores varied among year of study and were statistically significant using one-way ANOVA ($p < 0.0001$). The scores were progressively lower for students in the first to the fourth year of study. The proportion of respondents who stated that they were against vaccination in general was 5 (4.5%) of 112 first-year students, 10 (8.3%) of 121 second-year students, 16 (13.9%) of 115 third-year students and 35 (29.4%) of 119 fourth-year students.

Most students (276 or 59.1%) indicated that their views on vaccination had remained unchanged during the course of their studies at CMCC. However, 168 (36.0%) indicated that their views had become more negative, and only 23 (4.9%) indicated that they had developed a more positive attitude toward vaccination.

Most students (425 or 91.0%) felt that core CMCC lectures presented vaccination either positively or neutrally. However, among students who were against vaccination in general, 46 of 66 (69.7%) felt that information provided in the core lectures was an unfair representation, whereas among students who were in favour of vaccination in general, only 25 of 250 (10.0%) felt that such information was an unfair representation.

Invited lecturers speaking in informal settings were perceived by most students (273 or 58.4%) as presenting vaccination negatively; only a very small minority (18 or 3.8%) felt that vaccination was presented in a positive manner. However, among students who were against vaccination in general, 44 of 66 (66.7%) felt that the information provided in this setting was a fair representation, whereas among students who were in favour of vaccination in general, 198 of 250 (79.2%) felt that such information was either unfair or they were unsure about the fairness of the representation.

According to a linear regression model with 2 independent categorical variables (year of study and most important source of vaccine information), both variables appeared to be related to the total questionnaire score ($p = 0.03$ for year of study and $p < 0.001$ for most important source of vaccine information; adjusted $R^2 = 0.27$ for the model). However, addition of an interaction term suggested significant interaction between these 2 variables ($p = 0.003$, adjusted $R^2 = 0.29$). The mean scores for students who rated formal sources of vaccine information as most important were consistently high for each of the 4 years of study. However, the mean scores for

students who rated informal sources of vaccine information as most important were progressively lower from the first year to the fourth year of study. Among the latter group, the proportion of students who were against vaccination in general increased with higher year of study.

Interpretation

In our survey of chiropractic students attending CMCC during the 1999/2000 academic year most students reported positive attitudes toward vaccination. Our results suggest that students in later years have more negative attitudes toward vaccination, but this trend was limited almost exclusively to students who considered informal sources of vaccine information most important. Given their impact on the formation of attitudes toward vaccination, it is instructive to examine aspects of formal and informal sources of vaccine information, as previously described.

Philosophical approach, and presumably attitudes toward vaccination, varies considerably among chiropractic colleges. In a recent survey, Colley and Haas¹³ suggested that chiropractic college courses on chiropractic principles might, directly or indirectly, contradict pro-vaccination material taught in other courses. In our survey, students who relied on such formal sources of vaccine information, including core CMCC lectures given by faculty, had a relatively positive attitude toward vaccination, regardless of year of study.

Most of the chiropractic literature on vaccination has appeared in professional trade magazines.⁹ It appears that many of these magazines do not have a scholarly review process, with the result that they contain pseudoscientific articles promulgating viewpoints that, while claiming to be factual, are actually based on outdated or nonexistent data.^{9,14,15} It would be desirable to educate chiropractic students to be more critical consumers of information. Steps have recently been taken to formally teach such skills to incoming classes at CMCC.

Within the chiropractic profession, ultraconservative practitioners, known as “straight,” “principled,” “on-purpose” or “purpose-straight” chiropractors, maintain a literal interpretation of the theories of D.D. Palmer, the founder of chiropractic.^{9,16} The attitudes of these chiropractors are in keeping with historical chiropractic concepts, which state that malpositioned spinal vertebrae may interfere with the nervous system, thereby obstructing the body’s own natural healing power, and that patients should reject drugs, surgery and other allopathic medical procedures, including vaccination, in favour of chiropractic, for all their primary health care.¹⁷ Although their views do not represent those of the profession in general,¹⁸ “principled” chiropractic organizations are represented at CMCC through student groups, clubs and invited speakers.

There are other possible influences on student attitudes toward vaccination as they progress through CMCC. For

Table 1: Responses to questionnaire about attitudes toward vaccination among chiropractic students in the 1999/2000 academic year

Statement	Year of study; no. (and %) of respondents agreeing with statement							
	Year 1 <i>n</i> = 112		Year 2 <i>n</i> = 121		Year 3 <i>n</i> = 115		Year 4 <i>n</i> = 119	
The risk of a few adverse reactions to vaccines is acceptable if the majority of the population is protected against infectious disease	85	(75.9)	80	(66.1)	73	(63.5)	56	(47.0)
There is little scientific proof that immunization prevents infectious disease	3	(2.7)	9	(7.4)	17	(14.8)	28	(23.5)
Vaccines have not substantially changed the incidence of any major infectious disease	7	(6.2)	5	(4.1)	11	(9.6)	20	(16.8)
Vaccines actually cause more disease than they prevent	3	(2.7)	4	(3.3)	5	(4.3)	16	(13.4)
If you were required to travel to a country in which certain infectious diseases were endemic and prevalent, would you undergo prior vaccination?	95	(84.8)	95	(78.5)	86	(74.8)	73	(61.3)
The risk of pertussis vaccine outweighs its usefulness in preventing the disease (whooping cough).	23	(20.5)	23	(19.0)	36	(31.3)	38	(31.9)
Vaccines should never be given to elderly persons	9	(8.0)	15	(12.4)	20	(17.4)	25	(21.0)
Vaccines should never be given to infants under 1 year of age	19	(17.0)	25	(20.7)	37	(32.2)	57	(47.9)
In general, contracting an infectious disease naturally is safer than being vaccinated against it	9	(8.0)	9	(7.4)	29	(25.2)	41	(34.4)
Would you want your children to be vaccinated against infectious disease with any currently recommended vaccine?	68	(60.7)	68	(56.2)	60	(52.2)	45	(37.8)
Are you in favour of vaccination in general?	68	(60.7)	75	(62.0)	60	(52.2)	47	(39.5)

example, the subculture of class dynamics might influence attitudes, or the nonspecific effect of being in a drugless clinical profession might progressively influence thinking regarding the relative value of pharmacologic intervention and drugless therapy. As well, selection factors cannot be ruled out as influencing these data, in that student applicants who already disbelieve in vaccination might be more likely to choose a drugless clinical profession. Furthermore, given the apparent shifts of attitude during undergraduate years, it seems possible that shifts might also occur as a graduate begins and continues to practice in the community.

The prevalence of anti-vaccination attitudes within the chiropractic profession is currently unknown.^{13,19-21} Among practising US chiropractors, the figure has been reported to be approximately one-third of those surveyed;²⁰ however, the sole study from which this figure is derived had a small sample size (1% of US chiropractors) and a low response rate (36%). A recent survey of 150 US chiropractors practising in the Boston area, which had a 60% response rate, revealed that 7% actively recommended that their patients not undergo vaccination.¹⁹ Our results indicate that in 2000, 29.4% of CMCC students graduated with anti-vaccination attitudes. This represents a potential cause for concern, given the increasing role of chiropractors in the general health care of Canadians; however, the extent to which these attitudes translate into practice behaviours is unknown.

Competing interests: None declared.

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