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# Chiropractic Students and Research Assessing the Research Culture at a North American Chiropractic College

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**Purpose:** To continue positive professional growth and boost research endeavors, chiropractic institutions need to develop a research-oriented foundation and produce a larger body of researchers. The purpose of this study was to provide a current analysis of the research culture among students at Palmer College of Chiropractic Florida. This study will gain insight toward the research contributions of the next generation of chiropractors and identify the difficulties toward participation. This will help modify current academic programs to better foster research and ensure a promising, credible future for the chiropractic profession. **Methods:** Participants were students at Palmer College of Chiropractic Florida enrolled in quarters 1 through 12 during the 2008 summer term. To evaluate the research culture, participants were asked to complete a 33-item web-based survey. **Results:** A total of 303 students completed the survey. Forty-four percent were female, and the mean age was 26 (SD = 4.2). Ninety-nine percent of respondents agreed that research was necessary for positive growth within the chiropractic profession. A majority of students reported having research experience, and 58% planned to participate in research activities prior to graduation. Technical writing was reported as the most challenging aspect of research, and heavy academic workload was reported as the greatest deterrent to participation. **Conclusion:** This study expresses possibilities for building a strong research culture at the college. Students were aware of the necessity for research and were openly interested in conducting research. Modification of current academic policies will allow for greater student research opportunities and the development of tomorrow's researchers. (*J Chiropr Educ* 2010;24(1):35-45)

**Key Indexing Terms:** Attitude; Chiropractic; Education; Research; Students

## INTRODUCTION

The evidence-based approach to chiropractic allows the clinician to combine the most relevant research with clinical knowledge to make the most efficacious treatment decisions.<sup>1</sup> According to Sackett et al,<sup>2</sup> the framework of the evidence-based model is built from the integration of quality research, clinical expertise, and patient values. Because of chiropractic's holistic roots, the profession has been able to maintain a strong patient-centered philosophy.<sup>3</sup> Although chiropractic has made great steps in understanding patient values,

the profession has fallen short of establishing the research infrastructure essential for a health care profession.<sup>4</sup>

The growing focus on the evidence-based health care model requires significant volumes of empirical research to delineate between what has been shown to be effective and what has not yet shown validity. Chiropractic can not escape the evidence-based health care trend if the profession wants to maintain its status and credibility among other health care professions.<sup>5</sup> To continue positive professional growth and boost research endeavors, chiropractic institutions need to develop research-oriented institutions while striving to cultivate a larger body of researchers from the current student populace.<sup>4</sup>

Medical student research involvement has been strongly correlated to postgraduate research participation.<sup>6-8</sup> With this in mind, an assessment of

students' attitudes, interests, and participation with regard to research and chiropractic should be conducted to make sure that enough students are being involved in research to continue to produce a strong pool of chiropractic researchers.

Multiple studies assessing student research attitudes have been published in the medical,<sup>9-13</sup> physical therapy,<sup>14-16</sup> occupational therapy,<sup>16</sup> and nursing literature.<sup>17-19</sup> A thorough literature review of chiropractic journals provided only two previously published studies.<sup>20,21</sup>

The intention of this study was to provide an up-to-date analysis of students' perceptions and attitudes toward research in chiropractic while expanding on the previous studies. This would allow us to gain insight toward the future research contributions of the next generation of chiropractors and help identify the difficulties toward participation. This information could help modify current academic programs to better foster research and ensure a promising, credible future for the chiropractic profession.

## METHODS

Participants in this study were student volunteers from Palmer College of Chiropractic Florida enrolled in quarters 1 through 12 during the 2008 summer term. At Palmer College of Chiropractic Florida the curriculum is broken into 13 quarters, which are designed to be completed in 3½ calendar years. Since many 13th-quarter students complete off-campus internships during their final quarter, these students were not included in this study. Students were informed that participation was completely anonymous and abstention would have no effect on their relationship with the college or any faculty. All study protocols and procedures were approved by the Palmer College institutional review board with a minimal risk protocol.

To evaluate the research culture among Palmer Florida students, participants were asked to complete a 33-item web-based survey (see Appendix) consisting of Likert scale, multiple-choice, numerical input, and yes/no question formats (available online at [www.journalchiroed.com](http://www.journalchiroed.com)). The survey was created using Respondus 3.5 (Respondus Inc., Redmond, WA) and was then uploaded to the college's Blackboard Learning System 6.1 (Blackboard Inc., Washington, DC). Faculty helped to administer the instrument to the participants. The

survey was pilot tested by a group of three students and two faculty members with changes made per recommendations.

The survey was designed to evaluate students' perceptions and attitudes toward research. Demographic information was obtained, such as age, sex, area of undergraduate study, undergraduate cumulative grade point average (GPA), and current cumulative GPA in chiropractic college. Specifically the survey was designed to answer the following questions:

- Do students feel a demand exists for research in the chiropractic profession?
- What aspects of chiropractic treatments should this research entail?
- Who should be conducting research in chiropractic?
- What is the level of research knowledge and experience of the students?
- How involved are students in research activities?
- How interested are students in conducting research?
- What deterrents prevent research involvement?
- How would students like to increase their research involvement?

Mean and standard deviation were used to assess all continuous data. Responses of "strongly agree" and "agree" indicated agreement with item statements. Total agreement was summed, and the percent of participants in agreement was calculated. Equality of variances was analyzed using Levene's test. Independent two-tailed *t* tests were used to analyze differences in reading habits between students planning and not planning to conduct research for publication. Chi-square tests were used to identify if length in program, area of undergraduate study, completion of a course in research methodology/experimental design, completion of a statistics course, participation in research during undergraduate school, and participation in research since beginning the chiropractic program were associated with students planning to conduct research to publish. A *p* value <.05 was considered significant. All statistics were computed using PASW Statistics 17.0 (SPSS Inc., Chicago, IL).

## RESULTS

A total of 334 participants responded to the survey resulting in a response rate of 48%. Thirty-one

**Table 1. Research attitudes, participation, and experience**

Necessity of Research	Students in Agreement	
	Frequency	Percent
Research is necessary for positive professional growth	300	99
Research exploring the _____ of chiropractic treatments is necessary for positive professional growth		
Effectiveness	296	98
Benefits	295	97
Cost versus benefit ratio	251	83
Safety	273	90
Mechanisms	274	90
A demand exists for research in the chiropractic profession	279	92
Research will result in greater validation of chiropractic treatments among other health care professions	296	98
	Response	
Participation and Interests	Frequency	Percent
Participated in research activities during undergraduate career	186	61
Participated in research activities since beginning chiropractic college	29	10
Plan to participate in research activities before finishing the chiropractic program	175	58
Very interested in conducting basic science research	133	44
Very interested in conducting clinical research	192	63
Plan to conduct research and publish papers in the future	83	27
	Response	
Experience	Frequency	Percent
Took a course focusing on experimental design or research methodology	132	44
Took a statistics course	262	87
Have worked on a research project	128	42
Have completed their own research project	72	24
Have completed a research project and published a coinciding paper	14	5
Have no research experience	89	29
Have the skills necessary to conduct quality research	155	51

failed to complete the survey entirely and were excluded from the results, leaving 303 respondents. Forty-four percent of the respondents were female, and the mean age was 26 (SD = 4.2). Forty-two percent were in the 1st year of the chiropractic program, and 41% and 17% were in the 2nd year and 3rd year, respectively. Fifty-eight percent reported undergraduate backgrounds in biological sciences, 12% physical sciences, 7% law/business, 2% engineering, 2% fine arts, 1% communication/writing, <1% education, <1% mathematics, and 17% other.

Mean reported final undergraduate GPA was 3.30 (SD = 0.35), and mean reported current cumulative GPA in chiropractic college was 3.31 (SD = 0.41).

Overwhelmingly, students were in strong agreement that research is necessary for positive professional growth (Table 1). Fifty-seven percent agreed that chiropractors with research backgrounds were most qualified in conducting chiropractic research, while only 40% agreed that medical doctors, osteopathic doctors, and physical therapists with research

and chiropractic backgrounds were equally qualified to conduct chiropractic research. Students felt strongly that a demand exists for research within the chiropractic profession and that research would result in greater validation of chiropractic treatments among other health care professions (Table 1).

On average, respondents held subscriptions to 0.6 (SD = 1.1) chiropractic or other health care related journals, read 1.2 (SD = 1.6) chiropractic or other health care professional papers weekly, and skimmed 2.1 (SD = 3.1) chiropractic or other health care professional abstracts weekly. Many students reported taking courses in experimental design/research methodology and statistics (Table 1). A majority of students participated in research activities during their undergraduate careers, but few students had participated in research activities since beginning chiropractic college (Table 1). A majority of students reported

planning to participate in research activities before finishing the chiropractic program (Table 1). The extent of the students' research experience and level of involvement is also summarized in Table 1.

More students reported interest in conducting clinical versus basic science research. A majority reported having the skills necessary to conduct quality research, but fewer students reported planning to conduct research to publish (Table 1). Most students indicated planning to go into group or private practice with few planning to go into research or matriculate into a research degree program following graduation (Table 2). Forty-two percent of students reported technical report writing to be the most challenging aspect of research (Table 3). Academic workload was the most prevalent deterrent to research involvement (Table 3). Shadowing a faculty member conducting research and attending the research club were the preferred avenues to increase research involvement (Table 4).

**Table 2. Plans after graduation**

	Response	
	Frequency	Percent
Group/Private practice	265	88
Research or matriculate into a research degree program	4	1
Matriculate into another health professional degree program	4	1
Academics or teaching	1	<1
Not sure	26	9
Other	3	1

**Table 3. Challenges of and deterrents to research**

Challenges and Deterrents	Response	
	Frequency	Percent
Challenging aspects of research		
Technical writing	126	42
Experimental design	68	22
Statistics	54	18
Deciding on a topic or problem	27	9
Other	28	9
Deterrents to research involvement		
Heavy academic workload	128	42
Lack of personal interest	45	15
Lack of previous experience/knowledge	40	13
Family responsibilities/obligations	37	12
Lack of student research opportunities	25	8
Financial reasons	11	4
Other	17	6

**Table 4. Methods to increase research involvement**

	Response	
	Frequency	Percent
Shadow a faculty member	84	28
Attend research club	72	24
Take a class in research design/ data analysis	28	9
Plan and conduct a research project	19	6
Publish a review article in the school newspaper	5	2
No interest in increasing involvement	66	22
Other	29	10

This study found that students planning to conduct research had greater reading habits: reading more articles ( $p < .01$ ) and skimming more abstracts ( $p < .005$ ) per week than students not planning to conduct research. Students planning to conduct research were more likely to have taken a course in research methodology/experimental design ( $p < .05$ ), participated in research during their undergraduate career ( $p < .01$ ), and participated in research since beginning the chiropractic program ( $p < .001$ ). No correlation was found between students planning to conduct research with length in program, area of undergraduate study, and whether the student had taken a statistics course.

## DISCUSSION

The number of chiropractic students reporting that research is essential for the chiropractic profession has varied in previous studies. Zhang<sup>20</sup> reported in 1996 that 67.75% of students surveyed at Sherman College of Chiropractic felt research was needed within the chiropractic profession. Likewise Newell and Cunliffe<sup>21</sup> reported in 2003 that 75% of students surveyed at McTimoney College found research to be necessary for development in chiropractic. In accordance with these previous studies, this study reports that 99% of students in this study agreed that research was necessary for positive growth within the chiropractic profession. Even when breaking down research into different aspects, students agreed that research in each area was necessary. Students not only found research important for growth within the chiropractic profession, but also agreed that research will lead to greater validation of chiropractic treatments among other health care professions.

Both practical and cultural reasons may explain the rise in the percentage of students reporting research crucial for professional growth. Practically, students in this study may have exhibited stronger identification with their understanding of research than the students of the above mentioned studies. The majority of students at this institution complete a 4-year bachelor degree before entering the program. This is because applicants to the college holding a bachelor degree receive priority seating for admission<sup>22</sup> and Florida State law requires students to have obtained a bachelor degree before being eligible for licensure.<sup>23</sup> Also since 70% of participants reported undergraduate science backgrounds, students should be entering the chiropractic program with a rich background in basic scientific method, technical writing, and simple statistics. This strong science background may account for the increase in number of students reporting research to be necessary for growth in this study.

The steady rise in the percentage of students reporting research necessary for the chiropractic profession, from 67.75% in 1996<sup>20</sup> to 75% in 2003<sup>21</sup> and to 99% as reported in this study, may indicate a profession-wide trend. This may be explained by cultural changes over the last decade. The integration of evidence-based practice principles into the chiropractic curriculum has possibly augmented student awareness of how research could benefit their approach to treatment and enhance patient outcomes in practice. Furthermore, students may feel that the antediluvian theories regarding chiropractic techniques do not suffice, and more research in understanding the mechanisms of chiropractic treatments will not only strengthen the chiropractic profession but also advance interprofessional communication and lead to greater acceptance in mainstream health care.

Since most students have a science undergraduate background, it was anticipated that many students would have research experience. Zhang<sup>20</sup> reported only 25.81% of students having research experience, whereas this study found a majority of students having research experience. Interestingly, 51% of students in this study felt capable of conducting quality research. This figure seems high because typically more advanced training is needed to be a proficient researcher. This could be due to student involvement in research projects during their undergraduate career or, in contrast, this may indicate a disconnect in their understanding of research skills and quality research.

Fundamental to student involvement in scientific investigation is the level of students' intention to conduct research. A majority of students in this study plan to participate in research-related activities prior to graduation, and 27% plan at some point in their careers to conduct research for publication. Similarly, Zhang<sup>20</sup> reported that 61.29% of students would participate in research if given the opportunity. More students reporting interests in clinical research over basic science research was expected because students entering into a clinical profession may be more inclined to working in a clinical setting. This also suggests the necessity for promoting basic science and translational researchers among students because this research will explore the underlying mechanisms of chiropractic treatments, which may not be conducted in the clinical setting.

Although students appear to have an appreciation for research and a strong interest in conducting research, the level of participation in research activities remains low. A survey by Caspi et al<sup>10</sup> found that medical school students on average read 3.2 papers and skimmed 4.9 abstracts per week. A comparison of these data with the results from the current study indicates that chiropractic students' reading behavior in this study was less than half that reported by medical students. Caspi et al<sup>10</sup> did indicate that their study design was limited due to possible sample bias toward subjects with greater motivation to read literature. The perceived inconsistency between this study and the latter may not be entirely accurate. Policies to encourage greater participation in reading and appraising scientific literature need to be instated since these skills are essential to incorporate best evidence into daily clinical practice.

When asked what the greatest deterrent to research participation was, most students reported the heavy

academic workload. This was also reported by Zhang,<sup>20</sup> and Newell and Cunliffe<sup>21</sup> noted a drop in confidence to do research in 4th-year students, which also was contributed to the heavy academic workload. The overall structure of most chiropractic programs is not designed to facilitate extracurricular research activities. Since the chiropractic academic curriculum goes year round, students interested in research lack time to gain formal training. Restructuring the chiropractic curriculum to allow for summer internships may provide the essential time to involve students in research endeavors. The most challenging aspects of research reported were technical writing, statistics, and experimental design. These areas need to be stressed further in the curriculum, and as more students gain research experience, their comfort with these aspects of research should develop.

To expand their involvement in research, most students were interested in shadowing a faculty member conducting research or attending research club. Both of these avenues are hands-on approaches to learn research methods. Providing experiential learning through research assistance positions or shadowing research faculty is the optimal approach to become proficient in research.

A motive for increasing research efforts early on in the chiropractic education is that early research involvement is an indicator for a successful research career. Medical students interested in pursuing research typically decide within the first 2 years of medical school.<sup>7</sup> Also, participation in research activities is directly proportional to postgraduate research involvement<sup>7,8</sup> and scientific output.<sup>6</sup> Medical students engaged in extracurricular research studies publish four times more articles after graduation than students who did not participate in research during medical school.<sup>6</sup> Similarly, this study identified that students planning to conduct research and publish were more likely to have participated in research and taken a course in experimental design or research methodology. From this, one can reason that exposing more students to research and increasing student research participation will lead to more students planning to conduct research in the future. Therefore, it is paramount to engage students in research activities early in chiropractic education because a small investment should return a significant increase in chiropractic research output.

Currently research opportunities at the college are scant, if existent. This may explain why only 10% of

students report research participation in chiropractic college, although 61% of students reported participation during their undergraduate career. Currently, at Palmer Florida construction of a molecular biology lab is underway, which will hopefully create work-study positions for student research assistants. Changes are also being made in the clinic to train and encourage faculty involvement in research. These changes have resulted in poster<sup>24,25</sup> and platform<sup>26</sup> presentations at national conferences and will hopefully lead the way to clinical research projects.

The second most reported avenue to increase research participation in this study was to attend research club. Research club at the college is an informal platform where students and faculty engage weekly in literature appraisal, scientific workshops, and lectures. Green and Johnson<sup>27</sup> reported that a journal club combined with a letter to the editor project was effective in teaching critical appraisal skills at a chiropractic college. Students reported that the project enhanced their literature appraisal skills, understanding of how to write a publishable letter, and ability to communicate their opinions in writing. The letter to the editor project resulted in 10 publications. Linzer et al<sup>28</sup> reported that a journal club in the general medicine department at Duke University increased staff reading activities and knowledge of epidemiology and biostatistics. In general, a research club is a simple and useful way to expose students to research methodology.

Unfortunately, simply exposing students to research will not suffice to boost research endeavors. A solid research-centered infrastructure is needed not only to increase student research participation but also to provide opportunities for formal research training after graduation. Currently, many chiropractic institutions do not have the capability to support this, and research directives do not prioritize research.<sup>4</sup> Comparing the research activity of chiropractic college faculty to medical faculty research shows that a vast disparity exists. A study by Beaty et al<sup>29</sup> from 1989 surveyed approximately 75% of U.S. medical faculty regarding research activities. They reported that 77% of faculty with a MD degree and 95% of faculty with both MD and PhD degrees reported some research involvement. A 1996 survey in the *Journal of the American Chiropractic Association* reported that only 6.5% of chiropractic faculty had some research involvement.<sup>30</sup> Although these reports may be outdated, the lack of chiropractic faculty involved in research is apparent. The low priority placed

on research not only thwarts scientific output but conveys the impression to students that research is not a component of chiropractic practice. The meager percentage of students in this study planning to matriculate into a research program following graduation reiterates the nominal emphasis placed on research at chiropractic colleges. Research must be seen as a professional obligation, and faculty involvement must be compulsory.

To surmount this paucity, chiropractic institutions need to collaborate with research-intensive universities, and the profession needs to initiate chiropractic programs within already established academic institutions. This would open doors to immense research opportunities and would create a solid foundation of researchers, who then can act as mentors for research-oriented students.

## LIMITATIONS

This study has several limitations. As in all survey projects that rely on self-reported data, results are dependent on the quality of the assessment instrument. In order to limit ambiguity, actions were taken to create a clear and concise questionnaire, but we are unable to assume that all items were interpreted equally among all participants. Since sampling 3rd-year students was difficult due to clinic responsibilities, the study population may not be an accurate representation of the entire student body, and if more students who have clinical experience responded, the results may have differed. Because participation was voluntary, our results could be biased to participants who have a greater fondness toward research and were therefore more willing to complete the survey. Controlling for participation bias is a challenge and an inherent limitation of this study's design.

A direct comparison of our results with the studies of Zhang<sup>20</sup> and Newell and Cunliffe<sup>21</sup> needs to be taken with prudence. Each of these studies used different wording, response scales, and formats in their surveys. The dissimilarity between the surveys could result in different responses regardless of the participants' actual opinions. This demonstrates the need for future studies that employ a uniform questionnaire to allow for an accurate comparison between samples and studies.

Finally, this study only represents students from one campus, which makes the results difficult to generalize across the entire profession. Future studies encompassing all chiropractic institutions

would provide a true assessment of the profession's student research culture. It is the hope of the authors to collaborate on a larger profession-wide cohort study to evaluate trends in the research culture of not only the students but also the faculty.

## CONCLUSION

This study expresses immense possibilities to foster a strong research culture in chiropractic colleges. Students are aware of the necessity of research in the chiropractic profession, are openly interested in conducting research, and have adequate backgrounds for more advanced research training. Modification of current academic policies will allow for greater student research opportunities and the cultivation of tomorrow's researchers.

## CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

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## APPENDIX: SURVEY INSTRUMENT

### Overview

We invite you to take part in a research study designed to learn more about students' participation in and perceptions towards research in chiropractic. Participants for this study are Palmer College of Chiropractic Florida students who are enrolled currently in quarters 1 through 12.

### Purpose

The purpose of this study is to evaluate students' attitudes pertaining to research, participation in research, and interest in conducting research among the students at Palmer College of Chiropractic Florida. This information will be used to gain insight on the future research contributions from the next generation of chiropractors.

### Procedures

If you choose to participate in this study, you will be completing a 33-item questionnaire using a computer. This questionnaire has two different types of questions. Most of the questions will be multiple-choice while others will require entering

numbers using your keyboard. No compensation will be given for participation, and your participation in this research project is completely voluntary. Much time has been spent creating this questionnaire so please answer the questions honestly and to your best capability.

1. What quarter are you currently enrolled in?  
a. 1   b. 2   c. 3   d. 4   e. 5   f. 6   g. 7  
h. 8   i. 9   j. 10   k. 11   l. 12
2. What is your sex?  
a. Male  
b. Female
3. What is your age? \_\_\_\_\_
4. What best represents your area of undergraduate studies?  
a. Biological sciences  
b. Physical sciences  
c. Communication/Writing  
d. Law/Business  
e. Education  
f. Fine arts  
g. Mathematics  
h. Engineering  
i. Other
5. What was your final cumulative undergraduate GPA? \_\_\_\_\_
6. What is your current cumulative GPA in chiropractic college? \_\_\_\_\_
7. Scientific research in chiropractic is necessary for positive growth in the chiropractic profession.  
a. Strongly agree   b. Agree   c. Neutral  
d. Disagree   e. Strongly disagree
8. Scientific research exploring the effectiveness of chiropractic treatments is necessary for positive growth in the chiropractic profession.  
a. Strongly agree   b. Agree   c. Neutral  
d. Disagree   e. Strongly disagree
9. Scientific research exploring the benefits of chiropractic treatments is necessary for positive growth in the chiropractic profession.  
a. Strongly agree   b. Agree   c. Neutral  
d. Disagree   e. Strongly disagree
10. Scientific research exploring the cost versus benefit ratio of chiropractic treatments is necessary for positive growth in the chiropractic profession.  
a. Strongly agree   b. Agree   c. Neutral  
d. Disagree   e. Strongly disagree

11. Scientific research exploring the safety of chiropractic treatments is necessary for positive growth in the chiropractic profession.
  - a. Strongly agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly disagree
12. Scientific research exploring the mechanisms of chiropractic treatments is necessary for positive growth in the chiropractic profession.
  - a. Strongly agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly disagree
13. Chiropractors with research backgrounds are the most qualified to conduct studies with regard to chiropractic treatments.
  - a. Strongly agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly disagree
14. Medical doctors, osteopathic doctors, and physical therapists with chiropractic and research backgrounds are equally qualified to conduct studies with regard to chiropractic treatments.
  - a. Strongly agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly disagree
15. A demand exists for researchers in the chiropractic profession.
  - a. Strongly agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly disagree
16. Scientific research will result in greater validation of chiropractic treatments among other health care professions.
  - a. Strongly agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly disagree
17. How many chiropractic or other health care related professional journals do you currently hold subscriptions to? \_\_\_\_\_
18. On average how many chiropractic or other health care related professional papers do you read each week? \_\_\_\_\_
19. On average how many chiropractic or other health care related professional abstracts do you skim through each week? \_\_\_\_\_
20. Have you previously taken a course that focused on experimental design and/or research methodology?
  - a. Yes
  - b. No
21. Have you previously taken a statistics course?
  - a. Yes
  - b. No
22. Did you participate in any research activities during your undergraduate career?
  - a. Yes
  - b. No
23. Have you participated in any research activities since beginning the chiropractic program?
  - a. Yes
  - b. No
24. Do you plan to have participated in research activities before you finish the chiropractic program?
  - a. Yes
  - b. No
25. What best represents your research experience?
  - a. I have no research experience.
  - b. I have worked on a research project.
  - c. I have completed my own research project.
  - d. I have completed a research project and published a coinciding paper.
  - e. I have completed multiple research projects and published multiple coinciding papers.
26. I am very interested in conducting basic science research.
  - a. Strongly agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly disagree
27. I am very interested in conducting clinical research.
  - a. Strongly agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly disagree
28. I have the skills necessary to conduct quality research.
  - a. Strongly agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly disagree
29. I plan on conducting research to publish papers in order to share the information with others.
  - a. Strongly agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly disagree
30. What aspect of research do you find the most challenging?
  - a. Statistics
  - b. Technical writing
  - c. Experimental design
  - d. Deciding on a topic/problem
  - e. Other
31. What is your greatest deterrent to being more involved in research?
  - a. Family responsibilities/obligations
  - b. Heavy academic workload
  - c. Lack of personal interest
  - d. Lack of previous experience/knowledge
  - e. Lack of student research opportunities
  - f. Financial reasons
  - g. Other
32. What are your plans after graduation from chiropractic college?
  - a. Group/Private practice
  - b. Research/Matriculate into a research degree program (MS, PhD, etc.)

- c. Academics/Teaching
  - d. Matriculate into another professional degree program (MD, DDS, DO, etc.)
  - e. Not sure
  - f. Other
33. How would you like to increase your involvement in research?
- a. Attend research club
  - b. Plan and conduct my own project
  - c. Shadow a faculty member conducting research
  - d. Publish review articles in the school newspaper
  - e. Take a class regarding research methodology and data analysis
  - f. I have no interest in increasing my involvement in research
  - g. Other