



Gender differences among medical students in attitudes to learning about complementary and alternative medicine

S.M. Greenfield*, R. Brown, S.L. Dawlatly, J.A. Reynolds, S. Roberts, R.J. Dawlatly

Department of Primary Care & General Practice, Primary Care Clinical Sciences Building, University of Birmingham, Birmingham B15 2TT, UK

Available online 24 January 2006

KEYWORDS

Gender;
Medical students;
Complementary and
alternative medicine

Summary

Objectives: To explore gender differences in attitudes to CAM among Year 1, 2 and 3 medical students.

Design: Survey; seven-item self-administered questionnaire.

Setting: Plenary lectures at the start of semester 2 of the academic year at the University of Birmingham Medical School.

Results: 35.6% of 662 students were male and 64.4% female. Females were more likely than males to feel CAM has an important role in healthcare ($p < 0.001$). This difference increased through the medical course ($p < 0.05$). Females gave a more positive rating than males to the use of five therapies in healthcare ($p < 0.001$). Females were more positive than males about learning the theory ($p < 0.001$) and practice ($p < 0.001$) of CAM and a greater amount of CAM curriculum time ($p < 0.001$).

Conclusions: If CAM teaching is optional females may be more likely to choose it. An unexpected consequence of more women than men entering medical school may be a positive impact on the development of integrated medicine.

© 2006 Elsevier Ltd. All rights reserved.

Introduction

Medical schools are increasingly introducing teaching about complementary and alternative medicine (CAM) in the curriculum.^{1–6} The debate about whether CAM should be taught at all has therefore now given place to discussions about the appropriate format, content and timing of these

courses.^{1,3,8} At present there is immense variability between the courses offered by different medical schools.^{3,8,9} Teaching time tends to be limited and is often offered as special study modules and electives which students have to positively choose, rather than as core teaching within the undergraduate curriculum.^{2,6,10–13} General opinion surveys show that, in general, CAM is an area which interests medical students^{14–17} and which they may sometimes actively support.¹⁸

* Corresponding author. Tel.: +44 121 414 6493; fax: +44 121 414 7938.

The results of research into gender differences in medical education and the gender profile of CAM users among the general public suggest that this may be an interesting variable to consider in relation to medical student attitudes to CAM. Gender differences have been observed in student attitudes to specific components of medical undergraduate teaching, specialities and future career aspirations, even at the start of undergraduate studies.^{19–23} These attitudes are further influenced by experience at medical school which may direct women into areas of medicine where a patient centred approach is given greater emphasis,^{23–26} an approach which is central to CAM. Among the general public, women may be more likely to use CAM than men.^{27–30} Male and female students may therefore have had different prior experiences of CAM when they enter medical school.

No previous published study of medical student attitudes to CAM has taken gender differences as its main focus. Studies which have included gender among their range of study variables have widely varying numbers of participants and have shown conflicting results. Four studies of 209 UK pre-clinical students,³¹ 21 second year students,¹¹ 69 first year Australian students¹⁶ and 78 third year USA students¹⁵ did not report significant gender differences in attitudes to CAM. Other work has highlighted some significant gender differences in medical student attitudes to CAM in general and to specific therapies. In a study of 180 UK pre-clinical students³² women were more likely to be in favour of being taught about CAM, therapies being offered within the context of the NHS and to feel that there is a 'scientific basis' to CAM. Female students were more likely to have personally used aromatherapy or reflexology than male students in a study of 150 first year UK medical students.³³ In an Israeli study of 117 fifth and sixth year students females were more likely than males to hold positive views about the efficacy of CAM and to demonstrate an interest in phytotherapy.³⁴

UK female students had more positive attitudes than males to CAM, and were more enthusiastic with regard to CAM in a study of 311 first and third year students.³⁵ Similar gender differences emerged in a USA study in 2004 of 272 first and second year medical students.³⁶

As professional medical bodies are increasingly highlighting the need for CAM teaching in the medical curriculum^{15,37,38} and the importance of integrated medicine is being emphasized^{39–41} it is likely that the number of medical schools offering teaching will increase. Could the recent trend observed in the UK and elsewhere towards there

being a higher percentage of female than male students commencing medical studies^{26,42,43} therefore impact on the future development of CAM within the healthcare services? The questionnaire study described here set out to explore gender differences in attitudes to CAM among first, second and third year students in one UK Medical School.

Method

A questionnaire was given to medical students in Years 1 (290), 2 (260) and 3 (175) at the University of Birmingham Medical School during plenary lectures at the start of the second semester of the academic year. In order to maximize response rate, students were verbally requested to complete the questionnaire at both the beginning and the end of the lecture. The seven-item questionnaire (Table 1) explored attitudes to CAM in general and the five therapies classified by the House of Lords Select Committee Report⁴⁴ as 'the principal therapies'. It also explored the teaching of CAM in the undergraduate curriculum and whether in general students felt they should be taught about the theory, i.e. the theoretical principles underlying different therapies and the practice, i.e. training in how to practice individual therapies. For all attitudinal questions apart from the amount of time they felt would be appropriate for compulsory CAM teaching in the undergraduate course, students were asked to rate their attitudes on a scale of 1 (strongly disagree) to 5 (strongly agree). All students would have had the opportunity to observe two from a range of CAM therapies (explanation of the therapy, main principles, evidence base, practical demonstration) in their first semester in Year 1.³³ Thus different students are exposed to different therapies.

Data were analysed using the SPSS for Windows v10.0 statistics package. As the data were mainly ratings, non-parametric analyses: chi-square, Mann–Whitney *U* and Kruskal–Wallis were used where possible. However, where interactions needed to be investigated, ANOVA was used, provided the errors did not differ significantly from normality.

Results

There was an overall response rate of 92.2% (669/725); 87.5% (254/290) in Year 1, 93.5% (243/260) in Year 2 and 98.2% (172/175) in Year 3. Seven of the students who completed a

Table 1 Student questionnaire

1. Year of MBChB course _____		2. Gender: Male <input type="checkbox"/> Female <input type="checkbox"/>			
3. The theory of Complementary Medicine should be taught in the MBChB programme (circle one):					
<i>Strongly Disagree</i>	<i>Disagree</i>	<i>No opinion</i>	<i>Agree</i>	<i>Strongly Agree</i>	
1	2	3	4	5	
4. The practice of Complementary Medicine should be taught in the MBChB programme (circle one):					
<i>Strongly Disagree</i>	<i>Disagree</i>	<i>No opinion</i>	<i>Agree</i>	<i>Strongly Agree</i>	
1	2	3	4	5	
5. If Complementary Medicine were to be made a compulsory part of the MBChB course, how much teaching would you feel to be appropriate (Please tick one)?					
None <input type="checkbox"/> A single seminar or lecture (1-2 hours) <input type="checkbox"/> A series of seminars/tutorials (3-10 hours) <input type="checkbox"/> A complete module (11+ hours) <input type="checkbox"/>					
6. Complementary Medicine has an important role in healthcare (Please circle)					
<i>Strongly Disagree</i>	<i>Disagree</i>	<i>No opinion</i>	<i>Agree</i>	<i>Strongly Agree</i>	
1	2	3	4	5	
7. These therapies have an important role in healthcare: (Please circle)					
	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>No opinion</i>	<i>Agree</i>	<i>Strongly Agree</i>
Acupuncture	1	2	3	4	5
Chiropractic	1	2	3	4	5
Herbal Medicine	1	2	3	4	5
Homeopathy	1	2	3	4	5
Osteopathy	1	2	3	4	5

questionnaire did not indicate their gender and data from these respondents were not included in any analyses of gender. Of the remainder 35.6% (236/662) were male and 64.4% (426/662) were female. The overall distribution of male and female respondents was similar across all three years (Year 1, 88/252, 35.0% versus 164/252, 65.0%; Year 2, 92/241, 38.2% versus 149/241, 61.8%; Year 3, 56/170, 33.0% versus 114/170, 67.0%).

The role of CAM in healthcare

A majority of students (69.0%, 455/659), 55.3% of males (130/235) and 76.6% of females (325/424) ($\chi^2 = 32.2$, $p < 0.001$) thought that CAM has an important role in healthcare. Females were significantly more positive than males (mean Likert

score = 3.83 compared to 3.34, Mann–Whitney U , $z = -6.230$, $p < 0.001$). This gender difference varied across the years, being least noticeable in Year 1 (ANOVA, $F_{2,663} = 3.87$, $p < 0.05$).

Although students did not give any of the therapies a high rating, they tended to have a positive rather than negative view of the role of the five therapies in healthcare (Table 2). Overall, chiropractic was rated highest and homeopathy lowest. Female students gave a more positive rating than male students for all the five therapies (ANOVA, $F_{1,389} = 60.7$, $p < .001$). Both male and female students gave the highest rating to chiropractic, whereas males rated homeopathy lowest and females rated herbal medicine lowest. After allowing for the different level of ratings given by males and females, there is still a significant

Table 2 Mean ratings (S.E.M.) for male and female students of the importance of different CAM therapies in healthcare

Therapy	Mean rating (S.E.M.) (all subjects)	Mean rating (S.E.M.) (males)	Mean rating (S.E.M.) (females)
Chiropractic	3.78 (0.03)	3.59 (0.06)	3.89 (0.04)
Osteopathy	3.67 (0.04)	3.42 (0.06)	3.81 (0.04)
Acupuncture	3.63 (0.01)	3.34 (0.07)	3.81 (0.04)
Herbal Medicine	3.23 (0.04)	3.00 (0.07)	3.37 (0.04)
Homeopathy	3.21 (0.04)	2.83 (0.07)	3.43 (0.04)

difference in the pattern of preferences between the sexes (ANOVA, $F_{4,2877} = 3.01$, $p < 0.05$).

CAM teaching in the undergraduate curriculum

In computing the percentage of students in favour of studying either the theory or practice of CAM the categories 'strongly disagree' and 'disagree' were combined as were 'agree' and 'strongly agree'. 66.8% (445/666) of students wanted to study the theory of CAM whilst only 35.1% (234/665) of students believed that the practice should be taught. Once again, females were more positive towards both the theory 74.5% (316/424) versus 52.7% (124/235) and practice 40.0% (169/422) versus 26.6% (63/236) of CAM being taught (comparing Likert scores, Mann–Whitney U , $z = -5.849$, $p < 0.001$ and $z = -4.470$, $p < 0.001$, respectively). Progression from Year 1 to 3 did not significantly affect views regarding teaching CAM theory (chi-square test) although there was greater enthusiasm amongst females in Years 2 and 3. However, there was a negative trend in Likert scores through the years in both males and females with respect to teaching the practice of CAM (combined, Kruskal–Wallis, $p = 0.001$).

In general students agreed that either a single seminar of 1–2 h (266/661; 40.2%) or series of seminars (309/661; 46.7%) was an appropriate amount of teaching on CAM. Females were more positive than males ($\chi^2_1 = 15.3$, $p < 0.001$), with 58.3% (247/423) opting for 3 h or more, compared to 42.4% (98/231) of males. No significant variation was found between year groups ($\chi^2_6 = 9.67$, $p = 0.14$) although while a series of seminars was the preference for Year 1 and 2 students, a single seminar was preferred by Year 3 students.

Discussion

This study had a high response rate and included a larger number of medical students than any pre-

viously published which has considered gender and medical student attitudes to CAM. It highlighted a number of significant gender differences in attitude. Female students were more positive than male students to the importance of CAM in healthcare, to the extent to which they felt specific therapies had an important role in healthcare, to being taught about both the theory and practice of CAM and to more curriculum time for CAM teaching. These findings in a large group of students, across three medical school years, support the results of three recent studies which have referred to gender in this context.^{33–35} General surveys of university students have found that women are more likely to use CAM personally^{45,46} and male students to hold more negative attitudes.⁴⁷ Opinions about the validity of CAM and personal experience are both likely to impact on views on whether or not it should be taught. However, at the level of specific therapies, as with previous studies^{15,32} both male and female students had a broadly similar attitude to their comparative importance for medical care, being most positive towards those therapies which fit more closely to the medical model and their other undergraduate learning.³³

A limitation of this study may be that students attending the lectures in which questionnaires were distributed were not representative of the student years as a whole, however the number of non-attenders was small. The CAM teaching session in Year 1 may also have influenced their attitudes to CAM in general or to specific therapies. Students' own previous personal experience of CAM may also have contributed to their views, but as the focus of the current study was gender, this was the only socio-demographic variable collected. The questionnaire relied on an assumed degree of knowledge regarding individual therapies and the distinction between theory and practice. However, as the Year 1 teaching covered these topics, it was felt respondents would be able to interpret these questions correctly.

Previous studies have found that students' desire for CAM education declines as they progress through

medical school.^{7,35} In this study although Year 2 and 3 female students remained more enthusiastic than male students, student year did not significantly affect views about being taught the theory of CAM. However, both male and female students became progressively more negative towards being taught the practice of CAM suggesting that at this stage of their medical training students are more attracted by the theory than the practice of CAM. It is reasonable to assume that students become increasingly more focused on the skills they will require to practice conventional medicine which do not include the ability to practice CAM therapies.

Students' views suggest that there is an appreciation that the role of CAM in healthcare is becoming more widespread and is therefore a field of which future medical practitioners need to be aware. The current study showed that a smaller gender difference in attitudes to CAM was present at the start of the medical course and this may thus be the most appropriate time to introduce a short core general introduction to CAM. If CAM teaching is optional and offered only as special study modules and electives^{2,15} then female students may be more likely to make this choice. If the trend towards a greater proportion of women than men commencing medical studies continues, an unexpected consequence may be a positive impact on the future development of integrated medicine.

Acknowledgement

We would like to thank Roger Holder for statistical advice.

References

- Morgan D, Glanville H, Mars S, Nathanson V. Education and training in complementary and alternative medicine: a postal survey of UK universities, medical schools and faculties of nurse education. *Complement Ther Med* 1998;**6**:64–70.
- Wetzel M, Eisenberg D, Kaptchuk T. Courses involving complementary and alternative medicine at US medical schools. *JAMA* 1998;**280**:784–7.
- Ruedy J, Kaufman D, MacLeod H. Alternative and complementary medicine in Canadian medical schools: a survey. *Can Med Assoc J* 1999;**160**:816–7.
- Frenkel M, Ben Arye E. The growing need to teach about complementary and alternative medicine: questions and challenges. *Acad Med* 2001;**76**:251–4.
- Tsuruoka K, Tsuruoka Y, Kajii E. Complementary medicine education in Japanese medical schools: a survey. *Complement Ther Med* 2001;**9**:28–33.
- Brooks P. Undergraduate teaching of complementary medicine. *Med J Aust* 2004;**181**:275.
- Berman B. Complementary medicine and medical education. *Br Med J* 2001;**322**:121–2.
- The National Academy of Sciences. Complementary and alternative medicine in the United States 2005. www.nap.edu/books/0309092701/html (accessed 11/02/05).
- Jeffries WB. A fourth-year elective course in alternative medicine. *Acad Med* 2001;**76**:525–6.
- Falkenbach A, Blumenthal E, Buhning M. Course in massage therapy for medical students. *Med Educ* 1998;**32**:514–6.
- Greenfield S, Wearn A, Hunton M, Innes M. Considering the alternatives: a special study module in complementary therapy. *Complement Ther Med* 2000;**8**:15–20.
- Murdoch-Eaton D, Crombie H. Complementary and alternative medicine in the undergraduate curriculum. *Med Teach* 2002;**24**:100–2.
- Wetzel M, Kaptchuk T, Haramati A, Eisenberg D. Complementary and alternative medical therapies: implications for medical education. *Ann Intern Med* 2003;**138**:191–6.
- Ernst E. Medical students' attitudes towards complementary medicine: systematic review. *Student Br Med J* 1998;**6**:204–7.
- Chez R, Jonas W, Crawford C. A survey of medical students' opinions about complementary and alternative medicine. *Am J Obstet Gynecol* 2001;**185**:754–7.
- Duggan K, Verhoef M, Hilsden R. First-year medical students, and complementary and alternative medicine: attitudes, knowledge, and experiences. *Ann R Coll Physicians Surg Can* 1999;**32**:157–60.
- Sahar T, Sallon S. Attitudes and exposure of Israeli medical students to complementary medicine: a survey. *Harefuah* 2001;**140**:907–10.
- Jahn A. Letter to the editor. *Mt Sinai J Med* 2004;**71**:287–8.
- Allan I. *Doctors and their careers*. London: Policy Studies Institute; 1988.
- Allan I. *Doctors and their careers: A new generation*. London: Policy Studies Institute; 1994.
- Leonard JC, Ellsbury KE. Gender and interest in academic careers among first- and third-year residents. *Acad Med* 1996;**71**:502–4.
- Emmons SL, Adams KE, Nichols M, Cain J. The impact of perceived gender bias on obstetrics and gynecology skills acquisition by third-year medical students. *Acad Med* 2004;**79**:326–32.
- Buddeberg-Fischer B, Klaghofer R, Abel T, Buddeberg C. The influence of gender and personality traits on the career planning of Swiss medical students. *Swiss Med Wkly* 2003;**133**:535–40.
- Lempp H, Seale C. The hidden curriculum in undergraduate medical education: qualitative study of medical students' perceptions of teaching. *Br Med J* 2004;**329**:770–3.
- Seabrook MA. Clinical students' initial reports of the educational climate in a single medical school. *Med Educ* 2004;**38**:659–69.
- Burton KR. A force to contend with: the gender gap closes in Canadian medical schools. *Can Med Assoc J* 2004;**170**:1385–6.
- Ernst E, White A. The BBC survey of complementary medicine in the United Kingdom. *Complement Ther Med* 2000;**8**:32–6.
- Ong C-K, Banks B. Complementary and alternative medicine: the consumer perspective. The Prince of Wales's Foundation for Integrated Health, London 2003 www.fimed.org (accessed 15/02/005).
- Al-Windi A. Determinants of complementary medicine (CAM) use. *Com Ther Med* 2004;**12**:99–111.

30. Eisenberg DM, Davis RB, Ettner SL, Scott Appel MS, Wilkey S, Van Rompay MV, et al. Trends in alternative medicine use in the United States, 1990–1997. *JAMA* 1998;**280**:1569–75.
31. Furnham A. Attitudes to alternative medicine: a study of the perceptions of those studying orthodox medicine. *Complement Ther Med* 1993:120–6.
32. Furnham A, Hanna D, Vincent C. Medical students' attitudes to complementary medical therapies. *Complement Ther Med* 1995:212–9.
33. Greenfield S, Innes M, Allan T, Wearn A. First year medical students' perceptions and use of complementary and alternative medicine. *Complement Ther Med* 2002;**10**:27–32.
34. Oberbaum M, Notzer N, Abramovitz R, Branski D. Medical student attitude to the introduction of complementary medicine into the medical curriculum in Israel. *Isr Med Assoc J* 2003:5.
35. Furnham A, McGill C. Medical students' attitudes about complementary and alternative medicine. *Altern Complement Med* 2003;**9**:275–84.
36. Lie D, Boker J. Development and validation of the CAM health belief questionnaire (CHBQ) and CAM use and attitudes amongst medical students. *BMC Med Ed* 2004;**4**:2.
37. General Medical Council. "Tomorrow's doctors. Recommendations on undergraduate medical education." February 2003. <http://www.gmc-uk.org/med.ed/tomdoc.htm> (accessed 11.02.05).
38. Verhoef M. Exploring the rationale for introducing complementary and alternative medicine curricula into undergraduate medicine education: A report of a workshop at the 2004 Association of Canadian Medical Colleges Annual Meeting. Nova Scotia, April 2004. <http://www.fp.ucalgary.ca/CAMinUME/rationale.pdf>.
39. Rees L, Weil A. Integrated medicine. *Br Med J* 2001;**322**:119–20.
40. Bodeker G. Lessons on integration from the developing world's experience. *Br Med J* 2001;**322**:164–7.
41. Frenkel MA, Borkan JM. An approach for integrating complementary-alternative medicine into primary care. *Fam Pract* 2003;**20**:324–32.
42. Laqueuer T. Reviews. Boys in white: student culture in medical school. *Br Med J* 2002;**325**:721.
43. Moore W. BMA negotiator calls for more male medical students. *Br Med J* 2002;**324**:754.
44. House of Lords Select Committee on Science and technology, 6th report 1999–2000. London: Stationery Office; 2000.
45. Ambrose E, Samuels S. Herbal use in a university setting. *J Am Acad Nurse Pract* 2004;**16**:166–73.
46. Feldman R, Laura R. The use of complementary and alternative medicine practices among Australian university students. *Complement Health Pract Rev* 2004;**9**:173–9.
47. Wilkinson J, Simpson M. Complementary therapy use by nursing, pharmacy and biomedical science students. *Nurs Health Sci* 2001;**3**:19–27.

Available online at www.sciencedirect.com

