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Medical Student Sexuality: How Sexual Experience and Sexuality Training Impact U.S. and Canadian Medical Students' Comfort in Dealing with Patients' Sexuality in Clinical Practice

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Abstract

Purpose—To determine factors associated with students' comfort in addressing patients' sexuality in the clinical context.

Method—The authors invited students enrolled in MD-degree-granting and osteopathic medical schools in the United States and Canada to participate in an anonymous Internet survey between February and July 2008. The survey assessed ethnodemographic factors and sexual history. Respondents also completed the Center for Epidemiologic Studies Depression Scale. Male

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Ethical approval: The Committee for Human Research at the University of California, San Francisco approved, and the Executive Board of the American Medical Student Association sanctioned, this study.

Disclaimer: The opinions expressed in this article are those of the authors alone and do not necessarily reflect the views of the University of California, the Sexual Medicine Society of North America, or the American Medical Student Association. The first and last authors (AWS and JFS) had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

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respondents completed the International Index of Erectile Function and the Premature Ejaculation Diagnostic Tool. Female respondents completed the Female Sexual Function Index and the Index of Sex Life. The authors used descriptive statistics, ANOVA, and multivariable logistic regression to analyze responses.

Results—The authors' analyses included 2,261 completed survey responses: 910 from men, 1,343 from women, and 8 from individuals who self-identified as "other" gendered. Over 53% of respondents (n = 1,206) stated that they felt they had not received sufficient training in medical school to address sexual concerns clinically. Despite this, 81% of students (n = 1,827) reported feeling comfortable dealing with their patients' sexuality issues. Students with limited sexual experience, students at risk for sexual problems, and students who felt that they had not been trained adequately were less likely to report being comfortable talking to patients about sexual health issues.

Conclusions—Perception of inadequate sexuality training in medical school and personal issues pertaining to sex may be associated with students' difficulty in addressing patients' sexuality. Adequate training is preeminently associated with feeling comfortable addressing patients' sexuality and should be a priority for medical education.

Medical education is a rigorous process that may exact a significant toll on those who wish to become practicing physicians. There has been a great deal of recent interest in the psychological and physical well-being of medical students and postgraduate medical trainees (i.e., residents and fellows). Federal regulations have recently been passed to limit duty hours and to otherwise attend to the mental and physical health of individuals in medical training.[1] While these interventions have been welcome and have indubitably led to improvements in the quality of students' lives, the process of becoming a physician certainly is (and will remain) a demanding undertaking that has numerous effects on other spheres of an individual's life.

Sexuality is a critical component of life; despite this, few researchers have investigated the role of sexuality in the quality of life of medical students. Sexual problems are common among people in their 20s,[2] the age at which the majority of aspiring physicians enroll in medical training. That the significant stressors of medical education (or any other type of intense training) may produce or exacerbate sexual problems in this population is a logical hypothesis. Other investigators have further speculated, and more than 50 years ago Sandler reported, that an individual student's sexual mores, experiences, and/or difficulties may impact his or her capacity to relate to patients with sexual health concerns.[3]

The famed psychiatrist and sex therapist Harold Lief conducted pioneering investigations into sexuality and sexuality education in U.S. medical students in the 1960s and 1970s.[4] In a psychodynamic profile of medical students at Tulane University (New Orleans, Louisiana), published in 1960, Lief and his colleagues reported that 70% were "sexually inhibited," and 10% were "sexually promiscuous."[5] While these are no longer recognized psychological disturbances, issues of sexuality were apparently prevalent in that cohort of students. In more concrete terms, Lief reported that 15% of male and 35% of female medical students were virgins and that 25% of men and 23% of women had had just one sexual partner whereas 31% of men and 19% of women had had more than five partners.[6] These last figures for medical students were similar to the mean number of partners from the general population of age-matched men and women of the same era.[6] Importantly, Lief emphasized that sexual problems and behaviors were likely to influence students' interactions with patients who presented with a sexual concern.[7] Furthermore, he posited that many students who have the greatest need for training in how to sensitively approach issues of sexuality may avoid opportunities to gain these skills during their training if such courses are not mandatory.[6,7]

Lief's contributions are of great value. However, little investigation on this topic has occurred since his work in the 1970s. A more recent study using contemporary instruments for the assessment of human sexuality reported that rates of erectile dysfunction (ED) and female sexual dysfunction (FSD) were relatively high in medical students.[8] This 2008 study took place at a single institution and had a relatively small sample size, and both of these factors limited its results. Furthermore, the study did not assess participants' psychological sources of morbidity and therefore did not explore the potential influence of psychological problems on an individual's capacity to care for patients with sexual concerns.[8] To gain an accurate understanding of the prevalence and associations of sexual problems among medical students, a larger and more representative sample is required.

The primary purpose of the current study was to determine the incidence of comfort addressing sexuality in the clinical context among students enrolled in U.S. and Canadian MD-degree-granting and osteopathic medical schools and to explore ethnodemographic and sexuality-specific factors associated with being comfortable with patient sexuality. Our secondary goal was to assess students' perceptions of the quality of training in human sexuality they had received and the impact this training had on their level of comfort addressing sexuality with patients. Our hypothesis was three-fold: (1) U.S. and Canadian medical students exhibit sexual behaviors that are generally congruous with the general, age-matched population, (2) sexual dysfunction is prevalent among medical students, and (3) an individual student's personal sexual mores, practices, and function influence his or her comfort in addressing patients' sexual concerns.

Method

Study population

We invited medical students in the United States and Canada to participate in an Internet-based survey. We extended invitations via postings on American Medical Student Association (AMSA) list-serves, through postings on the Student-Doctor Network, and in a news story posted on Medscape.com. The survey was posted at QuestionPro.com (Seattle, Washington) and was available from February 22, 2008, until July 31, 2008. The Committee for Human Research at the University of California, San Francisco granted approval for this study and the survey instrument. Further, the Executive Board of AMSA sanctioned the study. We assumed participants' consent by their voluntary completion of the survey instrument. We did not offer students any form of compensation for participation so as to better ensure anonymity. To minimize the chances that participants would report more than once, we permitted only a single survey from any one IP (Internet protocol) computer address.

Main outcome measure

We used one yes/no item on the questionnaire to assess students' comfort in discussing sexuality with patients: "Would you or do you feel comfortable talking to patients about their sexual practices and problems?"

Exposure variables

Sociodemographics and sexual experience—The survey consisted of a questionnaire that assessed demographic characteristics such as age (continuous in five-year intervals, starting at age 16 years), race/ethnicity (Asian, Black, Caucasian, Hispanic, and other), current sexual relationship (yes/no), prior maternity/paternity (yes/no), medical school location (Canada or geographic region of the United States), and year in medical school. A sexuality survey assessed variables such as sexual orientation, age at first intercourse (if any), number of lifetime partners, number of recent partners, and sexual

repertoire. One question also asked students about their perception of the adequacy of the human sexuality training they received in medical school: "Do you feel that you have received adequate training in medical school to deal with patients' sexuality and sexual problems in clinical practice?"

Psychological—To assess psychological morbidity in the study population, we asked participants to complete the Center for Epidemiological Studies Depression (CES-D) Scale, a 20-item instrument designed to assess the presence and severity of depressive symptoms.[9] Higher scores indicate a greater burden of depressive symptoms; we used a CES-D Scale score of 16 as a cut-off for risk of clinically significant depressive symptoms.

Sexual quality of life—We used gender-appropriate instruments to screen for sexual problems and to characterize sexual functioning. Male participants completed the International Index of Erectile Function (IIEF), a 15-item validated instrument for the assessment of five domains of male sexuality (desire, erectile function, intercourse satisfaction, orgasmic function, and overall satisfaction).[10] The erectile function domain of the IIEF (IIEF-EF) derives from six questions of the IIEF (score range: 5–30); we used validated cut-off scores to classify ED of differing severity on the basis of IIEF-EF scores (≥26 = no ED, 22–25 = mild ED, 17–21 = mild-moderate ED, 11–16 = moderate ED, ≤10 = severe ED.)[11] Men also completed the Premature Ejaculation Diagnostic Tool (PEDT), a 5-item validated instrument for the assessment of premature ejaculation (PE). The PEDT total score ranges between 0 and 20; a score of 9 or 10 represents high risk for PE; and a score of ≥11 represents clinically significant PE.[12,13] We included only men who answered all domain-specific questions in subsequent analyses. For the purposes of this analysis, we considered all men with PEDT scores ≥9 to be at risk for PE. Female participants completed the Female Sexual Function Index (FSFI), a 19-item validated questionnaire for the assessment of six domains of female sexual function (desire, arousal, lubrication, orgasm, satisfaction, and pain.)[14] We included, in our calculation of the total FSFI score, only those women who completed all questions. We used a total score of ≤26.55 on the FSFI (score range: 2–36) as a cut-off value for high risk of FSD.[15] We asked female participants who were in a sexual relationship to complete the Index of Sex Life (ISL), an 11-item validated instrument for the assessment of relationship quality and sexual desire in women.[16] We asked all participants, after they completed the validated sexuality instruments, to give an answer to a single-item question regarding their general overall satisfaction with their sexual life and their interest in changing some aspect of it: "Which of the following statements best summarizes your feelings about your sexual function at this time?**"** Respondents could select exactly one of the following options as their answer:

- I am satisfied with my sexual function and would not change anything.
- I am mostly satisfied with my sexual function, but there are things I would like to change.
- I am dissatisfied with my sexual function, but I don't want to change anything at this time.
- I am dissatisfied with my sexual function, and there are things I would like to change.
- I feel that I have a sexual problem or dysfunction and would like to do something about it.
- Sexual function and dysfunction are not issues for me.
- Other (please elaborate).

We deemed such a question to be important because the numeric scores generated by quantitative instruments may not be accurate representations of actual sexual satisfaction in individual participants, particularly women.[17,18]

The sexuality-specific instruments (IIEF, PEDT, FSFI, ISL) were not designed to assess sexuality in individuals who have not engaged in sexual intercourse; for this reason, we excluded participants who had not engaged in sexual intercourse (as they defined it) from any analyses based on these instruments. Furthermore, these instruments were initially developed and validated for use in male or female participants engaging in heterosexual coitus. However, a version of the FSFI has been validated for use in a lesbian population and a version of the IIEF has recently been validated for use in homosexual HIV positive men.[19,20] So that this study would be as inclusive as possible, we made minor modifications to the instructions and wording of the sexuality instruments, maximizing their applicability to participants whose primary means of sexual expression is not heterosexual coitus (i.e., homosexual participants as well as heterosexual/bisexual participants who frequently engage in noncoital intercourse). These changes consisted primarily of (1) removing gender-specific terms for the participant's partner and replacing them with gender-neutral pronouns/nouns and (2) expanding the scope of what constitutes "sexual intercourse" to include "entering your partner's mouth, vagina, or anus" for the IIEF and "vaginal intercourse and/or stimulation of the genitalia with hands or mouth in the intent of producing orgasm (not as part of foreplay)" for the FSFI. While our instruments were not exact replicas of the instruments validated for use in lesbians and gay men, we believe that this prior work (i.e., these two recently validated instruments) supports the general applicability of these scales to nonheterosexual populations. The survey directed participants who selected a gender identity other than male or female to select whichever (either male or female) instruments were most applicable to their unique cases. Individuals who were not in steady sexual relationships did not complete the ISL.

Statistical analysis

We used descriptive statistics to characterize the study population. We used analysis of variance (ANOVA) to assess differences for continuous variables and chi squared tests to assess differences for categorical variables. We report odds ratios (ORs) and their 95% confidence intervals (CIs) to estimate the association between participants' characteristics and their comfort in discussing patients' sexuality.

We developed four multivariate logistic regression models to assess the relationship between participants' characteristics and their comfort in discussing sexuality with patients. In the first model, we evaluated the association between feeling comfortable discussing sex with patients and the following characteristics in nonvirgin participants (n = 1,692):

- age,
- gender,
- race,
- year in school,
- sexual orientation,
- presence of significant depressive symptoms,
- frequency of sex,
- number of sexual partners in the past six months,
- number of lifetime sexual partners, and

- perception of adequacy of sexuality training in medical school.

The second multivariable model explored the effect of virgin status on the odds of feeling comfortable discussing patients' sexual activity after adjustment for all of the factors noted above (1,977 participants were included in this analysis, 293 of whom were virgins). In the third model, we evaluated the association between erectile dysfunction and the odds of feeling comfortable discussing patients' sexuality by adding ED to the model that contained all of the variables noted above except virgin status (627 nonvirgin male participants had complete data for all factors in this analysis). In the fourth model, we assessed the association between high risk of FSD and the odds of feeling comfortable discussing sexuality with patients after adjusting for the covariates described above (887 nonvirgin female participants had complete data for all factors in this analysis). We set statistical significance at $P < .05$ and all tests were two-sided. We used STATA 10 (Statacorp, College Station, Texas) for all analyses.

Results

There were 2,261 completed, individual responses that included gender, a response to the perceived adequacy of sexual health training in medical school question, and a response to the question regarding the comfort of discussing sexuality with patients (Table 1). Of these responses, 910 (40.2%) were from men (mean [SD] age 25.7 [± 4.2] years); 1,343 (59.3%) were from women (mean age 25.4 [± 3.4] years); and 8 (<1%) were from individuals who self-identified as "other" gendered (mean age 27 +/−2.8 years for 2 participants). Because of both the small size of the group identifying as "other" gendered and the difficulty of applying the survey instruments accurately to this population, we focused our bivariate and multivariate analyses of associations of comfort addressing sexuality with patients in the students who endorsed a male or female gender identity.

Data on U.S. medical student enrollment is available from the Association of American Medical Colleges (AAMC). We believe, based on the AAMC's estimated enrollment of 74,518 students in 2008, that our study population represents approximately a 3% response rate.[21] Compared to overall U.S. and Canadian medical student population data, Caucasians represent a disproportionately large proportion of our respondent pool, and Black and Asian students represent a smaller proportion. The potential influence of this finding on our results is unclear, but it may be germane and must be considered in interpreting our results, particularly because race was significantly associated with the primary study outcome measure (i.e., feeling comfortable discussing patient sexuality), as will be detailed below.

Sexual practices

Among male students in our survey, 785 (86.3% of 910; Table 2) had engaged in sexual intercourse; for these men, the mean (SD) age at first intercourse was 18.8 (±2.7) years. Among female medical students in our survey, 1,175 (87.5% of 1,343) had engaged in sexual intercourse; for these women, the mean age (SD) at first intercourse was 18.6 (±2.8) years.

Excluding participants who had never engaged in sexual intercourse, the mean number of sexual partners over the past six months was 1.5 ± 1.5 for men and 1.2 ± 0.8 for women. The mean monthly intercourse frequency was 7.5 ± 7.1 (median: 6) and 6.8 ± 6.5 (median: 5) times per month for, respectively, men and women.

Sexual function and satisfaction

One hundred two men (13.9% of 734 nonvirgin men responding completely on the IIEF-EF domain) reported ED (Table 2). The majority of these men reported "mild" or "mild-

moderate" ED. There were 497 nonvirgin men who completed the PEDT; 114 (22.9%) of these reported high risk of PE.

We identified high risk of FSD in 560 women (49.1% of 1,141 female medical students with complete FSFI data; Table 2). The majority of women in sexual relationships cited interference in their sexual life from either tiredness or psychological stress (73.3% [n = 688/ 938] and 65.4% [n = 613/938], respectively).

Responses to the single-item satisfaction question revealed that approximately half of all participants (456 of 910 men [50.1%] and 594 of 1,343 women [44.2%]) feel mostly satisfied with their sexual life but express an interest in changing some aspect of it. The number of participants who reported unhappiness with their sexual function or who perceived sexual dysfunction and expressed a desire for change was 122 of 910 men (13.4%) and 312 of 1,343 women (23.2%).

Perception of adequacy of training in clinical sexuality

A majority of first-year students (n = 375, 64.4% of 582 first-year students) reported that they felt inadequately trained to deal with sexuality in the clinical context. This prevalence was significantly higher than that in students from other years: 49 to 53% ($P < .05$). Students who were not married were more likely than married students to report that training had been inadequate, as were men who had ED compared to men without ED ($P < .05$ for both). Gender, virginity status, race, geographic region, and risk of FSD were not significantly associated with perception of sexual health training ($P > .05$).

Comfort with sexual health concerns in patients

The vast majority of participants (1,827 or 81.1% of 2,253 complete responses) reported that they felt comfortable dealing with patients' sexuality issues (Table 1).

Bivariate analysis of associations of comfort addressing patients' sexual health concerns

Table 3 shows our bivariate analysis of associations of comfort addressing sexuality with patients. A perception of adequate training in sexual health during medical school was very strongly associated with feeling comfortable discussing patients' sexual health (OR = 6.06, $P < .01$).

Multivariable associations of comfort in discussing patients' sexual health

Multivariable analysis of nonvirgin responders with complete data on other variables (Table 4) showed that Asian participants (OR = 0.47; $P < .01$) and those with significant depressive symptoms (OR = 0.57; $P < .01$) were much less likely to feel comfortable discussing patients' sexual health than were Caucasian participants and participants without significant depressive symptoms, respectively. Bisexual students (OR = 3.81; $P < .01$) and students with six or more lifetime sexual partners (OR = 1.76; $P < .01$) were more likely to feel comfortable discussing sex with patients compared to heterosexual participants and participants with fewer than six lifetime partners, respectively. Perception of adequate sexuality training in medical school remained the strongest independent factor associated with feeling comfortable discussing patients' sexual health (OR 6.66; $P < .01$).

Multivariate analysis of the relationship between virginity and comfort in discussing sexual health with patients after adjusting for age, gender, and year in school revealed that virgin status was strongly associated with a lower likelihood of comfort discussing sexuality (OR = 0.50; 95% CI: 0.36–0.70; $P < .01$). After adjusting for virgin status, Asian race and significant depressive symptoms continued to be associated with lower odds of feeling comfortable discussing sex with patients (OR = 0.52; 95% CI: 0.37–0.73 and OR = 0.58;

95% CI: 0.45–0.74 respectively; $P < .01$ for both). In the same analysis, participants who believed that they had received adequate sexual health training during medical school were still much more likely to feel comfortable discussing sexual health after multivariable adjustment (OR = 6.41; 95% CI: 4.72–8.69; $P < .01$). Finally, bisexual students were more likely to report feeling comfortable addressing sexuality with patients even after adjustment for virgin status (OR 2.94; 95% CI 1.41–6.10; $P < .01$). Students with homosexual orientation still tended to be more comfortable discussing sexuality than were heterosexual students in this analysis but the difference did not attain statistical significance (OR = 1.53; 95% CI: 0.96–2.43; $P = .08$).

Bivariate analyses indicated that men with ED were less likely to be comfortable discussing sex with patients than were men without ED (OR 0.6; 95% CI: 0.36–1.00; $P = .05$); however, this difference was not statistically significant after adjusting for the effects of age, race, year in school, sexual orientation, number of sexual partners, frequency of sexual activity, and perception of adequacy of sexual health training (OR = 0.61; 95% CI: 0.32–1.18; $P = .14$). In nonvirgin male students, after adjusting for ED status, Asian race continued to be associated with a lower likelihood of feeling comfortable addressing sex in the clinical context (OR = 0.38; 95% CI: 0.19–0.76; $P = .01$) whereas adequate training in sexual health remained associated with a greater likelihood of feeling comfortable addressing sex in the clinical context (OR = 7.66; 95% CI: 4.07–14.42; $P < .01$). Given a lack of significant associations between PE and comfort addressing sexuality in the clinical context on bivariate analysis, we did not perform multivariate analyses of PE.

Multivariate analyses of the relationship between risk of sexual dysfunction in female students and comfort in discussing sexual health with patients revealed that a high risk of FSD was independently associated with lower odds of feeling comfortable discussing sex with patients (OR 0.63; 95% CI 0.41–0.95; $P = .03$); this relationship persisted even after adjusting for the effects of age, race, year in school, sexual orientation, number of sexual partners, frequency of sexual activity, and perception of the adequacy of sexual health training during medical school. Additional factors associated with a lower likelihood of feeling comfortable addressing sexuality among nonvirgin women at high risk for FSD included depressive symptoms (OR 0.54; 95% CI 0.37–0.80; $P < .01$), and Asian race (OR 0.50; 95% CI 0.27–0.90; $P = .02$). Among nonvirgin women at high risk for FSD, factors associated with a greater likelihood of feeling comfortable discussing sexuality included

- perceived adequacy of sexuality education in medical school (OR = 6.50; 95% CI: 4.04–10.46; $P < .01$),
- bisexual orientation (relative to heterosexuals, OR = 4.34; 95% CI: 1.47–12.83; $P = .01$),
- having six or more lifetime partners (OR = 1.68; 95% CI: 1.06–2.64; $P = .03$), and
- fourth-year status (relative to first-year students, OR = 1.89; 95% CI: 0.99–3.59; $P = .05$).

Discussion

The researcher Harold Lief compiled an exhaustive dataset on the sexual behaviors, attitudes, and beliefs of U.S. medical students in the 1960s and 1970s.[6] While these data are of value for historical context, the dramatic social and educational changes of the past 40 years make the contemporary applicability of these data unclear. The sexual practices of the medical student participants of this current study appear to be relatively similar to other observations of age-matched peers from the general population; slight variations exist, but may be attributable to methodological differences.[22–24] The implication of this study is that

medical students are, for the most part, similar to their age-matched controls. However, the percentage of respondents who had engaged in some same-gender sexual activity (about 17%) was higher in our population than that reported in the recent CDC report of sexual behaviors in contemporary Americans between the ages of 25 and 44 (which reported that about 6.5% of men and 11% of women engaged in some same-gender sexual activity.)[24] This difference may be attributable to the fact that the percentage of male respondents in our study who endorsed a homosexual orientation (13.2%) was higher than that reported in the CDC report, in which just 2.3% of men endorsed homosexual orientation and an additional 5.7% reported "nonheterosexuality."[24]

The National Health and Social Life (NHSL) study from 1992 estimated the prevalence of ED and early ejaculation in 18- to 29-year-old American men at 7% and 30%, respectively.[2] While no single item in that study specifically assessed FSD, difficulties in various specific spheres of sexual life were reported by 16% to 32% of women in this age cohort; problems pertaining to sexual interest, orgasm, and sexual pleasure were most prevalent.[2] Data from this age cohort 18–29 are more immediately relevant to our study than the overall rates of sexual problems for the entire population (ages 18 to 59) included in the NHSL. The NHSL data estimates of sexual dysfunction prevalence were based on a single-item question, and thus are not directly comparable to our data. Nevertheless, our data suggest that ED and FSD are more prevalent among medical students than among age-matched controls.

A survey of curriculum directors at U.S. and Canadian medical schools revealed that the majority (54.1%) of the 101 responding schools provided between 3 and 10 hours of sexual medicine training, while a third (32.7%) provided over 11 hours of sexual medicine training.[24] Most (81%) of the responding schools listed human sexuality as a lecture requirement, although less than half (42.5%) of the reporting schools offered a clinical program specific to the treatment of patients with sexual problems and/or dysfunction; one-third of the schools with such a program did not report providing supervised clerkship experiences.[25] Prior studies have suggested that up to 62% of medical students do not feel that they have been adequately trained to address and treat clinical sexual concerns.[26] Given data such as these, we are not surprised that over half of the participants in our survey perceived their training in human sexuality as inadequate.

Other investigators have previously reported the prevalence of medical student discomfort regarding addressing sexuality in the clinical context. Frank and colleagues reported that up to 43% of medical students surveyed did not feel comfortable discussing safer sex with patients.[27] Malhotra and colleagues reported a lower prevalence of student discomfort than did Frank and colleagues; however, they noted that students tend to be less comfortable discussing sex with patients at the extremes of age.[28] An important study by Merrill and colleagues suggested that even senior students often have difficulty inquiring about sexual health in their patients, and that low self-esteem, shyness, and anxiety were associated with difficulty in addressing sex in the clinical context.[29] The potential impact of the inability to discuss sexuality in a frank and honest manner with patients is considerable; a study of HIV counseling practices among clinically experienced medical students indicated that the majority of students failed to ask important questions about patients' sexual behaviors in a standardized patient teaching session.[30] While these important studies illuminate some of the challenges that students face when taking a sexual history, to our knowledge no other study has examined personal sexual practices and functioning as associations of comfort in dealing with patient sexuality.

The percentage of participants in this study who reported feeling comfortable discussing patient sexuality was higher than that reported in prior studies.[26,27] One conjecture is that students who were willing to participate in our study were more likely to be comfortable

addressing sexuality issues relative to medical students who declined to participate. In addition, the relatively simple method of assessing comfort dealing with sexuality in our study (i.e., a single yes/no item) may also have affected our results, leading to a relatively high estimate of medical student comfort in dealing with sexuality in the clinical context.

In our study, individuals who have not engaged in sexual intercourse were at greater risk of feeling uncomfortable dealing with issues of sexuality in patients. A number of other personal factors assessed in our study (e.g., a lower number of sexual partners, lower sexual frequency, sexual dysfunctions) were also associated with discomfort dealing with sexuality in the clinical context. These findings support a prior report showing that an individual student's sexual mores and experiences influence his or her perception of sexuality in general.[31] Interestingly, students of Asian descent tended to be less likely to report feeling comfortable dealing with sexuality in the clinical context. We cannot determine the reasons for this finding from this data set; however, some have reported that people of Asian descent in the United States and Australia tend to have more conservative views towards sexuality than do Caucasian individuals; our finding may be reflective of this tendency.[32,33]

Interestingly, year in training was not a strong association of feeling comfortable dealing with sexuality. However, first-year students were more likely to report that they had not received adequate training to address sexual concerns in patients, and multivariate analysis showed that women in the fourth year of training were significantly more likely to be comfortable addressing sexual concerns than were both men and women in the first-year of training; these two observations (i.e., first-year students' perception of inadequate training and fourth-year women students' greater comfort) are logical, and they each add credibility to our dataset. Perception of adequacy in training was positively associated with feeling comfortable with sexuality in the clinical context, so we can infer that year in training may play an indirect role in feeling comfortable addressing patient sexuality. However, social, cultural, and personal factors, as well as the overall quality of training, clearly have a stronger influence on an individual student's comfort in dealing with sexuality in patients than does his or her specific year in training.

Importantly, the most powerful association of lack of comfort in dealing with patients' sexuality was a perception of inadequate human sexuality training in medical school. Other investigators have demonstrated that curricular innovations in sexuality training can enhance student comfort with sexuality in the clinical context[34] and that medical school curricula may have a significant impact on students' comfort with clinical sexuality issues.[35–37] Our data speak to the need for the development of a medical school sexual health curriculum that not only is sensitive to and respectful of the mores and sexual situations of all students but that also simultaneously provides students with the necessary skills to address sexuality in a broad clinical context, perhaps even outside their comfort zone. The specific means by which to institute this enhanced education in sexuality are beyond the scope of this report, but they should be a topic of discussion among medical school curriculum directors.

Our findings are of interest and may be indicative of general trends among medical students but further confirmatory studies are required before these results can be definitively generalized to all U.S. and Canadian medical students.

Participants who are willing to complete an anonymous, Internet-based survey on sexuality and sexual practices may not be representative of the U.S. and Canadian medical student population as a whole. We speculate that the students willing to take such a survey may be generally more sexually comfortable and experienced than those who declined. Greater comfort with sexuality and more sexual experience among responders compared to nonresponders is a common problem in sexuality research, and this phenomenon would bias

our results towards overestimating the sexual experiences and comfort of medical students. This survey did not include means by which to objectively assess the quality of students' education in human sexuality nor their actual facility at addressing sexual issues in the real-world clinical context; some participants in this study may have underestimated their training and overestimated their abilities (or vice versa).

Finally, analysis of quantitative data from instruments designed to assess sexual function cannot be construed as a genuine means of accurately diagnosing clinically significant sexual problems, particularly since none of the instruments we utilized include the means to assess personal distress regarding the situation. We attempted to account for this limitation by asking a single-item question designed to ascertain participants' personal feelings about their current state of sexual functioning and whether or not they desired change. The clinical relevance of sexual problems for the individual student is not the focus of this report, but we will further explore this in subsequent analyses from this dataset.

While we cannot glean the actual presence of clinically meaningful sexual dysfunction in this population from these data, our instruments are useful as a means to quantify perturbations of normal sexual function, and subsequent analyses based on these data do have merit in our opinion. Whether these instruments, initially designed and validated for use in heterosexual populations, are accurate and valid for use in nonheterosexual populations is another important consideration. The FSFI has been validated in lesbians,[19] and a modified IIEF has very recently been validated in HIV positive men who have sex with men,[20] but we did not employ the same modifications used in the validated studies. Whether our specific instrument accurately assessed sexual function in nonheterosexual participants is unknown and this uncertainty remains an important limitation of our data collection.

Despite its limitations, this rich dataset represents a comprehensive and thorough assessment of sexuality and sexual function in contemporary medical students. Future analyses and studies of this population will likely shed more light on the ways in which human sexuality education in medical school can be advanced. An area of particular interest is the critical assessment of curricular innovations and/or interventions to determine which are of greatest utility for enhancing medical student comfort in addressing the complete spectrum of sexual health of patients. The development of curricula that are inclusive and that address the needs of a student body whose sexual practices and experiences are diverse is of critical importance for the advancement of sexuality education in medical school.

Conclusions

Many medical students in the United States and Canada have, or are at risk for, difficulties relating to sexual function. An open and free discourse on the importance of sexuality and access to sexual health care services may be useful in improving medical students' quality of life. Ensuring that medical students receive training to deal effectively with their patients' sexuality is also important. Our data suggest that, irrespective of their personal sexual choices and experiences, students who perceive that they have received adequate sexuality education are more likely to be comfortable addressing the sexual concerns of their patients. This finding speaks to the importance of ensuring a quality human sexuality curriculum at medical schools throughout the United States and Canada. The development of a modern, comprehensive, and inclusive curriculum to educate aspiring physicians on human sexuality is an important priority for medical educators and organizations. Extension of this curriculum to residents in training and practicing physicians is another important goal.

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Table 1

Demographic, Psychological, and Educational Characteristics of U.S. and Canadian Medical Students (N=2,253) Responding to a Survey About Sexual Behavior, Functioning, and Medical School Training in 2008

Characteristic	Male: No. (% of 910)	Female: No. (% of 1,343)
Race		
Caucasian	620 (68.1)	902 (67.2)
Hispanic	61 (6.7)	82 (6.1)
Black	22 (2.4)	53 (3.9)
Asian	127 (14.0)	163 (12.1)
Other	49 (5.4)	98 (7.3)
No response	31 (3.4)	45 (3.4)
Year in school		
1	227 (24.9)	355 (26.4)
2	247 (27.1)	374 (27.8)
3	215 (23.6)	303 (22.6)
4	162 (17.8)	246 (18.3)
Research year	54 (5.9)	62 (4.6)
No response	5 (0.6)	3 (0.2)
Region		
Canada	39 (4.3)	47 (3.5)
Midwestern U.S.A.	228 (25.1)	355 (26.4)
Northeastern U.S.A.	269 (29.6)	442 (32.9)
Northwestern U.S.A.	20 (2.2)	24 (1.8)
Southeastern U.S.A.	93 (10.2)	119 (8.9)
Southwestern U.S.A.	84 (9.2)	116 (8.6)
Southern U.S.A.	52 (5.7)	78 (5.8)
Western U.S.A.	101 (11.1)	130 (9.7)
No response	24 (2.6)	32 (2.4)
Have children	74 (8.1)	73 (5.4)
Significant depressive symptoms (CES-D ≥16) *	306 (33.6)	560 (41.6)
Sexual orientation		
Heterosexual	762 (83.7)	1,195 (89.0)
Homosexual	120 (13.2)	63 (4.7)
Bisexual	22 (2.4)	77 (5.7)
Asexual / other / no response	6 (0.7)	8 (0.6)
Married or in a domestic partnership		
Yes	264 (29.0)	420 (31.3)
No	302 (33.2)	492 (36.6)
No response	344 (37.8)	431 (32.1)

Characteristic	Male: No. (% of 910)	Female: No. (% of 1,343)
Feel adequately trained to deal with sexual health issues during medical school	443 (48.7)	612 (45.6)
Feel comfortable dealing with sexual health issues in patients	750 (82.4)	1,077 (80.2)

* CES-D is the Center for Epidemiologic Studies Depression Scale.

Table 2

Sexual Characteristics, Behavior, and Functioning Among U.S. and Canadian Medical Students, 2008 *

Sexual characteristic, behavior, or function	Male: No. (%)	Female: No. (%)
Virgin	125/910 (13.7)	168/1,343 (12.5)
In a sexual relationship	583/910 (64.1)	938/1,343 (69.8)
Six or more lifetime partners (non-virgin only)	347/785 (44.2)	451/1,175 (38.4)
No. of sex partners, last 6 months (non-virgin only)		
0	63/785 (8.0)	99/1,175 (8.4)
1	524/785 (66.7)	895/1,175 (76.1)
≥2	195/785 (24.8)	176/1,175 (15.0)
Sexual frequency in last month (non-virgin only)		
0–2 (<25%)	223/785 (28.4)	353/1,175 (30.0)
3–5 (25%–50%)	156/785 (19.9)	264/1,175 (22.5)
6–10 (50%–75%)	218/785 (27.8)	307/1,175 (26.1)
≥11 (>75%)	180/785 (22.9)	236/1,175 (20.1)
Sexual behavior		
Masturbation	875/910 (96.2)	1,147/1,343 (85.4)
Received oral sex	782/910 (85.9)	1,149/1,343 (85.6)
Performed oral sex	760/910 (83.5)	1,152/1,343 (85.8)
Vaginal sex	660/910 (72.5)	1,100/1,343 (81.9)
Anal receptive sex	119/910 (13.1)	355/1,343 (26.4)
Anal insertive sex	301/910 (33.1)	36/1,343 (2.7)
Sex acts with partner of different gender	690/910 (75.8)	1,072/1,343 (79.8)
Sex acts with partner of same gender	157/910 (17.3)	240/1,343 (17.9)
Was restrained for sexual pleasure	120/910 (13.2)	295/1,343 (22.0)
Restrained someone else for sexual pleasure	151/910 (16.6)	216/1,343 (16.1)
Received pain for sexual pleasure	42/910 (4.6)	123/1,343 (9.2)
Inflicted pain for sexual pleasure	39/910 (4.3)	62/1,343 (4.6)
Erectile dysfunction (IIEF-EF score <26; male non-virgin only)	102/734 (13.9)	—
Mild (IIEF-EF: 22–25)	67/734 (9.1)	—
Mild-moderate (IIEF-EF: 17–21)	28/734 (3.8)	—
Moderate (IIEF-EF: 11–16)	5/734 (0.7)	—
Severe (IIEF-EF: 6–10)	2/734 (0.3)	—
High risk for premature ejaculation (PEDT ≥9; male non-virgin only)	114/497 (22.9)	—
High risk for female sexual dysfunction (FSFI ≤26.55; female non-virgin only)	—	560/1,141 (49.1)
Interference with sex life from (female non-virgins in relationships only):		
Excessive tiredness	—	688/938 (73.3)
Psychological stress	—	613/938 (65.4)
Disease	—	57/938 (6.1)
Gynecological problem	—	142/938 (15.1)

Sexual characteristic, behavior, or function	Male: No. (%)	Female: No. (%)
Lack of partner availability	—	285/938 (30.4)

*The mean (standard deviation [SD]) age at first intercourse for men was 18.8 (2.7), and the mean (SD) age at first intercourse for women was 18.6 (2.8). IIEF-EF is the International Index of Erectile Function—Erectile Function domain. PE is premature ejaculation. FSFI is the Female Sexual Function Index. Geographic location and some other non-significant variables were excluded so as to streamline the table. Only those non-significant variables that would seem very central to sexuality issues were left on the table.

Table 3

Bivariate Analysis of Putative Sociodemographic and Sexual Predictors of Comfort Among U.S. and Canadian Medical Students in Dealing With Sexuality in the Clinical Context, 2008 *

Demographic and psychological factors	Odds ratio	95% Confidence interval	*P* value
Age (five year increase, beginning at age 16)	1.23	1.01–1.08	0.01
Gender (female vs. male)	1.15	0.93–1.43	0.20
Race			
Caucasian	1.00		Reference
Hispanic	0.67	0.44–1.01	0.06
Black	0.50	0.30–0.84	0.01
Asian	0.48	0.36–0.64	0.00
Other	0.69	0.46–1.05	0.08
Year in school			
1	1.00		Reference
2	1.24	0.93–1.65	0.14
3	1.17	0.87–1.57	0.30
4	1.32	0.95–1.82	0.10
Research year	1.30	0.77–2.18	0.33
Sexual preference			
Heterosexual	1.00		Reference
Homosexual	1.39	0.92–2.11	0.12
Bisexual	2.25	1.16–4.37	0.02
Prior children *	1.04	0.68–1.60	0.86
Married *	1.03	0.79–1.36	0.82
Significant depressive symptoms (CESD † **≥16)**	0.53	0.43–0.67	0.00
Virgin	0.45	0.34–0.59	0.00
Sexual frequency in past month (Percentile)			
0–2 (<25%)	1.00		Reference
3–5 (25%–50%)	1.40	1.01–1.95	0.04
6–10 (50%–75%)	1.39	1.02–1.88	0.04
≥11 (>75%)	1.71	1.21–2.41	0.00
Number of partners last 6 months			
0	1.00		Reference
1	1.21	0.81–1.81	0.36
≥2	1.61	1.00–2.61	0.05
Six or more lifetime partners	1.69	1.31–2.18	0.00
Currently in a sexual relationship *	1.04	0.80–1.35	0.79
Perceived adequacy of human sexuality training	6.06	4.61–7.97	0.00
Female sexual dysfunction	0.53	0.39–0.72	0.00

Demographic and psychological factors	Odds ratio	95% Confidence interval	*P* value
High risk for premature ejaculation (PE ≥9)	0.77	0.46–1.32	0.34
Erectile dysfunction	0.60	0.36–1.00	0.05

*Variables NOT included in multivariate analyses.

†CES-D is the Center for Epidemiologic Studies Depression Scale.

Table 4

Multivariable Analysis of Associations With Comfort in Dealing With Patients' Sexuality Among Non-Virgin U.S. and Canadian Medical Students * Responding to a Survey About Sexual Behavior, Functioning, and Medical School Training (N=1, 692) in 2008

Variable	Odds ratio	95% Confidence interval	*P* value
Age (five-year increase)	0.95	0.78–1.16	0.62
Gender	1.04	0.77–1.39	0.81
Race			
Caucasian	1.00		Reference
Hispanic	0.71	0.42–1.20	0.21
Black	0.66	0.30–1.45	0.30
Asian	0.47	0.31–0.70	0.00
Other	0.70	0.40–1.24	0.23
Year in school			
1	1.00		Reference
2	1.08	0.75–1.57	0.67
3	0.90	0.60–1.34	0.60
4	1.30	0.84–2.04	0.24
Research year	1.26	0.63–2.51	0.52
Sexual preference			
Heterosexual	1.00		Reference
Homosexual	1.09	0.66–1.78	0.74
Bisexual	3.81	1.48–9.84	0.01
Significant depressive symptoms (CES ^{*D} ≥16)	0.57	0.43–0.76	0.00
Sexual frequency in past month (Percentile)			
0–1 (<25%)	1.00		Reference
2–5 (25%–50%)	1.57	1.03–2.41	0.04
6–10 (50%–75%)	1.35	0.90–2.02	0.14
≥11 (>75%)	1.46	0.94–2.26	0.09
Number of sexual partners in last 6 months			
0	1.00		Reference
1	0.90	0.51–1.60	0.72
≥2	0.88	0.47–1.65	0.70
Six or more lifetime partners	1.76	1.26–2.44	0.00
Perceived adequacy of human sexuality training	6.66	4.69–9.46	0.00

* he authors had complete data on age, gender, race, year in school, sexual orientation, depressive symptoms, and sexuality variables for these 1,692 students.