

Harassment and Discrimination in Medical Training: A Systematic Review and Meta-Analysis

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Abstract

Purpose

Harassment and discrimination include a wide range of behaviors that medical trainees perceive as being humiliating, hostile, or abusive. To understand the significance of such mistreatment and to explore potential preventive strategies, the authors conducted a systematic review and meta-analysis to examine the prevalence, risk factors, and sources of harassment and discrimination among medical trainees.

Method

In 2011, the authors identified relevant studies by searching MEDLINE and EMBASE, scanning reference lists of relevant studies, and contacting experts. They included studies that reported the

prevalence, risk factors, and sources of harassment and discrimination among medical trainees. Two reviewers independently screened all articles and abstracted study and participant characteristics and study results. The authors assessed the methodological quality in individual studies using the Newcastle–Ottawa Scale. They also conducted a meta-analysis.

Results

The authors included 57 cross-sectional and 2 cohort studies in their review. The meta-analysis of 51 studies demonstrated that 59.4% of medical trainees had experienced at least one form of harassment or discrimination during their training (95% confidence

interval [CI]: 52.0%–66.7%). Verbal harassment was the most commonly cited form of harassment (prevalence: 63.0%; 95% CI: 54.8%–71.2%). Consultants were the most commonly cited source of harassment and discrimination, followed by patients or patients' families (34.4% and 21.9%, respectively).

Conclusions

This review demonstrates the surprisingly high prevalence of harassment and discrimination among medical trainees that has not declined over time. The authors recommend both drafting policies and promoting cultural change within academic institutions to prevent future abuse.

The quality of education that medical trainees, including medical students and residents, receive is influenced by their interactions with patients and their families, supervisors, nurses, peers, and other health care providers. These individuals can be a source of mentorship and encouragement and have a significant impact on trainees' career paths. However, sometimes these same individuals also can be a source of discomfort, stress, abuse, harassment, or discrimination.

In 1982, Silver¹ brought attention to this issue when he compared medical

students' attitudes before and after enrolling in medical school. He observed that some students went from being "alert, enthusiastic, and excited" to "cynical, dejected, frightened or depressed, and filled with frustration" over the course of their medical training.¹ Furthermore, Silver¹ suggested that the issue of abuse might be pervasive in medical training and perhaps that it was a necessary part of becoming a physician.

Recently, several studies have addressed this issue and found that medical trainee harassment and discrimination is a widespread phenomenon and not a problem limited to certain countries or particular training programs. In some studies, the prevalence of abuse was strikingly high, with up to 95% of trainees reporting that they had experienced at least one form of harassment or discrimination during their medical training.^{2–4} According to responses to the Association of American Medical Colleges Graduation Questionnaire in 2011, approximately one in six U.S. medical students reported

that they had experienced some form of harassment or discrimination by the end of their fourth year.⁵ In addition, different studies have reported variable forms of abuse, including verbal, physical, sexual, and academic harassment, and gender and racial discrimination.²

Such abuse during training creates hostile work environments and induces stress and discomfort, which may impair performance.⁶ Sheehan and colleagues⁶ found that trainees who were frequently harassed were less likely to complete assignments or provide optimal patient care. In addition, trainees who were harassed had more emotional health problems and family life and social responsibility disruptions compared with nonharassed trainees.⁶ Other studies found that harassed trainees were more likely to have depression, anxiety, insomnia, and appetite loss and were more likely to drink alcohol for escape than nonharassed trainees.^{7–11}

A synthesis of the prevalence and risk factors of harassment and discrimination

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Acad Med. 2014;89:817–827.

First published online March 24, 2014
doi: 10.1097/ACM.0000000000000200

Supplemental digital content for this article is available at <http://links.lww.com/ACADMED/A197>.

is needed to understand the significance of such mistreatment and to explore potential preventative strategies. Although some training programs have implemented several measures to eradicate the mistreatment of medical trainees, a time trend analysis on the prevalence of harassment and discrimination is needed to provide insight into the extent of the problem and whether these measures have been effective. Furthermore, common risk factors that are identified in such an analysis could be used by educators and program directors to develop, implement, and evaluate prevention interventions. The objective of our study was to examine the prevalence, risk factors, and sources of harassment and discrimination, as well as time trends, through a systematic review.

Method

To guide our review, we used a systematic review protocol based on the PRISMA Statement.¹² We assembled and circulated a draft protocol to systematic review methodologists and clinicians and revised it as necessary.

Eligibility criteria

Studies eligible for inclusion were cohort studies, cross-sectional studies, and case series written in English. We included studies reporting information on the following: prevalence of harassment and discrimination (for a complete taxonomy of the relevant terms, see Supplemental Digital Appendix 1 at <http://links.lww.com/ACADMED/A197>) among medical trainees (including medical students, interns, and residents in all residency levels and all training programs). When a study reported data on fellows or senior doctors, we abstracted only those data related to the trainees who fit our definition. We included the following sources of harassment and discrimination: consultants (also known as staff or attending physicians), fellows, residents, students, patients and patients' families, nurses, and other health care providers, and the following risk factors: gender, ethnicity, shift time, and type of rotation.

Search

An experienced information specialist (L.P.) conducted all of the literature searches in consultation with the research team. We used Medical Subject Headings

and text words related to the harassment and discrimination of medical trainees to search MEDLINE (OVID Interface, 1948 to July 2, 2011) and EMBASE (OVID Interface, 1980 to July 2, 2011). For our main electronic search strategy (MEDLINE), see Supplemental Digital Appendix 2 at <http://links.lww.com/ACADMED/A197>. We modified it as necessary for EMBASE (available on request from the authors). We did not limit the search by study design or date of dissemination. We identified additional articles through scanning the reference lists of included studies and e-mailing authors who published more than one article in this area of research.

Study selection

Two reviewers (two of N.F., C.S., M.T.) independently screened the search results for inclusion using a predefined inclusion criteria form. We obtained the full text of potentially relevant articles and assessed them in a similar manner. We resolved discrepancies by discussion or the involvement of a third reviewer (A.C.T.).

Data collection process

We developed a draft data extraction form, then piloted and modified it as necessary. Two reviewers (two of N.F., C.S., E.L., L.P.) independently extracted all of the data using the standardized data extraction form. We resolved discrepancies by discussion or the involvement of a third reviewer (A.C.T.). When multiple study publications reported data from the same population (i.e., companion reports), we considered the study reporting the largest sample size or longest duration of follow-up as the major publication, and we used the other report(s) for supplementary data only.

Data items

The extracted data included study characteristics (e.g., study design, sample size, type of harassment and discrimination examined, setting), participant characteristics (e.g., type of trainees, mean age, gender), and results for the prevalence, risk factors, and sources of harassment and discrimination.

Methodological quality

We assessed the methodological quality in individual studies using the Newcastle–Ottawa Scale (NOS).¹³ The NOS consists of eight items pertaining to selection (representativeness of

the exposed cohort, selection of the nonexposed cohort, ascertainment of exposure, demonstration that outcome of interest was not present at start of study), comparability (comparability of cohorts on the basis of the design or analysis), and outcome (assessment of outcome, sufficient duration of follow-up, adequacy of follow-up). For cross-sectional studies and case series, we modified the NOS to include the following five items: representativeness of the trainee population, ascertainment of exposure, comparability of cohorts on the basis of the design or analysis, assessment of outcome, and adequacy of response rate. Two reviewers (two of N.F., C.S., E.L., L.P.) assessed study quality independently, and we resolved discrepancies by discussion or the involvement of a third reviewer (A.C.T.).

Synthesis of results

We described the results narratively and conducted a meta-analysis, as appropriate. For the meta-analysis, we derived pooled prevalence estimates using a random-effects model and 95% confidence intervals (CIs) based on a normal distribution.¹⁴ We reported the mean, standard deviation, and range for continuous outcomes and the frequency and percentage for binary outcomes. We assessed statistical heterogeneity using the I^2 statistic¹⁴ and depicted the studies in a forest plot to examine heterogeneity visually. We conducted all analyses in SAS 9.2 software (SAS Institute Inc., Cary, North Carolina).

Results

Study selection

The literature search yielded 2,160 citations (see Figure 1). From these, we excluded 1,983 because they did not include medical trainees ($n = 1,451$), did not report harassment or discrimination of medical trainees ($n = 443$), did not provide primary data ($n = 68$), were not published in English ($n = 13$), were not eligible study designs ($n = 7$), or did not report prevalence or risk factors for harassment or discrimination ($n = 1$). We retrieved and examined the remaining 177 articles for relevance. Reasons for exclusion at the full-text review included that the study did not provide primary data ($n = 38$), did not report harassment or discrimination of

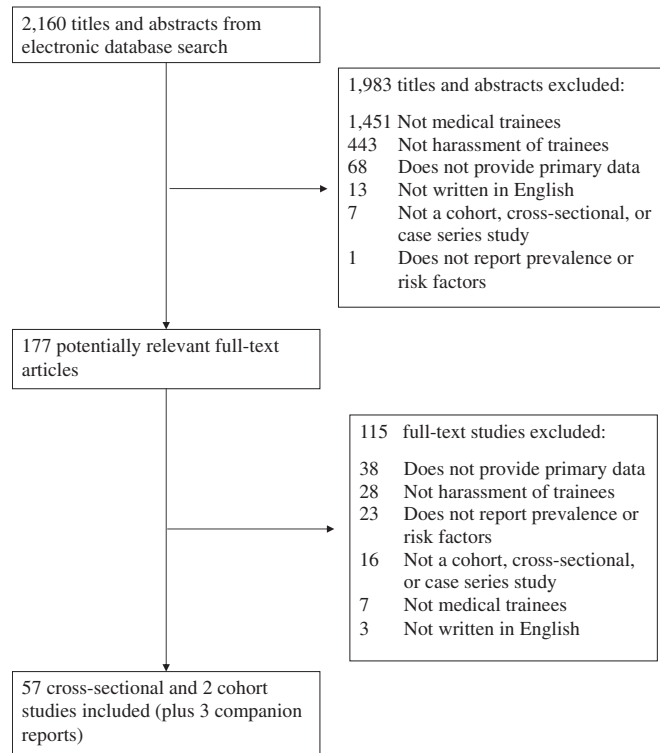


Figure 1 Flowchart of the literature search and study selection process in a 2011 systematic review of the literature on harassment and discrimination among medical trainees.

medical trainees ($n = 28$), did not report prevalence or risk factors of harassment or discrimination ($n = 23$), was not an eligible study design ($n = 16$), did not include medical trainees ($n = 7$), or was not written in English ($n = 3$). A total of 62 studies fulfilled the inclusion criteria: 57 cross-sectional^{12-4,6,11,15-55,57-67} and 2 cohort studies^{8,56} as well as 3 companion reports,⁶⁸⁻⁷⁰ which we used for supplemental data only.

Study and trainee characteristics

The majority of studies were conducted in the United States, Canada, Pakistan, the United Kingdom, Israel, and Japan. All studies were conducted between 1987 and 2011, and the number of trainees ranged from 6 to 13,168 (see Appendix 1). The types of harassment reported included verbal, physical, sexual, and academic harassment. Discrimination was categorized according to gender or race.

The population of trainees varied across the included studies (see Appendix 2). Medical students were included in 32 studies, residents in 23 studies, and interns (unspecified) in 3 studies. One of the included studies provided data for students and residents together.²¹

Sources of harassment and discrimination

Thirty-two studies reported an average of four sources of harassment and discrimination (range: 1–8). The most common sources were consultants (cited by 34.4% of respondents), followed by patients or patients' families (21.9%), nurses (15.6%), fellows/residents (15.6%), and others (faculty, interns, and students, 3.1%).

Risk factors for harassment and discrimination

Sixteen studies observed a higher prevalence of harassment (mainly sexual) and gender discrimination amongst female trainees compared with male trainees, which was statistically significant ($P < .05$) in 12 studies,^{4,8,19,25,31,33,38,41,42,52,63,70} yet not in the remaining 4 studies.^{2,16,20,56} Regarding ethnicity, 1 study found that residents from the Middle East experienced a higher level of discrimination in training programs conducted in the United States.²² Furthermore, 5 studies noted a higher prevalence of racial and cultural discrimination among nonwhite trainees ($P < .00001$).^{3,11,36-38} Four other studies found that residents in surgical training programs reported a higher incidence

of harassment and discrimination compared with those in other training programs,^{43,46,63,70} which was statistically significant in one study ($P < .001$).⁴³

Methodological quality

Among the 57 cross-sectional studies (see Supplemental Digital Appendix 3 at <http://links.lww.com/ACADMED/A197>), 17 studies used a sample that was truly representative of the average trainee (e.g., random sample), 19 studies used a sample that was somewhat representative of the average trainee, and 20 studies used a selected group of trainees (e.g., volunteers). We scored only 1 study as not providing a description of the derivation of the trainee population.⁴⁸ For the ascertainment of exposure item, only 1 study used a structured interview,⁴⁶ and the remaining 56 studies used written self-report. For the comparability of cohorts on the basis of the design or analysis item, 1 study controlled for the most important factors (e.g., age, gender),⁴¹ and the remaining 56 studies did not control for anything. For the assessment of outcome criterion, 31 studies used a record linkage/questionnaire and 26 studies used self-report. Lastly, 3 studies accounted for all eligible trainees who participated in the study,^{16,23,26} 13 studies accounted for 80% to 90% of eligible trainees, 36 studies accounted for <80% of eligible trainees, and 5 studies provided no statement about eligible trainees or participants for the adequacy of response rate criterion.^{42,48,54,64,66} For the results of the quality assessment for the 2 cohort studies, see Supplemental Digital Appendix 4 at <http://links.lww.com/ACADMED/A197>.

Meta-analysis

Harassment and discrimination prevalence for all trainees. The pooled prevalence for harassment and discrimination during medical training was 59.4% ($n = 51$ studies, 38,353 trainees, 95% CI: 52.0%–66.7%; see Table 1). The most common type of abuse experienced by the trainees was verbal harassment ($n = 28$ studies, 27,258 trainees, prevalence: 63.0%, 95% CI: 54.8%–71.2%), whereas the least common type was physical harassment ($n = 24$ studies, 23,776 trainees, prevalence: 15.3%, 95% CI: 12.1%–18.6%). We found statistical heterogeneity across studies (see

Table 1
Prevalence of Harassment and Discrimination Among Trainees, According to Studies Identified in a 2011 Systematic Review of the Literature

Type of harassment	No. of studies	Sample size	Mean	Median	Min/Max	95% CI	I ²
% Harassment	51	38,353	59.4	69	11/100	52.0–66.7	0.99
% Verbal abuse	28	27,258	63	61	28/94	54.8–71.2	0.99
% Gender discrimination	13	6,237	53.6	56	19/92	40.3–67.0	0.99
% Academic	14	5,319	36.1	37	3/71	24.9–47.2	0.99
% Sexual	35	27,919	33.1	48	3/93	27.6–38.5	0.99
% Racial discrimination	10	19,455	23.8	30.9	3.8/58	15.2–32.4	0.99
% Physical	24	23,776	15.3	52	3/100	12.1–18.6	0.98

Abbreviation: CI indicates confidence interval.

Supplemental Digital Appendix 5 at <http://links.lww.com/ACADMED/A197> but no time or regional trends.

Harassment and discrimination prevalence for medical students. The pooled prevalence for harassment and discrimination during undergraduate medical training and clerkship was 59.6% (n = 30 studies, 26,579 medical students, 95% CI: 49.2%–68.0%). Verbal harassment was the most common type of abuse (n = 16 studies, 18,865 medical students, prevalence: 68.8%, 95% CI: 56.6%–80.9%), whereas the least common type was physical harassment (n = 15 studies, 18,790 medical students, prevalence: 9.0%, 95% CI: 7.0%–11.1%). As expected, we again found statistical heterogeneity across studies (see Table 2 and Supplemental Digital Appendix 6 at <http://links.lww.com/ACADMED/A197>).

Harassment and discrimination prevalence for residents. The pooled

prevalence for harassment and discrimination during residency training was 63.4% (n = 19 studies, 11,193 residents, 95% CI: 53.6%–73.2%). Residents cited gender discrimination as the most common form of abuse (n = 3 studies, 1,315 residents, prevalence: 66.6%, 95% CI: 58.7%–74.5%), followed by verbal harassment (n = 12 studies, 9,867 residents, prevalence: 58.2%, 95% CI: 45.5%–70.9%). The least common type was racial discrimination (n = 3 studies, 3,261 trainees, prevalence: 26.3%, 95% CI: 24.2%–28.3%). Heterogeneity was significant across these studies (see Table 2 and Supplemental Digital Appendix 7 at <http://links.lww.com/ACADMED/A197>).

Post hoc subgroup analyses. We conducted a series of post hoc subgroup analyses using our data to identify trends in the prevalence of harassment and discrimination. For the 37 studies that were conducted in North America

(United States and Canada), the pooled prevalence for harassment and discrimination was 63.6% (33,736 trainees, 95% CI: 55.7%–71.4%; see Supplemental Digital Appendix 8 at <http://links.lww.com/ACADMED/A197>).

We also conducted a subgroup analysis on the year of training and did not identify wide variation in the prevalence of harassment. For example, 16 studies, which included all years of training and data from 6,468 students, indicated that the pooled prevalence of harassment was 68.7% (95% CI: 58.2%–79.2%). Four studies, which included 4,269 junior medical trainees (students/residents), indicated that the pooled prevalence of harassment was 57.8% (95% CI: 25.6%–89.7%). Nineteen studies, which included 19,297 senior medical trainees (students/residents), indicated that the pooled prevalence of harassment was 60.5% (95% CI: 48.6%–71.5%).

We also conducted a subgroup analysis by primary language of the country (English versus non-English) and did not identify any differences (non-English: 12 studies, 4,164 trainees, pooled prevalence 60.1% [95% CI: 49.2%–71.0%] versus English: 43 studies, 36,212 trainees, pooled prevalence 62.7% [95% CI: 55.7%–69.7%]). Finally, we classified the studies using the World Bank's classification of country economies.⁷¹ A higher pooled prevalence of harassment was reported in high-income countries (50 studies, 24,197 trainees, pooled prevalence 63.5% [95% CI: 57.4%–69.5%]) versus lower/upper-middle-income countries (6 studies, 2,877 trainees, pooled prevalence 48.7% [95% CI: 24.7%–72.6%]).

Table 2
Comparison of the Prevalence of Harassment and Discrimination Among Medical Students and Residents, According to Studies Identified in a 2011 Systematic Review of the Literature

Type of harassment	No. studies		Sample size		Mean		95% CI	
	S	R	S	R	S	R	S	R
% Harassment	30	19	26,579	11,193	59.6	63.4	49.2–68.0	53.6–73.2
% Verbal abuse	16	12	18,865	9,867	68.8	58.2	56.6–81.0	45.5–70.9
% Gender discrimination	10	3	4,922	1,315	49.8	66.6	34.6–65.0	58.7–74.5
% Academic	10	4	3,062	2,257	39.5	27.7	26.8–52.2	6.0–49.4
% Sexual	25	10	22,316	7,077	33.3	36.2	27.2–39.4	19.8–52.6
% Racial discrimination	7	3	16,121	3,261	23.7	26.3	13.6–33.9	24.2–28.3
% Physical	15	10	18,790	6,760	9	28.9	7.0–11.1	15.9–41.8

Abbreviations: CI indicates confidence interval; S, medical students; R, residents.

Discussion

We believe that our study provides the first systematic review and meta-analysis on the prevalence of harassment and discrimination among medical trainees. Our findings emphasize how common this problem is in medical training programs around the world. Moreover, many of the studies we included in our review were completed recently, highlighting that harassment continues to be a common problem in medical education. This finding suggests that more needs to be done at the individual and organizational levels to understand the complexity of the problem.

We included 51 studies in the meta-analysis, which confirmed Silver's earlier observations that a majority of trainees experience at least one type of harassment or discrimination during their medical training. The most commonly reported form of harassment included verbal and academic, with a prevalence ranging from 3% to 28%, whereas the most commonly reported forms of discrimination were due to race and gender, ranging from 4% to 19%. Medical trainees also reported having experienced other abusive behaviors, such as sexual and physical harassment. Although we included discrimination due to sexual orientation, we found that only 1 study reported this form of discrimination (and only 10 residents experienced it).² We did not find any significant trends in the prevalence of harassment and discrimination in our post hoc analyses, except that lower/upper-middle-income countries seemed to report less harassment and discrimination versus high-income countries. However, this finding might be spurious, as only 6 included studies were conducted in lower/upper-middle-income countries.^{44,55,58,59,64,69} This relationship is an area worthy of further examination in future research.

More than two-thirds of the included studies reported sexual harassment. Female trainees were more likely to have experienced such behaviors than their male counterparts.^{16,19,24,25,30,38,41,52} This finding is consistent with previous reports on sexual harassment from different professions. For example, 84% of the 13,867 sexual harassment complaints reported to the U.S. Equal Employment Opportunity Commission in 2008 were

filed by women.⁷² According to our findings, consultants and senior doctors were cited most frequently as the sources of such behaviors. In 1989, the American Medical Association (AMA) Council on Ethical and Judicial Affairs defined sexual harassment in its report entitled "Sexual Harassment and Exploitation Between Medical Supervisors and Trainees."⁷³ The definition included behaviors perceived as inappropriate sexual advances, sexist jokes or slurs, the exchange of rewards for sexual favors, sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature. In 1991, the AMA published *Guidelines for Establishing Sexual Harassment Prevention and Grievance Procedures*, which also defined sexual harassment and outlined grievance procedures.⁷³ Although some studies in our review used their own definitions, those definitions conformed to the definition provided by the AMA.⁷³

Despite the AMA's remarkable attention, sexual harassment remains the most common form of abusive behavior in U.S. training programs, suggesting that more needs to be done to address and prevent this issue. For example, we should place more emphasis on educating consultants, faculty, and all sources of abuse as to the rights of trainees. The presence of sexual harassment in medical training leads to a stressful and hostile environment that competes with the optimal aim of medical education.

Acik and colleagues⁵⁸ found that 5% of the trainees included in their study were considering leaving their current specialty training program because of harassment and 39% were deeply disturbed. Another report showed that a greater proportion of women than men believed that their specialty choice and residency program rankings were influenced by gender discrimination and sexual harassment considerations, evidence of the alarming consequences of such behaviors.⁷⁰ Recognition of the prevalence of harassment and discrimination and the most frequent types would help to implement preventive measures. As "a friendly working environment is a productive one,"⁷⁴ we suggest that health care professionals take part in communication skills and supervision training programs in addition to training in the recognition, management, and prevention of workplace violence.⁷⁴

Doing so might provide a more amenable workplace environment.

Many of the included studies did not identify the gender of the perpetrator(s), and not all of the studies reported on the gender, race, and disability of the trainees. These are important variables for researchers to consider in future work.

We cannot address this problem without a reporting structure for trainees to use. Supervisors are often the perpetrators of these behaviors and are in a superior position, which can intensify trainees' fear of negative consequences from reporting any form of abuse.⁶³ Thus, authorities must ensure trainees' confidentiality when reporting harassment or discrimination. Other reasons that may lead to the underreporting of harassment and discrimination include the fear of being disbelieved, embarrassment if peers learned of the occurrence, and a lack of trust in those who are in positions of authority. Trainees also may think that these behaviors are a necessary part of becoming a physician. Therefore, education is imperative for all parties to understand what constitutes abusive and hostile behaviors. For example, in 2009, Karen Judy⁶² from Loyola University Medical Center suggested implementing a universal curriculum on workplace violence through the graduate medical education office and ensuring an excellent dissemination to all parties, with periodic updates regarding this curriculum. Furthermore, all training programs must have a zero-tolerance policy and a grievance procedure to report all types of harassment and discrimination.⁷⁵ Thus, any complaint of harassment or discrimination should be considered and investigated thoroughly by someone trained within the organization. She or he then should recommend appropriate remedies, penalties, or other actions. Perpetrators should be subjected to several actions including a written reprimand, suspension, transfer, or even dismissal.

Limitations

We recognize some limitations in the included studies. First, a majority of reports on harassment and discrimination used subjective tools, such as self-report, which often lack validity or reliability. Second, many of the studies used cross-sectional surveys to assess the

respondents' experiences of harassment and discrimination, which often is open to recall bias. Third, some important variables (e.g., perpetrators' genders) were not identified in many of the studies. In addition, our systematic review process has a number of limitations. First, we did not conduct a comprehensive search for unpublished material. Because we only included articles written in English, our results may not be generalizable to all training programs globally. Also, we are unable to determine the link between mistreatment and professionalism, given the self-report data used in our analysis.

Conclusion

Our review demonstrates the surprisingly high prevalence of harassment and discrimination during medical training that has not declined over time. Furthermore, the large number of reports indicates the need for extensive revision to existing policies on harassment, discrimination, and workplace violence in medical schools and across residency training programs. However, drafting such policies is necessary but not sufficient to change behavior. We also must promote a cultural change within our academic institutions to ensure that unprofessional behaviors, such as harassment and discrimination, are not tolerated and, if they do occur, that trainees feel empowered to report them and that immediate action will be taken against the abusive individual. Highlighting the extent and significance of the problem, as we have done in this report, is the first step in addressing the issue and ultimately decreasing these inappropriate behaviors.

Funding/Support: This review was conducted as part of a systematic review course taught by Drs. Straus and Tricco through the Li Ka Shing Knowledge Institute of St. Michael's Hospital (Toronto, Ontario, Canada), which is funded by the King Saud University (Riyadh, Saudi Arabia). The funder had no role in the conception or conduct of the project, the acquisition of data, or the decision to submit for publication. Dr. Straus is funded by a Tier 1 Canada Research Chair in Knowledge Translation and Dr. Tricco by a Canadian Institutes for Health Research/Drug Safety and Effectiveness Network New Investigator Award in Knowledge Synthesis.

Other disclosures: None reported.

Ethical approval: Reported as not applicable.

Previous presentation: Abstract presentation at the Association for Medical Education in Europe 2012 Annual Meeting in Lyon, France.

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Appendix 1

Characteristics of the 62 Studies of Harassment and Discrimination Among Medical Trainees Identified in a 2011 Systematic Review of the Literature

First author, year	Study design	Country of conduct	Type of harassment and discrimination examined	Outcomes reported
Milstein, 1987 ¹⁵	Cross-sectional	USA	Physical	Prevalence of patient assaults
Baldwin, 1988 ¹⁶	Cross-sectional	USA	Verbal, physical, sexual	Prevalence, sources
Sheehan, 1990 ⁹	Cross-sectional	USA	Verbal, physical, academic, sexual, gender/racial discrimination	Prevalence
Silver, 1990 ¹⁷	Cross-sectional	USA	Abuse (defined as bullying)	Prevalence, sources
Baldwin, 1991 ³	Cross-sectional	USA	Verbal, physical, academic, sexual, racial discrimination	Prevalence, sources
Chaimowitz, 1991 ¹⁸	Cross-sectional	Canada	Physical	Prevalence, patients were the source, risk factors
Wolf, 1991 ¹⁹	Cross-sectional	USA	Verbal, physical, academic, sexual, gender discrimination	Prevalence, sources, risk factors
Richman, 1992 ⁸	Cohort	USA	Verbal, physical, academic, sexual, gender discrimination	Prevalence, sources, risk factors
Komaromy, 1993 ²⁰	Cross-sectional	USA	Sexual	Prevalence, sources, risk factors
Nicolson, 1993 ²¹	Cross-sectional	UK	Sexual	Prevalence, sources
Baldwin, 1994 ²²	Cross-sectional	USA	Racial and ethnic discrimination	Prevalence, sources, risk factors
Black, 1994 ²³	Cross-sectional	USA	Verbal, physical, sexual (does not present data on sexual harassment)	Prevalence
Moscarello, 1994 ²⁴	Cross-sectional	Canada	Verbal, physical, sexual	Prevalence, sources
Schulte, 1994 ²⁵	Cross-sectional	USA	Sexual	Prevalence
Uhari, 1994 ²⁶	Cross-sectional	Finland	Verbal, physical, academic, sexual	Prevalence, sources, risk factors
McNamara, 1995 ²⁷	Cross-sectional	USA	Verbal, physical, sexual, gender/racial discrimination	Prevalence, sources, risk factors
Bergen, 1996 ²⁸	Cross-sectional	USA	Verbal, sexual, gender discrimination	Prevalence, sources
Cook, 1996 ²	Cross-sectional	Canada	Verbal, physical, academic, sexual, sexual orientation, gender discrimination	Prevalence, sources
Lebenthal, 1996 ²⁹	Cross-sectional	Israel	Verbal, physical, sexual	Prevalence, sources
Margittai, 1996 ³⁰	Cross-sectional	Canada	Verbal, physical, sexual	Prevalence, sources, risk factors
Moscarello, 1996 ³¹	Cross-sectional	Canada	Sexual	Prevalence, risk factors
Nora, 1996 ³²	Cross-sectional	USA	Sexual, gender discrimination	Prevalence, impact on choice of medical program
vanInveld, 1996 ³³	Cross-sectional	Canada	Sexual, psychological, physical, sexual, verbal, gender and racial discrimination	Prevalence, sources
Vukovich, 1996 ³⁴	Cross-sectional	USA	Sexual, gender discrimination	Prevalence, sources
Barlow, 1997 ³⁵	Cross-sectional	USA	Verbal, physical	Prevalence, sources, risk factors
Daugherty, 1998 ³⁶	Cross-sectional	USA	Verbal, physical, academic, sexual, racial discrimination	Prevalence, sources
Kassebaum, 1998 ³⁷	Cross-sectional	USA	Verbal, physical, academic, sexual, racial discrimination	Prevalence, sources
Mangus, 1998 ³⁸	Cross-sectional	USA	Verbal, physical, sexual, discrimination (gender, age, racial, or religious)	Prevalence, risk factors
Elnicki, 1999 ³⁹	Cross-sectional	USA	Verbal, academic, sexual, physical	Prevalence, sources
Barry, 2000 ⁴⁰	Cross-sectional	USA	Harassment (not specified)	Not specified
Elnicki, 2002 ⁴¹	Cross-sectional	USA	Definition left to students	Prevalence, risk factors
MMA Committee, 2002 ⁴²	Cross-sectional	USA	Gender-based harassment (verbal, physical, academic, gender discrimination, sexual)	Prevalence, risk factors

(Appendix Continues)

Appendix 1

(Continued)

First author, year	Study design	Country of conduct	Type of harassment and discrimination examined	Outcomes reported
Nora, 2002 ⁴³	Cross-sectional	USA	Sexual harassment and gender discrimination	Prevalence of gender and sexual harassment in various specialties
Maida, 2003 ⁴⁴	Cross-sectional	Chile	Verbal, physical, academic, sexual	Prevalence, sources
Walter, 2003 ⁴⁵	Cross-sectional	Australia	Verbal, physical	Prevalence of abuse by patients only
Hinze, 2004 ⁴⁶	Cross-sectional	USA	Sexual	Prevalence, risk factors
Hoosen, 2004 ⁴⁷	Cross-sectional	UK	Bullying (no definition)	Prevalence, sources
Kovatz, 2004 ⁴⁸	Cross-sectional	Israel	Sexual, racial discrimination	Prevalence, sources
Cohen, 2005 ⁴⁹	Cross-sectional	Canada	Verbal	Prevalence, sources
Finucane, 2005 ⁵⁰	Cross-sectional	Ireland	Verbal, sexual	Prevalence, risk factors
Keeley, 2005 ⁵¹	Cross-sectional	UK	Physical, verbal	Prevalence
Recupero, 2005 ⁵³	Cross-sectional	USA	Verbal, physical, sexual, academic, gender discrimination (defined as boundary behaviors)	Prevalence, sources
Waddell, 2005 ⁵⁴	Cross-sectional	Canada	Physical abuse by patient	Prevalence, risk factors
Avan, 2006 ⁵⁵	Cross-sectional	Pakistan	Verbal, sexual harassment, gender and ethnic discrimination	Mistreatment index score (Likert scale from 0 to 4 used, resident self-reports)
Frank, 2006 ⁵⁶	Cohort	USA	Harassment and belittlement	Prevalence, sources
Nagata-Kobayashi, 2006 ⁵²	Cross-sectional	Japan	Verbal, physical, academic, sexual, gender discrimination	Prevalence, sources, risk factors
Wilkinson, 2006 ¹¹	Cross-sectional	New Zealand	Verbal, physical, gender/racial discrimination, sexual	Prevalence, sources
Witte, 2006 ⁵⁷	Cross-sectional	USA	Sexual, gender discrimination	Prevalence
Acik, 2008 ⁵⁸	Cross-sectional	Turkey	Verbal, physical abuse, sexual harassment	Sources of harassment by perpetrators
Ahmer, 2008 ⁵⁹	Cross-sectional	Pakistan	Verbal, physical, academic	Prevalence, sources
Cohen, 2008 ⁶⁰	Cross-sectional	Canada	Verbal	Prevalence, sources
Rademakers, 2008 ⁶¹	Cross-sectional	Netherlands	Sexual	Prevalence, sources
Judy, 2009 ⁶²	Cross-sectional	USA	Verbal, physical	Prevalence
Nagata-Kobayashi, 2009 ⁶³	Cross-sectional	Japan	Verbal, physical, academic, sexual, gender discrimination, alcohol-associated harassment	Prevalence, sources, risk factors
Li, 2010 ⁴	Cross-sectional	USA	Verbal, physical, sexual, racial discrimination	Prevalence, sources, risk factors
Mukhtar, 2010 ⁶⁴	Cross-sectional	Pakistan	Verbal, physical, academic	Prevalence, sources
Shoukat, 2010 ⁶⁵	Cross-sectional	Pakistan	Verbal, academic, physical, sexual, racial and ethnic discrimination	Prevalence, assessment of its effect on mental health
Benham, 2011 ⁶⁶	Cross-sectional	USA	Verbal, physical	Prevalence, source
Fnais, 2013 ⁶⁷	Cross-sectional	Saudi Arabia	Verbal, academic, physical, sexual, racial and ethnic discrimination	Prevalence, sources

Appendix 2 Characteristics of the Trainees Included in Studies of Harassment and Discrimination Identified in a 2011 Systematic Review of the Literature

First author, year	No. respondents	Response rate (%)	% male	Mean age in years (SD)	Age range	% resident	% intern	% medical student	Clinical discipline	% other
Milstein, 1987 ¹⁵	98	65	NR	NR	NR	100	NR	NR	Psychiatry, general medicine	NR
Baldwin, 1988 ¹⁶	102	42	60	NR	NR	NR	NR	100	NR	NR
Sheehan, 1990 ⁶	75	81	59	26.1 (2.5)	23–35	NR	NR	100	NR	NR
Silver, 1990 ¹⁷	431	83	56	Median: 27	20–46	NR	NR	100	NR	NR
Baldwin, 1991 ³	581	59	62	27.1 (3.7)	NR	NR	NR	100	NR	NR
Chaimowitz, 1991 ¹⁸	132	64	46	31.9	NR	100	NR	NR	Psychiatry	NR
Wolf, 1991 ¹⁹	87	61	70	28	NR	NR	NR	100	NR	NR
Richman, 1992 ⁸	137	75	66	NR	NR	NR	NR	100	NR	NR
Komaromy, 1993 ²⁰	133	62	60	NR	NR	100	NR	NR	Internal medicine	NR
Nicolson, 1993 ²¹	84	45	50	22.4 (3.16)	NR	NR	NR	32% preclinical, 68% clinical	NR	NR
Baldwin, 1994 ²²	1,847	72	NR	NR	NR	NR	NR	NR	NR	NR
Black, 1994 ²³	42	NR	57	NR	NR	100	NR	NR	Psychiatry	NR
Moscarello, 1994 ²⁴	347	88	66	NR	NR	NR	NR	100	NR	NR
Schulte, 1994 ²⁵	155	61	53	27.5	NR	NR	NR	100	NR	NR
Uhari, 1994 ²⁶	255	73	36	24.9	21–41	NR	NR	100	NR	NR
McNamara, 1995 ²⁷	1,774	80	74	30.8 (3.9)	20–47	100	NR	NR	Emergency medicine	NR
Bergen, 1996 ²⁸	77	85	52	26.3	NR	NR	NR	100	Beginning clerkship	NR
Cook, 1996 ²	186	83	50	30.5 (5.0)	27–33	100	NR	NR	Anesthesia, family medicine, internal medicine, obstetrics–gynecology, pediatrics, psychiatry, surgery	NR
Lebenthal, 1996 ²⁹	159	75	NR	NR	23–27	NR	NR	100	NR	NR
Margittai, 1996 ³⁰	315	72	62	NR	NR	NR	NR	100	NR	NR
Moscarello, 1996 ³¹	1991: 211 sampled (255 total students); 1994: 170 sampled (242 total students)	1991: 168/211; 1991: 50 (107); 1994: 159/170	1994: 64 (109)	NR	NR	NR	NR	NR	NR	NR
Nora, 1996 ³²	156	89	57	NR	NR	NR	NR	100	NR	NR
VanIneveld, 1996 ³³	543	84	65	28.5 (3.6)	NR	100	NR	NR	Internal medicine	NR
Vukovich, 1996 ³⁴	916	51	0, all females	NR	NR	100	NR	NR	Family practice	NR
Barlow, 1997 ²⁵	475	28	81	NR	26–40	100	NR	NR	Surgery	NR
Daugherty, 1998 ³⁶	1,274	72	NR	NR	NR	100	NR	NR	NR	NR
Kassebaum, 1998 ³⁷	13,168	83	58	NR	NR	NR	NR	100	NR	NR
Mangus, 1998 ³⁸	548	55	56	27.5	23–47	NR	NR	100	NR	NR
Elnicki, 1999 ³⁹	1,072	90	59	26.0	22–46	NR	NR	100	Internal medicine	NR
Barry, 2000 ⁴⁰	208	40	NR	NR	NR	NR	NR	100	NR	NR

(Appendix Continues)

Appendix 2

(Continued)

First author, year	No. respondents	Response rate (%)	% male	Mean age in years (SD)	Age range	% resident	% intern	% medical student	Clinical discipline	% other
Elnicki, 2002 ⁴¹	1,072	83	59	26.0	22–46	NR	NR	100	Internal medicine	NR
MMA Committee, 2002 ⁴²	408	NR	48	NR	NR	31	NR	38	46% primary care, 52% other specialties	NR
Nora, 2002 ⁴³	1,314	69	50	NR	NR	NR	NR	100	NR	NR
Maida, 2003 ⁴⁴	144	80	53	23.0	NR	NR	NR	100	NR	NR
Walter, 2003 ⁴⁵	317	48	42	NR	NR	100	NR	NR	Psychiatry	NR
Hinze, 2004 ⁴⁶	99	NR	0, all females	31.0	NR	100	NR	NR	NR	NR
Hoosen, 2004 ⁴⁷	177	76	53	NR	NR	NR	100	NR	NR	NR
Kovatz, 2004 ⁴⁸	196	NR	NR	NR	NR	NR	NR	100	NR	NR
Cohen, 2005 ⁴⁹	415	51	47	Median: 29	24–49	100	NR	NR	NR	NR
Finucane, 2005 ⁵⁰	300	65	45	NR	NR	NR	100	NR	NR	NR
Keeley, 2005 ⁵¹	46	72	48	NR	NR	NR	NR	NR	Palliative medicine	100 ^a
Recupero, 2005 ⁵³	118	77	44	NR	NR	100	NR	NR	67% internal medicine, 25% psychiatry, 8% obstetrics and gynecology	NR
Waddell, 2005 ⁵⁴	6	NR	NR	NR	NR	NR	100	NR	NR	NR
Avan, 2006 ⁵⁵	341	75	66	NR	NR	100	NR	NR	Specialist, medical, surgical, multidisciplinary	NR
Frank, 2006 ⁵⁶	2,316	80	NR	NR	NR	NR	NR	100	NR	NR
Nagata-Kobayashi, 2006 ⁵²	304	54	54	24.7 (2.80)	23–33	NR	NR	100	NR	NR
Wilkinson, 2006 ¹¹	1,382	83	NR	NR	NR	NR	NR	100	NR	NR
Witte, 2006 ⁵⁷	793	54	51	NR	NR	NR	NR	100	NR	NR
Acik, 2008 ⁵⁸	1,712	70	57	28.6 (3.3)	22–48	NR	NR	NR	13% basic medical sciences, 50% internal medicine, 37% surgical sciences	NR
Ahmer, 2008 ⁵⁹	342	64	52	23.7 (2.5)	NR	NR	NR	100	NR	NR
Cohen, 2008 ⁶⁰	1,999	35	NR	NR	NR	100	NR	NR	NR	NR
Rademakers, 2008 ⁶¹	227	58	29	24.0	NR	NR	NR	100	NR	NR
Judy, 2009 ⁶²	541	45	30	NR	NR	100	NR	NR	Pediatrics	NR
Nagata-Kobayashi, 2009 ⁶³	355	57	64 Men: 27.2 (2.0); women: 27.0 (1.8)	26–37	NR	100	NR	NR	NR	NR
Li, 2010 ⁴	196	52	48	30 (3.1)	NR	100	NR	NR	Emergency medicine	NR
Mukhtar, 2010 ⁶⁴	106	NR	30	20.8	18–24	NR	NR	100	NR	NR
Shoukat, 2010 ⁶⁵	232	66	51	21.4 (1.75)	NR	NR	NR	100	NR	NR
Benham, 2011 ⁶⁶	183	NR	64	NR	NR	100	NR	NR	Emergency medicine	NR
Fnais, 2013 ⁶⁷	213	NR	58	27.7 (2.1)	NR	100	NR	NR	NR	NR

Abbreviations: SD indicates standard deviation; NR, not reported.

^aThis study did not specify what kind of trainees they included.