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# BMJ Open

## **A systematic review of academic bullying in medicine: behaviours, perpetrators, victims, and consequences**

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3 **A systematic review of academic bullying in medicine: behaviours, perpetrators, victims, and consequences**  
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## ABSTRACT

**Objective:** To characterize academic bullying behaviours, perpetrators, victims, and interventions.

**Design:** Systematic review.

**Data sources:** We searched EMBASE and PsycINFO for articles published between January 1, 1999 and June 24, 2018.

**Study selection:** We included prospective studies conducted in academic settings in which victims were either consultants or trainees, and described: the method or impact of bullying; perpetrators or victims; and/or interventions. Study characteristics, quality, and data were assessed independently by 2 reviewers.

**Results:** We included 44 studies representing 36,262 consultants and trainees. We defined academic bullying as the abuse of authority in an academic setting through punishing behaviours that include overwork, destabilization, and isolation. Of 25,639 individuals (in 19 studies) who responded about bullying patterns, the most common (38.2% of respondents) was overwork. Of 9,181 individuals (20 studies) who reported the impact, the most common was psychologic distress (40.4%). Among bullies identified by 11,006 individuals (16 studies), consultants (55.1%) were most common. Of 6,923 victims who reported gender (17 studies), the majority were women (52.3%). Among 6,930 victims (in 15 studies) who described their response, 32.8% filed a report and most (52.3%) did not perceive a positive outcome. In the 7 before-after studies, anti-bullying committees (1 study) were associated with improvements.

**Conclusions:** Academic bullying commonly involves overwork, and is perceived as having a negative impact on well-being. Perpetrators were commonly male consultants and victims were commonly women. Only a minority of victims filed a report. Methodologically robust trials of anti-bullying interventions are needed.

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3 **Limitations:** Most studies (27/44) had at least a moderate risk of bias. All interventions were uncontrolled before-after studies.  
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5 **Keywords:** Medical Education & Training, General Medicine, Health Services Administration & Management  
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### 8 9 10 **Strengths and limitations**

- 11 • This review is comprehensive, including 44 articles with 36,262 consultants and trainees, across several countries and  
12 including all levels of training.  
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- 14 • We explicitly defined inclusion criteria, and used established tools to assess the risk of bias of included studies  
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- 16 • The major limitations of the included studies include differing definitions of bullying and inappropriate sampling methods for  
17 survey studies, and a lack of a control group or appropriate statistical analysis for interventions  
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## Background

Bullying behaviours have been described as repeated attempts to discredit, destabilize, or instill fear in an intended target<sup>1</sup>. Bullying can take many forms from overt abuse to subtle acts that erode the confidence, reputation, and progress of the victim<sup>2</sup>. Bullying is common in medicine, likely impacting mental health, professional interactions, and career advancement<sup>3-6</sup>. It may also impact a physician's ability to care for patients. Surveys from the National Health Service (NHS) showed that 55% of staff experienced at least one type of bullying; 31% were doctors in training<sup>7</sup>. Bullying is closely related to harassment and discrimination, in which mistreatment is based on personal characteristics or a protected class such as sex or race<sup>8</sup>. Within academic settings, victims may experience all three and the distinction may be less clear.

The hierarchical structure of academic medicine – in which there are power imbalances, subjective criteria for recruitment and career advancement, and siloed departments with few checks in place for toxic behaviours – may offer an operational environment in which bullying may be more widespread than in non-academic medical settings. Academic bullying is a seldom-used term within the literature, but is intended to describe the forms of bullying that may exist in academic settings. The prevalence of academic bullying in medical settings is unknown likely due to a lack of definition of bullying behaviours, a fear of reporting, and insufficient research. There is not much known about the characteristics of perpetrators and victims, and about the impact of bullying on academic productivity, career growth, and patient care. Furthermore, institutional barriers and facilitators of bullying behavior have not been reported, and the effectiveness of interventions in addressing academic bullying have not been evaluated.

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3 The purpose of this systematic review is to define and classify patterns of academic bullying; assess the characteristics of  
4 perpetrators and victims; evaluate the impact of bullying on victims; review institutional barriers and facilitators of bullying; and  
5 identify possible solutions.  
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## 10 11 12 **Methods**

### 13 14 **Data sources and searches**

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16 This study follows PRISMA reporting guidelines. Two reviewers searched two online databases (EMBASE and PsycINFO)  
17 for English-language articles published between January 1, 1999, to June 24, 2018 and relevant to academic bullying in medicine. An  
18 outline of the search is provided in Figure 1. A combination of medical subject heading (MeSH), title, and abstract text terms  
19 encompassing “Medicine”; “Bullying“ and “Academia” were used for the full search. The terms of the search are included in  
20 Supplementary figure S1. Two authors independently screened articles for inclusion. Differences were resolved by discussion, and if  
21 necessary, by a third author.  
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### 33 34 **Study selection**

35 We included prospective studies conducted in academic settings in which victims were either consultants or trainees. Studies  
36 were included if they described: the method and impact of bullying; the characteristics of perpetrators and victims; or interventions  
37 used to address the bullying. We excluded editorials, opinion pieces, reviews, and grey literature. For the purposes of study selection,  
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3 academic bullying was defined as mistreatment in academic institutions with the intention or effect of disrupting the academic or  
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5 career progress of the victim.  
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### 8 9 10 **Data extraction and quality assessment**

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12 Two reviewers independently extracted data on: study design, setting (academic or non-academic), definition, description and  
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14 impact of academic bullying, characteristics of perpetrators and victims, barriers and facilitators of bullying, and interventions and  
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16 their outcomes. Two reviewers independently assessed studies for risk of bias. We assessed before-after studies using the National  
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18 Heart, Lung, and Blood Institute quality assessment tool<sup>9</sup> and assessed prevalence surveys using the Joanna Briggs Institute critical  
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20 appraisal tool<sup>10</sup>. We classified survey studies as low risk of bias if at least 8 of 9 criteria were met, medium risk of bias if 7 of 9 were  
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22 met, and high risk of bias if less than 7 were met. We classified before-after studies as low risk of bias if at least 11 of 12 criteria were  
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24 met, medium risk of bias if at least 9 of 12 were met, and high risk of bias if less than 9 were met.  
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### 31 **Data synthesis and analysis**

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33 We pooled the results of surveys on the basis of similarity of survey themes to facilitate a descriptive analysis. For survey  
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35 studies on the prevalence or impact of bullying, we solely pooled the results of studies that asked respondents about specific bullying  
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37 behaviours or impacts, respectively. We then separated results by sex and level of training. Group selection was by consensus between  
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39 authors. We presented our results as numbers and percentages. We calculated the denominators from the total number of individuals  
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3 who completed surveys on types of bullying behaviours, the impact of bullying, characteristics of bullies and victims, or barriers to  
4 addressing academic bullying. The numerators were calculated from the number of individuals who experienced a specific behaviour  
5 or impact, were bullied by a perpetrator at a specified level of training, or endorsed a specific reason for not making a formal report.  
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7 We also reported the number of studies that described each specific bullying behaviour or impact, demographic characteristics of  
8 victims and perpetrators, barriers and facilitators of academic bullying, and specific reasons for not making a formal report. We could  
9 not perform a meta-analysis due to the conceptual heterogeneity between studies.  
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### 19 **Patient and public involvement**

20 Patients or the public were not involved in the design, conduct, reporting, or dissemination plans of our research.  
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## 26 **Results**

### 27 **Screening results**

28 We identified 933 unique articles, 44 of which met inclusion criteria. Reasons for exclusion are described in Figure 1.  
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### 35 **Characteristics of included studies**

36 Studies were most frequently set in the USA (reported in 13 studies)<sup>3,11-21</sup> and the UK (reported in 5 studies)<sup>7,22-25</sup> and were set  
37 in academic hospitals (reported in 36 studies)<sup>1,3-5,11-15,17-19,21-44</sup> or in both teaching and non-teaching sites (reported in 8  
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3 studies)<sup>7,16,20,45–48</sup>. Sixteen studies included medical students<sup>3–5,11,13–15,17,19,29,31,34,38–41</sup>, 12 included residents or fellows<sup>1,12,24,25,30–</sup>  
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6 33,35,36,42,43 and 17 included consultants<sup>6,7,16,18,20–23,27,28,32,37,44–48</sup> (Table 1).  
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### 10 **Definition of academic bullying**

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12 Four papers provided definitions for academic bullying<sup>29,31,36,39</sup>. Common themes included behaviours where the perpetrator  
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14 abuses authority to punish the victim through isolation, blocked career advancement, and threats to academic standing. We defined  
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16 academic bullying as the abuse of authority by a perpetrator who targets the victim in an academic setting through punishing  
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18 behaviours that include overwork, destabilization, and isolation. Multiple studies used the complete or partial Negative Acts  
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20 Questionnaire (NAQ), a standardized list of bullying behaviours (reviewed in 22 studies)<sup>1,3,4,6,11–14,16,26,28–31,33–35,38,41,42,46,48</sup>.  
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### 26 **Patterns of academic bullying behaviours**

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28 There were 25,639 consultant and trainee respondents to surveys of bullying behaviours (reported in 19 studies), but not all  
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30 were offered the same options to select from (Table 2). Bullying behaviours were grouped into destabilization (reported in 13 studies),  
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32 threats to professional status (reported in 15 studies), overwork (reported in 7 studies), and isolation (reported in 13 studies). Undue  
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34 pressure to produce work was commonly reported (38.2% of respondents affected, reported in 7 studies)<sup>12,16,25,26,28,30,48</sup>. Of the 13  
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36 studies that described destabilization, common methods included being ordered to work below one's competency level (35.7%,  
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38 reported in 9 studies)<sup>16,25,28–30,32,34,37,48</sup> and withholding information that affects performance (29.1%; reported in 7 studies)<sup>12,16,26,28–</sup>  
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3 30,48. Of the 15 studies that described threats to professional status, common methods were excessive monitoring (28.8%; reported in 6  
4 studies)<sup>12,16,26,28,30,48</sup> and criticism (24.9%; reported in 10 studies)<sup>12,16,25,26,28,30,32,34,37,48</sup>. Of the 13 studies that described isolation, the  
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6 most common method was social and professional exclusion (26.9%; reported in 13 studies)<sup>4,12,14,16,20,26,28–30,32,34,45,48</sup>.  
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12 There were 3,564 consultant and trainee respondents to surveys that separated the prevalence of bullying behaviours by sex  
13 (reported in 6 studies). A greater proportion of men experienced the intimidatory use of discipline procedures (18.5%, reported in 5  
14 studies)<sup>12,16,29,34,38</sup> while a greater proportion of women experienced all other bullying behaviours (reported in 6 studies)<sup>12,16,20,29,34,38</sup>  
15 (Table 2). There were 24,876 respondents to surveys that analyzed results by level of training (reported in 17 studies) (Supplementary  
16 table S1). A greater proportion of consultants experienced refusal of applications for leave, training, or promotion (25.7%, reported in  
17 2 studies)<sup>16,28</sup> and removal of areas of responsibility (27.8%, reported in 2 studies)<sup>16,28</sup> than residents (11.7%, reported in 2 studies;  
18 10.7%, reported in 3 studies, respectively)<sup>12,26,35</sup> or medical students (not reported; 19.6%, reported in 1 study, respectively)<sup>14</sup>.  
19 Compared to medical students (4.2%, reported in 5 studies)<sup>11,13,14,34,38</sup> and consultants (3.4%, reported in 2 studies)<sup>16,37</sup>, a greater  
20 proportion of residents experienced the intimidatory use of discipline procedures (21.1%, reported in 4 studies)<sup>12,26,29,35</sup>. A greater  
21 proportion of medical students experienced persistent criticism (71.4%, reported in 1 study)<sup>34</sup> than residents (26.3%, reported in 4  
22 studies)<sup>12,25,26,32</sup> and consultants (20.8%, reported in 3 studies)<sup>16,28,37</sup>.  
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#### 40 **Characteristics of bullies**

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3 Twenty-two studies representing 11,006 consultants and trainees described the characteristics of bullies, although not all were  
4 offered the same options to select from. Common perpetrators included consultants (55.9%, reported in 22  
5 studies)<sup>1,3,4,6,7,12,13,17,20,23,25,26,28–30,32,34,36,41,43,46,47</sup>, residents (21.6%, reported in 14 studies)<sup>1,3,6,7,13,17,25,26,29,30,36,41,43</sup>, and nurses (14.3%,  
6 reported in 14 studies)<sup>1,3,4,12,13,17,25,26,29,30,36,41,43,46</sup>. Of the 4,277 individuals who identified the gender of their bullies, most reported  
7 primarily male (67.2%, reported in 5 studies)<sup>7,16,23,28,32</sup>, followed by primarily female (26.1%, reported in 5 studies)<sup>7,16,23,28,32</sup>, and both  
8 (6.7%, reported in 3 studies)<sup>7,23,28</sup>. Among 5,444 medical students, perpetrators were commonly consultants (45.2%, reported in 6  
9 studies)<sup>3,4,13,17,34,41</sup>, residents (37.6%, reported in 4 studies)<sup>3,13,17,41</sup>, nurses (12.8%, reported in 5 studies)<sup>3,4,13,17,41</sup>, and other medical  
10 students (4.4%, reported in 3 studies)<sup>3,4,34</sup>. Among 2,980 residents, perpetrators were commonly consultants (51.0%, reported in 8  
11 studies)<sup>1,12,25,26,29,30,36,43</sup>, nurses (29.2%, reported in 8 studies)<sup>1,12,25,26,29,30,36,43</sup>, and other residents (16.4%, reported in 8  
12 studies)<sup>1,12,25,26,29,30,36,43</sup>. Of the 1,500 consultants, perpetrators were their peers (39.2%, reported in 7 studies)<sup>6,7,20,28,30,46,47</sup>, senior  
13 consultants (23.7%, reported in 5 studies)<sup>6,7,20,23,46</sup>, and administration (17.7%, reported in 4 studies)<sup>23,28,30,47</sup>.

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31 Six studies representing 1,258 interns and medical students described the prevalence of academic bullying according to the  
32 specialty rotation of the learner. Academic bullying was common in surgery (34.9% of respondents, reported in 5 studies)<sup>1,11,29,32,36,41</sup>,  
33 obstetrics and gynecology (25.5%, reported in 2 studies)<sup>11,41</sup> and internal medicine (21.4%, reported in 5 studies)<sup>1,11,29,32,36,41</sup>.

### 34 35 36 37 38 39 40 **Characteristics of victims**

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3 Twenty-five studies described the characteristics of victims, and 19 included the proportion of those who experienced bullying.  
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5 Of the 6,689 women and 9,162 men who responded to surveys that analyzed results by sex, women were more likely to report being  
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7 bullied than men (54.1% of all women compared to 36.1% of all men, reported in 17 studies)<sup>3,4,12,16,18,21,28–36,38,43</sup>. There were 8,454  
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9 consultant and trainee respondents to surveys that separated the results by demographic characteristics other than sex, but not all  
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11 characteristics were captured by each study. A greater proportion of international graduates / non-citizens experienced bullying than  
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13 citizens (55.2% compared to 50.6%, reported in 3 studies)<sup>12,25,32</sup>, and a greater proportion of overweight participants (BMI >25)  
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15 experienced bullying than those with a BMI ≤25 (17.8% compared to 11.8%, reported in 1 study)<sup>33</sup>. The relationship between age and  
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17 bullying varied based on the cutoff used and the survey sample in each study. Among consultants, a greater proportion of those with  
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19 full professorship experienced bullying than assistant professors (68.0% compared to 51.9%, reported in 1 study)<sup>21</sup>.  
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### 26 **Impact of academic bullying**

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28 There were 9,181 consultant and trainee respondents to surveys on the psychological (reported in 12 studies) and career impact  
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30 (reported in 16 studies) of academic bullying (Table 3), although not all were offered the same options to select from. Respondents  
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32 commonly reported psychiatric distress (40.4%; reported in 9 studies)<sup>6,23,28,34,36,37,40,43,46</sup>, considerations of quitting (37.8%; reported in  
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34 5 studies)<sup>23,28,32,45,47</sup>, and reduced clinical ability (29.3%; reported in 5 studies)<sup>25,28,34,36,40</sup>. No studies quantified the effect on patient  
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36 safety. Five studies representing 2,688 individuals described the impact of bullying separated by sex (Table 3). A greater proportion of  
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3 women experienced loss of career opportunities (23.4%, reported in 5 studies)<sup>16,18,20,21,34</sup> while a greater proportion of men  
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5 experienced decreased confidence (32.1%, reported in 2 studies)<sup>21,34</sup> and clinical ability (26.1%, reported in 1)<sup>34</sup>.  
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10 There were 8,545 consultant and trainee respondents to surveys that separated results by level of training (Supplementary table  
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12 S2). A greater proportion of medical students experienced psychiatric distress (72.9%, reported in 2 studies)<sup>34,40</sup> and decreased clinical  
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14 performance (34.9%, reported in 2 studies)<sup>34,40</sup> than residents (48.2%, reported in 2 studies and 17.2%, reported in 1 study,  
15  
16 respectively)<sup>36,43</sup> and consultants (17.9%, reported in 4 studies and 9.1%, reported in 1 study, respectively)<sup>23,28,37,46</sup>. A greater  
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18 proportion of residents endorsed loss of career opportunities (36.2%, reported in 2 studies)<sup>32,35</sup> compared to medical students (16.0%,  
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20 reported in 3 studies)<sup>11,13,34</sup> and consultants (23.7%, reported in 7 studies)<sup>16,18,20,21,28,37,45</sup>.  
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### 26 **Barriers and facilitators of academic bullying**

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28 Eighteen studies pertained to barriers to victims making a formal report (reported in 15 studies) and institutional facilitators  
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30 (reported in 14 studies) of academic bullying (Table 4). There were 6,930 consultant and trainee respondents to surveys on their  
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32 actions taken in response to bullying and reasons for not making a formal report, although not all were given the same options to select  
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34 from. Victims commonly did not make a formal report<sup>1,3,4,13,16,23,26,28,30–32,36,41,43,47</sup>; only 32.8% made a formal report. Deterrents to  
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36 reporting included concern regarding career implications (37.7%, reported in 12 studies)<sup>1,4,13,15,28,29,31,32,36,43,45,47</sup>, not knowing who to  
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38 report to (31.9%, reported in 9 studies)<sup>1,4,28,29,31,36,43,45,47</sup>, and poor recognition of bullying (13.4%, reported in 7 studies)<sup>5,13,15,17,22,29,36</sup>.  
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3 Of the 15 studies, 6 studies representing 1139 individuals reported the outcomes of reporting<sup>1,16,23,28,30,32</sup> although only a small range  
4 of outcomes were offered among options. Submitting a formal report often had no perceived effect on bullying (35.6%, reported in 5  
5 studies);<sup>16,23,28,30,32</sup> a similar proportion of victims endorsed worsening (16.7%, reported in 2)<sup>16,30</sup> and improvement (13.7%, reported  
6 in 5 studies)<sup>1,16,23,30,32</sup> in bullying following reporting.  
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14 In the 11 studies that described institutional facilitators of bullying, common facilitators were lack of enforcement (reported in  
15 8 studies)<sup>1,16,23,26,28,30,31,36</sup>, the hierarchical structure of medicine (reported in 4 studies)<sup>26,36–38</sup>, normalization of bullying (reported in 4  
16 studies)<sup>3,13,28,43</sup> and lack of a formal reporting process (reported in 2 studies)<sup>4,35</sup>. Individual-level data was not pooled as institutional  
17 facilitators of bullying were most commonly elicited via free-response portions of surveys with varying completion rates.  
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## 26 **Interventions and outcomes**

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28 Thirty-two studies reported strategies to address academic bullying, which included promoting anti-bullying policies (reported  
29 in 13 studies)<sup>2,8,41,46,10,11,17,19,26,28,32,39</sup>, education to prevent academic bullying (reported in 13 studies)<sup>2,3,46,48,4,12,13,20,24,25,28,31</sup>,  
30 establishing an anti-bullying oversight committee (reported in 5 studies)<sup>2,15,17,35</sup>, institutional support for victims (reported in 2  
31 studies)<sup>10,41</sup>, and internal reviews where hospitals develop targeted solutions for their environment (reported in 2 studies)<sup>14,45</sup>  
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33 (Supplementary table S3).  
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3 Of the 32 studies, 7 implemented interventions which included workshops with vignettes to improve recognition of bullying  
4 (reported in 3 studies)<sup>17,22,24</sup>; a gender and power abuse committee that established reporting mechanisms and held mandatory  
5 workshops on mistreatment (reported in 1)<sup>3</sup>; a gender equity office to handle reporting (reported in 1)<sup>19</sup>; zero-tolerance policies  
6 (reported in 1)<sup>44</sup>; and institutional-level tracking of mistreatment to provide targeted staff education (reported in 1)<sup>14</sup>. All 7 studies had  
7 an uncontrolled before-after design, and as such, did not establish causality. In the studies of vignettes, common bullying behaviours  
8 were demonstrated to improve recognition of both subtle and overt acts of bullying. Of the 3 studies that involved bullying recognition  
9 workshops, all reported an associated improvement in bullying recognition. In a study that developed a gender equity office, reporting  
10 was handled through an intermediary; decisions were binding with consequences for retaliation including termination of  
11 employment<sup>19</sup> and 96% of all formal reports were resolved. In a study where a Gender and Power Abuse committee was formed, there  
12 was an associated reduction in academic abuse<sup>3</sup>. In a study assessing the impact of a professionalism retreat about mistreatment for  
13 consultants, there was no reduction in medical student mistreatment<sup>11</sup>. In a study assessing the implementation of zero-tolerance  
14 policies, there was an associated improvement in awareness of bullying reporting processes<sup>44</sup>.

### 33 **Assessment of bias**

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35 Seventeen studies had a low risk of bias<sup>4,7,11,16,21,25,28,30–37,46,47</sup>, 15 had a medium risk of bias<sup>1,3,12,13,17,18,20,23,26,27,39,40,42,45,48</sup>, and  
36 12 had a high risk of bias<sup>5,6,14,15,19,22,24,29,38,41,43,44</sup>. Among the 37 survey studies, 13 sampled participants  
37 inappropriately<sup>5,6,12,15,20,26,27,29,38,39,41,43,48</sup>, 12 had inadequate sample sizes or did not justify their sample size<sup>1,5,6,15,20,27,29,31,35,37,38,41</sup>, 5  
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3 did not sufficiently describe the participants<sup>1,13,15,29,39</sup>, 7 had coverage bias<sup>6,12,20,26,29,38,43</sup>, 3 did not have an appropriate statistical  
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5 analysis<sup>13,15,48</sup>, and 2 had a low response rate<sup>1,5,12,13,15,16,23,25,28,30,32,34,36,38,40–43,45,47,48</sup> (Supplementary figure S2). Among the 7 before-  
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7 after trials, 1 did not have pre-specified inclusion criteria<sup>24</sup>, 4 had low sample sizes or did not justify their sample size<sup>14,17,22,24</sup>, 2 did  
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9 not have clearly defined, pre-specified, consistently measured outcomes<sup>14,24</sup>, 7 did not blind participants<sup>3,14,17,19,22,24,44</sup>, 3 did not  
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11 account for loss to follow-up in their analysis<sup>22,24,44</sup>, and 5 lacked statistical tests to assess for significant pre- to post-intervention  
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13 changes<sup>14,19,22,24,44</sup> (Supplementary figure S3).  
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## 19 Discussion

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21 In this systematic review, we established a definition for academic bullying, identified common patterns of bullying, and  
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23 assessed the impact on victims. We defined academic bullying as the abuse of authority by a perpetrator who targets the victim in an  
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25 academic setting through punishing behaviours that include overwork, destabilization, and isolation. Victims reported that academic  
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27 bullying often resulted in stalled career advancement and thoughts of leaving the position. A majority of academic bullies were senior  
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29 men, and a majority of victims were women. Barriers to reporting academic bullying included fear of reprisal, perceived hopelessness,  
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31 and institutional non-enforcement of anti-bullying policies. Strategies to overcome academic bullying, such as anti-bullying  
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33 committees and workplace reassignment were associated with an improvement in the prevalence of bullying and resolution of formal  
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35 reports.  
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3 Several factors contribute to the prevalence of bullying within academia. The hierarchical structure lends itself to power  
4 imbalances and prevents victims from speaking out, especially when the aggressor is tenured<sup>51</sup>. The relative isolation of departments  
5 within universities allows poor behaviour to go unchecked. Furthermore, the closed networks within departments lend themselves to  
6 mobbing behaviour and causes victims to fear being blacklisted for speaking out<sup>52</sup>.  
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15 A lack of clarity around the definition can limit awareness and reporting<sup>31</sup>. The Graduation Questionnaire administered to all  
16 American medical students found that in years where respondents were asked if they had been bullied, the estimated prevalence was  
17 lower than when they were asked about specific bullying behaviours<sup>13</sup>. Surveys on bullying should include a list of defining  
18 behaviours to increase clarity and accuracy in responses<sup>53</sup>. Even in institutions with established reporting systems, respondents were  
19 often unaware of how to file a report<sup>28</sup>. We found that victims of academic bullying rarely filed reports, primarily due to fear of  
20 retaliation. Reporting was not consistently effective and was equally likely to worsen bullying.  
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31 We found that consultants were the most common sources of bullying at all levels of training, although residents often bullied  
32 medical students. No studies assessed the relative contribution of fellows and senior residents to resident bullying. Among studies that  
33 analyzed bullying among consultants by seniority, senior consultants were a more commonly reported source of bullying<sup>6,7,20,23,46</sup>.  
34 Women and ethnic minorities reported higher rates of bullying among demographic groups surveyed, although racial factors were  
35 infrequently assessed in the surveys included in this study.  
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6 Our review illustrates the self-reported harms of academic bullying. Victims experienced depressive symptoms, self-perceived  
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8 loss of clinical ability, and termination of employment. Academic bullying has been linked to depression<sup>33</sup>, substance abuse<sup>54</sup>, and  
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10 hospitalization for coronary artery or cerebrovascular disease<sup>55</sup>. Bullying costs the National Health Service (NHS) of the United  
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12 Kingdom £325 million annually due to reduced performance and increased staff turnover<sup>56</sup>. Disruptive behavior, linked to bullying in  
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14 the perioperative setting has been linked to 27% of patient deaths, 67% of adverse events, and 71% of medical errors<sup>57</sup>. Reasons for  
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16 consultant error include intimidation leading to a fear of communicating sources of harm and slow response times<sup>58</sup> .  
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22 Anti-bullying committees involving staff and learners can research bullying within their institution and address the most  
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24 common disruptive behaviours through targeted interventions<sup>48</sup>. We found that anti-bullying committees typically included three  
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26 elements: (1) a multidisciplinary team that includes clinicians and other front-line staff; (2) development of anti-bullying policies and  
27  
28 a reporting process; and (3) an education campaign to promote awareness of policies. Owing to their multifaceted nature, it is  
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30 challenging to evaluate the relative contributions of their components. Furthermore, without well-designed trials, the effect of anti-  
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32 bullying committees is unknown.  
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38 The need for a confidential reporting process was raised in the studies included in this review, but few described how  
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40 confidentiality could be maintained when the report has to describe details of the bullying that may be only privy to the perpetrator  
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3 and victim. The reporting process could take the form of the Office of Gender Equity at the University of California, where the  
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5 accuser and the accused do not meet face to face; the discipline process is through an intermediary<sup>19</sup>. A unique, non-punitive approach  
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7 is the restorative justice approach used at Dalhousie University where victims, offenders, and administrators work collaboratively to  
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9 address sexual harassment and re-integrate offenders<sup>59</sup>. Reporting may have been ineffective in this review due to the impunity offered  
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11 to prominent consultants. Senior personnel, particularly those who are well-known and successful in grant funding, are often  
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13 considered “untouchable”, beyond reproach by their institutions<sup>60</sup>. Behaviour is often learned and modeling positive behaviours may  
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15 break the cycle of bullying in medicine<sup>61</sup>. One approach would be making professionalism a requirement for promotion and career  
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17 advancement, as in the Department of Medicine at the University of Toronto in Canada<sup>62</sup>.  
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### 24 **Strengths and limitations**

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26 The strengths of this review include its broad scope; capturing several aspects of academic bullying, and its size (n = 44  
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28 studies, 36,262 consultants and trainees). The cohort included was diverse, comprising several specialties and countries. We explicitly  
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30 defined eligibility criteria and extracted data in duplicate. We used established tools to assess the risk of bias.  
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35 There are multiple limitations to this review. Most studies used questionnaires that did not appear to have been validated. The  
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37 survey instruments across studies differed from each other, and we pooled responses according to themes to synthesize the results. We  
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39 could not account for differences in institutional culture and hospital systems in the responses of survey participants. Data on  
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3 bully/victim demographics were underrepresented. Selection bias was a significant concern: 13 studies used convenience sampling,  
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5 and 2 included voluntary focus groups for victims of bullying to sign up for. Overall, the response rate was 59.2%, with a range of  
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7 12% to 100%. Surrogate outcomes were used such as awareness of bullying, and the reporting of outcomes was inconsistent. As such,  
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9 the effect of anti-bullying interventions must be interpreted cautiously.  
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### 14 **Future directions**

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17 Significant gaps exist in the quality of the academic bullying literature, particularly with inconsistent definitions and  
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19 limitations in study methodology. Our definition may be used to provide the breadth and granularity required to sufficiently capture  
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21 cases of academic bullying in medicine. Studies on the impact of academic bullying would benefit from standardized, validated survey  
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23 instruments. Although randomization and blinding are not always possible to test the effect of interventions, a control group should be  
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25 included in anti-bullying intervention studies.  
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### 31 **Conclusions:**

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33 Academic bullying refers to specific behaviours that disrupt the learning or career of the intended target and commonly  
34  
35 consists of exclusion and overwork. The consequences include significant psychiatric distress and loss of career opportunities. Bullies  
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37 tend to be male senior consultants, whereas victims tend to be females. The fear of reprisal and non-enforcement of anti-bullying  
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39 policies are the greatest barriers to addressing academic bullying. Results of bullying interventions must be interpreted with caution  
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3 due to their methodological quality and reliance on surrogate measures. There is a need for well-designed trials with transparent  
4 reporting of relevant outcomes and accounting for temporal trends.  
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### 10 **Author contributions**

11  
12 TA contributed to study design, informed the search strategy, extracted and synthesized study data, and drafted and edited the  
13 manuscript. YE informed the search strategy, extracted and synthesized study data, and edited the manuscript. HV conceived the study  
14 idea, informed the search strategy, analyzed the data, drafted and edited the manuscript, and supervised the conduct of the study. HV  
15 affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the  
16 study have been omitted; and that any discrepancies from the study as planned have been explained.  
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29 None.  
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### 34 **Competing interests**

35 All authors have reported that they have no relationships relevant to the contents of this paper to disclose.  
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### Ethical approval

Not required.

### Data sharing

All data relevant to the study are included in the article.

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**Table 1. Summary of studies investigating bullying in academic medicine**

Author (year), Country	Study design	Setting	Definition of academic bullying	Target	Perpetrator	Source of bias	Risk of Bias
Benmore et al. (2018), England	Before-after	Academic hospital*	Data not provided	Residents	Senior consultants	Insufficient enrollment, inadequate sample size, no blinding of outcome assessors, high loss to follow-up, lack of statistical analysis or ITS <sup>†</sup> design	High
Duru et al. (2018), Turkey	Survey	Academic hospital	Data not provided	Consultants, researchers, administrators, nurses	Specific occupations of bullies not specified	Inappropriate sampling and inadequate sample size	Moderate
Chambers et al. (2018), New Zealand	Survey	Academic and non-academic hospitals	Data not provided	Specialist consultants	Primarily male. Senior medical staff 52.5%, non-clinical managers 31.8%, and clinical leaders 24.9%.	Low response rate	Low
House et al. (2018), USA	Before-after	Academic hospital	Data not provided	Medical Students	Faculty most frequently were the source of	Insufficient enrollment, inadequate sample size,	High



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					bullying followed by residents. Exact breakdown not specified	no blinding of outcome assessors, outcomes not clearly described, lack of statistical analysis, individual-level analysis or ITS design	
Kulaylat et al. (2017), USA	Survey	Academic hospital	Verbal abuse, specialty-choice discrimination, non-educational tasks, withholding/denying learning opportunities, neglect and gender/racial insensitivity	Medical Students	Faculty (57%), residents, fellows (49%), and nurses (33%)	Inappropriate sampling, inadequate sample size, classification bias, and non-validated identification or measurement of bullying	High
Bernotaite et al. (2017), Lithuania	Survey	Academic hospitals	Data not provided	Family Consultants	25.3% supervisor, 9.8% colleague, 2.9% subordinate	Inappropriate sampling, inadequate sample size, and coverage bias	Moderate

Chrysafi et al. (2017), Greece	Survey	Academic and non-academic hospitals	Data not provided	Consultants	Surgeons most frequently followed by internal medicine consultants, then radiologists/ laboratory consultants	Low response rate and coverage bias	Moderate
Kapoor et al. (2016), India	Survey	Academic hospital	Data not provided	Medical students	Data not provided	Inappropriate sampling and inadequate description of study population	Moderate
Chadaga et al. (2016), USA	Survey	Academic hospitals	NAQ <sup>‡</sup> used	Residents and fellows	Consultants 29%, nurses 27%, patients 23%, peers 19%	Low response rate, inadequate sample size, and coverage bias	Moderate
Llewellyn et al. (2016), Australia	Survey	Academic hospitals	Data not provided	Residents	Senior medical staff: 58.3% in 2015, 60.6% in 2016. Non-medical staff 33.2% 2015, 33.9% 2016, Manager 5.2% in 2015, 1.2% in 2016, junior resident 3.3%	Low response rate, biased sampling, coverage and classification bias	High

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					in 2015, 4.3% in 2016		
Rouse et al. (2016), USA	Survey	Academic clinics	NAQ used	Family medicine consultants	Data not provided	Low response rate	Low
Shabazz et al. (2016), UK	Survey	Academic and non-academic hospitals	Belittle and undermine an individual's work; undermining an individual's integrity; persistent and unjustified criticism and monitoring of work; freezing out, ignoring or excluding and continual undervaluing of an individual's effort.	Gynecology consultants	50.9% senior consultants, 22.3% junior consultants, 4.5% medical director	Low response rate, and classification bias	Moderate
Peres et al. (2016), Brazil	Survey	Academic hospital	Data not provided	Medical students	Data not provided	Low response rate, and classification bias	Moderate

Ling et al. (2016), Australia	Survey	Academic hospitals	NAQ used	General surgery residents and consultants	For trainee victims: staff surgeon 48%, trainee surgeon 13%, admin 13%, nurses 11%, other consultant 6% For consultant victims; 31% staff surgeon, 28% admin, 13% other consultant, 11% nurses, other 10%, trainees 4%	Low response rate	Low
Kulaylat et al. (2016), USA	Before-after	Academic hospital	Data not provided	Medical Students	Faculty (57%), residents/fellows (49%), and nurses (33%)	Inadequate sample size, no blinding of outcome assessors	Moderate
Ahmadipour et al. (2016), Iran	Survey	Academic hospital	Being assigned tasks as punishment, being threatened with an unjustly bad score or failure	Medical students, interns and residents	Data not provided	Inadequate sample size	Low

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Jagsi et al. (2016), USA	Survey	Academic hospital	Data not provided	Consultants who won a career advancement award	Data not provided	Inadequate sampling frame and classification bias	Moderate
Crebbin et al. (2015), Australia and New Zealand	Survey	Academic hospitals	Data not provided	Residents, fellows and consultants	50% surgical consultants, other medical consultants (24%) and nursing staff (26%)	Low response rate	Low
Cresswell et al. (2016), UK	Before-after	Academic hospital	Data not provided	Residents	Data not provided	Insufficient description of study objectives, inadequate enrollment and sample size, no blinding of outcome assessors, outcomes not clearly described, lack of statistical analysis or ITS design and high loss to follow-up	High
Loerbroks et al. (2015), Germany	Survey	Academic hospitals	Data not provided	Residents	Data not provided	-	Low

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1 2 3 4 5 6 7 8 9 10	Malinauskiene et al. (2014), Lithuania	Survey	Non-academic clinics	NAQ used	Family medicine consultants	Bullying from patients 11.8%, from colleagues by 8.4%, from superiors by 26.6%.	-	Low
11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27	Mavis et al. (2014), USA	Survey	Academic hospitals	Mistreatment either intentional or unintentional occurs when behavior shows disrespect for the dignity of others and unreasonably interferes with the learning process	Medical students	Clinical faculty in the hospital (31%) residents/ interns (28%), nurses (11%)	Low response rate, inadequate description of study population and statistical analysis	Moderate
28 29 30 31 32 33 34 35	Oser et al. (2014), USA	Survey	Academic hospital	Data not provided	Medical students	Residents > clerkship faculty > other attendings > other students > preceptors = nurses	-	Low
36 37 38 39 40 41 42	Oku et al. (2014), Nigeria	Survey	Academic hospital	Data not provided	Medical students	23.7% other students, 21.7% consultants, 17.5%	-	Low

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					lecturers, 16.5% consultants, 16.5% nurses, 4.1% other staff		
Gan et al. (2014), Canada	Survey	Academic hospital	Data not provided	Medical students	Consultants	Low response rate, inappropriate sampling, small sample size and classification bias	High
Fried et al. (2015), USA	Before-after	Academic hospital	Power mistreatment defined as “made to feel intimidated, dehumanized, or had a threat made about a recommendation, your grade, or your career	Medical students	Residents 49.7%, Clinical faculty 36.9%, preclinical faculty 7.9%	-	low
Al-Shafae et al. (2013), Oman	Survey	Academic hospitals	Being coerced into carrying out personal services unrelated to the expected role of interns and instances	Residents	Internal medicine 60.3%, surgery 29%, pediatrics 15.5%. Specialists 51.7%,	Inappropriate sampling, inadequate sample size, inadequate description of study	High

			in which interns were excluded from reasonable learning opportunities offered to others, or threatened with failure or poor evaluations for reasons unrelated to academic performance		consultants 50%, residents 12.1%, nurses 24.1%	population and coverage bias	
Owoaje et al. (2012), Nigeria	Survey	Academic hospital	Data not provided	Medical Students	Consultants 69.1%, residents/fellows 52.4%, other students 15.7%, nurses 7.8%, laboratory technicians 4.1%	Low response rate	Low
Askew et al. (2012), Australia	Survey	Academic and non-academic hospitals	Data not provided	Consultants	Consultants 44%, Managers 27%, Patients 15%, Nurses/midwives 4%,	Low response rate	Low



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					junior consultants 1%		
Meloni et al. (2011), Australia	Before-after	Academic hospital	Data not provided	Hospital employees	Data not provided	Lack of blinding of outcome assessors, high loss to follow-up, lack of statistical analysis or ITS design, and unit of analysis not clearly described	High
Dikmetas et al. (2011), Turkey	Survey	Academic hospital	Data not provided	Residents	Surgeons > Internists	Low response rate	Moderate
Eriksen et al. (2011), Norway	Survey	Academic hospital	NAQ used	Hospital employees	Colleagues. Specific occupations not described	Low response rate, inappropriate sampling and inadequate statistical analysis	Moderate
Imran et al. (2010), Pakistan	Survey	Academic hospitals	Threats to professional status, threats to personal standing, isolation,	Residents	Consultants	Inappropriate sampling, classification and coverage bias	Moderate

			overwork, and destabilization				
Ogunsemi et al. (2010), Nigeria	Survey	Academic hospital	Data not provided	Residents	58% administrative staff, 41.4% from the hospital chief executive, 40.4% from patient relatives, 32.7% nurses, 30% residents, 20% patients	Inadequate sample size	Low
Best et al. (2010), USA	Before-after	Academic hospital	Data not provided	Unspecified	Data not provided	Study objective not clearly described, insufficient enrollment, no blinding of outcome assessors, lack of statistical or individual-level analysis or ITS design	High
Nagata-Kobayashi et al. (2009), Japan	Survey	Academic hospitals	Assigned you tasks as punishment; threatened to fail you	Residents	Surgery (27.6%), internal medicine (21.4%),	Low response rate	Low

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			unfairly in residency; competed maliciously or unfairly with you; made negative remarks to you about becoming a consultant or pursuing a career in medicine		emergency medicine (11.5%), anaesthesia (11.3%). Consultants 34.1%, patients 21.7%, nurses 17.2%		
Scott et al. (2008), New Zealand	Survey	Academic hospital	A threat to professional status and personal standing, isolation, enforced overwork, destabilization	Residents	Consultants 30%, nurses 30%, patients 25%, radiologists 8%, residents/fellows 7%	Low response rate, inadequate sample size and description of study population	Moderate
Gadit et al. (2007), Pakistan	Survey	Academic and non-academic hospitals	Data not provided	Consultants	Senior colleagues	Inadequate sample size	Low
Shrier et al. (2007), USA	Survey	Academic and non-academic hospitals	Data not provided	Consultants	Colleagues 24%, patients 19%, teachers 18%, supervisors 15%,	Inappropriate sampling, inadequate sample size, and coverage bias	Moderate

Cheema et al. (2005), Ireland	Survey	Academic hospitals	Data not provided	Residents	Senior residents 51-70%, Nursing staff 47-59%, Administration 15-16%, Colleagues 12-13%	Low response rate	Low
Rautio et al. (2005), Finland	Survey	Academic hospital	Data not provided	Medical students	Lecturers 27.9%, Research/senior research fellows 27.7%, Professors 16.6%, Associate professors 13.6%	Low response rate, inappropriate sampling, inadequate sample size, and coverage bias	High
Carr et al. (2000), USA	Survey	Academic hospitals	Data not provided	Consultants	Superiors and colleagues	-	Low
Quine (1999), UK	Survey	Non-academic clinics	Data not provided	Consultants	54% greater seniority, 34% same seniority, 12% less senior. 49% of bullies older than victim	-	Low
Wear et al. (2005), USA	Survey	Academic hospital	Data not provided	Medical students	General surgeons and obstetricians	Low response rate, inappropriate sampling, inadequate	High

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						sample size, classification and lack of validated measurement tool	
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\*Academic hospitals/clinics were defined as teaching hospitals/clinics with a university affiliation

†Interrupted time series

‡The NAQ is the negative acts questionnaire, a validated tool for assessing the prevalence of workplace bullying

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**Table 2: Self-reported description of specific bullying behaviours**

Behaviour	No. of studies/ Total studies*	Total cohort No. affected/ total participants who completed surveys on behaviours (%)*	Men No. affected/ total men who completed surveys on behaviours (%)†	Women No. affected/ Total women who completed surveys on behaviours (%)†
<b>Threats to professional status</b>				
Persistent unjustified criticism	10/19	2587/10404 (24.9)	535/1690 (31.7)	552/1402 (39.4)
Excessive monitoring of work	6/19	1752/6079 (28.8)	442/1525 (27.7)	441/1298 (34.0)
Intimidatory use of discipline	11/19	1156/17046 (6.8)	323/1746 (18.5)	237/1546 (15.3)
Spread of gossip/rumours	5/19	892/3694 (24.2)	88/596 (14.8)	94/453 (20.8)
False allegations	5/19	577/3694 (15.6)	59/596 (9.9)	54/453 (11.9)
Refusal of leave, training or promotion	6/19	1174/6079 (19.3)	215/1690 (12.7)	197/1402 (14.1)
<b>Isolation</b>				
Social/professional exclusion	13/19	3895/13963 (27.9)	301/1718 (17.5)	925/2385 (38.8)
<b>Overwork</b>				
Undue pressure to produce work	7/19	2509/6562 (38.2)	233/1525 (15.3)	355/1570 (22.6)
Setting impossible deadlines	6/19	1571/6079 (25.8)	164/1525 (10.8)	189/1298 (14.6)
<b>Destabilization</b>				
Shifting goalposts	1/19	54/417 (12.9)	Not reported	Not reported
Removal of areas of responsibility without consultation	8/19	1397/6193 (22.6)	160/1525 (10.5)	171/1298 (13.2)

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Withholding information that affects performance	7/19	1786/6137 (29.1)	219/1553 (14.1)	267/1328 (20.1)
Ordered to work below one's competence level	9/19	2860/8017 (35.7)	81/625 (13.0)	99/483 (20.5)

\*Total number of studies that described types of bullying behaviours, including studies that did not stratify results by sex. As a result, the denominator for the number of participants in total is not the sum of the denominators for men and women. The denominator was calculated from the total number of individuals who completed surveys on specific bullying behaviours, while the numerator was calculated from the number of individuals who indicated they experienced the specified bullying behaviour. Not all survey studies offered respondents the same options to respond to, and as a result the denominators for each bullying behaviour differ.

†Of the studies that separated data by gender or solely included the results of one gender and included the specified bullying behaviour.

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**Table 3. Self-reported impact of academic bullying**

Effect of academic bullying	No. of studies/ Total studies*	Total cohort No. of affected participants/ total participants who completed surveys on the impact of bullying (%)*	Men No. of affected men/ total men who completed surveys on the impact of bullying (%)†	Women No. of affected women/ total women who completed surveys on the impact of bullying (%)†
<b>Psychologic</b>				
Psychologic distress including depressive/PTSD symptoms	9/20	839/2076 (40.4)	103/161 (64.0)	64/101 (63.4)
Reduced confidence in clinical skill	4/20	296/1518 (19.5)	68/212 (32.1)	97/597 (16.2)
<b>Career</b>				
Missed career opportunities	12/20	1570/6637 (23.7)	89/812 (11.0)	310/1325 (23.4)
Considerations of quitting	8/20	1023/2704 (37.8)	Not reported	Not reported
Termination of employment	3/20	84/1046 (8.0)	4/139 (2.9)	4/150 (2.7)
Leave of absence	2/20	50/748 (6.7)	Not reported	Not reported
Self-reported worsening of clinical performance	5/20	528/1801 (29.3)	42/161 (26.1)	22/101 (21.8)

\*Total number of studies that described the impact of bullying, including studies that did not stratify results by sex. Not all participants were given the same options to select from.

†Of the studies that separated data by gender or solely included the results of one gender and included the impact of bullying.



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**Table 4. Barriers to addressing academic bullying**

<b>Barrier</b>	<b>No. of studies/Total studies*</b>	<b>No. of participants/ total participants (%)</b>
<b>Low reporting rates</b>		
Lack of awareness of what constitutes bullying	3/18	53/397 (13.4)
Lack of awareness of reporting process	8/18	934/2931 (31.9)
Lack of perceived benefit	4/18	214/538 (39.8)
Fear that bullying would worsen	6/18	448/1168 (38.4)
Fear of career ramifications	7/18	829/2199 (37.7)
Concerns regarding confidentiality	3/18	48/397 (12.1)
<b>Institutional factors</b>		
Hierarchical nature of medicine	4/18	Not reported
Recurring cycle of abuse	3/18	Not reported
Normalization of bullying	5/18	Not reported
Lack of enforcement	5/18	391/1106 (35.4)

\*Total number of studies that described barriers of bullying behaviours

**Supplementary table S1: Pooled prevalence of specific bullying behaviours by level of training**

<b>Behaviour</b>	<b>No. of studies/ Total studies*</b>	<b>Medical Students No. of participants/ total participants (%)*</b>	<b>Residents and fellows No. of participants/ total participants (%)*</b>	<b>Consultants No. of participants/ total participants (%)*</b>
<b>Threats to professional status</b>				
Persistent unjustified criticism	8/17	192/269 (71.4)	1696/6444 (26.3)	600/2881 (20.8)
Excessive monitoring of work	4/17	Not reported	1020/2445 (41.7)	564/2824 (20.0)
Intimidatory use of discipline	11/17	565/13363 (4.2)	541/2561 (21.1)	38/1112 (3.4)
Spread of gossip/rumours	3/17	Not reported	Not reported	755/2881 (26.2)
False allegations	3/17	Not reported	Not reported	509/2881 (17.7)
<b>Isolation</b>				
Social/professional exclusion	12/17	156/776 (20.1)	1684/6019 (28.0)	1272/4445 (28.6)
Refusal of leave, training or promotion	4/17	Not reported	286/2445 (11.7)	727/2824 (25.7)
<b>Overwork</b>				
Undue pressure to produce work	7/17	Not reported	827/2928 (28.2)	1326/2824 (47.0)
Setting impossible deadlines	6/17	Not reported	351/2445 (14.4)	965/2824 (34.2)
<b>Destabilization</b>				
Shifting goalposts	1/17	Not reported	54/654 (8.3)	Not reported

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Removal of areas of responsibility without consultation	6/17	11/56 (19.6)	267/2503 (10.7)	784/2824 (27.8)
Withholding information that affects performance	5/17	Not reported	415/2503 (16.6)	1140/2824 (40.4)
Ordered to work below one's competence level	6/17	182/269 (67.7)	1202/3574 (33.6)	975/2881 (33.8)

\*Total number of studies that described types of bullying behaviours that separated data by level of training

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**Supplementary table S2: The pooled impact of academic bullying by level of training**

<b>Effect of academic bullying</b>	<b>No. of studies/ Total studies*</b>	<b>Medical Students No. of participants/ total participants (%)*</b>	<b>Residents and fellows No. of participants/ total participants (%)*</b>	<b>Consultants No. of participants/ total participants (%)*</b>
<b>Psychiatric</b>				
Psychiatric distress including depressive/PTSD symptoms	8/19	422/579 (72.9)	220/456 (48.2)	178/996 (17.9)
Reduced confidence in clinical skill	4/19	119/262 (45.4)	Not reported	177/1259 (14.1)
<b>Career</b>				
Missed career opportunities	12/19	484/3020 (16.0)	141/389 (36.2)	948/3228 (29.4)
Considered quitting	8/19	109/317 (34.4)	Not reported	908/2375 (38.2)
Terminated employment	3/19	Not reported	73/698 (10.5)	11/348 (3.2)
Leave of absence	2/19	Not reported	Not reported	50/748 (6.7)
Self-reported worsening of clinical performance	4/19	202/579 (34.9)	35/203 (17.2)	51/563 (9.1)

\*Total number of studies that described the impact of academic bullying and separated data by level of training

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**Supplementary table S3. Suggested policies, interventions and reported outcomes**

Intervention	Outcome
<b>Zero-tolerance policy</b>	
(Meloni and Austin, 2011)	Increased employee engagement and workplace satisfaction Increased trust among victims that reports would be appropriately managed (44% to 64%)
(Fried et al., 2012)	Victims felt safer reporting incidents of bullying (67% to 84%) Improved awareness of where and whom to report to (67% to 84%) Reduced power abuse (43% to 30%) but no change in overall mistreatment rates
<b>Bullying workshops</b>	
(Benmore et al., 2018)	Increased willingness to try to repair the harm caused by bullying and became more conscious of giving feedback
(Kulaylat et al., 2016)*, USA)	Data not provided
(Cresswell et al., 2016)*	Data not provided
(Oku et al., 2014)*	Data not provided
<b>Tracking and reporting mistreatment data</b>	
(House et al., 2018)	Decreased unprofessional or disrespectful behaviour by faculty as reported by students [4.8% (2015-16) to 1.7% (2016-17)]
(Gan and Snell, 2014)	No difference in mistreatment
(Mavis et al., 2014)*	Data not provided
<b>Staff education on formal reporting process</b>	
(Fried et al., 2012)	No change in reporting rate
(Al-Shafae, 2013)*	Data not provided
(Imran et al., 2010)*	Data not provided

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3 (Wear et al., 2005)\* Data not provided

4 (Scott et al., 2008)\* Data not provided

5 **Develop a committee to handle reporting**

6 (Best et al., 2010) Resolutions reached 96% of formal reports

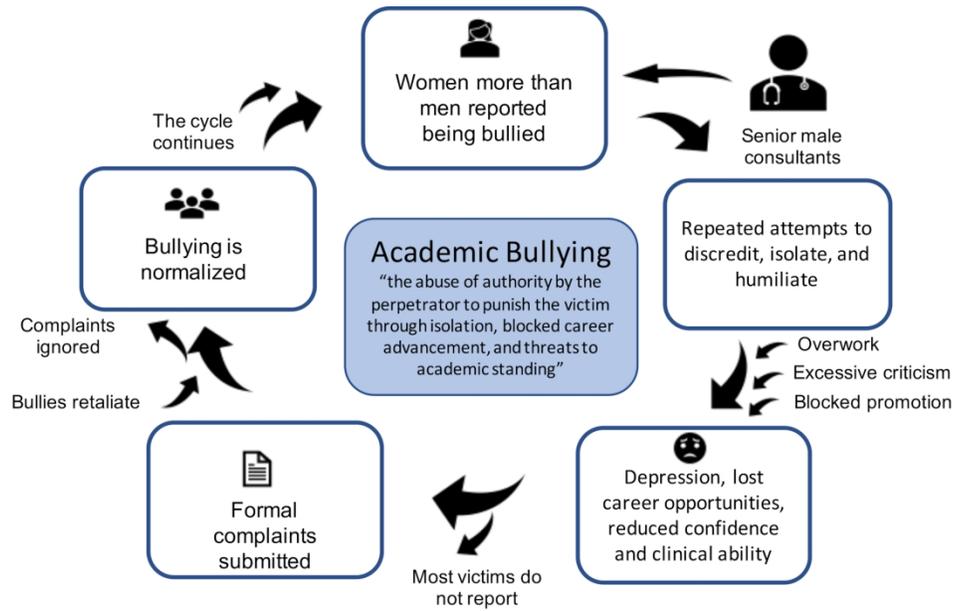
7 (Gadit et al., 2007)\* Data not provided

8 (Kapoor et al., 2016)\* Data not provided

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\*Suggested approach that had not been implemented



Central illustration: The definition, impact, victims, bullies, and contributing factors of academic bullying in medicine

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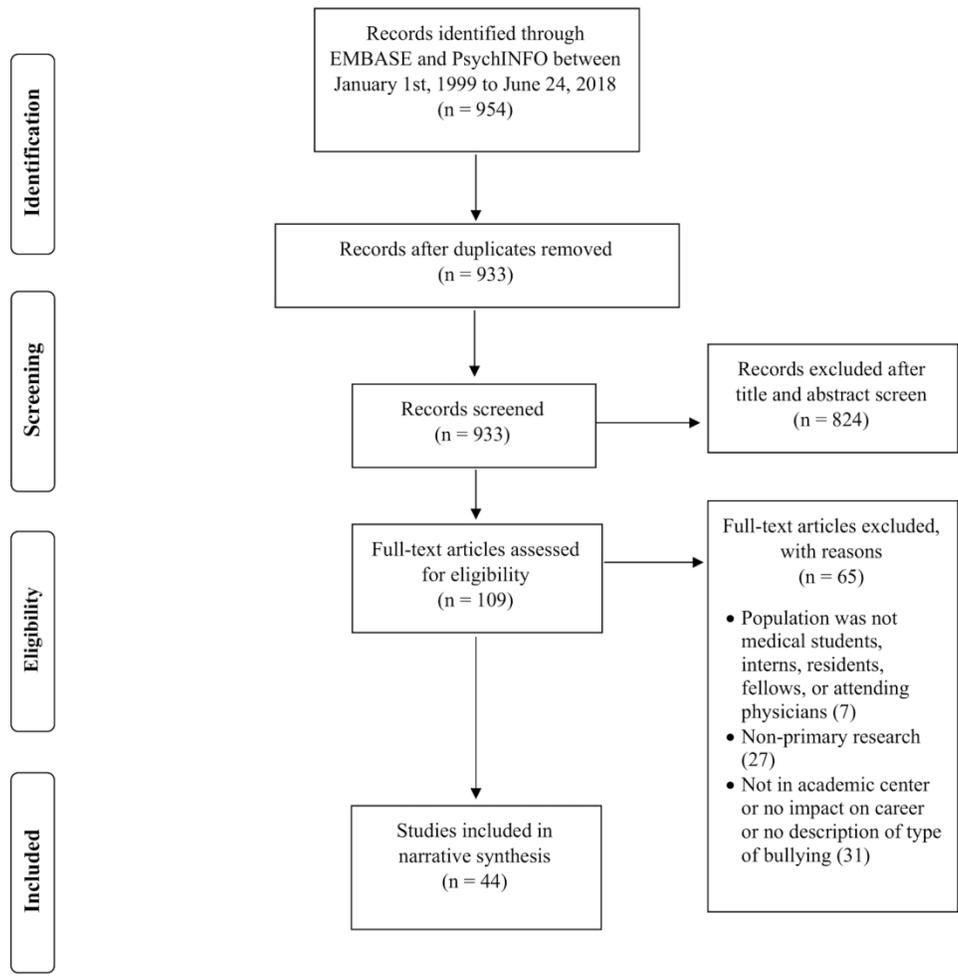


Figure 1: The flow diagram of included studies  
We included 44 studies in this review. Reasons for exclusion are described at each stage of study selection.

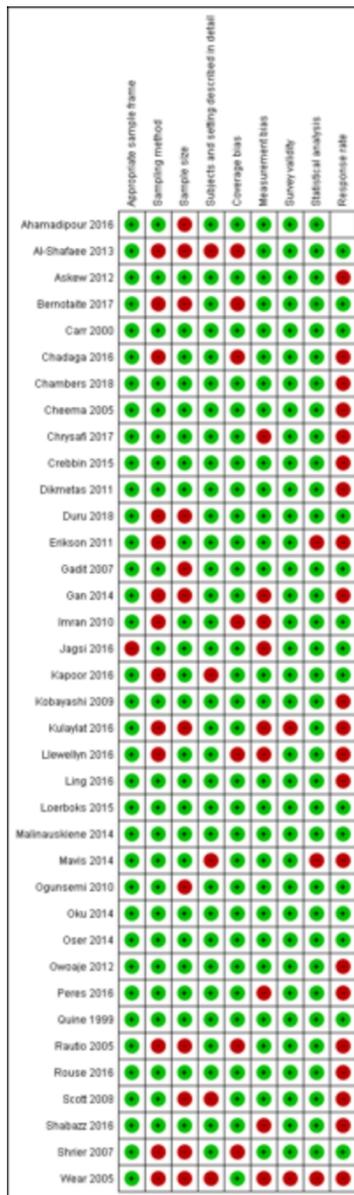
2195x2212mm (72 x 72 DPI)



**Supplementary figure S1: Search strategy**

1. Exp bullying
2. Exp medicine
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4. (sabotage or mistreat\* or discredit or humiliation or harassment or demean or bully\* or belittle or intimidate or disrespect or coerce or ignore or undermine or exclude or libel or slander or criticism or overwork\*).ti
5. (Workplace or career or professional or academic or promotion\* or employment or job or profession or reputation or academia).mp
6. (medicine or residency\* or "medical school" or "clinical training" or hospital or internship or fellow\* or "junior doctor" or "house officer" or "clinical clerk" or "attending physician" or physician or doctor or clinician or hierarchical system or "clinician-scientist" or learner or faculty or "NHS").ti,ab.
7. Exp aggression
8. 1 or 4 or 7
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10. 2 or 3 or 6
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Supplementary figure S2: The risk of bias of survey studies included in this review  
Most studies in this review had at least a moderate risk of bias. Common sources of bias included inappropriate sampling techniques and low sample sizes

	Study objective clearly stated	Eligibility criteria pre-specified	Sample representativeness	All eligible participants enrolled	Sample size	Intervention clearly described	Outcome measures clearly described and valid	Blinding of outcome assessors	Follow-up rate	Statistical analysis of pre-post changes	Multiple outcome measures	Group-level interventions and individual-level outcome efforts
Benmore 2018	+	+	+	-	-	+	+	-	-	-	-	+
Best 2010	-	+	+	-	+	+	+	-	+	-	-	-
Cresswell 2016	-	-	+	-	-	+	-	-	-	-	-	+
Fried 2015	+	+	+	+	+	+	+	-	+	+	-	+
House 2018	+	+	+	-	-	+	-	-	+	-	-	-
Kulaylat 2016	+	+	+	+	-	+	+	-	+	+	-	+
Meloni 2011	+	+	+	+	+	+	+	-	-	-	-	-

Supplementary figure S3: The risk of bias of before-after studies included in this review  
 Most studies in this review had at least a moderate risk of bias. Common sources of bias included lack of blinding or a control group and low sample sizes



# PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
<b>TITLE</b>			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
<b>ABSTRACT</b>			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
<b>INTRODUCTION</b>			
Rationale	3	Describe the rationale for the review in the context of what is already known.	4
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	4-5
<b>METHODS</b>			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	N/A
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	5-6
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	5
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	5
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	5-6
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	6
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	6
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	6
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	7
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., $I^2$ ) for each meta-analysis.	7



# PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	N/A
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	6-7
<b>RESULTS</b>			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	7
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	7
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	14-15
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	8-14
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	N/A
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	N/A
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	9-12
<b>DISCUSSION</b>			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	15-18
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	18-19
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	19-20
<b>FUNDING</b>			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	20

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

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# BMJ Open

## A systematic review of academic bullying in medical settings: behaviours, perpetrators, victims, and consequences

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Manuscript ID	bmjopen-2020-043256.R1
Article Type:	Original research
Date Submitted by the Author:	01-Dec-2020
Complete List of Authors:	Averbuch, Tauben; McMaster University, Medicine Eliya, Yousif; McMaster University, Health Research Methodology Van Spall, Harriette Gillian Christine; Population Health Research Institute; McMaster University, Medicine
<b>Primary Subject Heading</b>:	Medical education and training
Secondary Subject Heading:	Occupational and environmental medicine
Keywords:	MEDICAL EDUCATION & TRAINING, GENERAL MEDICINE (see Internal Medicine), HEALTH SERVICES ADMINISTRATION & MANAGEMENT

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Manuscripts



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3 **A systematic review of academic bullying in medical settings: behaviours, perpetrators, victims, and consequences**  
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5 Averbuch T<sup>a</sup>, Yousif E<sup>b</sup>, Van Spall HGC<sup>a, b, c</sup>  
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17 **Word count: 4213**  
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## ABSTRACT

**Purpose:** To characterize the dynamics and consequences of bullying in academic medical settings.

**Design:** Systematic review.

**Data sources:** We searched EMBASE and PsycINFO for articles published between January 1, 1999 and June 24, 2018.

**Study selection:** We included studies conducted in academic medical settings in which victims were either consultants or trainees, and described bullying behaviours; the perpetrators or victims; the impact, and/or interventions. Study characteristics, quality, and data were assessed independently by 2 reviewers.

**Results:** We included 44 studies representing 36,262 consultants and trainees. We defined academic bullying as the abuse of authority in an academic setting through punishing behaviours that include overwork, destabilization, and isolation. Of 25,639 individuals (in 19 studies) who responded about bullying patterns, the most common (38.2% of respondents) was overwork. Of 9,181 individuals (20 studies) who reported the impact, the most common was psychologic distress (40.4%). Among bullies identified by 11,006 individuals (16 studies), consultants (55.1%) were most common. Of 6,923 victims who reported gender (17 studies), the majority were women (52.3%). Among 6,930 victims (in 15 studies) who described their response, 32.8% filed a report and most (52.3%) did not perceive a positive outcome. Studies that tested the effect of interventions to mitigate bullying had high risk of bias.

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3 **Conclusions:** Academic bullying commonly involves overwork, and is perceived as having a negative impact on well-being.  
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5 Perpetrators were commonly male consultants and victims were commonly women. Only a minority of victims filed a report.  
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7 Methodologically robust trials of anti-bullying interventions are needed.  
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10 **Limitations:** Most studies (27/44) had at least a moderate risk of bias. All interventions were uncontrolled before-after studies.  
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12 **Keywords:** Medical Education & Training, General Medicine, Health Services Administration & Management  
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### 17 **Strengths and limitations**

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- 19 • This review is comprehensive, including 44 studies with 36,262 consultants and trainees, across several countries and  
20 including all levels of training.  
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- 22 • We explicitly defined inclusion criteria, and used established tools to assess the risk of bias of included studies  
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- 24 • The included studies varied in their definitions of bullying, sampling bias was noted among the surveys, and intervention  
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## Background

Bullying behaviours have been described as repeated attempts to discredit, destabilize, or instill fear in an intended target<sup>1</sup>. Bullying can take many forms from overt abuse to subtle acts that erode the confidence, reputation, and progress of the victim<sup>2</sup>. Bullying is common in medicine, likely impacting mental health, professional interactions, and career advancement<sup>3-6</sup>. It may also impact a physician's ability to care for patients<sup>7</sup>. Surveys from the National Health Service (NHS) in the United Kingdom showed that 55% of staff experienced at least one type of bullying; 31% were doctors in training<sup>8</sup>. Bullying is closely related to harassment and discrimination, in which mistreatment is based on personal characteristics or a protected class such as sex or race<sup>9</sup>. Within academic settings, victims may experience all three and the distinction may be less clear. Unlike harassment and discrimination, which have specific legal definitions, bullying is an amorphous term whose victims are often left without legal recourse.

The hierarchical structure of academic medicine – in which there are power imbalances, subjective criteria for recruitment and career advancement, and siloed departments with few checks in place for toxic behaviours – may offer an operational environment in which bullying may be more widespread than in non-academic medical settings. Academic bullying is a seldom-used term within the literature, but is intended to describe the forms of bullying that may exist in academic settings. The prevalence of academic bullying in medical settings is unknown likely due to a lack of definition of bullying behaviours, a fear of reporting, and insufficient research. There is not much known about the characteristics of perpetrators and victims, and about the impact of bullying on academic

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3 productivity, career growth, and patient care. Furthermore, institutional barriers and facilitators of bullying behavior have not been  
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5 reported, and the effectiveness of interventions in addressing academic bullying have not been evaluated.  
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10 The purpose of this systematic review is to define and classify patterns of academic bullying in medical settings; assess the  
11 characteristics of perpetrators and victims; describe the impact of bullying on victims; review institutional barriers and facilitators of  
12 bullying; and identify possible solutions.  
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## 19 **Methods**

### 20 **Data sources and searches**

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22 This study follows PRISMA reporting guidelines. Two reviewers (T.A, Y.E.) searched two online databases (EMBASE and  
23 PsycINFO) for English-language articles published between January 1, 1999, to June 24, 2018 and relevant to academic bullying in  
24 medicine. An outline of the search is provided in Figure 1. A combination of medical subject heading (MeSH), title, and abstract text  
25 terms encompassing “Medicine”; “Bullying“ and “Academia” were used for the full search. The terms of the search are included in  
26 Supplementary figure S1. Two authors (T.A, Y.E.) independently screened articles for inclusion. Differences were resolved by  
27 discussion, and if necessary, by a third author (H.V.).  
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## Study selection

We included studies conducted in academic medical settings in which victims were either consultants or trainees. We defined academic medical settings as hospitals or clinics that were either university-affiliated or involved trainees. In the case of pre-clinical medical students, academic medical settings included the university where medical instruction took place. Studies were included if they described: the method and impact of bullying; the characteristics of perpetrators and victims; or interventions used to address the bullying. Studies that included trainees or consultants in both academic and non-academic settings were included. We excluded editorials, opinion pieces, reviews, conference abstracts, theses, dissertations, and grey literature. For the purposes of study selection, academic bullying was defined as mistreatment in academic institutions with the intention or effect of disrupting the academic or career progress of the victim.

## Data extraction and quality assessment

Two reviewers (T.A, Y.E.) independently extracted data on: study design, setting (academic or non-academic), definition, description and impact of academic bullying, characteristics of perpetrators and victims, barriers and facilitators of bullying, and interventions and their outcomes. Two reviewers independently assessed studies for risk of bias. We assessed before-after studies using the National Heart, Lung, and Blood Institute quality assessment tool<sup>10</sup> and assessed prevalence surveys using the Joanna Briggs Institute critical appraisal tool<sup>11</sup>. We classified survey studies as low risk of bias if at least 8 of 9 criteria were met, medium risk of

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3 bias if 7 of 9 were met, and high risk of bias if less than 7 were met. We classified before-after studies as low risk of bias if at least 11  
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5 of 12 criteria were met, medium risk of bias if at least 9 of 12 were met, and high risk of bias if less than 9 were met.  
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### 8 9 10 **Data synthesis and analysis**

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12 We pooled the results of surveys on the basis of similarity of survey themes to facilitate a descriptive analysis. For survey  
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14 studies on the prevalence or impact of bullying, we solely pooled the results of studies that asked respondents about specific bullying  
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16 behaviours or impacts, respectively. We then separated results by sex and level of training. Group selection was by consensus between  
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18 authors. We presented our results as numbers and percentages. We calculated the denominators from the total number of individuals  
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20 who completed surveys on types of bullying behaviours, the impact of bullying, characteristics of bullies and victims, or barriers to  
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22 addressing academic bullying. The numerators were calculated from the number of individuals who experienced a specific behaviour  
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24 or impact, were bullied by a perpetrator at a specified level of training, or endorsed a specific reason for not making a formal report.  
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26 We also reported the number of studies that described each specific bullying behaviour or impact, demographic characteristics of  
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28 victims and perpetrators, barriers and facilitators of academic bullying, and specific reasons for not making a formal report. We could  
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30 not perform a meta-analysis due to the conceptual heterogeneity between studies.  
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### 38 **Patient and public involvement**

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40 Patients or the public were not involved in the design, conduct, reporting, or dissemination plans of our research.  
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## Results

### Screening results

We identified 933 unique articles, 44 of which met inclusion criteria. Reasons for exclusion are described in Figure 1.

### Characteristics of included studies

Studies were most frequently set in the USA (reported in 13 studies)<sup>3,12-22</sup> and the UK (reported in 5 studies)<sup>8,23-26</sup> and were set in academic hospitals (reported in 36 studies)<sup>1,3-5,12-16,18-20,22-45</sup> or in both teaching and non-teaching sites (reported in 8 studies)<sup>8,17,21,46-49</sup>. Sixteen studies included medical students<sup>3-5,12,14-16,18,20,30,32,35,39-42</sup>, 12 included residents or fellows<sup>1,13,25,26,31-34,36,37,43,44</sup> and 17 included consultants<sup>6,8,17,19,21-24,28,29,33,38,45-49</sup> (Table 1).

### Definition of academic bullying

Four papers provided definitions for academic bullying<sup>30,32,37,40</sup>. Common themes included behaviours where the perpetrator abuses authority to punish the victim through isolation, blocked career advancement, and threats to academic standing. We defined academic bullying as the abuse of authority by a perpetrator who targets the victim in an academic setting through punishing behaviours that include overwork, destabilization, and isolation. Multiple studies used the complete or partial Negative Acts Questionnaire (NAQ), a standardized list of bullying behaviours (reported in 22 studies)<sup>1,3,4,6,12-15,17,27,29-32,34-36,39,42,43,47,49</sup>.

### Patterns of academic bullying behaviours

There were 25,639 consultant and trainee respondents to surveys of bullying behaviours (reported in 19 studies), but not all were offered the same options to select from (Table 2). Bullying behaviours were grouped into destabilization (reported in 13 studies), threats to professional status (reported in 15 studies), overwork (reported in 7 studies), and isolation (reported in 13 studies). Undue pressure to produce work was commonly reported (38.2% of respondents affected, reported in 7 studies)<sup>13,17,26,27,29,31,49</sup>. Of the 13 studies that described destabilization, common methods included being ordered to work below one's competency level (35.7%, reported in 9 studies)<sup>17,26,29-31,33,35,38,49</sup> and withholding information that affects performance (29.1%; reported in 7 studies)<sup>13,17,27,29-31,49</sup>. Of the 15 studies that described threats to professional status, common methods were excessive monitoring (28.8%; reported in 6 studies)<sup>13,17,27,29,31,49</sup> and criticism (24.9%; reported in 10 studies)<sup>13,17,26,27,29,31,33,35,38,49</sup>. Of the 13 studies that described isolation, the most common method was social and professional exclusion (26.9%; reported in 13 studies)<sup>4,13,15,17,21,27,29-31,33,35,46,49</sup>.

There were 3,564 consultant and trainee respondents to surveys that separated the prevalence of bullying behaviours by sex (reported in 6 studies). A greater proportion of men experienced the intimidatory use of discipline procedures (18.5%, reported in 5 studies)<sup>13,17,30,35,39</sup> while a greater proportion of women experienced all other bullying behaviours (reported in 6 studies)<sup>13,17,21,30,35,39</sup> (Table 2). There were 24,876 respondents to surveys that analyzed results by level of training (reported in 17 studies) (Supplementary table S1). A greater proportion of consultants experienced refusal of applications for leave, training, or promotion (25.7%, reported in 2 studies)<sup>17,29</sup> and removal of areas of responsibility (27.8%, reported in 2 studies)<sup>17,29</sup> than residents (11.7%, reported in 2 studies;



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3 10.7%, reported in 3 studies, respectively)<sup>13,27,36</sup> or medical students (not reported; 19.6%, reported in 1 study, respectively)<sup>15</sup>.  
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5 Compared to medical students (4.2%, reported in 5 studies)<sup>12,14,15,35,39</sup> and consultants (3.4%, reported in 2 studies)<sup>17,38</sup>, a greater  
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7 proportion of residents experienced the intimidatory use of discipline procedures (21.1%, reported in 4 studies)<sup>13,27,30,36</sup>. A greater  
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9 proportion of medical students experienced persistent criticism (71.4%, reported in 1 study)<sup>35</sup> than residents (26.3%, reported in 4  
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11 studies)<sup>13,26,27,33</sup> and consultants (20.8%, reported in 3 studies)<sup>17,29,38</sup>.  
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### 17 **Characteristics of bullies**

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19 Twenty-two studies representing 11,006 consultants and trainees described the characteristics of bullies, although not all were  
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21 offered the same options to select from. Common perpetrators included consultants (55.9%, reported in 22  
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23 studies)<sup>1,3,4,6,8,13,14,18,21,24,26,27,29-31,33,35,37,42,44,47,48</sup>, residents (21.6%, reported in 14 studies)<sup>1,3,6,8,14,18,26,27,30,31,37,42,44</sup>, and nurses (14.3%,  
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25 reported in 14 studies)<sup>1,3,4,13,14,18,26,27,30,31,37,42,44,47</sup>. Of the 4,277 individuals who identified the gender of their bullies, most reported  
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27 primarily male (67.2%, reported in 5 studies)<sup>8,17,24,29,33</sup>, followed by primarily female (26.1%, reported in 5 studies)<sup>8,17,24,29,33</sup>, and both  
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29 (6.7%, reported in 3 studies)<sup>8,24,29</sup>. Among 5,444 medical students, perpetrators were commonly consultants (45.2%, reported in 6  
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31 studies)<sup>3,4,14,18,35,42</sup>, residents (37.6%, reported in 4 studies)<sup>3,14,18,42</sup>, nurses (12.8%, reported in 5 studies)<sup>3,4,14,18,42</sup>, and other medical  
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33 students (4.4%, reported in 3 studies)<sup>3,4,35</sup>. Among 2,980 residents, perpetrators were commonly consultants (51.0%, reported in 8  
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35 studies)<sup>1,13,26,27,30,31,37,44</sup>, nurses (29.2%, reported in 8 studies)<sup>1,13,26,27,30,31,37,44</sup>, and other residents (16.4%, reported in 8  
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3 studies)<sup>1,13,26,27,30,31,37,44</sup>. Of the 1,500 consultants, perpetrators were their peers (39.2%, reported in 7 studies)<sup>6,8,21,29,31,47,48</sup>, senior  
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5 consultants (23.7%, reported in 5 studies)<sup>6,8,21,24,47</sup>, and administration (17.7%, reported in 4 studies)<sup>24,29,31,48</sup>.  
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10 Six studies representing 1,258 interns and medical students described the prevalence of academic bullying according to the  
11 specialty rotation of the learner. Academic bullying was common in surgery (34.9% of respondents, reported in 5 studies)<sup>1,12,30,33,37,42</sup>,  
12 obstetrics and gynecology (25.5%, reported in 2 studies)<sup>12,42</sup> and internal medicine (21.4%, reported in 5 studies)<sup>1,12,30,33,37,42</sup>.  
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### 19 **Characteristics of victims**

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21 Twenty-five studies described the characteristics of victims, and 19 included the proportion of those who experienced bullying.  
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23 Of the 6,689 women and 9,162 men who responded to surveys that analyzed results by sex, women were more likely to report being  
24 bullied than men (54.1% of all women compared to 36.1% of all men, reported in 17 studies)<sup>3,4,13,17,19,22,29–37,39,44</sup>. There were 8,454  
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26 consultant and trainee respondents to surveys that separated the results by demographic characteristics other than sex, but not all  
27 characteristics were captured by each study. A greater proportion of international graduates / non-citizens experienced bullying than  
28 citizens (55.2% compared to 50.6%, reported in 3 studies)<sup>13,26,33</sup>, and a greater proportion of overweight participants (BMI >25)  
29 experienced bullying than those with a BMI ≤25 (17.8% compared to 11.8%, reported in 1 study)<sup>34</sup>. The relationship between age and  
30 bullying varied based on the cutoff used and the survey sample in each study. Among consultants, a greater proportion of those with  
31 full professorship experienced bullying than assistant professors (68.0% compared to 51.9%, reported in 1 study)<sup>22</sup>.  
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### Impact of academic bullying

There were 9,181 consultant and trainee respondents to surveys on the psychological (reported in 12 studies) and career impact (reported in 16 studies) of academic bullying (Table 3), although not all were offered the same options to select from. Respondents commonly reported psychiatric distress (40.4%; reported in 9 studies)<sup>6,24,29,35,37,38,41,44,47</sup>, considerations of quitting (37.8%; reported in 5 studies)<sup>24,29,33,46,48</sup>, and reduced clinical ability (29.3%; reported in 5 studies)<sup>26,29,35,37,41</sup>. No studies quantified the effect on patient safety. Five studies representing 2,688 individuals described the impact of bullying separated by sex (Table 3). A greater proportion of women experienced loss of career opportunities (23.4%, reported in 5 studies)<sup>17,19,21,22,35</sup> while a greater proportion of men experienced decreased confidence (32.1%, reported in 2 studies)<sup>22,35</sup> and clinical ability (26.1%, reported in 1)<sup>35</sup>.

There were 8,545 consultant and trainee respondents to surveys that separated results by level of training (Supplementary table S2). A greater proportion of medical students experienced psychiatric distress (72.9%, reported in 2 studies)<sup>35,41</sup> and decreased clinical performance (34.9%, reported in 2 studies)<sup>35,41</sup> than residents (48.2%, reported in 2 studies and 17.2%, reported in 1 study, respectively)<sup>37,44</sup> and consultants (17.9%, reported in 4 studies and 9.1%, reported in 1 study, respectively)<sup>24,29,38,47</sup>. A greater proportion of residents endorsed loss of career opportunities (36.2%, reported in 2 studies)<sup>33,36</sup> compared to medical students (16.0%, reported in 3 studies)<sup>12,14,35</sup> and consultants (23.7%, reported in 7 studies)<sup>17,19,21,22,29,38,46</sup>.

### Barriers and facilitators of academic bullying

Eighteen studies pertained to barriers to victims making a formal report (reported in 15 studies) and institutional facilitators (reported in 14 studies) of academic bullying (Table 4). There were 6,930 consultant and trainee respondents to surveys on their actions taken in response to bullying and reasons for not making a formal report, although not all were given the same options to select from. Victims commonly did not make a formal report<sup>1,3,4,14,17,24,27,29,31-33,37,42,44,48</sup>; only 32.8% made a formal report. Deterrents to reporting included concern regarding career implications (37.7%, reported in 12 studies)<sup>1,4,14,16,29,30,32,33,37,44,46,48</sup>, not knowing who to report to (31.9%, reported in 9 studies)<sup>1,4,29,30,32,37,44,46,48</sup>, and poor recognition of bullying (13.4%, reported in 7 studies)<sup>5,14,16,18,23,30,37</sup>. Of the 15 studies, 6 studies representing 1139 individuals reported the outcomes of reporting<sup>1,17,24,29,31,33</sup> although only a small range of outcomes were offered among options. Submitting a formal report often had no perceived effect on bullying (35.6%, reported in 5 studies)<sup>17,24,29,31,33</sup> a similar proportion of victims endorsed worsening (16.7%, reported in 2)<sup>17,31</sup> and improvement (13.7%, reported in 5 studies)<sup>1,17,24,31,33</sup> in bullying following reporting.

In the 11 studies that described institutional facilitators of bullying, common facilitators were lack of enforcement (reported in 8 studies)<sup>1,17,24,27,29,31,32,37</sup>, the hierarchical structure of medicine (reported in 4 studies)<sup>27,37-39</sup>, normalization of bullying (reported in 4 studies)<sup>3,14,29,44</sup> and lack of a formal reporting process (reported in 2 studies)<sup>4,36</sup>. Individual-level data was not pooled as institutional facilitators of bullying were most commonly elicited via free-response portions of surveys with varying completion rates.

### Suggested strategies, interventions, and outcomes

Thirty-two studies suggested strategies to address academic bullying. These strategies included promoting anti-bullying policies (reported in 13 studies)<sup>2,8,41,46,10,11,17,19,26,28,32,39</sup>, education to prevent academic bullying (reported in 13 studies)<sup>2,3,46,48,4,12,13,20,24,25,28,31</sup>, establishing an anti-bullying oversight committee (reported in 5 studies)<sup>2,15,17,35</sup>, institutional support for victims (reported in 2 studies)<sup>10,41</sup>, and internal reviews where hospitals develop targeted solutions for their environment (reported in 2 studies)<sup>15,46</sup> (Supplementary table S3).

Of the 32 studies, 7 implemented organization-level interventions which included workshops with vignettes to improve recognition of bullying (reported in 3 studies)<sup>18,23,25</sup>; a gender and power abuse committee that established reporting mechanisms and held mandatory workshops on mistreatment (reported in 1)<sup>3</sup>; a gender equity office to handle reporting (reported in 1)<sup>20</sup>; zero-tolerance policies (reported in 1)<sup>45</sup>; and institutional-level tracking of mistreatment to provide targeted staff education (reported in 1)<sup>15</sup>. All 7 studies had an uncontrolled before-after design, and as such, did not establish causality. In the studies of vignettes, common bullying behaviours were demonstrated to improve recognition of both subtle and overt acts of bullying. Of the 3 studies that involved bullying recognition workshops, all reported an associated improvement in bullying recognition. In a study that developed a gender equity office, reporting was handled through an intermediary; decisions were binding with consequences for retaliation including termination of employment<sup>20</sup> and 96% of all formal reports were resolved. In a study where a Gender and Power Abuse committee was formed, there was an associated reduction in academic abuse<sup>3</sup>. In a study assessing the impact of a professionalism retreat about mistreatment

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3 for consultants, there was no reduction in medical student mistreatment<sup>12</sup>. In a study assessing the implementation of zero-tolerance  
4 policies, there was an associated improvement in awareness of bullying reporting processes<sup>45</sup>.  
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### 8 9 10 **Assessment of bias**

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12 Seventeen studies had a low risk of bias<sup>4,8,12,17,22,26,29,31–38,47,48</sup>, 15 had a medium risk of bias<sup>1,3,13,14,18,19,21,24,27,28,40,41,43,46,49</sup>, and  
13 12 had a high risk of bias<sup>5,6,15,16,20,23,25,30,39,42,44,45</sup>. Among the 37 survey studies, 13 sampled participants  
14 inappropriately<sup>5,6,13,16,21,27,28,30,39,40,42,44,49</sup>, 12 had inadequate sample sizes or did not justify their sample size<sup>1,5,6,16,21,28,30,32,36,38,39,42</sup>, 5  
15 did not sufficiently describe the participants<sup>1,14,16,30,40</sup>, 7 had coverage bias<sup>6,13,21,27,30,39,44</sup>, 3 did not have an appropriate statistical  
16 analysis<sup>14,16,49</sup>, and 2 had a low response rate<sup>1,5,13,14,16,17,24,26,29,31,33,35,37,39,41–44,46,48,49</sup> (Supplementary figure S2). Among the 7 before-  
17 after trials, 1 did not have pre-specified inclusion criteria<sup>25</sup>, 4 had low sample sizes or did not justify their sample size<sup>15,18,23,25</sup>, 2 did  
18 not have clearly defined, pre-specified, consistently measured outcomes<sup>15,25</sup>, 7 did not blind participants<sup>3,15,18,20,23,25,45</sup>, 3 did not  
19 account for loss to follow-up in their analysis<sup>23,25,45</sup>, and 5 lacked statistical tests to assess for significant pre- to post-intervention  
20 changes<sup>15,20,23,25,45</sup> (Supplementary figure S3).  
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### 34 35 **Discussion**

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37 In this systematic review, we established a definition for academic bullying, identified common patterns of bullying, and  
38 reported the impact on victims. We defined academic bullying as the abuse of authority by a perpetrator who targets the victim in an  
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3 academic setting through punishing behaviours that include overwork, destabilization, and isolation. Victims reported that academic  
4 bullying often resulted in stalled career advancement and thoughts of leaving the position. A majority of academic bullies were senior  
5 men, and a majority of victims were women. Barriers to reporting academic bullying included fear of reprisal, perceived hopelessness,  
6 and institutional non-enforcement of anti-bullying policies. Strategies to overcome academic bullying, such as anti-bullying  
7 committees and workplace reassignment were associated with an improvement in the prevalence of bullying and resolution of formal  
8 reports (Central illustration).  
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19 Several factors contribute to the prevalence of bullying within academia<sup>50,51</sup>. The hierarchical structure lends itself to power  
20 imbalances and prevents victims from speaking out, especially when the aggressor is tenured<sup>52</sup>. The relative isolation of departments  
21 within universities allows poor behaviour to go unchecked. Furthermore, the closed networks within departments lend themselves to  
22 mobbing behaviour and causes victims to fear being blacklisted for speaking out<sup>53</sup>.  
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31 A lack of clarity around the definition can limit awareness and reporting<sup>32</sup>. The Graduation Questionnaire administered to all  
32 American medical students found that in years where respondents were asked if they had been bullied, the estimated prevalence was  
33 lower than when they were asked about specific bullying behaviours<sup>14</sup>. Surveys on bullying should include a list of defining  
34 behaviours to increase clarity and accuracy in responses<sup>54</sup>. Even in institutions with established reporting systems, respondents were  
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3 often unaware of how to file a report<sup>29</sup>. We found that victims of academic bullying rarely filed reports, primarily due to fear of  
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5 retaliation. Reporting was not consistently effective and was equally likely to worsen bullying.  
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10 We found that consultants were the most common sources of bullying at all levels of training, although residents often bullied  
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12 medical students. No studies assessed the relative contribution of fellows and senior residents to resident bullying. Among studies that  
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14 analyzed bullying among consultants by seniority, senior consultants were a more commonly reported source of bullying<sup>6,8,21,24,47</sup>.  
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16 Women and ethnic minorities reported higher rates of bullying among demographic groups surveyed, although racial factors were  
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18 infrequently assessed in the surveys included in this study. While some argue that the increasing proportion of women trainees<sup>55,56</sup>  
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20 may change dynamics in healthcare settings, the leaky academic pipeline in which women remain underrepresented in several  
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22 academic specialties and in positions of leadership make them vulnerable to the power dynamics of academic medicine<sup>57</sup>.  
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28 Our review illustrates the self-reported harms of academic bullying. Victims experienced depressive symptoms, self-perceived  
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30 loss of clinical ability, and termination of employment. Academic bullying has been linked to depression<sup>34</sup>, substance abuse<sup>58</sup>, and  
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32 hospitalization for coronary artery or cerebrovascular disease<sup>59</sup>. Bullying costs the National Health Service (NHS) of the United  
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34 Kingdom £325 million annually due to reduced performance and increased staff turnover<sup>60</sup>. Disruptive behavior, linked to bullying in  
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36 the perioperative setting has been linked to 27% of patient deaths, 67% of adverse events, and 71% of medical errors<sup>7</sup>. Reasons for  
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38 consultant error include intimidation leading to a fear of communicating sources of harm and slow response times<sup>61</sup>.  
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6 Interventions reported as effective were simple, non-resource intensive, and organization-level, such as anti-bullying  
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8 workshops and committees. Anti-bullying committees involving staff and learners can research bullying within their institution and  
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10 address the most common disruptive behaviours through targeted interventions<sup>49</sup>. An organization-level, rather than individual-level  
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12 approach may address the root causes of academic bullying as well as the organizational culture that facilitates ongoing bullying. We  
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14 found that anti-bullying committees typically included three elements: (1) a multidisciplinary team that includes clinicians and other  
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16 front-line staff; (2) development of anti-bullying policies and a reporting process; and (3) an education campaign to promote  
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18 awareness of policies. Owing to their multifaceted nature, it is challenging to evaluate the relative contributions of their components.  
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20 Furthermore, without well-designed trials, the effect of anti-bullying committees is unknown.  
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26 The need for a confidential reporting process was raised in the studies included in this review, but few described how  
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28 confidentiality could be maintained when the report has to describe details of the bullying that may be only privy to the perpetrator  
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30 and victim. The reporting process could take the form of the Office of Gender Equity at the University of California, where the  
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32 accuser and the accused do not meet face to face; the discipline process is through an intermediary<sup>20</sup>. A unique, non-punitive approach  
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34 is the restorative justice approach used at Dalhousie University where victims, offenders, and administrators work collaboratively to  
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36 address sexual harassment and re-integrate offenders<sup>62</sup>. Reporting may have been ineffective in this review due to the impunity offered  
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38 to prominent consultants. Senior personnel, particularly those who are well-known and successful in grant funding, are often  
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3 considered “untouchable”, beyond reproach by their institutions<sup>63</sup>. Behaviour is often learned and modeling positive behaviours may  
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5 break the cycle of bullying in medicine<sup>64</sup>. One approach would be making professionalism a requirement for promotion and career  
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7 advancement, as in the Department of Medicine at the University of Toronto in Canada<sup>65</sup>.  
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### 10 11 12 **Strengths and limitations**

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14 The strengths of this review include its broad scope; capturing several aspects of academic bullying, and its size (n = 44  
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16 studies, 36,262 consultants and trainees). The cohort included was diverse, comprising several specialties and countries. We explicitly  
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18 defined eligibility criteria and extracted data in duplicate. We used established tools to assess the risk of bias.  
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24 There are several limitations that should be acknowledged. There is no validated definition of bullying, and the included  
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26 studies varied in their description of bullying. Most studies used questionnaires that were not previously validated. The survey  
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28 instruments across studies differed from each other, and their results had to be pooled according to themes to be synthesized. We  
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30 could not account for differences in institutional culture and hospital systems in the responses of survey participants. Data on  
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32 bully/victim demographics were underrepresented. Selection bias was a significant concern: 13 studies used convenience sampling,  
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34 and 2 included voluntary focus groups for victims of bullying to sign up for. Overall, the response rate was 59.2%, with a range of  
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36 12% to 100%. Surrogate outcomes were used such as awareness of bullying, and the reporting of outcomes was inconsistent. As such,  
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38 the effect of anti-bullying interventions must be interpreted cautiously.  
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## Future directions

Significant gaps exist in the quality of the academic bullying literature, particularly with inconsistent definitions and limitations in study methodology. Our definition may be used to provide the breadth and granularity required to sufficiently capture cases of academic bullying in medicine. Studies on the impact of academic bullying would benefit from standardized, validated survey instruments. Although randomization and blinding are not always possible to test the effect of interventions, a control group should be included in anti-bullying intervention studies.

## Conclusions:

Academic bullying refers to specific behaviours that disrupt the learning or career of the intended target and commonly consists of exclusion and overwork. The consequences include significant psychiatric distress and loss of career opportunities. Bullies tend to be male senior consultants, whereas victims tend to be females. The fear of reprisal and non-enforcement of anti-bullying policies are the greatest barriers to addressing academic bullying. Results of bullying interventions must be interpreted with caution due to their methodological quality and reliance on surrogate measures. There is a need for well-designed trials with transparent reporting of relevant outcomes and accounting for temporal trends.

## Author contributions

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3 TA contributed to study design, informed the search strategy, extracted and synthesized study data, and drafted and edited the  
4 manuscript. YE informed the search strategy, extracted and synthesized study data, and edited the manuscript. HGCV conceived the  
5 study idea, informed the search strategy, analyzed the data, drafted and edited the manuscript, and supervised the conduct of the study.  
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10 HGCV affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important  
11 aspects of the study have been omitted; and that any discrepancies from the study as planned have been explained.  
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18  
19 None.  
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### 24 **Competing interests**

25  
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28 to the contents of this paper to disclose.  
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### 35 **Ethical approval**

36  
37 Not required.  
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## Data sharing

All data relevant to the study are included in the article.

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**Table 1. Summary of studies investigating bullying in academic medicine**

Author (year), Country	Study design	Setting	Definition of academic bullying	Target	Perpetrator	Source of bias	Risk of Bias
Benmore et al. (2018), England	Before-after	Academic hospital*	Data not provided	Residents	Senior consultants	Insufficient enrollment, inadequate sample size, no blinding of outcome assessors, high loss to follow-up, lack of statistical analysis or ITS <sup>†</sup> design	High
Duru et al. (2018), Turkey	Survey	Academic hospital	Data not provided	Consultants, researchers, administrators, nurses	Specific occupations of bullies not specified Primarily male. Senior medical staff 52.5%, non-clinical managers 31.8%, and clinical leaders 24.9%.	Inappropriate sampling and inadequate sample size	Moderate
Chambers et al. (2018), New Zealand	Survey	Academic and non-academic hospitals	Data not provided	Specialist consultants	52.5%, non-clinical managers 31.8%, and clinical leaders 24.9%.	Low response rate	Low

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House et al. (2018), USA	Before-after	Academic hospital	Data not provided	Medical Students	Faculty most frequently were the source of bullying followed by residents. Exact breakdown not specified	Insufficient enrollment, inadequate sample size, no blinding of outcome assessors, outcomes not clearly described, lack of statistical analysis, individual-level analysis or ITS design	High
Kulaylat et al. (2017), USA	Survey	Academic hospital	Verbal abuse, specialty-choice discrimination, non-educational tasks, withholding/denying learning opportunities, neglect and gender/racial insensitivity	Medical Students	Faculty (57%), residents, fellows (49%), and nurses (33%)	Inappropriate sampling, inadequate sample size, classification bias, and non-validated identification or measurement of bullying	High
Bernotaite et al. (2017), Lithuania	Survey	Academic hospitals	Data not provided	Family Consultants	25.3% supervisor, 9.8% colleague,	Inappropriate sampling, inadequate sample size,	Moderate

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					2.9% subordinate	and coverage bias	
					Surgeons most frequently followed by internal medicine consultants, then radiologists/ laboratory consultants	Low response rate and coverage bias	Moderate
Chrysafi et al. (2017), Greece	Survey	Academic and non-academic hospitals	Data not provided	Consultants			
						Inappropriate sampling and inadequate description of study population	Moderate
Kapoor et al. (2016), India	Survey	Academic hospital	Data not provided	Medical students	Data not provided	Low response rate, inadequate sample size, and coverage bias	Moderate
					Consultants 29%, nurses 27%, patients 23%, peers 19%		
Chadaga et al. (2016), USA	Survey	Academic hospitals	NAQ <sup>‡</sup> used	Residents and fellows		Low response rate, biased sampling, coverage and classification bias	High
					Senior medical staff: 58.3% in 2015, 60.6% in 2016. Non-medical staff 33.2% 2015, 33.9% 2016, Manager 5.2%		
Llewellyn et al. (2016), Australia	Survey	Academic hospitals	Data not provided	Residents			

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Rouse et al. (2016), USA	Survey	Academic clinics	NAQ used	Family medicine consultants	Data not provided	Low response rate	Low
Shabazz et al. (2016), UK	Survey	Academic and non-academic hospitals	Belittle and undermine an individual's work; undermining an individual's integrity; persistent and unjustified criticism and monitoring of work; freezing out, ignoring or excluding and continual undervaluing of an individual's effort.	Gynecology consultants	50.9% senior consultants, 22.3% junior consultants, 4.5% medical director	Low response rate, and classification bias	Moderate
Peres et al. (2016), Brazil	Survey	Academic hospital	Data not provided	Medical students	Data not provided	Low response rate, and classification bias	Moderate



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Ling et al. (2016), Australia	Survey	Academic hospitals	NAQ used	General surgery residents and consultants	For trainee victims: staff surgeon 48%, trainee surgeon 13%, admin 13%, nurses 11%, other consultant 6% For consultant victims; 31% staff surgeon, 28% admin, 13% other consultant, 11% nurses, other 10%, trainees 4%	Low response rate	Low
Kulaylat et al. (2016), USA	Before-after	Academic hospital	Data not provided	Medical Students	Faculty (57%), residents/fellows (49%), and nurses (33%)	Inadequate sample size, no blinding of outcome assessors	Moderate
Ahmadipour et al. (2016), Iran	Survey	Academic hospital	Being assigned tasks as punishment, being threatened with an unjustly bad score or failure	Medical students, interns and residents	Data not provided	Inadequate sample size	Low

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Jagsi et al. (2016), USA	Survey	Academic hospital	Data not provided	Consultants who won a career advancement award	Data not provided	Inadequate sampling frame and classification bias	Moderate
Crebbin et al. (2015), Australia and New Zealand	Survey	Academic hospitals	Data not provided	Residents, fellows and consultants	50% surgical consultants, other medical consultants (24%) and nursing staff (26%)	Low response rate	Low
Cresswell et al. (2016), UK	Before-after	Academic hospital	Data not provided	Residents	Data not provided	Insufficient description of study purpose, inadequate enrollment and sample size, no blinding of outcome assessors, outcomes not clearly described, lack of statistical analysis or ITS design and high loss to follow-up	High
Loerbroks et al. (2015), Germany	Survey	Academic hospitals	Data not provided	Residents	Data not provided	-	Low

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Malinauskiene et al. (2014), Lithuania	Survey	Non-academic clinics	NAQ used	Family medicine consultants	Bullying from patients 11.8%, from colleagues by 8.4%, from superiors by 26.6%.	-	Low
Mavis et al. (2014), USA	Survey	Academic hospitals	Mistreatment either intentional or unintentional occurs when behavior shows disrespect for the dignity of others and unreasonably interferes with the learning process	Medical students	Clinical faculty in the hospital (31%) residents/ interns (28%), nurses (11%)	Low response rate, inadequate description of study population and statistical analysis	Moderate
Oser et al. (2014), USA	Survey	Academic hospital	Data not provided	Medical students	Residents > clerkship faculty > other attendings > other students > preceptors = nurses	-	Low
Oku et al. (2014), Nigeria	Survey	Academic hospital	Data not provided	Medical students	23.7% other students, 21.7% consultants, 17.5%	-	Low

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					lecturers, 16.5% consultants, 16.5% nurses, 4.1% other staff		
Gan et al. (2014), Canada	Survey	Academic hospital	Data not provided	Medical students	Consultants	Low response rate, inappropriate sampling, small sample size and classification bias	High
Fried et al. (2015), USA	Before-after	Academic hospital	Power mistreatment defined as “made to feel intimidated, dehumanized, or had a threat made about a recommendati on, your grade, or your career Being coerced into carrying out personal services unrelated to the expected role of interns and instances	Medical students	Residents 49.7%, Clinical faculty 36.9%, preclinical faculty 7.9%	-	low
Al-Shafae et al. (2013), Oman	Survey	Academic hospitals		Residents	Internal medicine 60.3%, surgery 29%, pediatrics 15.5%. Specialists 51.7%,	Inappropriate sampling, inadequate sample size, inadequate description of study	High

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For peer review only

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evaluations for  
reasons  
unrelated to  
academic  
performance

consultants  
50%, residents  
12.1%, nurses  
24.1%

population and  
coverage bias

Owoaje et al.  
(2012),  
Nigeria

Survey

Academic  
hospital

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Medical  
Students

Consultants  
69.1%,  
residents/  
fellows 52.4%,  
other students  
15.7%, nurses  
7.8%,  
laboratory  
technicians  
4.1%

Low response  
rate

Low

Askew et al.  
(2012),  
Australia

Survey

Academic and  
non-academic  
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Meloni et al. (2011), Australia	Before-after	Academic hospital	Data not provided	Hospital employees	junior consultants 1%	Data not provided	Lack of blinding of outcome assessors, high loss to follow-up, lack of statistical analysis or ITS design, and unit of analysis not clearly described	High
Dikmetas et al. (2011), Turkey	Survey	Academic hospital	Data not provided	Residents	Surgeons > Internists	Low response rate	Low response rate, inappropriate sampling and inadequate statistical analysis	Moderate
Eriksen et al. (2011), Norway	Survey	Academic hospital	NAQ used	Hospital employees	Colleagues. Specific occupations not described	Low response rate, inappropriate sampling and inadequate statistical analysis	Inappropriate sampling, classification and coverage bias	Moderate
Imran et al. (2010), Pakistan	Survey	Academic hospitals	Threats to professional status, threats to personal standing, isolation,	Residents	Consultants	Inappropriate sampling, classification and coverage bias		Moderate

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Ogunsemi et al. (2010), Nigeria	Survey	Academic hospital	Data not provided	Residents	58% administrative staff, 41.4% from the hospital chief executive, 40.4% from patient relatives, 32.7% nurses, 30% residents, 20% patients	Inadequate sample size	Low
Best et al. (2010), USA	Before-after	Academic hospital	Data not provided	Unspecified	Data not provided	Study purpose not clearly described, insufficient enrollment, no blinding of outcome assessors, lack of statistical or individual-level analysis or ITS design	High
Nagata-Kobayashi et al. (2009), Japan	Survey	Academic hospitals	Assigned you tasks as punishment; threatened to fail you unfairly in	Residents	Surgery (27.6%), internal medicine (21.4%), emergency	Low response rate	Low

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			residency; competed maliciously or unfairly with you; made negative remarks to you about becoming a consultant or pursuing a career in medicine		medicine (11.5%), anaesthesia (11.3%). Consultants 34.1%, patients 21.7%, nurses 17.2%		
			A threat to professional status and personal standing, isolation, enforced overwork, destabilization	Residents	Consultants 30%, nurses 30%, patients 25%, radiologists 8%, residents/fellows 7%	Low response rate, inadequate sample size and description of study population	Moderate
	Scott et al. (2008), New Zealand	Survey	Academic hospital				
			Data not provided	Consultants	Senior colleagues	Inadequate sample size	Low
	Gadit et al. (2007), Pakistan	Survey	Academic and non-academic hospitals				
			Data not provided	Consultants	Colleagues 24%, patients 19%, teachers 18%, supervisors 15%,	Inappropriate sampling, inadequate sample size, and coverage bias	Moderate
	Shrier et al. (2007), USA	Survey	Academic and non-academic hospitals				



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Cheema et al. (2005), Ireland	Survey	Academic hospitals	Data not provided	Residents	Senior residents 51-70%, Nursing staff 47-59%, Administration 15-16%, Colleagues 12-13% Lecturers 27.9%, Research/senior research fellows 27.7%, Professors 16.6%, Associate professors 13.6%	Low response rate	Low
Rautio et al. (2005), Finland	Survey	Academic hospital	Data not provided	Medical students	Superiors and colleagues	Low response rate, inappropriate sampling, inadequate sample size, and coverage bias	High
Carr et al. (2000), USA	Survey	Academic hospitals	Data not provided	Consultants	54% greater seniority, 34% same seniority, 12% less senior. 49% of bullies older than victim	-	Low
Quine (1999), UK	Survey	Non-academic clinics	Data not provided	Consultants	General surgeons and obstetricians	-	Low
Wear et al. (2005), USA	Survey	Academic hospital	Data not provided	Medical students		Low response rate, inappropriate sampling, inadequate	High

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sample size,  
classification  
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validated  
measurement  
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\*Academic hospitals/clinics were defined as teaching hospitals/clinics with a university affiliation

†Interrupted time series

‡The NAQ is the negative acts questionnaire, a validated tool for assessing the prevalence of workplace bullying

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**Table 2: Self-reported description of specific bullying behaviours**

Behaviour	No. of studies/ Total studies*	Total cohort No. affected/ total participants who completed surveys on behaviours (%)*	Men No. affected/ total men who completed surveys on behaviours (%)†	Women No. affected/ Total women who completed surveys on behaviours (%)†
<b>Threats to professional status</b>				
Persistent unjustified criticism	10/19	2587/10404 (24.9)	535/1690 (31.7)	552/1402 (39.4)
Excessive monitoring of work	6/19	1752/6079 (28.8)	442/1525 (27.7)	441/1298 (34.0)
Intimidatory use of discipline	11/19	1156/17046 (6.8)	323/1746 (18.5)	237/1546 (15.3)
Spread of gossip/rumours	5/19	892/3694 (24.2)	88/596 (14.8)	94/453 (20.8)
False allegations	5/19	577/3694 (15.6)	59/596 (9.9)	54/453 (11.9)
Refusal of leave, training or promotion	6/19	1174/6079 (19.3)	215/1690 (12.7)	197/1402 (14.1)
<b>Isolation</b>				
Social/professional exclusion	13/19	3895/13963 (27.9)	301/1718 (17.5)	925/2385 (38.8)
<b>Overwork</b>				
Undue pressure to produce work	7/19	2509/6562 (38.2)	233/1525 (15.3)	355/1570 (22.6)
Setting impossible deadlines	6/19	1571/6079 (25.8)	164/1525 (10.8)	189/1298 (14.6)
<b>Destabilization</b>				
Shifting goalposts	1/19	54/417 (12.9)	Not reported	Not reported
Removal of areas of responsibility without consultation	8/19	1397/6193 (22.6)	160/1525 (10.5)	171/1298 (13.2)

Withholding information that affects performance	7/19	1786/6137 (29.1)	219/1553 (14.1)	267/1328 (20.1)
Ordered to work below one's competence level	9/19	2860/8017 (35.7)	81/625 (13.0)	99/483 (20.5)

\*Total number of studies that described types of bullying behaviours, including studies that did not stratify results by sex. As a result, the denominator for the number of participants in total is not the sum of the denominators for men and women. The denominator was calculated from the total number of individuals who completed surveys on specific bullying behaviours, while the numerator was calculated from the number of individuals who indicated they experienced the specified bullying behaviour. Not all survey studies offered respondents the same options to respond to, and as a result the denominators for each bullying behaviour differ.

†Of the studies that separated data by gender or solely included the results of one gender and included the specified bullying behaviour.

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**Table 3. Self-reported impact of academic bullying**

<b>Effect of academic bullying</b>	<b>No. of studies/ Total studies*</b>	<b>Total cohort No. of affected participants/ total participants who completed surveys on the impact of bullying (%)*</b>	<b>Men No. of affected men/ total men who completed surveys on the impact of bullying (%)†</b>	<b>Women No. of affected women/ total women who completed surveys on the impact of bullying (%)†</b>
<b>Psychologic</b>				
Psychologic distress including depressive/PTSD symptoms	9/20	839/2076 (40.4)	103/161 (64.0)	64/101 (63.4)
Reduced confidence in clinical skill	4/20	296/1518 (19.5)	68/212 (32.1)	97/597 (16.2)
<b>Career</b>				
Missed career opportunities	12/20	1570/6637 (23.7)	89/812 (11.0)	310/1325 (23.4)
Considerations of quitting	8/20	1023/2704 (37.8)	Not reported	Not reported
Termination of employment	3/20	84/1046 (8.0)	4/139 (2.9)	4/150 (2.7)
Leave of absence	2/20	50/748 (6.7)	Not reported	Not reported
Self-reported worsening of clinical performance	5/20	528/1801 (29.3)	42/161 (26.1)	22/101 (21.8)

\*Total number of studies that described the impact of bullying, including studies that did not stratify results by sex. Not all participants were given the same options to select from.

†Of the studies that separated data by gender or solely included the results of one gender and included the impact of bullying.

**Table 4. Barriers to addressing academic bullying**

<b>Barrier</b>	<b>No. of studies/Total studies*</b>	<b>No. of participants/total participants (%)</b>
<b>Low reporting rates</b>		
Lack of awareness of what constitutes bullying	3/18	53/397 (13.4)
Lack of awareness of reporting process	8/18	934/2931 (31.9)
Lack of perceived benefit	4/18	214/538 (39.8)
Fear that bullying would worsen	6/18	448/1168 (38.4)
Fear of career ramifications	7/18	829/2199 (37.7)
Concerns regarding confidentiality	3/18	48/397 (12.1)
<b>Institutional factors</b>		
Hierarchical nature of medicine	4/18	Not reported
Recurring cycle of abuse	3/18	Not reported
Normalization of bullying	5/18	Not reported
Lack of enforcement	5/18	391/1106 (35.4)

\*Total number of studies that described barriers of bullying behaviours

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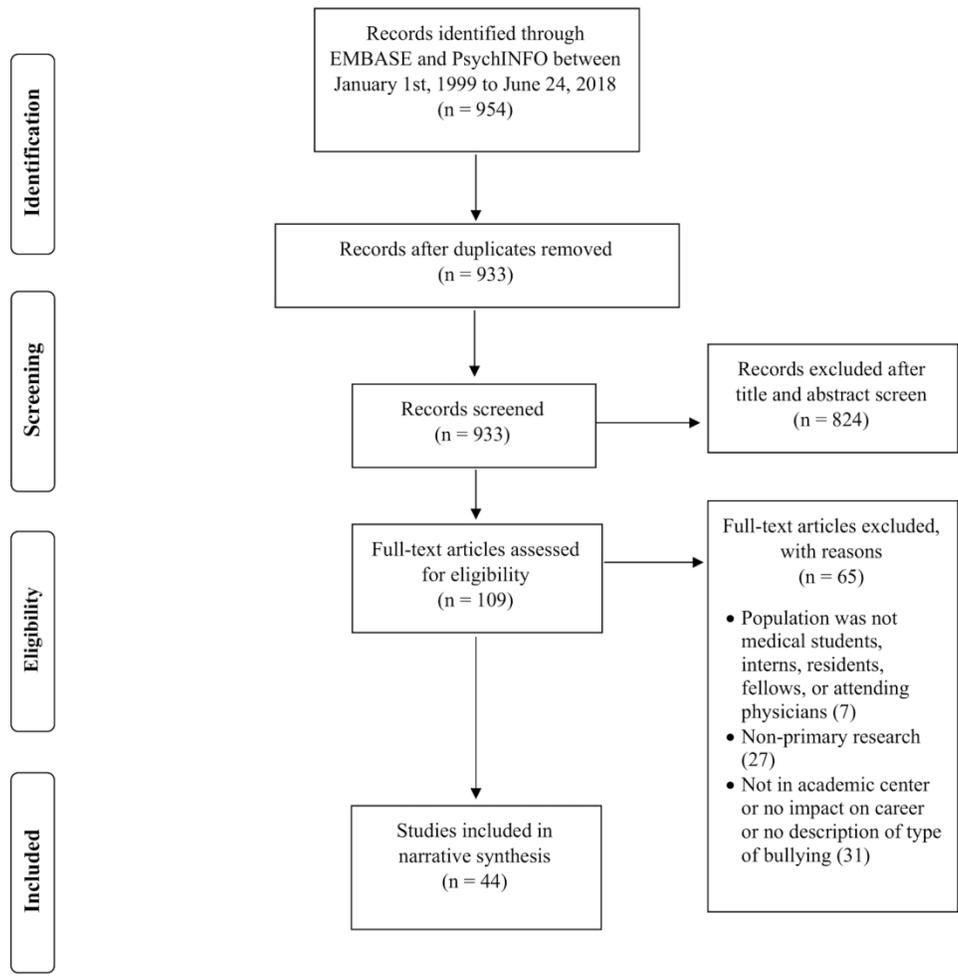
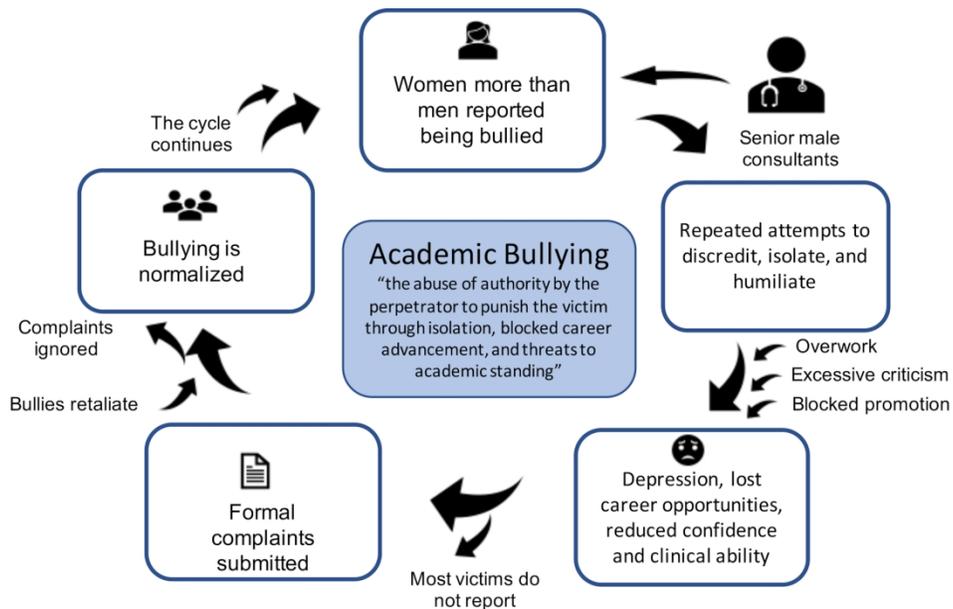


Figure 1: The flow diagram of included studies  
We included 44 studies in this review. Reasons for exclusion are described at each stage of study selection.

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Central illustration: The definition, manifestations, impact, victims, and perpetrators of academic bullying

Academic bullying is defined as an abuse of authority through punishing behaviours that include overwork, destabilization, and isolation. Victims are commonly men, while perpetrators are commonly male consultants. Individual and institutional factors contribute to the ongoing cycle of bullying.

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**Supplementary table S1: Pooled prevalence of specific bullying behaviours by level of training**

<b>Behaviour</b>	<b>No. of studies/ Total studies*</b>	<b>Medical Students No. of participants/ total participants (%)*</b>	<b>Residents and fellows No. of participants/ total participants (%)*</b>	<b>Consultants No. of participants/ total participants (%)*</b>
<b>Threats to professional status</b>				
Persistent unjustified criticism	8/17	192/269 (71.4)	1696/6444 (26.3)	600/2881 (20.8)
Excessive monitoring of work	4/17	Not reported	1020/2445 (41.7)	564/2824 (20.0)
Intimidatory use of discipline	11/17	565/13363 (4.2)	541/2561 (21.1)	38/1112 (3.4)
Spread of gossip/rumours	3/17	Not reported	Not reported	755/2881 (26.2)
False allegations	3/17	Not reported	Not reported	509/2881 (17.7)
<b>Isolation</b>				
Social/professional exclusion	12/17	156/776 (20.1)	1684/6019 (28.0)	1272/4445 (28.6)
Refusal of leave, training or promotion	4/17	Not reported	286/2445 (11.7)	727/2824 (25.7)
<b>Overwork</b>				
Undue pressure to produce work	7/17	Not reported	827/2928 (28.2)	1326/2824 (47.0)
Setting impossible deadlines	6/17	Not reported	351/2445 (14.4)	965/2824 (34.2)
<b>Destabilization</b>				
Shifting goalposts	1/17	Not reported	54/654 (8.3)	Not reported
Removal of areas of responsibility without consultation	6/17	11/56 (19.6)	267/2503 (10.7)	784/2824 (27.8)

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Withholding information that affects performance	5/17	Not reported	415/2503 (16.6)	1140/2824 (40.4)
Ordered to work below one's competence level	6/17	182/269 (67.7)	1202/3574 (33.6)	975/2881 (33.8)

\*Total number of studies that described types of bullying behaviours that separated data by level of training

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**Supplementary table S2: The pooled impact of academic bullying by level of training**

<b>Effect of academic bullying</b>	<b>No. of studies/ Total studies*</b>	<b>Medical Students No. of participants/ total participants (%)*</b>	<b>Residents and fellows No. of participants/ total participants (%)*</b>	<b>Consultants No. of participants/ total participants (%)*</b>
<b>Psychiatric</b>				
Psychiatric distress including depressive/PTSD symptoms	8/19	422/579 (72.9)	220/456 (48.2)	178/996 (17.9)
Reduced confidence in clinical skill	4/19	119/262 (45.4)	Not reported	177/1259 (14.1)
<b>Career</b>				
Missed career opportunities	12/19	484/3020 (16.0)	141/389 (36.2)	948/3228 (29.4)
Considered quitting	8/19	109/317 (34.4)	Not reported	908/2375 (38.2)
Terminated employment	3/19	Not reported	73/698 (10.5)	11/348 (3.2)
Leave of absence	2/19	Not reported	Not reported	50/748 (6.7)
Self-reported worsening of clinical performance	4/19	202/579 (34.9)	35/203 (17.2)	51/563 (9.1)

\*Total number of studies that described the impact of academic bullying and separated data by level of training

**Supplementary table S3. Suggested policies, interventions and reported outcomes**

Intervention	Outcome
<b>Zero-tolerance policy</b>	
(Meloni and Austin, 2011)	Increased employee engagement and workplace satisfaction Increased trust among victims that reports would be appropriately managed (44% to 64%) Victims felt safer reporting incidents of bullying (67% to 84%)
(Fried et al., 2012)	Improved awareness of where and whom to report to (67% to 84%) Reduced power abuse (43% to 30%) but no change in overall mistreatment rates
<b>Bullying workshops</b>	
(Benmore et al., 2018)	Increased willingness to try to repair the harm caused by bullying and became more conscious of giving feedback
(Kulaylat et al., 2016)*, USA)	Data not provided
(Cresswell et al., 2016)*	Data not provided
(Oku et al., 2014)*	Data not provided
<b>Tracking and reporting mistreatment data</b>	
(House et al., 2018)	Decreased unprofessional or disrespectful behaviour by faculty as reported by students [4.8% (2015-16) to 1.7% (2016-17)]
(Gan and Snell, 2014)	No difference in mistreatment
(Mavis et al., 2014)*	Data not provided
<b>Staff education on formal reporting process</b>	
(Fried et al., 2012)	No change in reporting rate
(Al-Shafae, 2013)*	Data not provided
(Imran et al., 2010)*	Data not provided
(Wear et al., 2005)*	Data not provided
(Scott et al., 2008)*	Data not provided

**Develop a committee to handle reporting**

(Best et al., 2010) Resolutions reached 96% of formal reports

(Gadit et al., 2007)\* Data not provided

(Kapoor et al., 2016)\* Data not provided

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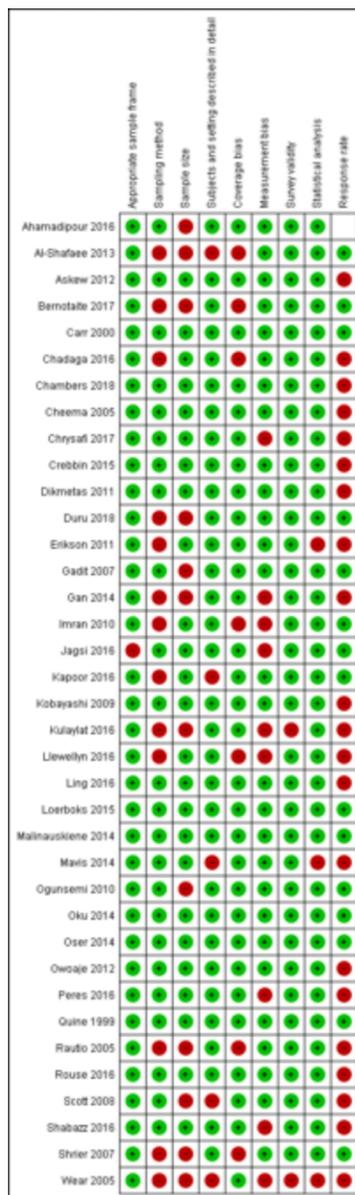
\*Suggested approach that had not been implemented

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**Supplementary figure S1: Search strategy**

1. Exp bullying
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3. Exp hospitals
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5. (Workplace or career or professional or academic or promotion\* or employment or job or profession or reputation or academia).mp
6. (medicine or residency\* or "medical school" or "clinical training" or hospital or internship or fellow\* or "junior doctor" or "house officer" or "clinical clerk" or "attending physician" or physician or doctor or clinician or hierarchical system or "clinician-scientist" or learner or faculty or "NHS").ti,ab.
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Supplementary figure S2: The risk of bias of survey studies included in this review  
Most studies in this review had at least a moderate risk of bias. Common sources of bias included inappropriate sampling techniques and low sample sizes



	Study objective clearly stated	Eligibility criteria pre-specified	Sample representativeness	All eligible participants enrolled	Sample size	Intervention clearly described	Outcome measures clearly described and valid	Blinding of outcome assessors	Follow-up rate	Statistical analysis of pre-post changes	Multiple outcome measures	Group-level interventions and individual-level outcome efforts
Benmore 2018	+	+	+	-	-	+	+	-	-	-	-	+
Best 2010	-	+	+	-	+	+	+	-	+	-	-	-
Cresswell 2016	-	-	+	-	-	+	-	-	-	-	-	+
Fried 2015	+	+	+	+	+	+	+	-	+	+	-	+
House 2018	+	+	+	-	-	+	-	-	+	-	-	-
Kulaylat 2016	+	+	+	+	-	+	+	-	+	+	-	+
Meloni 2011	+	+	+	+	+	+	+	-	-	-	-	-

Supplementary figure S3: The risk of bias of before-after studies included in this review  
 Most studies in this review had at least a moderate risk of bias. Common sources of bias included lack of blinding or a control group and low sample sizes



# PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
<b>TITLE</b>			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
<b>ABSTRACT</b>			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
<b>INTRODUCTION</b>			
Rationale	3	Describe the rationale for the review in the context of what is already known.	4
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	4-5
<b>METHODS</b>			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	N/A
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	5-6
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	5
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	5
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	6
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	6
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	6
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	6-7
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	7
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I <sup>2</sup> ) for each meta-analysis.	7



# PRISMA 2009 Checklist

Page 1 of 2

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	N/A
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	6-7
<b>RESULTS</b>			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	8
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	8
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	15
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	8-14
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	N/A
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	N/A
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	9-12
<b>DISCUSSION</b>			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	15-19
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	19
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	20
<b>FUNDING</b>			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	21

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

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Page 2 of 2

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# BMJ Open

## A systematic review of academic bullying in medical settings: behaviours, perpetrators, victims, and consequences

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2020-043256.R2
Article Type:	Original research
Date Submitted by the Author:	29-Mar-2021
Complete List of Authors:	Averbuch, Tauben; McMaster University, Medicine Eliya, Yousif; McMaster University, Health Research Methodology Van Spall, Harriette Gillian Christine; McMaster University, Health Research Methods, Evidence, and Impact; Population Health Research Institute, Medicine
<b>Primary Subject Heading</b>:	Medical education and training
Secondary Subject Heading:	Occupational and environmental medicine
Keywords:	MEDICAL EDUCATION & TRAINING, GENERAL MEDICINE (see Internal Medicine), HEALTH SERVICES ADMINISTRATION & MANAGEMENT

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3 **A systematic review of academic bullying in medical settings: behaviours, perpetrators, victims, and consequences**  
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5 Averbuch T<sup>a</sup>, Yousif E<sup>b</sup>, Van Spall HGC<sup>b, c</sup>  
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14 McMaster University, Hamilton, Ontario; <sup>c</sup>Population Health Research Institute, Hamilton, Ontario  
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## ABSTRACT

**Purpose:** To characterize the dynamics and consequences of bullying in academic medical settings, describe individual and institutional factors that promote academic bullying, and potential interventions.

**Design:** Systematic review.

**Data sources:** We searched EMBASE and PsycINFO for articles published between January 1, 1999 and February 7, 2021.

**Study selection:** We included studies conducted in academic medical settings in which victims were either consultants or trainees, and described bullying behaviours; the perpetrators or victims; the impact, barriers to addressing academic bullying, and/or interventions. Study characteristics, quality, and data were assessed independently by 2 reviewers.

**Results:** We included 68 studies representing 82,349 consultants and trainees. We defined academic bullying as the abuse of authority in an academic setting to impede the education or career of the victim through punishing behaviours that include overwork, destabilization, and isolation. Of 35,779 individuals (in 28 studies) who responded about bullying patterns, the most common (38.2% of respondents) was overwork. Of 24,894 individuals (33 studies) who reported the impact, the most common was psychologic distress (39.1%). Among bullies identified by 15,868 individuals (31 studies), consultants (53.6%) were most common. Of 15,246 victims who reported gender (27 studies), the majority were women (56.2%). Among 9,410 victims (in 25 studies) who described their response, 28.9% filed a report and most (57.5%) did not perceive a positive outcome. Studies that tested the effect of interventions to mitigate bullying had a high risk of bias.

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3 **Conclusions:** Academic bullying commonly involves overwork, and is perceived as having a negative impact on well-being.  
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5 Perpetrators were commonly male consultants and victims were commonly women. Only a minority of victims filed a report.  
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7 Methodologically robust trials of anti-bullying interventions are needed.  
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10 **Limitations:** Most studies (40/68) had at least a moderate risk of bias. All interventions were uncontrolled before-after studies.  
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12 **Keywords:** Medical Education & Training, General Medicine, Health Services Administration & Management  
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### 17 **Strengths and limitations**

- 19 • This review is comprehensive, including 68 studies with 82,349 consultants and trainees, across several countries and  
20 including all levels of training.  
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- 22 • We explicitly defined inclusion criteria, and used established tools to assess the risk of bias of included studies  
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- 24 • The included studies varied in their definitions of bullying, sampling bias was noted among the surveys, and intervention  
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## Background

Bullying behaviours have been described as repeated attempts to discredit, destabilize, or instill fear in an intended target<sup>1</sup>. Bullying can take many forms from overt abuse to subtle acts that erode the confidence, reputation, and progress of the victim<sup>2</sup>. Bullying is common in medicine, likely impacting mental health, professional interactions, and career advancement<sup>3-6</sup>. It may also impact a physician's ability to care for patients<sup>7</sup>. Surveys from the National Health Service (NHS) in the United Kingdom showed that 55% of staff experienced at least one type of bullying; 31% were doctors in training<sup>8</sup>. Bullying is closely related to harassment and discrimination, in which mistreatment is based on personal characteristics or a protected class such as sex or race<sup>9</sup>. Within academic settings, victims may experience all three and the distinction may be less clear. Unlike harassment and discrimination, which have specific legal definitions, bullying is an amorphous term whose victims are often left without legal recourse.

The hierarchical structure of academic medicine – in which there are power imbalances, subjective criteria for recruitment and career advancement, and siloed departments with few checks in place for toxic behaviours – may offer an operational environment in which bullying may be more widespread than in non-academic medical settings. Academic bullying is a seldom-used term within the literature, but is intended to describe the forms of bullying that may exist in academic settings. Academic bullying can be defined as mistreatment in academic institutions with the intention or effect of disrupting the academic or career progress of the victim<sup>10</sup>. The prevalence of academic bullying in medical settings is unknown likely due to a lack of definition of bullying behaviours, a fear of reporting, and insufficient research. There is not much known about the characteristics of perpetrators and victims, and about the

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3 impact of bullying on academic productivity, career growth, and patient care. Furthermore, institutional barriers and facilitators of  
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5 bullying behavior have not been reported, and the effectiveness of interventions in addressing academic bullying have not been  
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7 evaluated.  
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12 The purpose of this systematic review is to define and classify patterns of academic bullying in medical settings; assess the  
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14 characteristics of perpetrators and victims; describe the impact of bullying on victims; review institutional barriers and facilitators of  
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16 bullying; and identify possible solutions.  
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## 20 21 **Methods**

### 22 23 **Data sources and searches**

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25 This study follows PRISMA reporting guidelines. Two reviewers (T.A, Y.E.) searched two online databases (EMBASE and  
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27 PsycINFO) for English-language articles published between January 1, 1999, to February 7, 2021 and relevant to academic bullying in  
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29 medicine. An outline of the search is provided in Figure 1. A combination of medical subject heading (MeSH), title, and abstract text  
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31 terms encompassing “Medicine”; “Bullying” and “Academia” were used for the full search. The terms of the search are included in  
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33 Supplementary figure S1. Two authors (T.A, Y.E.) independently screened articles for inclusion. Differences were resolved by  
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35 discussion, and if necessary, by a third author (H.V.).  
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## Study selection

We included studies conducted in academic medical settings in which victims were either consultants or trainees. We defined academic medical settings as hospitals or clinics that were either university-affiliated or involved trainees. In the case of pre-clinical medical students, academic medical settings included the university where medical instruction took place. Studies were included if they described: the method and impact of bullying; the characteristics of perpetrators and victims; or interventions used to address the bullying. Studies that included trainees or consultants in both academic and non-academic settings were included. We excluded editorials, opinion pieces, reviews, conference abstracts, theses, dissertations, and grey literature.

## Data extraction and quality assessment

Two reviewers (T.A, Y.E.) independently extracted data on: study design, setting (academic or non-academic), definition, description and impact of academic bullying, characteristics of perpetrators and victims, barriers and facilitators of bullying, and interventions and their outcomes. Two reviewers independently assessed studies for risk of bias. We assessed before-after studies using the National Heart, Lung, and Blood Institute quality assessment tool<sup>11</sup> and assessed prevalence surveys using the Joanna Briggs Institute critical appraisal tool<sup>12</sup>. We classified survey studies as low risk of bias if at least 8 of 9 criteria were met, medium risk of bias if 7 of 9 were met, and high risk of bias if less than 7 were met. We classified before-after studies as low risk of bias if at least 11 of 12 criteria were met, medium risk of bias if at least 9 of 12 were met, and high risk of bias if less than 9 were met.

## Data synthesis and analysis

We developed a definition for academic bullying through narrative synthesis of the definitions provided by studies included in this systematic review. We pooled the results of surveys on the basis of similarity of survey themes to facilitate a descriptive analysis. For survey studies on the prevalence or impact of bullying, we solely pooled the results of studies that asked respondents about specific bullying behaviours or impacts, respectively. We then separated results by sex and level of training. Group selection was by consensus between authors. We presented our results as numbers and percentages. We calculated the denominators from the total number of individuals who completed surveys on types of bullying behaviours, the impact of bullying, characteristics of bullies and victims, or barriers to addressing academic bullying. The numerators were calculated from the number of individuals who experienced a specific behaviour or impact, were bullied by a perpetrator at a specified level of training, or endorsed a specific reason for not making a formal report. We also reported the number of studies that described each specific bullying behaviour or impact, demographic characteristics of victims and perpetrators, barriers and facilitators of academic bullying, and specific reasons for not making a formal report. We could not perform a meta-analysis due to the conceptual heterogeneity between studies.

## Patient and public involvement

Patients or the public were not involved in the design, conduct, reporting, or dissemination plans of our research.

## Results

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## Screening results

We identified 1342 unique articles, 68 of which met inclusion criteria. Reasons for exclusion are described in Figure 1.

## Characteristics of included studies

Studies were most frequently set in the USA (reported in 31 studies)<sup>3,13-41</sup> and the UK (reported in 5 studies)<sup>8,42-45</sup> and were set in academic hospitals (reported in 54 studies)<sup>1,3-6,13-15,17,19-21,23,24,26,27,29,30,32-35,37-39,41-65</sup> or in both teaching and non-teaching sites (reported in 14 studies)<sup>8,16,25,28,36,40,66-73</sup>. Twenty-five studies included medical students<sup>3-5,13,15,21,22,24,26,33-35,37,39,48,50,52,57-60,63,64,74,75</sup>, 27 included residents or fellows<sup>1,14,16-18,20,22,23,25,27-32,44,45,49-51,55,56,61,62,65,69,72</sup> and 25 included consultants<sup>6,8,16,19,20,25,28,36,38,40-43,46,47,53,66-73,75</sup> (Table 1).

## Definition of academic bullying

Six papers provided definitions for academic bullying<sup>33,48,50,56,58,63</sup>. Common themes included behaviours where the perpetrator abuses authority to punish the victim through isolation, blocked career advancement, and threats to academic standing. We defined academic bullying as the abuse of authority by a perpetrator who targets the victim in an academic setting through punishing behaviours that include overwork, destabilization, and isolation in order to impede the education or career of the target. Multiple studies used the complete or partial Negative Acts Questionnaire (NAQ), a standardized list of bullying behaviours (reported in 24 studies)<sup>1,3,4,6,13-15,24,29,31,36,47-52,54,55,57,60,61,67,73</sup>.

### Patterns of academic bullying behaviours

There were 35,779 consultant and trainee respondents to surveys of bullying behaviours (reported in 28 studies), but not all were offered the same options to select from (Table 2). Bullying behaviours were grouped into destabilization (reported in 15 studies), threats to professional status (reported in 23 studies), overwork (reported in 7 studies), and isolation (reported in 17 studies). Undue pressure to produce work was commonly reported (38.2% of respondents affected, reported in 7 studies)<sup>14,36,45,47,49,54,67</sup>. Of the 15 studies that described destabilization, common methods included being ordered to work below one's competency level (36.1%, reported in 10 studies)<sup>31,36,45,47-49,52,67,71,72</sup> and withholding information that affects performance (30.7%; reported in 9 studies)<sup>14,29,31,36,47-49,54,67</sup>. Of the 23 studies that described threats to professional status, common methods were excessive monitoring (28.8%; reported in 6 studies)<sup>14,36,47,49,54,67</sup> and criticism (26.9%; reported in 12 studies)<sup>14,21,29,36,45,47,49,52,54,67,71,72</sup>. Of the 17 studies that described isolation, the most common method was social and professional exclusion (29.1%; reported in 17 studies)<sup>4,14,21,24,29,31,36,40,47-49,52,54,63,67,70,72</sup>.

There were 6,179 consultant and trainee respondents to surveys that separated the prevalence of bullying behaviours by sex (reported in 11 studies). A greater proportion of women experienced all bullying behaviours (reported in 11 studies)<sup>14,16,19,22,36,40,48,52,57,63,65</sup> (Table 2). There were 34,175 respondents to surveys that analyzed results by level of training (reported in 24 studies) (Supplementary table S1). A greater proportion of consultants experienced refusal of applications for leave, training, or promotion (26.3%, reported in 3 studies)<sup>19,36,47</sup> and removal of areas of responsibility (27.8%, reported in 2 studies)<sup>36,47</sup> than residents

(11.0%, reported in 3 studies; 10.7%, reported in 3 studies, respectively)<sup>14,22,54,55</sup> or medical students (13.4%; 19.6%, reported in 1 study)<sup>22,24</sup>. Compared to medical students (4.6%, reported in 6 studies)<sup>13,15,22,24,52,57</sup> and consultants (3.4%, reported in 2 studies)<sup>36,71</sup>, a greater proportion of residents experienced the intimidatory use of discipline procedures (17.8%, reported in 6 studies)<sup>14,22,48,54,55,65</sup>. A greater proportion of medical students experienced persistent criticism (66.4%, reported in 2 studies)<sup>21,52</sup> than residents (28.3%, reported in 5 studies)<sup>14,29,45,54,72</sup> and consultants (20.8%, reported in 3 studies)<sup>36,47,71</sup>.

### Characteristics of bullies

Thirty-one unique studies representing 15,868 consultants and trainees described the characteristics of bullies, although not all were offered the same options to select from. Common perpetrators included consultants (53.6%, reported in 30 studies)<sup>1,3,4,6,8,14,15,17,18,20,22,27,28,33,37,40,43,45,47-49,52,54,56,60,62,63,66,72,73</sup>, residents (22.0%, reported in 22 studies)<sup>1,3,6,8,15,17,18,20,22,25,27,28,33,37,45,48,49,54,56,60,62</sup>, and nurses (14.9%, reported in 21 studies)<sup>1,3,4,14,15,17,20,22,25,27,28,33,37,45,48,49,54,56,60,62,73</sup>. Of the 4,277 individuals who identified the gender of their bullies, most reported primarily male (67.2%, reported in 5 studies)<sup>8,36,43,47,72</sup>, followed by primarily female (26.1%, reported in 5 studies)<sup>8,36,43,47,72</sup>, and both (6.7%, reported in 3 studies)<sup>8,43,47</sup>. Among 6,084 medical students, perpetrators were commonly consultants (43.1%, reported in 8 studies)<sup>3,4,15,22,33,37,52,60</sup>, residents (35.7%, reported in 6 studies)<sup>3,15,22,33,37,60</sup>, nurses (12.4%, reported in 7 studies)<sup>3,4,15,22,33,37,60</sup>, and other medical students (8.8%, reported in 5 studies)<sup>3,4,22,52,63</sup>. Among 6,289 residents, perpetrators were commonly consultants (52.2%, reported in 12 studies)<sup>1,14,17,18,22,27,45,48,49,54,56,62</sup>, nurses (24.3%, reported in 11 studies)<sup>1,14,17,22,27,45,48,49,54,56,62</sup>, and other residents (20.6%, reported in

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12 studies)<sup>1,14,17,18,22,27,45,48,49,54,56,62</sup>. Of the 1,500 consultants, perpetrators were their peers (39.2%, reported in 7 studies)<sup>6,8,40,47,49,66,73</sup>, senior consultants (23.7%, reported in 5 studies)<sup>6,8,40,43,73</sup>, and administration (17.7%, reported in 4 studies)<sup>43,47,49,66</sup>.

Six unique studies representing 1,698 interns and medical students described the prevalence of academic bullying according to the specialty rotation of the learner. Academic bullying was common in surgery (32.9% of respondents, reported in 6 studies)<sup>1,13,34,48,56,60,72</sup>, obstetrics and gynecology (25.5%, reported in 2 studies)<sup>13,60</sup> and internal medicine (21.4%, reported in 5 studies)<sup>1,13,48,56,60,72</sup>.

### Characteristics of victims

Forty-one unique studies described the characteristics of victims, and 29 included the proportion of those who experienced bullying. Of the 15,704 women and 19,495 men who responded to surveys that analyzed results by sex, women were more likely to report being bullied than men (54.6% of all women compared to 34.2% of all men, reported in 27 studies)<sup>3,4,14,16,17,19,20,27,28,36,38,41,47-52,55-57,62,63,65,69,72,75</sup>. There were 10,730 consultant and trainee respondents to surveys that separated the results by demographic characteristics other than sex, but not all characteristics were captured by each study. A greater proportion of international graduates / non-citizens experienced bullying than citizens (48.0% compared to 43.3%, reported in 4 studies)<sup>14,17,45,72</sup>, and a greater proportion of overweight participants (BMI > 25) experienced bullying than those with a BMI ≤ 25 (17.8% compared to 11.8%, reported in 1 study)<sup>51</sup>. The relationship between age and bullying varied based on the cut-off used and the survey sample in each study. Among



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3 consultants, a greater proportion of those with full professorship experienced bullying than assistant professors (68.0% compared to  
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5 51.9%, reported in 1 study)<sup>41</sup>.  
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### 10 **Impact of academic bullying**

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12 There were 24,894 consultant and trainee respondents to surveys on the psychological (reported in 20 studies) and career  
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14 impact (reported in 25 studies) of academic bullying (Table 3), although not all were offered the same options to select from.  
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16 Respondents commonly reported psychiatric distress (39.2%; reported in 14 studies)<sup>6,17,18,27,29,30,43,47,52,56,59,62,71,73</sup>, considerations of  
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18 quitting (35.9%; reported in 7 studies)<sup>25,31,43,47,66,70,72</sup>, and reduced clinical ability (34.6%; reported in 8 studies)<sup>25,30,31,45,47,52,56,59</sup>.  
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20 Respondents agreed that academic bullying negatively affected patient safety (68.0%; reported in 2 studies)<sup>18,31</sup>. Nine studies  
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22 representing 13,418 individuals described the impact of bullying separated by sex (Table 3). A greater proportion of women  
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24 experienced loss of career opportunities (43.6%, reported in 8 studies)<sup>16,19,36,38,40,41,52,65</sup> while a greater proportion of men experienced  
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26 decreased confidence (32.1%, reported in 2 studies)<sup>41,52</sup> and clinical ability (26.1%, reported in 1)<sup>52</sup>.  
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33 There were 16,523 consultant and trainee respondents to surveys that separated results by level of training (Supplementary  
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35 table S2). A greater proportion of medical students experienced psychiatric distress (72.9%; reported in 2 studies)<sup>52,59</sup> than residents  
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37 (40.8%; reported in 6 studies)<sup>17,18,29,30,56,62</sup> and consultants (17.9%; reported in 4 studies)<sup>43,47,71,73</sup>. A greater proportion of residents  
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3 endorsed loss of career opportunities (35.0%; reported in 3 studies)<sup>55,65,72</sup> compared to medical students (16.0%; reported in 3  
4 studies)<sup>13,15,52</sup> and consultants (30.6%; reported in 8 studies)<sup>19,36,38,40,41,47,70,71</sup>.  
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### 8 9 10 **Barriers and facilitators of academic bullying**

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12 Thirty-five unique studies pertained to barriers to victims making a formal report (reported in 26 studies) and institutional  
13 facilitators (reported in 25 studies) of academic bullying (Table 4). There were 9,239 consultant and trainee respondents to surveys on  
14 their actions taken in response to bullying and reasons for not making a formal report, although not all were given the same options to  
15 select from. Victims commonly did not make a formal report<sup>1,3,4,15,36,43,47,49,50,54,56,60,62,66,72</sup>; only 28.9% made a formal report.  
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17 Deterrents to reporting included concern regarding career implications (41.1%; reported in 15 studies)<sup>1,4,15,25,28,35,47,48,50,56,62,65,66,70,72</sup>,  
18 not knowing who to report to (26.5%; reported in 15 studies)<sup>1,4,16,22,25,33,47,48,50,56,62,65,66,70,75</sup>, and poor recognition of bullying (11.4%;  
19 reported in 5 studies)<sup>5,15,25,33,35,37,42,48,56</sup>. Of the 26 studies, 7 studies representing 1139 individuals reported the outcomes of  
20 reporting<sup>1,36,43,47,49,65,72</sup> although only a small range of outcomes were offered among options. Submitting a formal report often had no  
21 perceived effect on bullying (35.6%; reported in 5 studies)<sup>36,43,47,49,72</sup> a greater proportion of victims endorsed worsening (21.9%;  
22 reported in 3)<sup>36,49,65</sup> than improvement (13.7%; reported in 5 studies)<sup>1,36,43,49,72</sup> in bullying following reporting.  
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38 In the 25 unique studies that described institutional facilitators of bullying, common facilitators were lack of enforcement  
39 (reported in 13 studies)<sup>1,16,20,25,28,36,43,47,49,50,54,56,65</sup>, the hierarchical structure of medicine (reported in 7 studies)<sup>26,54,56,57,63,64,71</sup>, and  
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3 normalization of bullying (reported in 10 studies)<sup>3,15,19,23,26,31,34,47,62,65</sup>. Individual-level data was not pooled as institutional facilitators  
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5 of bullying were most commonly elicited via free-response portions of surveys with varying completion rates.  
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### 8 9 10 **Suggested strategies, interventions, and outcomes**

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12 Forty-nine unique studies suggested strategies to address academic bullying. These strategies included promoting anti-bullying  
13 policies (reported in 13 studies)<sup>3,14–16,35,45,53,54,56,58,59,66,71</sup>, education to prevent academic bullying (reported in 20  
14 studies)<sup>1,3,4,14,15,20,25,26,31,33,35,45,48,54,59,63–65,71,72</sup>, establishing an anti-bullying oversight committee (reported in 10  
15 studies)<sup>21,22,26,28,30,34,39,58,69,71</sup>, institutional support for victims (reported in 5 studies)<sup>35,46,58,62,72</sup>, and internal reviews where hospitals  
16 develop targeted solutions for their environment (reported in 5 studies)<sup>15,22,24,60,63</sup> (Supplementary table S3).  
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26 Of the 49 unique studies, 10 implemented organization-level interventions which included workshops with vignettes to  
27 improve recognition of bullying (reported in 4 studies)<sup>23,37,42,44</sup>; a gender and power abuse committee that established reporting  
28 mechanisms and held mandatory workshops on mistreatment (reported in 1)<sup>3</sup>; a gender equity office to handle reporting (reported in  
29 1)<sup>39</sup>; a professionalism-focused approach that included professionalism in employee contracts and performance reviews and a  
30 professionalism office to handle student complaints (reported in 1)<sup>26</sup>; zero-tolerance policies (reported in 1)<sup>53</sup>; and institutional-level  
31 tracking of mistreatment to provide targeted staff education (reported in 2)<sup>21,24</sup>. All 10 studies had an uncontrolled before-after design,  
32 and as such, did not establish causality. In the studies of vignettes, common bullying behaviours were demonstrated to improve  
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3 recognition of both subtle and overt acts of bullying. Of the 4 studies that involved bullying recognition workshops, three reported an  
4 associated improvement in bullying recognition<sup>37,42,44</sup>. In a study that developed a gender equity office, reporting was handled through  
5 an intermediary; decisions were binding with consequences for retaliation including termination of employment<sup>39</sup> and 96% of all  
6 formal reports were resolved. In a study where a Gender and Power Abuse committee was formed, there was an associated reduction  
7 in academic abuse<sup>3</sup>. Similarly, in a study that used a multifaceted approach of developing a professionalism committee, and including  
8 professionalism in contracts and performance reviews, there was a 35.9% decrease in reporting of mistreatment, and improved  
9 awareness of the reporting process<sup>26</sup>. In a study where a clerkship committee monitored unprofessionalism, there was an associated  
10 reduction in narrative comments regarding unprofessionalism on end of rotation surveys<sup>21</sup>. In a study assessing the impact of a  
11 professionalism retreat about mistreatment for consultants, there was no reduction in medical student mistreatment<sup>13</sup>. In a study  
12 assessing the implementation of zero-tolerance policies, there was an associated improvement in awareness of bullying reporting  
13 processes<sup>53</sup>.

### 31 **Assessment of bias**

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33 Twenty-eight studies had a low risk of bias<sup>3,4,8,13,16–19,22,27,29,30,36,41,45,47,49–52,55,56,63,66,71–73,75</sup>, 21 had a moderate risk of  
34 bias<sup>1,6,14,15,21,25,28,34,37,38,40,43,46,54,58,59,61,67–70</sup>, and 19 had a high risk of bias<sup>20,23,24,26,31–33,35,37,39,42,44,48,53,57,60,62,64,65</sup>. Among the 58 survey  
35 studies, 14 sampled participants inappropriately<sup>5,6,14,19,33,35,40,46,48,54,57,58,60,62,67</sup>, 19 had inadequate sample sizes or did not justify their  
36 sample size<sup>1,5,6,14,18,25,31,35,40,46,48,50,55,57,60,64,68,69,71</sup>, 7 did not sufficiently describe the participants<sup>1,15,29,31,35,48,58</sup>, 9 had coverage  
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3 bias<sup>6,14,40,48,54,57,62,64,65</sup>, 8 did not have an appropriate statistical analysis<sup>15,20,28,34,35,64,67,68</sup>, and 30 had a low response rate<sup>1,5,34–</sup>  
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5 36,43,45,47,49,52,56,57,14,59–62,65–67,69,70,72,15,16,20,22,28,31,32 (Supplementary figure S2). Among the 10 before-after trials, 1 did not have pre-  
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7 specified inclusion criteria<sup>44</sup>, 5 had low sample sizes or did not justify their sample size<sup>23,24,37,42,44</sup>, 3 did not have clearly defined, pre-  
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9 specified, consistently measured outcomes<sup>21,24,44</sup>, 9 did not blind participants<sup>3,23,24,26,37,39,42,44,53</sup>, 5 did not account for loss to follow-up  
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11 in their analysis<sup>23,26,42,44,53</sup>, and 6 lacked statistical tests to assess for significant pre- to post-intervention changes<sup>24,26,39,42,44,53</sup>  
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13 (Supplementary figure S3).  
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## 19 Discussion

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21 In this systematic review, we established a definition for academic bullying, identified common patterns of bullying, and  
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23 reported the impact on victims. We defined academic bullying as the abuse of authority by a perpetrator who targets the victim in  
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25 order to impede their education or career through punishing behaviours that include overwork, destabilization, and isolation in an  
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27 academic setting. Victims reported that academic bullying often resulted in stalled career advancement and thoughts of leaving the  
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29 position. A majority of academic bullies were senior men, and a majority of victims were women. Barriers to reporting academic  
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31 bullying included fear of reprisal, perceived hopelessness, and institutional non-enforcement of anti-bullying policies. Strategies to  
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33 overcome academic bullying, such as anti-bullying committees and adding professionalism as a requirement for career advancement,  
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35 were associated with an improvement in the prevalence of bullying and resolution of formal reports (Central illustration).  
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3 Several factors contribute to the prevalence of bullying within academia. The hierarchical structure lends itself to power  
4 imbalances and prevents victims from speaking out, especially when the aggressor is tenured<sup>76</sup>. The relative isolation of departments  
5 within universities allows poor behaviour to go unchecked. Furthermore, the closed networks within departments lend themselves to  
6 mobbing behaviour and causes victims to fear being blacklisted for speaking out<sup>77</sup>.  
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14 A lack of clarity around the definition can limit awareness and reporting<sup>50</sup>. The Graduation Questionnaire administered to all  
15 American medical students found that in years where respondents were asked if they had been bullied, the estimated prevalence was  
16 lower than when they were asked about specific bullying behaviours<sup>15</sup>. Surveys on bullying should include a list of defining  
17 behaviours to increase clarity and accuracy in responses<sup>78</sup>. Even in institutions with established reporting systems, respondents were  
18 often unaware of how to file a report<sup>47</sup>. We found that victims of academic bullying rarely filed reports, primarily due to fear of  
19 retaliation. Reporting was not consistently effective and was more likely to worsen bullying.  
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31 We found that consultants were the most common sources of bullying at all levels of training, although residents often bullied  
32 medical students. No studies assessed the relative contribution of fellows and senior residents to resident bullying. Among studies that  
33 analyzed bullying among consultants by seniority, senior consultants were a commonly reported source of bullying<sup>6,8,40,43,73</sup>. Women  
34 and ethnic minorities reported higher rates of bullying among demographic groups surveyed, although racial factors were infrequently  
35 assessed in the surveys included in this study. While some argue that the increasing proportion of women trainees<sup>79,80</sup> may change  
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3 dynamics in healthcare settings, the leaky academic pipeline in which women remain underrepresented in several academic  
4 specialties and in positions of leadership make them vulnerable to the power dynamics of academic medicine<sup>81</sup>.  
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10 Our review illustrates the self-reported harms of academic bullying. Victims experienced depressive symptoms, self-perceived  
11 loss of clinical ability, and termination of employment. Academic bullying has been linked to depression<sup>51</sup>, substance abuse<sup>82</sup>, and  
12 hospitalization for coronary artery or cerebrovascular disease<sup>83</sup>. Bullying costs the National Health Service (NHS) of the United  
13 Kingdom £325 million annually due to reduced performance and increased staff turnover<sup>84</sup>. Disruptive behavior, linked to bullying in  
14 the perioperative setting has been linked to 27% of patient deaths, 67% of adverse events, and 71% of medical errors<sup>7</sup>. Reasons for  
15 consultant error include intimidation leading to a fear of communicating sources of harm and slow response times<sup>85</sup>. We found that  
16 academic bullying negatively impacted patient safety. In a study of emergency medicine residents, 90% reported examples in which  
17 disruptive behaviour affected patient care, and 51% were less likely to call an abusive consultant<sup>18</sup>.  
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31 Interventions reported as effective were simple, non-resource intensive, and organization-level, such as anti-bullying  
32 workshops and committees. Anti-bullying committees involving staff and learners can research bullying within their institution and  
33 address the most common disruptive behaviours through targeted interventions<sup>67</sup>. An organization-level, rather than individual-level  
34 approach may address the root causes of academic bullying as well as the organizational culture that facilitates ongoing bullying. We  
35 found that anti-bullying committees typically included three elements: (1) a multidisciplinary team that includes clinicians and other  
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3 front-line staff; (2) development of anti-bullying policies and a reporting process; and (3) an education campaign to promote  
4 awareness of policies. Owing to their multifaceted nature, it is challenging to evaluate the relative contributions of their components.  
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6 Furthermore, without well-designed trials, the effect of anti-bullying committees is unknown.  
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12 The need for a confidential reporting process was raised in the studies included in this review, but few described how  
13 confidentiality could be maintained when the report has to describe details of the bullying that may be only privy to the perpetrator  
14 and victim. The reporting process could take the form of the Office of Gender Equity at the University of California, where the  
15 accuser and the accused do not meet face to face; the discipline process is through an intermediary<sup>39</sup>. A unique, non-punitive approach  
16 is the restorative justice approach used at Dalhousie University where victims, offenders, and administrators work collaboratively to  
17 address sexual harassment and re-integrate offenders<sup>86</sup>. Reporting may have been ineffective in this review due to the impunity offered  
18 to prominent consultants. Senior personnel, particularly those who are well-known and successful in grant funding, are often  
19 considered “untouchable”, beyond reproach by their institutions<sup>87</sup>. Behaviour is often learned and modeling positive behaviours may  
20 break the cycle of bullying in medicine<sup>88</sup>. One approach would be making professionalism a requirement for promotion and career  
21 advancement, as in the Department of Medicine at the University of Toronto in Canada<sup>89</sup> or the University of Colorado School of  
22 Medicine<sup>26</sup>.  
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#### 40 **Strengths and limitations**

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3 The strengths of this review include its broad scope; capturing several aspects of academic bullying, and its size (n = 68  
4 studies, 82,349 consultants and trainees). The cohort included was diverse, comprising several specialties and countries. We explicitly  
5 defined eligibility criteria and extracted data in duplicate. We used established tools to assess the risk of bias.  
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12 There are several limitations that should be acknowledged. There is no validated definition of bullying, and the included  
13 studies varied in their description of bullying. Most studies used questionnaires that were not previously validated. The survey  
14 instruments across studies differed from each other, and their results had to be pooled according to themes to be synthesized. We  
15 could not account for differences in institutional culture and hospital systems in the responses of survey participants. Data on  
16 bully/victim demographics were underrepresented. Selection bias was a significant concern: 14 studies used convenience sampling,  
17 and 2 included voluntary focus groups for victims of bullying to sign up for. Overall, the response rate was 59.2%, with a range of  
18 12% to 100%. Surrogate outcomes were used such as awareness of bullying, and the reporting of outcomes was inconsistent. As such,  
19 the effect of anti-bullying interventions must be interpreted cautiously.  
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### 33 **Future directions**

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35 Significant gaps exist in the quality of the academic bullying literature, particularly with inconsistent definitions and  
36 limitations in study methodology. Our definition may be used to provide the breadth and granularity required to sufficiently capture  
37 cases of academic bullying in medicine. Studies on the impact of academic bullying would benefit from standardized, validated survey  
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3 instruments. Although randomization and blinding are not always possible to test the effect of interventions, a control group should be  
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5 included in anti-bullying intervention studies.  
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### 10 **Conclusions:**

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12 Academic bullying refers to specific behaviours that disrupt the learning or career of the intended target and commonly  
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14 consists of exclusion and overwork. The consequences include significant psychiatric distress and loss of career opportunities. Bullies  
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16 tend to be male senior consultants, whereas victims tend to be females. The fear of reprisal and non-enforcement of anti-bullying  
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18 policies are the greatest barriers to addressing academic bullying. Results of bullying interventions must be interpreted with caution  
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20 due to their methodological quality and reliance on surrogate measures. There is a need for well-designed trials with transparent  
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22 reporting of relevant outcomes and accounting for temporal trends.  
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### 28 **Author contributions**

29  
30 TA contributed to study design, informed the search strategy, extracted and synthesized study data, and drafted and edited the  
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32 manuscript. YE informed the search strategy, extracted and synthesized study data, and edited the manuscript. HGCV conceived the  
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34 study idea, informed the search strategy, analyzed the data, drafted and edited the manuscript, and supervised the conduct of the study.  
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36 HGCV affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important  
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38 aspects of the study have been omitted; and that any discrepancies from the study as planned have been explained.  
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### Competing interests

All authors have reported that they have no relationships relevant to the contents of this paper to disclose.

### Ethical approval

Not required.

### Data sharing

All data relevant to the study are included in the article.

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**Table 1. Summary of studies investigating bullying in academic medicine**

Author (year), Country	Study design	Setting	Definition of academic bullying	Target	Perpetrator	Source of bias	Risk of Bias
Huber et al. (2020), USA	Survey	Academic and non-academic hospitals	Data not provided	Residents	Consultant (83%) and resident (63%)	Inadequate sample size	Low
Hammoud et al. (2020), USA	Survey	Academic hospitals	Study based graduation questionnaire	Residents and medical students	For resident victims: consultant (58.7%), resident (27.9%), nurses (26.4%), other employees (10.2%), and administration (5.4%). For medical student victims: consultant (66.4%), resident (50.9%), nurses (22.4%), other employees (13.8%), administration (5.2%), and students (12.0%)	Low response rate	Low
Samora et al. (2020), USA	Survey	Academic hospitals	A behavior that a reasonable person would expect might	Residents, fellows, and consultants	Multiple*	Inappropriate statistical analysis, and	Moderate



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			victimize, humiliate, undermine, or threaten a person to whom the behavior is directed			low response rate	
Brown et al. (2020), Canada	Survey	Academic hospitals	Gender-based discrimination included belittling remarks, inappropriate comments and jokes, denial of opportunities, and behaviors that are perceived as hostile or humiliating	Residents	Nurses, consultants, and residents	Inadequate sample size, analysis not conducted in full coverage of the sample, inappropriate identification of bullying, and low response rate	High
Zhang et al. (2020), USA	Survey	Academic and non-academic hospitals	NAQ <sup>‡</sup> used	Residents	Consultants, co-residents, nurses, and administrators	Study subjects not described in details	Low
Lind et al. (2020), USA	Before-After	Academic	Public belittlement or humiliation; physical harm; denied opportunities for training or rewards, or receiving lower evaluations or grades, based	Medical students	Data not provided	Unblinded outcome assessors, small sample size, high loss to follow-up, and analysis of change score not applied	High

			solely on gender; and being subjected to racially or ethnically offensive remarks				
Colenbrander et al. (2020), Australia	Survey	Academic hospitals	Data not provided	Medical students	Data not provided	Inadequate sample size, analysis plan, data analysis coverage, and unreliable measurement of bullying	High
Iqbal et al. (2020), Pakistan	Survey	Academic and non-academic hospitals	NAQ* used	Consultants	Data not provided	Inadequate sample size and statistical analysis	Moderate
Elghazally et al. (2020), Egypt	Survey	Academic	Behaviour that is intended to cause physical or psychological damage due to the imbalance of power, strength or status between the aggressor and the victim	Medical students	Professors (30.1%), students (51.2%), and staff (18.7%)	None	Low
Raj et al. (2020), USA	Survey	Academic	Harassment defined as unwanted sexual advances, subtle bribery to	Consultants	Data not provided	None	Low

			engage in sexual behavior, threats to engage in sexual behavior, or coercive advances				
Kemper et al. (2020), USA	Survey	Academic and non-academic hospitals	Data not provided	Residents	Faculty (43%), clinical staff (60%), resident (28%), medical student (3%), and admin (9%)	None	Low
Stasenko et al. (2020), USA	Survey	Academic and non-academic hospitals	Harassment is defined as an unwelcome sexual advances or other forms of physical and verbal aggression that is sexual in nature	Consultants and fellows	Data not provided	Low response rate	Low
Afkhamzadeh et al. (2019), Iran	Survey	Academic hospitals	Physical or verbal violence, or bullying	Medical students and consultants	Data not provided	None	Low
Wolfman et al. (2019), USA	Survey	Academic and non-academic hospitals	Repeated negative actions and practices that are carried out as a deliberate act or unconsciously. These behaviors cause humiliation,	Residents	Data not provided	Inappropriate sampling frame, and identification of bullying condition, low response rate	High

			offense and distress to the target				
Chowdhury et al. (2019), USA	Survey	Academic and non-academic hospitals	NAQ* used	Residents	Data not provided	Inadequate sample size, description of subjects and setting, and low response rate	High
Ayyala et al. (2019), USA	Survey	Academic and non-academic hospitals	Harassment that occurs repeatedly (> once) by an individual in a position of greater power	Residents	Data not provided	Inappropriate methods of bullying identification	Low
Hu et al. (2019), USA	Survey	Academic and non-academic hospitals	Discrimination and harassment on the basis of gender, race, or pregnancy or childcare	Residents	Consultants (52.4%), admin (1.1%), co-residents (20.2%), and nurses (7.9%)	None	Low
Brown et al. (2019), International	Survey	Academic and non-academic hospitals	Data not provided	Residents or fellow and consultant	Data not provided	Inappropriate methods of bullying identification and low response rate	Moderate
Zurayk et al. (2019), USA	Survey	Academic and non-academic clinics	Study-based sexual experience questionnaire	Consultants and residents	Residents (60%), lecturers (33%), professors (44%), nurses (10%), and hospital staff (29%)	Inadequate sample size, inappropriate sample frame	Moderate

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Castillo-Angeles et al. (2019), USA	Before-after	Academic hospital	Study-based abuse sensitivity questionnaire	Residents	Data not provided	Small sample size, inadequate blinding of outcome assessors, and loss to follow-up	High
Kappy et al. (2019), USA	Before-after	Academic hospital	Harassment; discrimination; humiliation; physical punishment; and the use of grading and other forms of assessment in a punitive manner.	Medical students	Consultant, co-resident, and nurse	Intervention and outcomes not well defined	Moderate
D'Agostino et al. (2019), USA	Survey	Academic and non-academic hospitals	Abuse or harassment particularly of a sexual type	Residents, fellows, and attending	Consultants (64.5%), co-resident (38.7%), ancillary staff (25.8%)	Inappropriate methods of bullying identification, Inadequate statistical analysis plan, and low response rate	High
Chung et al. (2018), USA	Survey	Academic	Feeling of intimidation, dehumanization, or threat to grade, or career advancement	Medical students	Attending physician (68.4%), resident (26.3%), and nurse (10.5%)	Inappropriate sample methods, Non-validated method of bullying identification	High

Kemp et al. (2018), USA	Survey	Academic hospital	Disrespect for the dignity of others that interferes with the learning process	Residents, consultants, and fellows	Data not provided	Inadequate statistical analysis plan, and low response rate	Moderate
Benmore et al. (2018), England	Before-after	Academic hospital*	Data not provided	Residents	Senior consultants	Insufficient enrollment, inadequate sample size, no blinding of outcome assessors, high loss to follow-up, lack of statistical analysis or ITS <sup>†</sup> design	High
Duru et al. (2018), Turkey	Survey	Academic hospital	Data not provided	Consultants, researchers, administrators, nurses	Specific occupations of bullies not specified	Inappropriate sampling and inadequate sample size	Moderate
Chambers et al. (2018), New Zealand	Survey	Academic and non-academic hospitals	Data not provided	Specialist Consultants	Primarily male. Senior medical staff (52.5%), non-clinical managers (31.8%), and clinical leaders (24.9%)	Low response rate	Low
House et al. (2018), USA	Before-after	Academic hospital	Data not provided	Medical Students	Faculty most frequently were the source of bullying followed by residents. Exact	Insufficient enrollment, inadequate sample size, no blinding of outcome	High

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					breakdown not specified	assessors, outcomes not clearly described, lack of statistical analysis, individual-level analysis or ITS design	
Kulaylat et al. (2017), USA	Survey	Academic hospital	Verbal abuse, specialty-choice discrimination, non-educational tasks, withholding/denying learning opportunities, neglect and gender/racial insensitivity	Medical Students	Faculty (57%), residents, fellows (49%), and nurses (33%)	Inappropriate sampling, inadequate sample size, classification bias, and non-validated identification or measurement of bullying	High
Bernotaite et al. (2017), Lithuania	Survey	Academic hospitals	Data not provided	Family Consultants	Supervisor (25.3%), colleague (9.8%), subordinate (2.9%)	Inappropriate sampling, inadequate sample size, and coverage bias	Moderate
Chrysafi et al. (2017), Greece	Survey	Academic and non-academic hospitals	Data not provided	Consultants	Surgeons most frequently followed by internal medicine consultants, then radiologists/	Low response rate and coverage bias	Moderate

					laboratory consultants		
Kapoor et al. (2016), India	Survey	Academic hospital	Data not provided	Medical students	Data not provided	Inappropriate sampling and inadequate description of study population	Moderate
Chadaga et al. (2016), USA	Survey	Academic hospitals	NAQ <sup>‡</sup> used	Residents and fellows	Consultants (29%), nurses (27%), patients (23%), peers (19%)	Low response rate, inadequate sample size, and coverage bias	Moderate
Llewellyn et al. (2016), Australia	Survey	Academic hospitals	Data not provided	Residents	Senior medical staff: (58.3%) in 2015, (60.6%) in 2016. Non-medical staff (33.2%) 2015, (33.9%) 2016, Manager (5.2%) in 2015, (1.2%) in 2016, junior resident (3.3%) in 2015, (4.3%) in 2016	Low response rate, biased sampling, coverage and classification bias	High
Rouse et al. (2016), USA	Survey	Academic clinics	NAQ used	Family medicine consultants	Data not provided	Low response rate	Low
Shabazz et al. (2016), UK	Survey	Academic and non-academic hospitals	Belittle and undermine an individual's work;	Gynecology consultants	Senior consultants (50.9%), junior consultants	Low response rate, and classification bias	Moderate



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			undermining an individual's integrity; persistent and unjustified criticism and monitoring of work; freezing out, ignoring or excluding and continual undervaluing of an individual's effort.		(22.3%), medical director (4.5%)		
Peres et al. (2016), Brazil	Survey	Academic hospital	Data not provided	Medical students	Data not provided	Low response rate, and classification bias	Moderate
Ling et al. (2016), Australia	Survey	Academic hospitals	NAQ used	General surgery residents and consultants	For trainee victims: staff surgeon (48%), trainee surgeon (13%), admin (13%), nurses (11%), other consultant (6%) For consultant victims; (31%) staff surgeon, (28%) admin, (13%) other consultant, (11%) nurses, other (10%), trainees (4%)	Low response rate	Low

Kulaylat et al. (2016), USA	Before-after	Academic hospital	Data not provided	Medical Students	Faculty (57%), residents/fellows (49%), and nurses (33%)	Inadequate sample size, no blinding of outcome assessors	Moderate
Ahmadipour et al. (2016), Iran	Survey	Academic hospital	Being assigned tasks as punishment, being threatened with an unjustly bad score or failure	Medical students, interns and residents	Data not provided	Inadequate sample size	Low
Jagsi et al. (2016), USA	Survey	Academic hospital	Data not provided	Consultants who won a career advancement award	Data not provided	Inadequate sampling frame and classification bias	Moderate
Crebbin et al. (2015), Australia and New Zealand	Survey	Academic hospitals	Data not provided	Residents, fellows and consultants	Surgical consultants (50%), other medical consultants (24%) and nursing staff (26%)	Low response rate	Low
Cresswell et al. (2016), UK	Before-after	Academic hospital	Data not provided	Residents	Data not provided	Insufficient description of study purpose, inadequate enrollment and sample size, no blinding of outcome assessors, outcomes not clearly	High

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						described, lack of statistical analysis or ITS design and high loss to follow-up	
Loerbroks et al. (2015), Germany	Survey	Academic hospitals	Data not provided	Residents	Data not provided	None	Low
Malinauskiene et al. (2014), Lithuania	Survey	Non-academic clinics	NAQ used	Family medicine consultants	Bullying from patients (11.8%), from colleagues by (8.4%), from superiors by (26.6%)	None	Low
Mavis et al. (2014), USA	Survey	Academic hospitals	Mistreatment either intentional or unintentional occurs when behavior shows disrespect for the dignity of others and unreasonably interferes with the learning process	Medical students	Clinical faculty in the hospital (31%) residents/interns (28%), nurses (11%)	Low response rate, inadequate description of study population and statistical analysis	Moderate
Oser et al. (2014), USA	Survey	Academic hospital	Data not provided	Medical students	Residents > clerkship faculty > other attendings > other students >	None	Low

					preceptors = nurses		
Oku et al. (2014), Nigeria	Survey	Academic hospital	Data not provided	Medical students	Medical students (23.7%), consultants (21.7%), lecturers (17.5%), consultants (16.5%), nurses (16.5%), other staff (4.1%)	None	Low
Gan et al. (2014), Canada	Survey	Academic hospital	Data not provided	Medical students	Consultants	Low response rate, inappropriate sampling, small sample size and classification bias	High
Fried et al. (2015), USA	Before-after	Academic hospital	Power mistreatment defined as “made to feel intimidated, dehumanized, or had a threat made about a recommendation, your grade, or your career	Medical students	Residents (49.7%), clinical faculty (36.9%), preclinical faculty (7.9%)	None	Low

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Al-Shafae et al. (2013), Oman	Survey	Academic hospitals	Being coerced into carrying out personal services unrelated to the expected role of interns and instances in which interns were excluded from reasonable learning opportunities offered to others, or threatened with failure or poor evaluations for reasons unrelated to academic performance	Residents	Internal medicine (60.3%), surgery (29%), pediatrics (15.5%), specialists (51.7%), consultants (50%), residents (12.1%), nurses (24.1%)	Inappropriate sampling, inadequate sample size, inadequate description of study population and coverage bias	High
Owoaje et al. (2012), Nigeria	Survey	Academic hospital	Data not provided	Medical Students	Consultants (69.1%), residents/fellows (52.4%), other students (15.7%), nurses (7.8%), laboratory technicians (4.1%)	Low response rate	Low

1 2 3 4 5 6 7 8 9 10 11 12	Askew et al. (2012), Australia	Survey	Academic and non-academic hospitals	Data not provided	Consultants	Consultants (44%), managers (27%), patients (15%), nurses/midwives (4%), junior consultants (1%)	Low response rate	Low
13 14 15 16 17 18 19 20 21 22 23 24 25	Meloni et al. (2011), Australia	Before-after	Academic hospital	Data not provided	Hospital employees	Data not provided	Lack of blinding of outcome assessors, high loss to follow-up, lack of statistical analysis or ITS design, and unit of analysis not clearly described	High
26 27 28 29	Dikmetas et al. (2011), Turkey	Survey	Academic hospital	Data not provided	Residents	Surgeons > Internists	Low response rate	Moderate
30 31 32 33 34 35 36	Eriksen et al. (2011), Norway	Survey	Academic hospital	NAQ used	Hospital employees	Colleagues. Specific occupations not described	Low response rate, inappropriate sampling and inadequate statistical analysis	Moderate
37 38 39 40 41 42	Imran et al. (2010), Pakistan	Survey	Academic hospitals	Threats to professional status, threats to personal	Residents	Consultants	Inappropriate sampling, classification	Moderate

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			standing, isolation, overwork, and destabilization			and coverage bias	
Ogunsemi et al. (2010), Nigeria	Survey	Academic hospital	Data not provided	Residents	Administrative staff (58%), from the hospital chief executive( 41.4%), from patient relatives (40.4%), nurses (32.7%), residents (30%), patients (20%)	Inadequate sample size	Low
Best et al. (2010), USA	Before-after	Academic hospital	Data not provided	Unspecified	Data not provided	Study purpose not clearly described, insufficient enrollment, no blinding of outcome assessors, lack of statistical or individual-level analysis or ITS design	High
Nagata-Kobayashi et al. (2009), Japan	Survey	Academic hospitals	Assigned you tasks as punishment; threatened to fail you unfairly in residency; competed maliciously or unfairly with	Residents	Surgery (27.6%), internal medicine (21.4%), emergency medicine (11.5%), anaesthesia	Low response rate	Low

			you; made negative remarks to you about becoming a consultant or pursuing a career in medicine		(11.3%). Consultants 34.1%, patients 21.7%, nurses 17.2%		
Scott et al. (2008), New Zealand	Survey	Academic hospital	A threat to professional status and personal standing, isolation, enforced overwork, destabilization	Residents	Consultants (30%), nurses (30%), patients (25%), radiologists (8%), residents/fellows (7%)	Low response rate, inadequate sample size and description of study population	Moderate
Gadit et al. (2007), Pakistan	Survey	Academic and non-academic hospitals	Data not provided	Consultants	Senior colleagues	Inadequate sample size	Low
Shrier et al. (2007), USA	Survey	Academic and non-academic hospitals	Data not provided	Consultants	Colleagues (24%), patients (19%), teachers (18%), supervisors (15%),	Inappropriate sampling, inadequate sample size, and coverage bias	Moderate
Cheema et al. (2005), Ireland	Survey	Academic hospitals	Data not provided	Residents	Senior residents (51-70%), nursing staff 47-59%, administration (15%-16%), colleagues (12%-13%)	Low response rate	Low



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Rautio et al. (2005), Finland	Survey	Academic hospital	Data not provided	Medical students	Lecturers (27.9%), research/senior research fellows (27.7%), professors (16.6%), associate professors (13.6%)	Low response rate, inappropriate sampling, inadequate sample size, and coverage bias	High
Wear et al. (2005), USA	Survey	Academic hospital	Data not provided	Medical students	General surgeons and obstetricians	Low response rate, inappropriate sampling, inadequate sample size, classification and lack of validated measurement tool	High
Carr et al. (2000), USA	Survey	Academic hospitals	Data not provided	Consultants	Superiors and colleagues	None	Low
Quine (1999), UK	Survey	Non-academic clinics	Data not provided	Consultants	54% greater seniority, 34% same seniority, 12% less senior. 49% of bullies older than victim	None	Low

\*Regarding sexual harassment: the most common sources were attending surgeons (69% overall, 71% female, 18% male); trainee (46% overall, 47% female, 9% male); attending nonsurgical (22%, 22% female, 18% male); other allied health professionals (16%, 15% female, 36% male); nursing (14%, 12% female, 73% male); admin staff (4%, 2% female, 36% male). Re: harassing behaviors: the most common sources were attending orthopaedic surgeon (76% overall, 75% female, 86% male); trainee (30%, 32% female, 14% male); attending physician; nonsurgical (e.g., anesthesiologist, internist) (20%, 21% female, 11% male, nursing staff (18%, 18% female, 20% male); administration staff (13%, 12% female, 17% male); and other allied health professional (9%, 10% female, 9% male)

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3 \*\*Academic hospitals/clinics were defined as teaching hospitals/clinics with a university affiliation

4 †Interrupted time series

5 ‡The NAQ is the negative acts questionnaire, a validated tool for assessing the prevalence of workplace bullying

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**Table 2: Self-reported description of specific bullying behaviours**

Behaviour	No. of studies/ Total studies*	Total cohort No. affected/ total participants who completed surveys on behaviours (%)*	Men No. affected/ total men who completed surveys on behaviours (%)†	Women No. affected/ Total women who completed surveys on behaviours (%)†
<b>Threats to professional status</b>				
Persistent unjustified criticism	12/28	4495/16700 (26.9)	535/1690 (31.7)	552/1402 (39.4)
Excessive monitoring of work	6/28	1752/6079 (28.8)	442/1525 (27.7)	441/1298 (34.0)
Intimidatory use of discipline	15/28	1531/19471 (7.9)	366/2381 (15.4)	363/2209 (16.4)
Spread of gossip/rumours	7/28	2977/10060 (29.6)	88/596 (14.8)	94/453 (20.8)
False allegations	6/28	613/3796 (16.1)	59/596 (9.9)	54/453 (11.9)
Refusal of leave, training or promotion	9/28	1604/8551 (18.8)	296/2594 (11.4)	458/2340 (19.6)
<b>Isolation</b>				
Social/professional exclusion	17/28	6160/21099 (29.1)	420/2027 (20.7)	1064/2814 (37.8)
<b>Overwork</b>				
Undue pressure to produce work	7/28	2509/6562 (38.2)	233/1525 (15.3)	355/1570 (22.6)
Setting impossible deadlines	6/28	1571/6079 (25.8)	164/1525 (10.8)	189/1298 (14.6)
<b>Destabilization</b>				
Shifting goalposts	1/28	54/417 (12.9)	Not reported	Not reported
Removal of areas of responsibility without consultation	8/28	1397/6193 (22.6)	160/1525 (10.5)	171/1298 (13.2)

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3	Withholding information			
4	that affects performance	9/28	3836/12503 (30.7)	219/1553 (14.1)
5	Ordered to work below			
6	one's competence level	10/28	2934/8119 (36.1)	81/625 (13.0)
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\*Total number of studies that described types of bullying behaviours, including studies that did not stratify results by sex. As a result, the denominator for the number of participants in total is not the sum of the denominators for men and women. The denominator was calculated from the total number of individuals who completed surveys on specific bullying behaviours, while the numerator was calculated from the number of individuals who indicated they experienced the specified bullying behaviour. Not all survey studies offered respondents the same options to respond to, and as a result the denominators for each bullying behaviour differ.

†Of the studies that separated data by gender or solely included the results of one gender and included the specified bullying behaviour.

**Table 3. Self-reported impact of academic bullying**

Effect of academic bullying	No. of studies/ Total studies*	Total cohort No. of affected participants/ total participants who completed surveys on the impact of bullying (%)*	Men No. of affected men/ total men who completed surveys on the impact of bullying (%)†	Women No. of affected women/ total women who completed surveys on the impact of bullying (%)†
<b>Psychologic</b>				
Psychologic distress including depressive/PTSD symptoms	14/33	5597/14285 (39.1)	1750/5172 (33.8)	1636/3529 (46.4)
Reduced confidence in clinical skill	8/33	564/2112 (26.7)	68/212 (32.1)	97/597 (16.2)
<b>Career</b>				
Missed career opportunities	17/33	2823/9442 (29.9)	357/1898 (18.8)	1104/2530 (43.6)
Considerations of quitting	7/33	1034/2880 (35.9)	Not reported	Not reported
Termination of employment	5/33	228/4419 (5.2)	4/139 (2.9)	4/150 (2.7)
Leave of absence	2/33	50/748 (6.7)	Not reported	Not reported
Self-reported worsening of clinical performance	8/33	1673/4841 (34.6)	42/161 (26.1)	22/101 (21.8)

\*Total number of studies that described the impact of bullying, including studies that did not stratify results by sex. Not all participants were given the same options to select from.

†Of the studies that separated data by gender or solely included the results of one gender and included the impact of bullying.

**Table 4. Barriers to addressing academic bullying**

Barrier	No. of studies/Total studies*	No. of participants/total participants (%)
<b>Low reporting rates</b>		
Lack of awareness of what constitutes bullying	5/35	73/642 (11.4)
Lack of awareness of reporting process	15/35	1115/4215 (26.5)
Lack of perceived benefit	9/35	667/1621 (41.1)
Fear that bullying would worsen	13/35	969/2696 (35.9)
Fear of career ramifications	15/35	1094/2664 (41.1)
Concerns regarding confidentiality	4/35	56/445 (12.6)
<b>Institutional factors</b>		
Hierarchical nature of medicine	7/35	Not reported
Recurring cycle of abuse	3/35	Not reported
Normalization of bullying	10/35	Not reported
Lack of enforcement	13/35	586/1400 (41.9)

\*Total number of studies that described barriers of bullying behaviours

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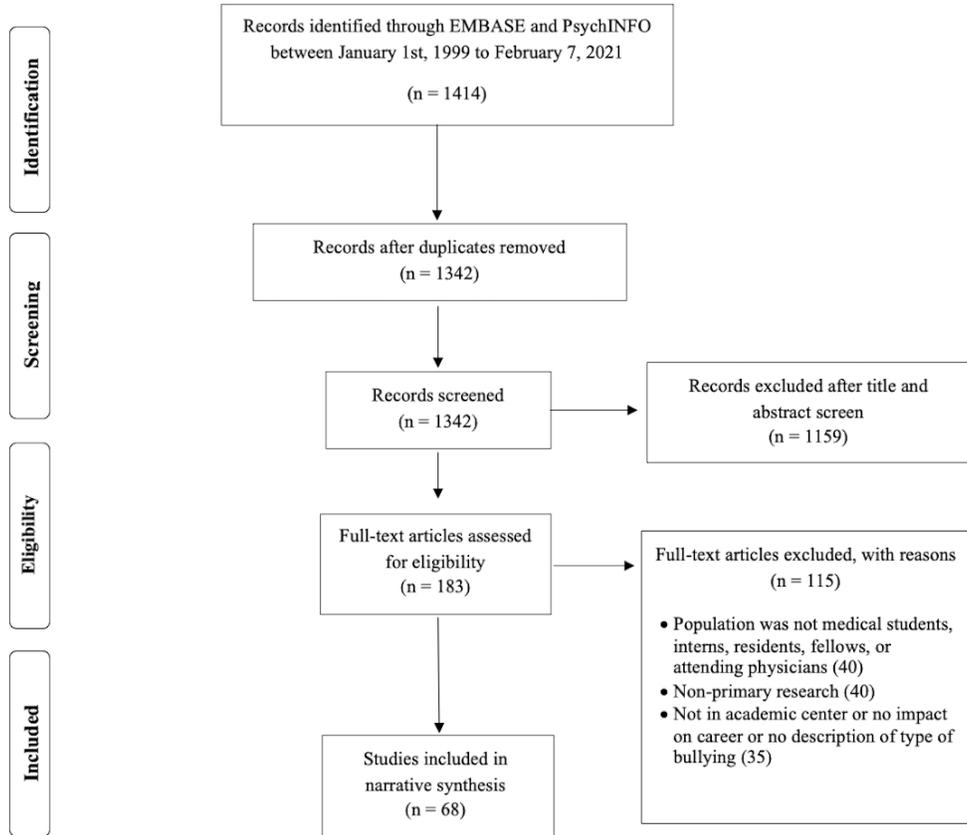
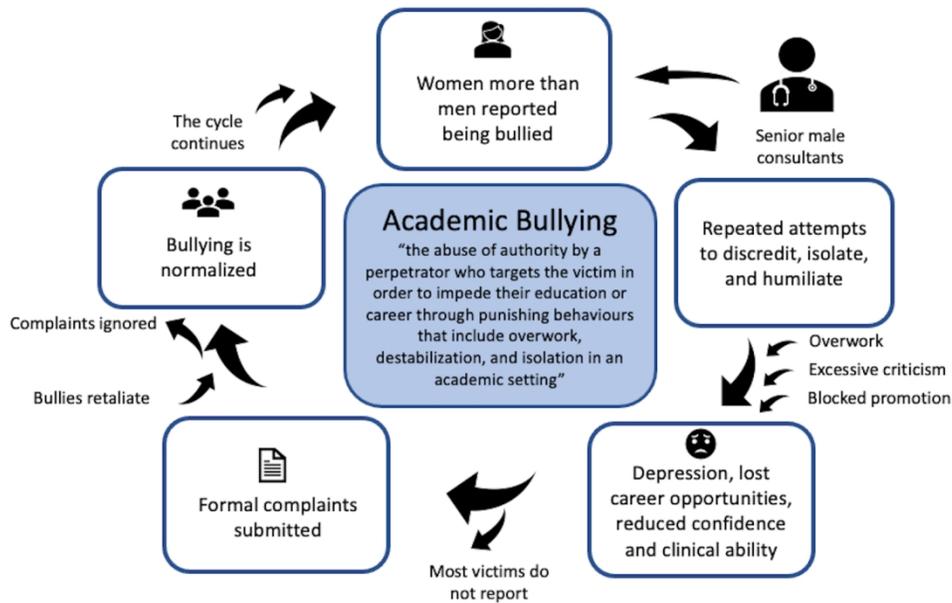


Figure 1: PRISMA diagram of included studies

We identified 68 articles relevant to academic bullying. We describe the reasons for exclusion at each stage of screening

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Central illustration: The definition, manifestations, impact, victims, and perpetrators of academic bullying

Academic bullying is defined as an abuse of authority through punishing behaviours that include overwork, destabilization, and isolation. Victims are commonly men, while perpetrators are commonly male consultants. Individual and institutional factors contribute to the ongoing cycle of bullying.

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**Supplementary table S1: Pooled prevalence of specific bullying behaviours by level of training**

<b>Behaviour</b>	<b>No. of studies/ Total studies*</b>	<b>Medical Students No. of participants/ total participants (%)*</b>	<b>Residents and fellows No. of participants/ total participants (%)*</b>	<b>Consultants No. of participants/ total participants (%)*</b>
<b>Threats to professional status</b>				
Persistent unjustified criticism	10/24	200/301 (66.4)	3596/12708 (28.3)	600/2881 (20.8)
Excessive monitoring of work	4/24	Not reported	1020/2445 (41.7)	564/2824 (20.0)
Intimidatory use of discipline	14/24	641/13914 (4.6)	640/3594 (17.8)	38/1112 (3.4)
Spread of gossip/rumours	5/24	Not reported	2085/6366 (32.8)	755/2881 (26.2)
False allegations	4/24	Not reported	36/102 (35.3)	509/2881 (17.7)
Refusal of leave, training or promotion	8/24	74/551 (13.4)	379/3441 (11.0)	894/3403 (26.3)
<b>Isolation</b>				
Social/professional exclusion	16/24	418/1546 (27.0)	3687/12385 (29.8)	1272/4445 (28.6)
<b>Overwork</b>				
Undue pressure to produce work	7/24	Not reported	827/2928 (28.2)	1326/2824 (47.0)
Setting impossible deadlines	6/24	Not reported	351/2445 (14.4)	965/2824 (34.2)
<b>Destabilization</b>				
Shifting goalposts	1/24	Not reported	54/654 (8.3)	Not reported
Removal of areas of responsibility without consultation	6/24	11/56 (19.6)	267/2503 (10.7)	784/2824 (27.8)

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Withholding information that affects performance	7/24	Not reported	2465/8869 (27.8)	1140/2824 (40.4)
Ordered to work below one's competence level	7/24	182/269 (67.7)	1276/3676 (34.7)	975/2881 (33.8)

\*Total number of studies that described types of bullying behaviours that separated data by level of training

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**Supplementary table S2: The pooled impact of academic bullying by level of training**

<b>Effect of academic bullying</b>	<b>No. of studies/ Total studies*</b>	<b>Medical Students No. of participants/ total participants (%) *</b>	<b>Residents and fellows No. of participants/ total participants (%) *</b>	<b>Consultants No. of participants/ total participants (%) *</b>
<b>Psychiatric</b>				
Psychiatric distress including depressive/PTSD symptoms	12/28	422/579 (72.9)	2142/5256 (40.8)	178/996 (17.9)
Reduced confidence in clinical skill	4/28	119/262 (45.4)	Not reported	177/1259 (14.1)
<b>Career</b>				
Missed career opportunities	14/28	484/3020 (16.0)	149/426 (35.0)	1789/5854 (30.6)
Considered quitting	9/28	109/317 (34.4)	5/100 (5.0)	908/2375 (38.2)
Terminated employment	4/28	Not reported	135/3574 (3.8)	11/348 (3.2)
Leave of absence	2/28	Not reported	Not reported	50/748 (6.7)
Self-reported worsening of clinical performance	6/28	202/579 (34.9)	1168/3179 (36.7)	51/563 (9.1)

\*Total number of studies that described the impact of academic bullying and separated data by level of training

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**Supplementary table S3. Suggested policies, interventions and reported outcomes**

Intervention	Outcome
<b>Zero-tolerance/Anti-bullying policy</b>	
(Cheema et al., 2005) *	Data not provided
(Wear et al., 2005) *	Data not provided
(Gadit et al., 2007) *	Data not provided
(Nagata-Kobayashi et al., 2009) *	Data not provided
(Imran et al., 2010) *	Data not provided
(Meloni and Austin, 2011)	Increased employee engagement and workplace satisfaction Increased trust among victims that reports would be appropriately managed (44% to 64%) Victims felt safer reporting incidents of bullying (67% to 84%) Improved awareness of where and whom to report to (67% to 84%)
(Fried et al., 2012)	Reduced power abuse (43% to 30%) but no change in overall mistreatment rates
(Askew et al., 2012) *	Data not provided
(Mavis et al., 2014) *	Data not provided
(Chadaga et al., 2016) *	Data not provided
(Kapoor et al., 2016) *	Data not provided
(Peres et al., 2016) *	Data not provided
(Wolfman et al., 2019) *	Data not provided
<b>Bullying workshops</b>	
(Oku et al., 2014) *	Data not provided
(Kulaylat et al., 2016) *	Data not provided

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3	(Cresswell et al.,	
4	2016) *	Data not provided
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6	(Benmore et al., 2018)	Increased willingness to try to repair the harm caused by bullying
7		and became more conscious of giving feedback
8	(Castillo-Angeles et	
9	al., 2019)	Bullying behaviour persisted
10	(Colenbrander et al.,	
11	2020) *	Data not provided
12	(Stasenko et al., 2020)	
13	*	Data not provided
14		
15	<b>Tracking and reporting mistreatment data</b>	
16	(Gan and Snell, 2014)	No difference in mistreatment
17	(Mavis et al., 2014) *	Data not provided
18		
19	(House et al., 2018)	Decreased unprofessional or disrespectful behaviour by faculty as
20		reported by students [4.8% (2015-16) to 1.7% (2016-17)]
21	(Elghazally et al.,	
22	2020) *	Data not provided
23	(Hammoud et al.,	
24	2020) *	Data not provided
25		
26	<b>Staff education on bullying and the reporting process</b>	
27	(Cheema et al., 2005)	
28	*	Data not provided
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30	(Wear et al., 2005) *	Data not provided
31	(Gadit et al., 2007) *	Data not provided
32	(Scott et al., 2008) *	Data not provided
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34	(Imran et al., 2010) *	Data not provided
35	(Fried et al., 2012)	No change in reporting rate
36	(Al-Shafae, 2013) *	Data not provided
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38	(Mavis et al., 2014) *	Data not provided
39	(Oku et al., 2014) *	Data not provided
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3 (Crebbin et al., 2015)  
4 \* Data not provided  
5 (Chadaga et al., 2016)  
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8 (Peres et al., 2016) \* Data not provided  
9 (Chung et al., 2018) \* Data not provided  
10 (D’Agostino et al.,  
11 2019) \* Data not provided  
12 (Chowdhury et al.,  
13 2019) \* Data not provided  
14 (Zurayk et al. 2019) \* Data not provided  
15 (Colenbrander et al.,  
16 2020) \* Data not provided  
17 (Elghazally et al.,  
18 2020) \* Data not provided  
19 (Lind et al. 2020) Multiple effect\*\*  
20 (Brown et al., 2020) \* Data not provided  
21  
22 **Develop a committee to handle and support reporting**  
23 (Gadit et al., 2007) \* Data not provided  
24 (Best et al., 2010) Resolutions reached 96% of formal reports  
25 (Kapoor et al., 2016) \* Data not provided  
26 (Kemp et al., 2018) \* Data not provided  
27 (Kappy et al., 2019) Fewer comments on mistreatment  
28 (Ayyala et al., 2019) \* Data not provided  
29 (Brown et al., 2019) \* Data not provided  
30 (Lind et al. 2020) Multiple effects\*\*  
31 (Samora et al., 2020) \* Data not provided  
32 (Hammoud et al.,  
33 2020) \* Data not provided  
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35 **Accessible and confidential reporting**

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3	(Imran et al., 2010) *	Data not provided
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5	(Fried et al., 2012)	Reduced power abuse (43% to 30%) but no change in overall
6		mistreatment rates
7	(Askew et al., 2012) *	Data not provided
8	(Al-Shafae, 2013) *	Data not provided
9		
10	(Crebbin et al., 2015)	Data not provided
11	*	
12	(Mavis et al., 2014) *	Data not provided
13		
14	(Colenbrander et al.,	Data not provided
15	2020) *	
16	(Brown et al. 2019) *	Data not provided
17	(Samora et al., 2020) *	Data not provided

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18 \*Suggested approach that had not been implemented

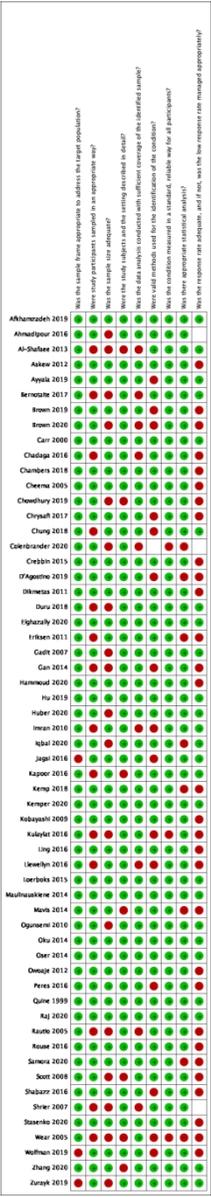
19 \*\* In this study, a substantial decrease in mistreatment (from 62.9% to 40.3%), fear of reporting (from 42.2% to 37.1%), fear of  
20 reprisal (from 28.9% to 22.6%), and an increase in knowledge of reporting increased (from 88.8% to 94.2%) was observed.  
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**Supplementary figure S1: Search strategy**

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5. (Workplace or career or professional or academic or promotion\* or employment or job or profession or reputation or academia).mp
6. (medicine or residency\* or "medical school" or "clinical training" or hospital or internship or fellow\* or "junior doctor" or "house officer" or "clinical clerk" or "attending physician" or physician or doctor or clinician or hierarchical system or "clinician-scientist" or learner or faculty or "NHS").ti,ab.
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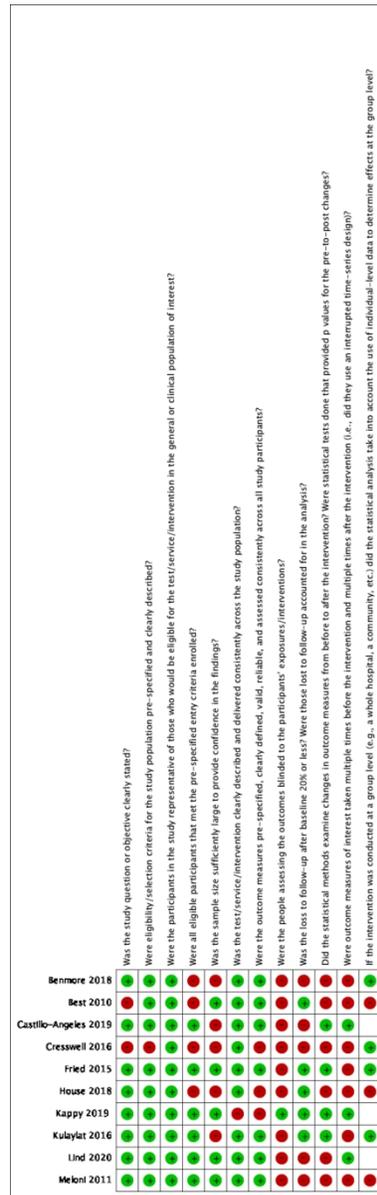


Supplementary figure S2: The risk of bias of survey studies included in this review

Most studies in this review had at least a moderate risk of bias. Common sources of bias included inappropriate sampling techniques and low sample sizes

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Supplementary figure S3: The risk of bias of before-after studies included in this review

Most studies in this review had at least a moderate risk of bias. Common sources of bias included lack of blinding or a control group and low sample sizes

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# PRISMA 2009 Checklist

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Section/topic	#	Checklist item	Reported on page #
<b>TITLE</b>			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
<b>ABSTRACT</b>			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	3
<b>INTRODUCTION</b>			
Rationale	3	Describe the rationale for the review in the context of what is already known.	4
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	4
<b>METHODS</b>			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	n/a
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	4,5
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	4
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	4
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	5
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	5
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	n/a
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	5
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	5
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., $I^2$ ) for each meta-analysis.	n/a



# PRISMA 2009 Checklist

Page 1 of 2

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	5
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	n/a
<b>RESULTS</b>			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	5
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	5
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	9,10
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	5
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	6,7,8,9
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	n/a
<b>DISCUSSION</b>			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	10
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	12
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	13
<b>FUNDING</b>			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	13

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# BMJ Open

## A systematic review of academic bullying in medical settings: dynamics and consequences

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3 **A systematic review of academic bullying in medical settings: dynamics and consequences**  
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## ABSTRACT

**Purpose:** To characterize the dynamics and consequences of bullying in academic medical settings, report factors that promote academic bullying, and describe potential interventions.

**Design:** Systematic review.

**Data sources:** We searched EMBASE and PsycINFO for articles published between January 1, 1999 and February 7, 2021.

**Study selection:** We included studies conducted in academic medical settings in which victims were consultants or trainees. Studies had to describe bullying behaviours; the perpetrators or victims; barriers or facilitators; impact; or interventions. Data were assessed independently by 2 reviewers.

**Results:** We included 68 studies representing 82,349 respondents. Studies described academic bullying as the abuse of authority that impeded the education or career of the victim through punishing behaviours that include overwork, destabilization, and isolation in academic settings. Among 35,779 individuals in 28 studies who responded about bullying patterns, the most commonly described (38.2% respondents) was overwork. Among 24,894 individuals in 33 studies who reported the impact, the most common was psychologic distress (39.1% respondents). Consultants were the most common bullies identified among 15,868 individuals in 31 studies (53.6% respondents). Women represented a majority (56.2%) of victims among 15,246 respondents in 27 studies. Only a minority (28.9%) of 9,410 victims in 25 studies reported the bullying, and most (57.5%) did not perceive a positive outcome. Facilitators of bullying included lack of enforcement of institutional policies (reported in 13 studies), hierarchies (7 studies), and normalization of bullying (10 studies). Studies testing the effectiveness of anti-bullying interventions had a high risk of bias.

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3 **Conclusions:** Academic bullying commonly involved overwork, had a negative impact on well-being, and was not typically reported.  
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5 Perpetrators were commonly male consultants and victims were commonly women. Methodologically robust trials of anti-bullying  
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7 interventions are needed.  
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10 **Limitations:** Most studies (40/68) had at least a moderate risk of bias. All interventions were tested in uncontrolled before-after  
11  
12 studies.  
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14 **Keywords:** Medical Education & Training, General Medicine, Health Services Administration & Management  
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### 17 18 19 **Strengths and limitations** 20

- 21 • This systematic review is comprehensive, including 68 studies with 82,349 consultants and trainees, across several countries  
22 and including all levels of training.  
23
- 24 • We defined inclusion criteria a priori, and used established tools to assess the risk of bias of included studies  
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- 26 • The included studies varied in their definitions of bullying, sampling bias was noted among the surveys, and intervention  
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31 studies were sub-optimally designed  
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## Background

Bullying behaviours have been described as repeated attempts to discredit, destabilize, or instill fear in an intended target<sup>1</sup>. Bullying can take many forms from overt abuse to subtle acts that erode the confidence, reputation, and progress of the victim<sup>2</sup>. Bullying is common in medicine, likely impacting mental health, professional interactions, and career advancement<sup>3-6</sup>. It may also impact a physician's ability to care for patients<sup>7</sup>. Surveys from the National Health Service (NHS) in the United Kingdom showed that 55% of staff experienced at least one type of bullying; 31% were doctors in training<sup>8</sup>. Bullying is closely related to harassment and discrimination, in which mistreatment is based on personal characteristics or a protected class such as sex or race<sup>9</sup>. Within academic settings, victims may experience all three and the distinction may be less clear. Unlike harassment and discrimination, which have specific legal definitions, bullying is an amorphous term whose victims are often left without legal recourse.

The hierarchical structure of academic medicine – in which there are power imbalances, subjective criteria for recruitment and career advancement, and siloed departments with few checks in place for toxic behaviours – may offer an operational environment in which bullying may be more widespread than in non-academic medical settings. Academic bullying is a seldom-used term within the literature, but is intended to describe the forms of bullying that may exist in academic settings. Academic bullying can be defined as mistreatment in academic institutions with the intention or effect of disrupting the academic or career progress of the victim<sup>10</sup>. The prevalence of academic bullying in medical settings is unknown likely due to a lack of definition of bullying behaviours, a fear of reporting, and insufficient research. There is not much known about the characteristics of perpetrators and victims, and about the

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3 impact of bullying on academic productivity, career growth, and patient care. Furthermore, institutional barriers and facilitators of  
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5 bullying behavior have not been reported, and the effectiveness of interventions in addressing academic bullying have not been  
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7 evaluated.  
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12 The purpose of this systematic review is to define and classify patterns of academic bullying in medical settings; assess the  
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14 characteristics of perpetrators and victims; describe the impact of bullying on victims; review institutional barriers and facilitators of  
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16 bullying; and identify possible solutions.  
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## 21 **Methods**

### 22 **Data sources and searches**

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25 This study follows PRISMA reporting guidelines. Two reviewers (T.A, Y.E.) searched two online databases (EMBASE and  
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27 PsycINFO) for English-language articles published between January 1, 1999, to February 7, 2021 and relevant to academic bullying in  
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29 medicine. An outline of the search is provided in Figure 1. A combination of medical subject heading (MeSH), title, and abstract text  
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31 terms encompassing “Medicine”; “Bullying” and “Academia” were used for the full search. The terms of the search are included in  
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33 Supplementary figure S1. Two authors (T.A, Y.E.) independently screened articles for inclusion. Differences were resolved by  
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35 discussion, and if necessary, by a third author (H.V.).  
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## Study selection

We included studies conducted in academic medical settings in which victims were either consultants or trainees. We defined academic medical settings as hospitals or clinics that were either university-affiliated or involved trainees. In the case of pre-clinical medical students, academic medical settings included the university where medical instruction took place. Studies were included if they described: the method and impact of bullying; the characteristics of perpetrators and victims; or interventions used to address the bullying. Studies that included trainees or consultants in both academic and non-academic settings were included. We excluded editorials, opinion pieces, reviews, conference abstracts, theses, dissertations, and grey literature.

## Data extraction and quality assessment

Two reviewers (T.A, Y.E.) independently extracted data on: study design, setting (academic or non-academic), definition, description and impact of academic bullying, characteristics of perpetrators and victims, barriers and facilitators of bullying, and interventions and their outcomes. Two reviewers independently assessed studies for risk of bias. We assessed before-after studies using the National Heart, Lung, and Blood Institute quality assessment tool<sup>11</sup> and assessed prevalence surveys using the Joanna Briggs Institute critical appraisal tool<sup>12</sup>. We classified survey studies as low risk of bias if at least 8 of 9 criteria were met, medium risk of bias if 7 of 9 were met, and high risk of bias if less than 7 were met. We classified bias in before-after studies as low if at least 11 of 12 criteria were met, medium if at least 9 of 12 were met, and high if less than 9 were met.

## Data synthesis and analysis

We developed a definition for academic bullying through narrative synthesis of the definitions provided by studies included in this systematic review. We pooled the results of surveys on the basis of similarity of survey themes to facilitate a descriptive analysis. For survey studies on the prevalence or impact of bullying, we solely pooled the results of studies that asked respondents about specific bullying behaviours or impacts, respectively. We then separated results by sex and level of training. Group selection was by consensus between authors. We presented our results as numbers and percentages. We calculated the denominators from the total number of individuals who completed surveys on types of bullying behaviours, the impact of bullying, characteristics of bullies and victims, or barriers to addressing academic bullying. The numerators were calculated from the number of individuals who experienced a specific behaviour or impact, were bullied by a perpetrator at a specified level of training, or endorsed a specific reason for not making a formal report. We also reported the number of studies that described each specific bullying behaviour or impact, demographic characteristics of victims and perpetrators, barriers and facilitators of academic bullying, and specific reasons for not making a formal report. We could not perform a meta-analysis due to the conceptual heterogeneity between studies.

## Patient and public involvement

Patients or the public were not involved in the design, conduct, reporting, or dissemination plans of our research.

## Results

### Screening results

We identified 1342 unique articles, 68 of which met inclusion criteria. Reasons for exclusion are described in Figure 1.

### Characteristics of included studies

Studies were most frequently set in the USA (reported in 31 studies)<sup>3,13-41</sup> and the UK (reported in 5 studies)<sup>8,42-45</sup> and were set in academic hospitals (reported in 54 studies)<sup>1,3-6,13-15,17,19-21,23,24,26,27,29,30,32-35,37-39,41-65</sup> or in both teaching and non-teaching sites (reported in 14 studies)<sup>8,16,25,28,36,40,66-73</sup>. Twenty-five studies included medical students<sup>3-5,13,15,21,22,24,26,33-35,37,39,48,50,52,57-60,63,64,74,75</sup>, 27 included residents or fellows<sup>1,14,16-18,20,22,23,25,27-32,44,45,49-51,55,56,61,62,65,69,72</sup> and 25 included consultants<sup>6,8,16,19,20,25,28,36,38,40-43,46,47,53,66-73,75</sup> (Table 1).

### Definition of academic bullying

Six papers provided definitions for academic bullying<sup>33,48,50,56,58,63</sup>. Common themes included behaviours where the perpetrator abuses authority to punish the victim through isolation, blocked career advancement, and threats to academic standing. We defined academic bullying as the abuse of authority by a perpetrator who targets the victim in an academic setting through punishing behaviours that include overwork, destabilization, and isolation in order to impede the education or career of the target. Multiple

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3 studies used the complete or partial Negative Acts Questionnaire (NAQ), a standardized list of bullying behaviours (reported in 24  
4 studies)<sup>1,3,4,6,13–15,24,29,31,36,47–52,54,55,57,60,61,67,73</sup>.

### 10 **Patterns of academic bullying behaviours**

11  
12 There were 35,779 consultant and trainee respondents to surveys of bullying behaviours (reported in 28 studies), but not all  
13 were offered the same options to select from (Table 2). Bullying behaviours were grouped into destabilization (reported in 15 studies),  
14 threats to professional status (reported in 23 studies), overwork (reported in 7 studies), and isolation (reported in 17 studies). Undue  
15 pressure to produce work was commonly reported (38.2% of respondents affected, reported in 7 studies)<sup>14,36,45,47,49,54,67</sup>. Of the 15  
16 studies that described destabilization, common methods included being ordered to work below one's competency level (36.1%,  
17 reported in 10 studies)<sup>31,36,45,47–49,52,67,71,72</sup> and withholding information that affects performance (30.7%; reported in 9  
18 studies)<sup>14,29,31,36,47–49,54,67</sup>. Of the 23 studies that described threats to professional status, common methods were excessive monitoring  
19 (28.8%; reported in 6 studies)<sup>14,36,47,49,54,67</sup> and criticism (26.9%; reported in 12 studies)<sup>14,21,29,36,45,47,49,52,54,67,71,72</sup>. Of the 17 studies that  
20 described isolation, the most common method was social and professional exclusion (29.1%; reported in 17 studies)<sup>4,14,21,24,29,31,36,40,47–  
21 49,52,54,63,67,70,72</sup>.

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38 There were 6,179 consultant and trainee respondents to surveys that separated the prevalence of bullying behaviours by sex  
39 (reported in 11 studies). A greater proportion of women experienced all bullying behaviours (reported in 11  
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3 studies)<sup>14,16,19,22,36,40,48,52,57,63,65</sup> (Table 2). There were 34,175 respondents to surveys that analyzed results by level of training (reported  
4 in 24 studies) (Supplementary table S1). A greater proportion of consultants experienced refusal of applications for leave, training, or  
5 promotion (26.3%, reported in 3 studies)<sup>19,36,47</sup> and removal of areas of responsibility (27.8%, reported in 2 studies)<sup>36,47</sup> than residents  
6 (11.0%, reported in 3 studies; 10.7%, reported in 3 studies, respectively)<sup>14,22,54,55</sup> or medical students (13.4%; 19.6%, reported in 1  
7 study)<sup>22,24</sup>. Compared to medical students (4.6%, reported in 6 studies)<sup>13,15,22,24,52,57</sup> and consultants (3.4%, reported in 2 studies)<sup>36,71</sup>, a  
8 greater proportion of residents experienced the intimidatory use of discipline procedures (17.8%, reported in 6 studies)<sup>14,22,48,54,55,65</sup>. A  
9 greater proportion of medical students experienced persistent criticism (66.4%, reported in 2 studies)<sup>21,52</sup> than residents (28.3%,  
10 reported in 5 studies)<sup>14,29,45,54,72</sup> and consultants (20.8%, reported in 3 studies)<sup>36,47,71</sup>.

### 11 12 13 14 15 16 17 18 19 20 21 22 23 24 **Characteristics of bullies**

25  
26 Thirty-one unique studies representing 15,868 consultants and trainees described the characteristics of bullies, although not all  
27 were offered the same options to select from. Common perpetrators included consultants (53.6%, reported in 30  
28 studies)<sup>1,3,4,6,8,14,15,17,18,20,22,27,28,33,37,40,43,45,47-49,52,54,56,60,62,63,66,72,73</sup>, residents (22.0%, reported in 22  
29 studies)<sup>1,3,6,8,15,17,18,20,22,25,27,28,33,37,45,48,49,54,56,60,62</sup>, and nurses (14.9%, reported in 21 studies)<sup>1,3,4,14,15,17,20,22,25,27,28,33,37,45,48,49,54,56,60,62,73</sup>.

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33 Of the 4,277 individuals who identified the gender of their bullies, most reported primarily male (67.2%, reported in 5  
34 studies)<sup>8,36,43,47,72</sup>, followed by primarily female (26.1%, reported in 5 studies)<sup>8,36,43,47,72</sup>, and both (6.7%, reported in 3 studies)<sup>8,43,47</sup>.

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38 Among 6,084 medical students, perpetrators were commonly consultants (43.1%, reported in 8 studies)<sup>3,4,15,22,33,37,52,60</sup>, residents

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3 (35.7%, reported in 6 studies)<sup>3,15,22,33,37,60</sup>, nurses (12.4%, reported in 7 studies)<sup>3,4,15,22,33,37,60</sup>, and other medical students (8.8%,  
4 reported in 5 studies)<sup>3,4,22,52,63</sup>. Among 6,289 residents, perpetrators were commonly consultants (52.2%, reported in 12  
5 reported in 5 studies)<sup>3,4,22,52,63</sup>. Among 6,289 residents, perpetrators were commonly consultants (52.2%, reported in 12  
6 studies)<sup>1,14,17,18,22,27,45,48,49,54,56,62</sup>, nurses (24.3%, reported in 11 studies)<sup>1,14,17,22,27,45,48,49,54,56,62</sup>, and other residents (20.6%, reported in  
7 12 studies)<sup>1,14,17,18,22,27,45,48,49,54,56,62</sup>. Of the 1,500 consultants, perpetrators were their peers (39.2%, reported in 7 studies)<sup>6,8,40,47,49,66,73</sup>,  
8 senior consultants (23.7%, reported in 5 studies)<sup>6,8,40,43,73</sup>, and administration (17.7%, reported in 4 studies)<sup>43,47,49,66</sup>.  
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17 Six unique studies representing 1,698 interns and medical students described the prevalence of academic bullying according to  
18 the specialty rotation of the learner. Academic bullying was common in surgery (32.9% of respondents, reported in 6  
19 studies)<sup>1,13,34,48,56,60,72</sup>, obstetrics and gynecology (25.5%, reported in 2 studies)<sup>13,60</sup> and internal medicine (21.4%, reported in 5  
20 studies)<sup>1,13,48,56,60,72</sup>.  
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## 28 **Characteristics of victims**

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30 Forty-one unique studies described the characteristics of victims, and 29 included the proportion of those who experienced  
31 bullying. Of the 15,704 women and 19,495 men who responded to surveys that analyzed results by sex, women were more likely to  
32 report being bullied than men (54.6% of all women compared to 34.2% of all men, reported in 27 studies)<sup>3,4,14,16,17,19,20,27,28,36,38,41,47–  
33 52,55–57,62,63,65,69,72,75</sup>. There were 10,730 consultant and trainee respondents to surveys that separated the results by demographic  
34 characteristics other than sex, but not all characteristics were captured by each study. A greater proportion of international graduates /  
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3 non-citizens experienced bullying than citizens (48.0% compared to 43.3%, reported in 4 studies)<sup>14,17,45,72</sup>, and a greater proportion of  
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5 overweight participants (BMI > 25) experienced bullying than those with a BMI ≤ 25 (17.8% compared to 11.8%, reported in 1  
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7 study)<sup>51</sup>. The relationship between age and bullying varied based on the cut-off used and the survey sample in each study. Among  
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9 consultants, a greater proportion of those with full professorship experienced bullying than assistant professors (68.0% compared to  
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11 51.9%, reported in 1 study)<sup>41</sup>.

### 12 13 14 15 16 17 **Impact of academic bullying**

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19 There were 24,894 consultant and trainee respondents to surveys on the psychological (reported in 20 studies) and career  
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21 impact (reported in 25 studies) of academic bullying (Table 3), although not all were offered the same options to select from.  
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23 Respondents commonly reported psychiatric distress (39.2%; reported in 14 studies)<sup>6,17,18,27,29,30,43,47,52,56,59,62,71,73</sup>, considerations of  
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25 quitting (35.9%; reported in 7 studies)<sup>25,31,43,47,66,70,72</sup>, and reduced clinical ability (34.6%; reported in 8 studies)<sup>25,30,31,45,47,52,56,59</sup>.  
26  
27 Respondents agreed that academic bullying negatively affected patient safety (68.0%; reported in 2 studies)<sup>18,31</sup>. Nine studies  
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29 representing 13,418 individuals described the impact of bullying separated by sex (Table 3). A greater proportion of women  
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31 experienced loss of career opportunities (43.6%, reported in 8 studies)<sup>16,19,36,38,40,41,52,65</sup> while a greater proportion of men experienced  
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33 decreased confidence (32.1%, reported in 2 studies)<sup>41,52</sup> and clinical ability (26.1%, reported in 1)<sup>52</sup>.  
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There were 16,523 consultant and trainee respondents to surveys that separated results by level of training (Supplementary table S2). A greater proportion of medical students experienced psychiatric distress (72.9%; reported in 2 studies)<sup>52,59</sup> than residents (40.8%; reported in 6 studies)<sup>17,18,29,30,56,62</sup> and consultants (17.9%; reported in 4 studies)<sup>43,47,71,73</sup>. A greater proportion of residents endorsed loss of career opportunities (35.0%; reported in 3 studies)<sup>55,65,72</sup> compared to medical students (16.0%; reported in 3 studies)<sup>13,15,52</sup> and consultants (30.6%; reported in 8 studies)<sup>19,36,38,40,41,47,70,71</sup>.

### **Barriers and facilitators of academic bullying**

Thirty-five unique studies pertained to barriers to victims making a formal report (reported in 26 studies) and institutional facilitators (reported in 25 studies) of academic bullying (Table 4). There were 9,239 consultant and trainee respondents to surveys on their actions taken in response to bullying and reasons for not making a formal report, although not all were given the same options to select from. Victims commonly did not formally report the bullying<sup>1,3,4,15,36,43,47,49,50,54,56,60,62,66,72</sup>; only 28.9% of respondents made a formal report. Deterrents to reporting included concern regarding career implications (41.1%; reported in 15 studies)<sup>1,4,15,25,28,35,47,48,50,56,62,65,66,70,72</sup>, not knowing who to report to (26.5%; reported in 15 studies)<sup>1,4,16,22,25,33,47,48,50,56,62,65,66,70,75</sup>, and poor recognition of bullying (11.4%; reported in 5 studies)<sup>5,15,25,33,35,37,42,48,56</sup>. Of the 26 studies, 7 studies representing 1139 individuals reported the outcomes of reporting<sup>1,36,43,47,49,65,72</sup> although only a small range of outcomes were offered among options. Submitting a formal report often had no perceived effect on bullying (35.6%; reported in 5 studies)<sup>36,43,47,49,72</sup> a greater proportion of victims

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3 endorsed worsening (21.9%; reported in 3)<sup>36,49,65</sup> than improvement (13.7%; reported in 5 studies)<sup>1,36,43,49,72</sup> in bullying following  
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5 reporting.  
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10 In the 25 unique studies that described institutional facilitators of bullying, common facilitators were lack of enforcement  
11 (reported in 13 studies)<sup>1,16,20,25,28,36,43,47,49,50,54,56,65</sup>, the hierarchical structure of medicine (reported in 7 studies)<sup>26,54,56,57,63,64,71</sup>, and  
12 normalization of bullying (reported in 10 studies)<sup>3,15,19,23,26,31,34,47,62,65</sup>. Individual-level data was not pooled as institutional facilitators  
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14 of bullying were most commonly elicited via free-response portions of surveys with varying completion rates.  
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### 20 21 **Suggested strategies, interventions, and outcomes**

22  
23 Forty-nine unique studies suggested strategies to address academic bullying. These strategies included promoting anti-bullying  
24 policies (reported in 13 studies)<sup>3,14–16,35,45,53,54,56,58,59,66,71</sup>, education to prevent academic bullying (reported in 20  
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26 studies)<sup>1,3,4,14,15,20,25,26,31,33,35,45,48,54,59,63–65,71,72</sup>, establishing an anti-bullying oversight committee (reported in 10  
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28 studies)<sup>21,22,26,28,30,34,39,58,69,71</sup>, institutional support for victims (reported in 5 studies)<sup>35,46,58,62,72</sup>, and internal reviews where hospitals  
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30 develop targeted solutions for their environment (reported in 5 studies)<sup>15,22,24,60,63</sup> (Supplementary table S3).  
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38 Of the 49 unique studies, 10 implemented organization-level interventions which included workshops with vignettes to  
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40 improve recognition of bullying (reported in 4 studies)<sup>23,37,42,44</sup>; a gender and power abuse committee that established reporting  
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3 mechanisms and held mandatory workshops on mistreatment (reported in 1)<sup>3</sup>; a gender equity office to handle reporting (reported in  
4 1)<sup>39</sup>; a professionalism-focused approach that included professionalism in employee contracts and performance reviews and a  
5 professionalism office to handle student complaints (reported in 1)<sup>26</sup>; zero-tolerance policies (reported in 1)<sup>53</sup>; and institutional-level  
6 tracking of mistreatment to provide targeted staff education (reported in 2)<sup>21,24</sup>. All 10 studies had an uncontrolled before-after design,  
7 and as such, did not establish causality. In the studies of vignettes, common bullying behaviours were demonstrated to improve  
8 recognition of both subtle and overt acts of bullying. Of the 4 studies that involved bullying recognition workshops, three reported an  
9 associated improvement in bullying recognition<sup>37,42,44</sup>. In a study that developed a gender equity office, reporting was handled through  
10 an intermediary; decisions were binding with consequences for retaliation including termination of employment<sup>39</sup> and 96% of all  
11 formal reports were resolved. In a study where a Gender and Power Abuse committee was formed, there was an associated reduction  
12 in academic abuse<sup>3</sup>. Similarly, in a study that used a multifaceted approach of developing a professionalism committee, and including  
13 professionalism in contracts and performance reviews, there was a 35.9% decrease in reporting of mistreatment, and improved  
14 awareness of the reporting process<sup>26</sup>. In a study where a clerkship committee monitored unprofessionalism, there was an associated  
15 reduction in narrative comments regarding unprofessionalism on end of rotation surveys<sup>21</sup>. In a study assessing the impact of a  
16 professionalism retreat about mistreatment for consultants, there was no reduction in medical student mistreatment<sup>13</sup>. In a study  
17 assessing the implementation of zero-tolerance policies, there was an associated improvement in awareness of bullying reporting  
18 processes<sup>53</sup>.  
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## Assessment of bias

Twenty-eight studies had a low risk of bias<sup>3,4,8,13,16–19,22,27,29,30,36,41,45,47,49–52,55,56,63,66,71–73,75</sup>, 21 had a moderate risk of bias<sup>1,6,14,15,21,25,28,34,37,38,40,43,46,54,58,59,61,67–70</sup>, and 19 had a high risk of bias<sup>20,23,24,26,31–33,35,37,39,42,44,48,53,57,60,62,64,65</sup>. Among the 58 survey studies, 14 sampled participants inappropriately<sup>5,6,14,19,33,35,40,46,48,54,57,58,60,62,67</sup>, 19 had inadequate sample sizes or did not justify their sample size<sup>1,5,6,14,18,25,31,35,40,46,48,50,55,57,60,64,68,69,71</sup>, 7 did not sufficiently describe the participants<sup>1,15,29,31,35,48,58</sup>, 9 had coverage bias<sup>6,14,40,48,54,57,62,64,65</sup>, 8 did not have an appropriate statistical analysis<sup>15,20,28,34,35,64,67,68</sup>, and 30 had a low response rate<sup>1,5,14–16,20,22,28,31,32,34–36,43,45,47,49,52,56,57,59–62,65–67,69,70,72</sup> (Supplementary figure S2). Among the 10 before-after trials, 1 did not have pre-specified inclusion criteria<sup>44</sup>, 5 had low sample sizes or did not justify their sample size<sup>23,24,37,42,44</sup>, 3 did not have clearly defined, pre-specified, consistently measured outcomes<sup>21,24,44</sup>, 9 did not blind participants<sup>3,23,24,26,37,39,42,44,53</sup>, 5 did not account for loss to follow-up in their analysis<sup>23,26,42,44,53</sup>, and 6 lacked statistical tests to assess for significant pre- to post-intervention changes<sup>24,26,39,42,44,53</sup> (Supplementary figure S3).

## Discussion

In this systematic review, we established a definition for academic bullying, identified common patterns of bullying, and reported the impact on victims. We defined academic bullying as the abuse of authority by a perpetrator who targets the victim in order to impede their education or career through punishing behaviours that include overwork, destabilization, and isolation in an academic setting. Victims reported that academic bullying often resulted in stalled career advancement and thoughts of leaving the

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3 position. A majority of academic bullies were senior men, and a majority of victims were women. Barriers to reporting academic  
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5 bullying included fear of reprisal, perceived hopelessness, and institutional non-enforcement of anti-bullying policies. Strategies to  
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7 overcome academic bullying, such as anti-bullying committees and adding professionalism as a requirement for career advancement,  
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9 were associated with an improvement in the prevalence of bullying and resolution of formal reports (Figure 2). Our review differs  
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11 from other systematic reviews of bullying in medicine in its scope and population studied. We included studies involving all medical  
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13 and surgical disciplines, but limited our analysis to physicians and physician trainees. While prior reviews have focused on the  
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15 prevalence of bullying<sup>76</sup> or anti-bullying interventions<sup>77</sup>, our comprehensive review expanded the focus to also include characteristics  
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17 of bullies and victims, impact and outcomes of bullying, anti-bullying strategies, and facilitators of academic bullying.  
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24 Several factors contribute to the prevalence of bullying within academia. The hierarchical structure lends itself to power  
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26 imbalances and prevents victims from speaking out, especially when the aggressor is tenured<sup>78</sup>. The relative isolation of departments  
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28 within universities allows poor behaviour to go unchecked. Furthermore, the closed networks within departments lend themselves to  
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30 mobbing behaviour and causes victims to fear being blacklisted for speaking out<sup>79</sup>.  
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35 A lack of clarity around the definition can limit awareness and reporting<sup>50</sup>. The Graduation Questionnaire administered to all  
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37 American medical students found that in years where respondents were asked if they had been bullied, the estimated prevalence was  
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39 lower than when they were asked about specific bullying behaviours<sup>15</sup>. Surveys on bullying should include a list of defining  
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3 behaviours to increase clarity and accuracy in responses<sup>80</sup>. Even in institutions with established reporting systems, respondents were  
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5 often unaware of how to file a report<sup>47</sup>. We found that victims of academic bullying rarely filed reports, primarily due to fear of  
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7 retaliation. Reporting was not consistently effective and was more likely to worsen bullying.  
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12 We found that consultants were the most common perpetrators of bullying at all levels of training, although residents often  
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14 bullied medical students. No studies assessed the relative contribution of fellows and senior residents to resident bullying. Among  
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16 studies that analyzed bullying among consultants by seniority, senior consultants were a commonly reported source of  
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18 bullying<sup>6,8,40,43,73</sup>. Women and ethnic minorities reported higher rates of bullying among demographic groups surveyed, although race  
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20 and ethnicity were infrequently assessed in the surveys included in this study. While some argue that the increasing proportion of  
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22 women trainees<sup>81,82</sup> may change dynamics in healthcare settings, the leaky academic pipeline in which women remain  
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24 underrepresented in several academic specialties and in positions of leadership make them vulnerable to the power asymmetries in  
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26 academic medicine<sup>83</sup>.  
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33 Our review illustrates the self-reported harms of academic bullying. Victims experienced depressive symptoms, self-perceived  
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35 loss of clinical ability, and termination of employment. Academic bullying has been linked to depression<sup>51</sup>, substance abuse<sup>84</sup>, and  
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37 hospitalization for coronary artery or cerebrovascular disease<sup>85</sup>. Bullying costs the National Health Service (NHS) of the United  
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39 Kingdom £325 million annually due to reduced performance and increased staff turnover<sup>86</sup>. Disruptive behavior, linked to bullying in  
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3 the perioperative setting has been linked to 27% of patient deaths, 67% of adverse events, and 71% of medical errors<sup>7</sup>. Reasons for  
4 consultant error include intimidation leading to a fear of communicating sources of harm and slow response times<sup>87</sup>. We found that  
5 academic bullying negatively impacted patient safety. In a study of emergency medicine residents, 90% reported examples in which  
6 disruptive behaviour affected patient care, and 51% were less likely to call an abusive consultant<sup>18</sup>.  
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15 Interventions reported as effective were simple and organization-level, such as anti-bullying workshops and committees. Anti-  
16 bullying committees involving staff and learners can research bullying within their institution and address the most common  
17 disruptive behaviours through targeted interventions<sup>67</sup>. An organization-level, rather than individual-level approach may address the  
18 root causes of academic bullying as well as the organizational culture that facilitates ongoing bullying. We found that anti-bullying  
19 committees typically included three elements: (1) a multidisciplinary team that includes clinicians and other front-line staff; (2)  
20 development of anti-bullying policies and a reporting process; and (3) an education campaign to promote awareness of policies.  
21 Owing to their multifaceted nature, it is challenging to evaluate the relative contributions of their components. Without well-designed  
22 trials, the effects of anti-bullying interventions are unknown. All of the intervention studies used before-after designs, which did not  
23 account for confounding variables, co-interventions, and background changes in policy or practice; the majority were at high-risk of  
24 bias. Furthermore, among studies that implemented anti-bullying workshops, the majority interviewed participants immediately after  
25 the workshop without longitudinal follow-up to determine if benefits were sustained.  
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3 The need for a confidential reporting process was raised in the studies included in this review, but few described how  
4 confidentiality could be maintained when the report has to describe details of the bullying that may be only privy to the perpetrator  
5 and victim. The reporting process could take the form of the Office of Gender Equity at the University of California, where the  
6 accuser and the accused do not meet face to face; the discipline process is through an intermediary<sup>39</sup>. A unique, non-punitive approach  
7 is the restorative justice approach used at Dalhousie University where victims, offenders, and administrators work collaboratively to  
8 address sexual harassment and re-integrate offenders<sup>88</sup>. Reporting may have been ineffective in this review due to the impunity offered  
9 to prominent consultants. Senior personnel, particularly those who are well-known and successful in grant funding, are often  
10 considered “untouchable”, beyond reproach by their institutions<sup>89</sup>. Behaviour is often learned and modeling positive behaviours may  
11 break the cycle of bullying in medicine<sup>90</sup>. One approach would be making professionalism a requirement for promotion and career  
12 advancement, as in the Department of Medicine at the University of Toronto in Canada<sup>91</sup> or the University of Colorado School of  
13 Medicine<sup>26</sup>.

### 30 **Strengths and limitations**

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32 The strengths of this review include its broad scope; capturing several aspects of academic bullying, and its size (n = 68  
33 studies, 82,349 consultants and trainees). The cohort included was diverse, comprising several specialties and countries. We explicitly  
34 defined eligibility criteria and extracted data in duplicate. We used established tools to assess the risk of bias.  
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3 There are several limitations that should be acknowledged. There is no validated definition of academic bullying, and the  
4 included studies varied in their description of bullying. Most studies used questionnaires that were not previously validated. The  
5 survey instruments across studies differed from each other, and their results had to be pooled according to themes to be synthesized.  
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7 We could not account for differences in institutional culture and hospital systems in the responses of survey participants. Estimates of  
8 the prevalence of bullying must be interpreted in light of the self-reported nature of bullying surveys. Data on bully/victim  
9 demographics were underrepresented. Selection bias was a significant concern: 14 studies used convenience sampling, and 2 included  
10 voluntary focus groups for victims of bullying to sign up for. Overall, the response rate was 59.2%, with a range of 12% to 100%.  
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12 Surrogate outcomes were used such as awareness of bullying, and the reporting of outcomes was inconsistent. As such, the effect of  
13 anti-bullying interventions must be interpreted cautiously.  
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### 26 **Future directions**

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28 Significant gaps exist in the quality of the academic bullying literature, particularly with inconsistent definitions and  
29 limitations in study methodology. Our definition may be used to provide the breadth and granularity required to sufficiently capture  
30 cases of academic bullying in medicine. Studies on the impact of academic bullying would benefit from standardized, validated survey  
31 instruments. Although randomization and blinding are not always possible to test the effect of interventions, a control group should be  
32 included in anti-bullying intervention studies.  
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## Conclusions:

Academic bullying refers to specific behaviours that disrupt the learning or career of the intended target and commonly consists of exclusion and overwork. The consequences include significant psychiatric distress and loss of career opportunities. Bullies tend to be male senior consultants, whereas victims tend to be females. The fear of reprisal and non-enforcement of anti-bullying policies are the greatest barriers to addressing academic bullying. Results of bullying interventions must be interpreted with caution due to their methodological quality and reliance on surrogate measures. There is a need for well-designed trials with transparent reporting of relevant outcomes and accounting for temporal trends.

## Author contributions

TA contributed to study design, informed the search strategy, extracted and synthesized study data, and drafted and edited the manuscript. YE informed the search strategy, extracted and synthesized study data, and edited the manuscript. HGCV conceived the study idea, informed the search strategy, analyzed the data, drafted and edited the manuscript, and supervised the conduct of the study. HGCV affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned have been explained.

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### 10 **Competing interests**

11 All authors have reported that they have no relationships relevant to the contents of this paper to disclose.  
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### 17 **Ethical approval**

18 Not required.  
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### 24 **Data sharing**

25 All data relevant to the study are included in the article.  
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**Table 1. Summary of studies investigating bullying in academic medicine**

Author (year), Country	Study design	Setting	Definition of academic bullying	Target	Perpetrator	Source of bias	Risk of Bias
Huber et al. (2020), USA	Survey	Academic and non-academic hospitals	Data not provided	Residents	Consultant (83%) and resident (63%)	Inadequate sample size	Low
Hammoud et al. (2020), USA	Survey	Academic hospitals	Study based graduation questionnaire	Residents and medical students	For resident victims: consultant (58.7%), resident (27.9%), nurses (26.4%), other employees (10.2%), and administration (5.4%). For medical student victims: consultant (66.4%), resident (50.9%), nurses (22.4%), other employees (13.8%), administration (5.2%), and students (12.0%)	Low response rate	Low
Samora et al. (2020), USA	Survey	Academic hospitals	A behavior that a reasonable person would expect might	Residents, fellows, and consultants	Multiple*	Inappropriate statistical analysis, and	Moderate

			victimize, humiliate, undermine, or threaten a person to whom the behavior is directed			low response rate	
Brown et al. (2020), Canada	Survey	Academic hospitals	Gender-based discrimination included belittling remarks, inappropriate comments and jokes, denial of opportunities, and behaviors that are perceived as hostile or humiliating	Residents	Nurses, consultants, and residents	Inadequate sample size, analysis not conducted in full coverage of the sample, inappropriate identification of bullying, and low response rate	High
Zhang et al. (2020), USA	Survey	Academic and non-academic hospitals	NAQ <sup>‡</sup> used	Residents	Consultants, co-residents, nurses, and administrators	Study subjects not described in details	Low
Lind et al. (2020), USA	Before-After	Academic	Public belittlement or humiliation; physical harm; denied opportunities for training or rewards, or receiving lower evaluations or grades, based	Medical students	Data not provided	Unblinded outcome assessors, small sample size, high loss to follow-up, and analysis of change score not applied	High

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			solely on gender; and being subjected to racially or ethnically offensive remarks				
Colenbrander et al. (2020), Australia	Survey	Academic hospitals	Data not provided	Medical students	Data not provided	Inadequate sample size, analysis plan, data analysis coverage, and unreliable measurement of bullying	High
Iqbal et al. (2020), Pakistan	Survey	Academic and non-academic hospitals	NAQ* used	Consultants	Data not provided	Inadequate sample size and statistical analysis	Moderate
Elghazally et al. (2020), Egypt	Survey	Academic	Behaviour that is intended to cause physical or psychological damage due to the imbalance of power, strength or status between the aggressor and the victim	Medical students	Professors (30.1%), students (51.2%), and staff (18.7%)	None	Low
Raj et al. (2020), USA	Survey	Academic	Harassment defined as unwanted sexual advances, subtle bribery to	Consultants	Data not provided	None	Low

			engage in sexual behavior, threats to engage in sexual behavior, or coercive advances				
Kemper et al. (2020), USA	Survey	Academic and non-academic hospitals	Data not provided	Residents	Faculty (43%), clinical staff (60%), resident (28%), medical student (3%), and admin (9%)	None	Low
Stasenko et al. (2020), USA	Survey	Academic and non-academic hospitals	Harassment is defined as an unwelcome sexual advances or other forms of physical and verbal aggression that is sexual in nature	Consultants and fellows	Data not provided	Low response rate	Low
Afkhamzadeh et al. (2019), Iran	Survey	Academic hospitals	Physical or verbal violence, or bullying	Medical students and consultants	Data not provided	None	Low
Wolfman et al. (2019), USA	Survey	Academic and non-academic hospitals	Repeated negative actions and practices that are carried out as a deliberate act or unconsciously. These behaviors cause humiliation,	Residents	Data not provided	Inappropriate sampling frame, and identification of bullying condition, low response rate	High

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			offense and distress to the target				
Chowdhury et al. (2019), USA	Survey	Academic and non-academic hospitals	NAQ* used	Residents	Data not provided	Inadequate sample size, description of subjects and setting, and low response rate	High
Ayyala et al. (2019), USA	Survey	Academic and non-academic hospitals	Harassment that occurs repeatedly (> once) by an individual in a position of greater power	Residents	Data not provided	Inappropriate methods of bullying identification	Low
Hu et al. (2019), USA	Survey	Academic and non-academic hospitals	Discrimination and harassment on the basis of gender, race, or pregnancy or childcare	Residents	Consultants (52.4%), admin (1.1%), co-residents (20.2%), and nurses (7.9%)	None	Low
Brown et al. (2019), International	Survey	Academic and non-academic hospitals	Data not provided	Residents or fellow and consultant	Data not provided	Inappropriate methods of bullying identification and low response rate	Moderate
Zurayk et al. (2019), USA	Survey	Academic and non-academic clinics	Study-based sexual experience questionnaire	Consultants and residents	Residents (60%), lecturers (33%), professors (44%), nurses (10%), and hospital staff (29%)	Inadequate sample size, inappropriate sample frame	Moderate

Castillo-Angeles et al. (2019), USA	Before-after	Academic hospital	Study-based abuse sensitivity questionnaire	Residents	Data not provided	Small sample size, inadequate blinding of outcome assessors, and loss to follow-up	High
Kappy et al. (2019), USA	Before-after	Academic hospital	Harassment; discrimination; humiliation; physical punishment; and the use of grading and other forms of assessment in a punitive manner.	Medical students	Consultant, co-resident, and nurse	Intervention and outcomes not well defined	Moderate
D'Agostino et al. (2019), USA	Survey	Academic and non-academic hospitals	Abuse or harassment particularly of a sexual type	Residents, fellows, and attending	Consultants (64.5%), co-resident (38.7%), ancillary staff (25.8%)	Inappropriate methods of bullying identification, Inadequate statistical analysis plan, and low response rate	High
Chung et al. (2018), USA	Survey	Academic	Feeling of intimidation, dehumanization, or threat to grade, or career advancement	Medical students	Attending physician (68.4%), resident (26.3%), and nurse (10.5%)	Inappropriate sample methods, Non-validated method of bullying identification	High



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Kemp et al. (2018), USA	Survey	Academic hospital	Disrespect for the dignity of others that interferes with the learning process	Residents, consultants, and fellows	Data not provided	Inadequate statistical analysis plan, and low response rate	Moderate
Benmore et al. (2018), England	Before-after	Academic hospital*	Data not provided	Residents	Senior consultants	Insufficient enrollment, inadequate sample size, no blinding of outcome assessors, high loss to follow-up, lack of statistical analysis or ITS <sup>†</sup> design	High
Duru et al. (2018), Turkey	Survey	Academic hospital	Data not provided	Consultants, researchers, administrators, nurses	Specific occupations of bullies not specified	Inappropriate sampling and inadequate sample size	Moderate
Chambers et al. (2018), New Zealand	Survey	Academic and non-academic hospitals	Data not provided	Specialist Consultants	Primarily male. Senior medical staff (52.5%), non-clinical managers (31.8%), and clinical leaders (24.9%)	Low response rate	Low
House et al. (2018), USA	Before-after	Academic hospital	Data not provided	Medical Students	Faculty most frequently were the source of bullying followed by residents. Exact	Insufficient enrollment, inadequate sample size, no blinding of outcome	High

					breakdown not specified	assessors, outcomes not clearly described, lack of statistical analysis, individual-level analysis or ITS design	
Kulaylat et al. (2017), USA	Survey	Academic hospital	Verbal abuse, specialty-choice discrimination, non-educational tasks, withholding/denying learning opportunities, neglect and gender/racial insensitivity	Medical Students	Faculty (57%), residents, fellows (49%), and nurses (33%)	Inappropriate sampling, inadequate sample size, classification bias, and non-validated identification or measurement of bullying	High
Bernotaite et al. (2017), Lithuania	Survey	Academic hospitals	Data not provided	Family Consultants	Supervisor (25.3%), colleague (9.8%), subordinate (2.9%)	Inappropriate sampling, inadequate sample size, and coverage bias	Moderate
Chrysafi et al. (2017), Greece	Survey	Academic and non-academic hospitals	Data not provided	Consultants	Surgeons most frequently followed by internal medicine consultants, then radiologists/	Low response rate and coverage bias	Moderate

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					laboratory consultants		
Kapoor et al. (2016), India	Survey	Academic hospital	Data not provided	Medical students	Data not provided	Inappropriate sampling and inadequate description of study population	Moderate
Chadaga et al. (2016), USA	Survey	Academic hospitals	NAQ <sup>‡</sup> used	Residents and fellows	Consultants (29%), nurses (27%), patients (23%), peers (19%)	Low response rate, inadequate sample size, and coverage bias	Moderate
Llewellyn et al. (2016), Australia	Survey	Academic hospitals	Data not provided	Residents	Senior medical staff: (58.3%) in 2015, (60.6%) in 2016. Non-medical staff (33.2%) 2015, (33.9%) 2016, Manager (5.2%) in 2015, (1.2%) in 2016, junior resident (3.3%) in 2015, (4.3%) in 2016	Low response rate, biased sampling, coverage and classification bias	High
Rouse et al. (2016), USA	Survey	Academic clinics	NAQ used	Family medicine consultants	Data not provided	Low response rate	Low
Shabazz et al. (2016), UK	Survey	Academic and non-academic hospitals	Belittle and undermine an individual's work;	Gynecology consultants	Senior consultants (50.9%), junior consultants	Low response rate, and classification bias	Moderate

			undermining an individual's integrity; persistent and unjustified criticism and monitoring of work; freezing out, ignoring or excluding and continual undervaluing of an individual's effort.		(22.3%), medical director (4.5%)		
Peres et al. (2016), Brazil	Survey	Academic hospital	Data not provided	Medical students	Data not provided	Low response rate, and classification bias	Moderate
Ling et al. (2016), Australia	Survey	Academic hospitals	NAQ used	General surgery residents and consultants	For trainee victims: staff surgeon (48%), trainee surgeon (13%), admin (13%), nurses (11%), other consultant (6%) For consultant victims; (31%) staff surgeon, (28%) admin, (13%) other consultant, (11%) nurses, other (10%), trainees (4%)	Low response rate	Low

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Kulaylat et al. (2016), USA	Before-after	Academic hospital	Data not provided	Medical Students	Faculty (57%), residents/fellows (49%), and nurses (33%)	Inadequate sample size, no blinding of outcome assessors	Moderate
Ahmadipour et al. (2016), Iran	Survey	Academic hospital	Being assigned tasks as punishment, being threatened with an unjustly bad score or failure	Medical students, interns and residents	Data not provided	Inadequate sample size	Low
Jagsi et al. (2016), USA	Survey	Academic hospital	Data not provided	Consultants who won a career advancement award	Data not provided	Inadequate sampling frame and classification bias	Moderate
Crebbin et al. (2015), Australia and New Zealand	Survey	Academic hospitals	Data not provided	Residents, fellows and consultants	Surgical consultants (50%), other medical consultants (24%) and nursing staff (26%)	Low response rate	Low
Cresswell et al. (2016), UK	Before-after	Academic hospital	Data not provided	Residents	Data not provided	Insufficient description of study purpose, inadequate enrollment and sample size, no blinding of outcome assessors, outcomes not clearly	High

						described, lack of statistical analysis or ITS design and high loss to follow-up	
Loerbroks et al. (2015), Germany	Survey	Academic hospitals	Data not provided	Residents	Data not provided	None	Low
Malinauskiene et al. (2014), Lithuania	Survey	Non-academic clinics	NAQ used	Family medicine consultants	Bullying from patients (11.8%), from colleagues by (8.4%), from superiors by (26.6%)	None	Low
Mavis et al. (2014), USA	Survey	Academic hospitals	Mistreatment either intentional or unintentional occurs when behavior shows disrespect for the dignity of others and unreasonably interferes with the learning process	Medical students	Clinical faculty in the hospital (31%) residents/interns (28%), nurses (11%)	Low response rate, inadequate description of study population and statistical analysis	Moderate
Oser et al. (2014), USA	Survey	Academic hospital	Data not provided	Medical students	Residents > clerkship faculty > other attendings > other students >	None	Low

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					preceptors = nurses		
Oku et al. (2014), Nigeria	Survey	Academic hospital	Data not provided	Medical students	Medical students (23.7%), consultants (21.7%), lecturers (17.5%), consultants (16.5%), nurses (16.5%), other staff (4.1%)	None	Low
Gan et al. (2014), Canada	Survey	Academic hospital	Data not provided	Medical students	Consultants	Low response rate, inappropriate sampling, small sample size and classification bias	High
Fried et al. (2015), USA	Before-after	Academic hospital	Power mistreatment defined as “made to feel intimidated, dehumanized, or had a threat made about a recommendation, your grade, or your career	Medical students	Residents (49.7%), clinical faculty (36.9%), preclinical faculty (7.9%)	None	Low

Al-Shafae et al. (2013), Oman	Survey	Academic hospitals	Being coerced into carrying out personal services unrelated to the expected role of interns and instances in which interns were excluded from reasonable learning opportunities offered to others, or threatened with failure or poor evaluations for reasons unrelated to academic performance	Residents	Internal medicine (60.3%), surgery (29%), pediatrics (15.5%), specialists (51.7%), consultants (50%), residents (12.1%), nurses (24.1%)	Inappropriate sampling, inadequate sample size, inadequate description of study population and coverage bias	High
Owoaje et al. (2012), Nigeria	Survey	Academic hospital	Data not provided	Medical Students	Consultants (69.1%), residents/fellows (52.4%), other students (15.7%), nurses (7.8%), laboratory technicians (4.1%)	Low response rate	Low



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Askew et al. (2012), Australia	Survey	Academic and non-academic hospitals	Data not provided	Consultants	Consultants (44%), managers (27%), patients (15%), nurses/midwives (4%), junior consultants (1%)	Low response rate	Low
Meloni et al. (2011), Australia	Before-after	Academic hospital	Data not provided	Hospital employees	Data not provided	Lack of blinding of outcome assessors, high loss to follow-up, lack of statistical analysis or ITS design, and unit of analysis not clearly described	High
Dikmetas et al. (2011), Turkey	Survey	Academic hospital	Data not provided	Residents	Surgeons > Internists	Low response rate	Moderate
Eriksen et al. (2011), Norway	Survey	Academic hospital	NAQ used	Hospital employees	Colleagues. Specific occupations not described	Low response rate, inappropriate sampling and inadequate statistical analysis	Moderate
Imran et al. (2010), Pakistan	Survey	Academic hospitals	Threats to professional status, threats to personal	Residents	Consultants	Inappropriate sampling, classification	Moderate

			standing, isolation, overwork, and destabilization			and coverage bias	
Ogunsemi et al. (2010), Nigeria	Survey	Academic hospital	Data not provided	Residents	Administrative staff (58%), from the hospital chief executive( 41.4%), from patient relatives (40.4%), nurses (32.7%), residents (30%), patients (20%)	Inadequate sample size	Low
Best et al. (2010), USA	Before-after	Academic hospital	Data not provided	Unspecified	Data not provided	Study purpose not clearly described, insufficient enrollment, no blinding of outcome assessors, lack of statistical or individual-level analysis or ITS design	High
Nagata-Kobayashi et al. (2009), Japan	Survey	Academic hospitals	Assigned you tasks as punishment; threatened to fail you unfairly in residency; competed maliciously or unfairly with	Residents	Surgery (27.6%), internal medicine (21.4%), emergency medicine (11.5%), anaesthesia	Low response rate	Low

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			you; made negative remarks to you about becoming a consultant or pursuing a career in medicine		(11.3%). Consultants 34.1%, patients 21.7%, nurses 17.2%		
Scott et al. (2008), New Zealand	Survey	Academic hospital	A threat to professional status and personal standing, isolation, enforced overwork, destabilization	Residents	Consultants (30%), nurses (30%), patients (25%), radiologists (8%), residents/fellows (7%)	Low response rate, inadequate sample size and description of study population	Moderate
Gadit et al. (2007), Pakistan	Survey	Academic and non-academic hospitals	Data not provided	Consultants	Senior colleagues	Inadequate sample size	Low
Shrier et al. (2007), USA	Survey	Academic and non-academic hospitals	Data not provided	Consultants	Colleagues (24%), patients (19%), teachers (18%), supervisors (15%),	Inappropriate sampling, inadequate sample size, and coverage bias	Moderate
Cheema et al. (2005), Ireland	Survey	Academic hospitals	Data not provided	Residents	Senior residents (51-70%), nursing staff 47-59%, administration (15%-16%), colleagues (12%-13%)	Low response rate	Low

Rautio et al. (2005), Finland	Survey	Academic hospital	Data not provided	Medical students	Lecturers (27.9%), research/senior research fellows (27.7%), professors (16.6%), associate professors (13.6%)	Low response rate, inappropriate sampling, inadequate sample size, and coverage bias	High
Wear et al. (2005), USA	Survey	Academic hospital	Data not provided	Medical students	General surgeons and obstetricians	Low response rate, inappropriate sampling, inadequate sample size, classification and lack of validated measurement tool	High
Carr et al. (2000), USA	Survey	Academic hospitals	Data not provided	Consultants	Superiors and colleagues	None	Low
Quine (1999), UK	Survey	Non-academic clinics	Data not provided	Consultants	54% greater seniority, 34% same seniority, 12% less senior. 49% of bullies older than victim	None	Low

\*Regarding sexual harassment: the most common sources were attending surgeons (69% overall, 71% female, 18% male); trainee (46% overall, 47% female, 9% male); attending nonsurgical (22%, 22% female, 18% male); other allied health professionals (16%, 15% female, 36% male); nursing (14%, 12% female, 73% male); admin staff (4%, 2% female, 36% male). Re: harassing behaviors: the most common sources were attending orthopaedic surgeon (76% overall, 75% female, 86% male); trainee (30%, 32% female, 14% male); attending physician; nonsurgical (e.g., anesthesiologist, internist) (20%, 21% female, 11% male, nursing staff (18%, 18% female, 20% male); administration staff (13%, 12% female, 17% male); and other allied health professional (9%, 10% female, 9% male)

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\*\*Academic hospitals/clinics were defined as teaching hospitals/clinics with a university affiliation  
†Interrupted time series  
‡The NAQ is the negative acts questionnaire, a validated tool for assessing the prevalence of workplace bullying

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**Table 2: Self-reported description of specific bullying behaviours**

Behaviour	No. of studies/ Total studies*	Total cohort No. affected/ total participants who completed surveys on behaviours (%)*	Men No. affected/ total men who completed surveys on behaviours (%)†	Women No. affected/ Total women who completed surveys on behaviours (%)†
<b>Threats to professional status</b>				
Persistent unjustified criticism	12/28	4495/16700 (26.9)	535/1690 (31.7)	552/1402 (39.4)
Excessive monitoring of work	6/28	1752/6079 (28.8)	442/1525 (27.7)	441/1298 (34.0)
Intimidatory use of discipline	15/28	1531/19471 (7.9)	366/2381 (15.4)	363/2209 (16.4)
Spread of gossip/rumours	7/28	2977/10060 (29.6)	88/596 (14.8)	94/453 (20.8)
False allegations	6/28	613/3796 (16.1)	59/596 (9.9)	54/453 (11.9)
Refusal of leave, training or promotion	9/28	1604/8551 (18.8)	296/2594 (11.4)	458/2340 (19.6)
<b>Isolation</b>				
Social/professional exclusion	17/28	6160/21099 (29.1)	420/2027 (20.7)	1064/2814 (37.8)
<b>Overwork</b>				
Undue pressure to produce work	7/28	2509/6562 (38.2)	233/1525 (15.3)	355/1570 (22.6)
Setting impossible deadlines	6/28	1571/6079 (25.8)	164/1525 (10.8)	189/1298 (14.6)
<b>Destabilization</b>				
Shifting goalposts	1/28	54/417 (12.9)	Not reported	Not reported
Removal of areas of responsibility without consultation	8/28	1397/6193 (22.6)	160/1525 (10.5)	171/1298 (13.2)

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Withholding information that affects performance	9/28	3836/12503 (30.7)	219/1553 (14.1)	267/1328 (20.1)
Ordered to work below one's competence level	10/28	2934/8119 (36.1)	81/625 (13.0)	99/483 (20.5)

\*Total number of studies that described types of bullying behaviours, including studies that did not stratify results by sex. As a result, the denominator for the number of participants in total is not the sum of the denominators for men and women. The denominator was calculated from the total number of individuals who completed surveys on specific bullying behaviours, while the numerator was calculated from the number of individuals who indicated they experienced the specified bullying behaviour. Not all survey studies offered respondents the same options to respond to, and as a result the denominators for each bullying behaviour differ.

†Of the studies that separated data by gender or solely included the results of one gender and included the specified bullying behaviour.

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**Table 3. Self-reported impact of academic bullying**

Effect of academic bullying	No. of studies/ Total studies*	Total cohort No. of affected participants/ total participants who completed surveys on the impact of bullying (%)*	Men No. of affected men/ total men who completed surveys on the impact of bullying (%)†	Women No. of affected women/ total women who completed surveys on the impact of bullying (%)†
<b>Psychologic</b>				
Psychologic distress including depressive/PTSD symptoms	14/33	5597/14285 (39.1)	1750/5172 (33.8)	1636/3529 (46.4)
Reduced confidence in clinical skill	8/33	564/2112 (26.7)	68/212 (32.1)	97/597 (16.2)
<b>Career</b>				
Missed career opportunities	17/33	2823/9442 (29.9)	357/1898 (18.8)	1104/2530 (43.6)
Considerations of quitting	7/33	1034/2880 (35.9)	Not reported	Not reported
Termination of employment	5/33	228/4419 (5.2)	4/139 (2.9)	4/150 (2.7)
Leave of absence	2/33	50/748 (6.7)	Not reported	Not reported
Self-reported worsening of clinical performance	8/33	1673/4841 (34.6)	42/161 (26.1)	22/101 (21.8)

\*Total number of studies that described the impact of bullying, including studies that did not stratify results by sex. Not all participants were given the same options to select from.

†Of the studies that separated data by gender or solely included the results of one gender and included the impact of bullying.



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**Table 4. Barriers to addressing academic bullying**

<b>Barrier</b>	<b>No. of studies/Total studies*</b>	<b>No. of participants/ total participants (%)</b>
<b>Low reporting rates</b>		
Lack of awareness of what constitutes bullying	5/35	73/642 (11.4)
Lack of awareness of reporting process	15/35	1115/4215 (26.5)
Lack of perceived benefit	9/35	667/1621 (41.1)
Fear that bullying would worsen	13/35	969/2696 (35.9)
Fear of career ramifications	15/35	1094/2664 (41.1)
Concerns regarding confidentiality	4/35	56/445 (12.6)
<b>Institutional factors</b>		
Hierarchical nature of medicine	7/35	Not reported
Recurring cycle of abuse	3/35	Not reported
Normalization of bullying	10/35	Not reported
Lack of enforcement	13/35	586/1400 (41.9)

\*Total number of studies that described barriers of bullying behaviours

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7 **Figure titles and legends**

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9 **Figure 1: PRIMSA diagram of included studies**

10 We identified 68 articles relevant to academic bullying. We describe the reasons for exclusion at each stage of screening  
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7 **Figure 2: The definition, manifestations, impact, victims, and perpetrators of academic bullying**

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9 Academic bullying is defined as an abuse of authority through punishing behaviours that include overwork, destabilization, and  
10 isolation. Victims are commonly men, while perpetrators are commonly male consultants. Individual and institutional factors  
11 contribute to the ongoing cycle of bullying.  
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7 **Supplementary figure S1: Search strategy**  
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9 We included search terms relevant to academic bullying  
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**Supplementary figure S2: Risk of bias of survey studies included in this review**

Most studies in this review had at least a moderate risk of bias. Common sources of bias included inappropriate sampling techniques and low sample sizes

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7 **Supplementary figure S3: The risk of bias of before-after studies included in this review**

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9 Most studies in this review had at least a moderate risk of bias. Common sources of bias included lack of blinding or a control group  
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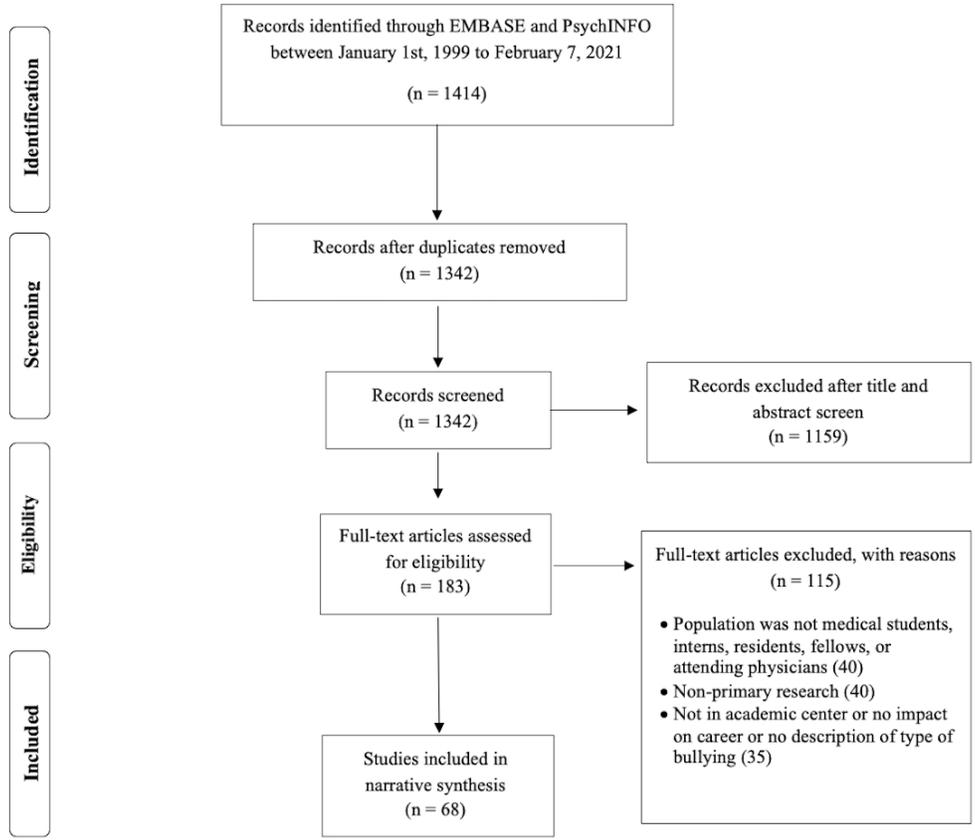


Figure 1: PRISMA diagram of included studies

We identified 68 articles relevant to academic bullying. We describe the reasons for exclusion at each stage of screening

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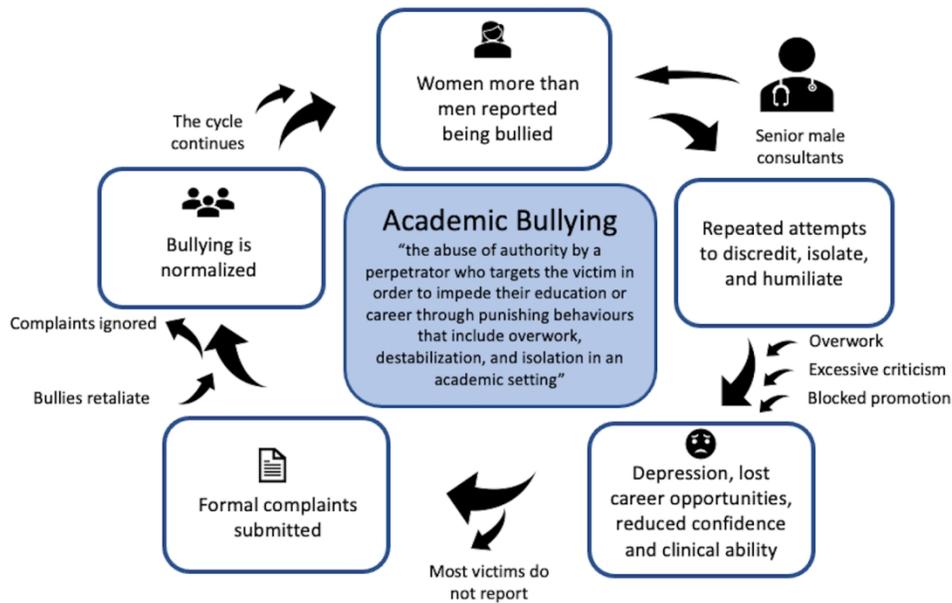


Figure 2: The definition, manifestations, impact, victims, and perpetrators of academic bullying. Academic bullying is defined as an abuse of authority through punishing behaviours that include overwork, destabilization, and isolation. Victims are commonly men, while perpetrators are commonly male consultants. Individual and institutional factors contribute to the ongoing cycle of bullying.

136x88mm (300 x 300 DPI)



**Supplementary table S1: Pooled prevalence of specific bullying behaviours by level of training**

<b>Behaviour</b>	<b>No. of studies/ Total studies*</b>	<b>Medical Students No. of participants/ total participants (%)*</b>	<b>Residents and fellows No. of participants/ total participants (%)*</b>	<b>Consultants No. of participants/ total participants (%)*</b>
<b>Threats to professional status</b>				
Persistent unjustified criticism	10/24	200/301 (66.4)	3596/12708 (28.3)	600/2881 (20.8)
Excessive monitoring of work	4/24	Not reported	1020/2445 (41.7)	564/2824 (20.0)
Intimidatory use of discipline	14/24	641/13914 (4.6)	640/3594 (17.8)	38/1112 (3.4)
Spread of gossip/rumours	5/24	Not reported	2085/6366 (32.8)	755/2881 (26.2)
False allegations	4/24	Not reported	36/102 (35.3)	509/2881 (17.7)
Refusal of leave, training or promotion	8/24	74/551 (13.4)	379/3441 (11.0)	894/3403 (26.3)
<b>Isolation</b>				
Social/professional exclusion	16/24	418/1546 (27.0)	3687/12385 (29.8)	1272/4445 (28.6)
<b>Overwork</b>				
Undue pressure to produce work	7/24	Not reported	827/2928 (28.2)	1326/2824 (47.0)
Setting impossible deadlines	6/24	Not reported	351/2445 (14.4)	965/2824 (34.2)
<b>Destabilization</b>				
Shifting goalposts	1/24	Not reported	54/654 (8.3)	Not reported
Removal of areas of responsibility without consultation	6/24	11/56 (19.6)	267/2503 (10.7)	784/2824 (27.8)

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4	Withholding				
5	information that	7/24	Not reported	2465/8869 (27.8)	1140/2824 (40.4)
6	affects performance				
7	Ordered to work				
8	below one's	7/24	182/269 (67.7)	1276/3676 (34.7)	975/2881 (33.8)
9	competence level				

\*Total number of studies that described types of bullying behaviours that separated data by level of training

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**Supplementary table S2: The pooled impact of academic bullying by level of training**

<b>Effect of academic bullying</b>	<b>No. of studies/ Total studies*</b>	<b>Medical Students No. of participants/ total participants (%) *</b>	<b>Residents and fellows No. of participants/ total participants (%) *</b>	<b>Consultants No. of participants/ total participants (%) *</b>
<b>Psychiatric</b>				
Psychiatric distress including depressive/PTSD symptoms	12/28	422/579 (72.9)	2142/5256 (40.8)	178/996 (17.9)
Reduced confidence in clinical skill	4/28	119/262 (45.4)	Not reported	177/1259 (14.1)
<b>Career</b>				
Missed career opportunities	14/28	484/3020 (16.0)	149/426 (35.0)	1789/5854 (30.6)
Considered quitting	9/28	109/317 (34.4)	5/100 (5.0)	908/2375 (38.2)
Terminated employment	4/28	Not reported	135/3574 (3.8)	11/348 (3.2)
Leave of absence	2/28	Not reported	Not reported	50/748 (6.7)
Self-reported worsening of clinical performance	6/28	202/579 (34.9)	1168/3179 (36.7)	51/563 (9.1)

\*Total number of studies that described the impact of academic bullying and separated data by level of training

**Supplementary table S3. Suggested policies, interventions and reported outcomes**

Intervention	Outcome
<b>Zero-tolerance/Anti-bullying policy</b>	
(Cheema et al., 2005) *	Data not provided
(Wear et al., 2005) *	Data not provided
(Gadit et al., 2007) *	Data not provided
(Nagata-Kobayashi et al., 2009) *	Data not provided
(Imran et al., 2010) *	Data not provided
(Meloni and Austin, 2011)	Increased employee engagement and workplace satisfaction Increased trust among victims that reports would be appropriately managed (44% to 64%) Victims felt safer reporting incidents of bullying (67% to 84%) Improved awareness of where and whom to report to (67% to 84%)
(Fried et al., 2012)	Reduced power abuse (43% to 30%) but no change in overall mistreatment rates
(Askew et al., 2012) *	Data not provided
(Mavis et al., 2014) *	Data not provided
(Chadaga et al., 2016) *	Data not provided
(Kapoor et al., 2016) *	Data not provided
(Peres et al., 2016) *	Data not provided
(Wolfman et al., 2019) *	Data not provided
<b>Bullying workshops</b>	
(Oku et al., 2014) *	Data not provided
(Kulaylat et al., 2016) *	Data not provided

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3	(Cresswell et al.,	
4	2016) *	Data not provided
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6	(Benmore et al., 2018)	Increased willingness to try to repair the harm caused by bullying
7		and became more conscious of giving feedback
8	(Castillo-Angeles et	
9	al., 2019)	Bullying behaviour persisted
10	(Colenbrander et al.,	
11	2020) *	Data not provided
12	(Stasenko et al., 2020)	
13	*	Data not provided
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15	<b>Tracking and reporting mistreatment data</b>	
16	(Gan and Snell, 2014)	No difference in mistreatment
17	(Mavis et al., 2014) *	Data not provided
18		
19	(House et al., 2018)	Decreased unprofessional or disrespectful behaviour by faculty as
20		reported by students [4.8% (2015-16) to 1.7% (2016-17)]
21	(Elghazally et al.,	
22	2020) *	Data not provided
23	(Hammoud et al.,	
24	2020) *	Data not provided
25		
26	<b>Staff education on bullying and the reporting process</b>	
27	(Cheema et al., 2005)	
28	*	Data not provided
29	(Wear et al., 2005) *	Data not provided
30	(Gadit et al., 2007) *	Data not provided
31	(Scott et al., 2008) *	Data not provided
32	(Imran et al., 2010) *	Data not provided
33	(Fried et al., 2012)	No change in reporting rate
34	(Al-Shafae, 2013) *	Data not provided
35	(Mavis et al., 2014) *	Data not provided
36	(Oku et al., 2014) *	Data not provided
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3	(Crebbin et al., 2015)	Data not provided
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5	(Chadaga et al., 2016)	Data not provided
6	*	
7		
8	(Peres et al., 2016) *	Data not provided
9	(Chung et al., 2018) *	Data not provided
10		
11	(D'Agostino et al.,	Data not provided
12	2019) *	
13	(Chowdhury et al.,	Data not provided
14	2019) *	
15	(Zurayk et al. 2019) *	Data not provided
16		
17	(Colenbrander et al.,	Data not provided
18	2020) *	
19	(Elghazally et al.,	Data not provided
20	2020) *	
21	(Lind et al. 2020)	Multiple effect**
22		
23	(Brown et al., 2020) *	Data not provided
24	<b>Develop a committee to handle and support reporting</b>	
25	(Gadit et al., 2007) *	Data not provided
26		
27	(Best et al., 2010)	Resolutions reached 96% of formal reports
28	(Kapoor et al., 2016) *	Data not provided
29		
30	(Kemp et al., 2018) *	Data not provided
31	(Kappy et al., 2019)	Fewer comments on mistreatment
32	(Ayyala et al., 2019) *	Data not provided
33		
34	(Brown et al., 2019) *	Data not provided
35	(Lind et al. 2020)	Multiple effects**
36	(Samora et al., 2020) *	Data not provided
37		
38	(Hammoud et al.,	Data not provided
39	2020) *	

#### Accessible and confidential reporting

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3	(Imran et al., 2010) *	Data not provided
4		
5	(Fried et al., 2012)	Reduced power abuse (43% to 30%) but no change in overall
6		mistreatment rates
7	(Askew et al., 2012) *	Data not provided
8	(Al-Shafae, 2013) *	Data not provided
9		
10	(Crebbin et al., 2015)	Data not provided
11	*	
12	(Mavis et al., 2014) *	Data not provided
13		
14	(Colenbrander et al.,	Data not provided
15	2020) *	
16	(Brown et al. 2019) *	Data not provided
17	(Samora et al., 2020) *	Data not provided

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\*Suggested approach that had not been implemented

\*\* In this study, a substantial decrease in mistreatment (from 62.9% to 40.3%), fear of reporting (from 42.2% to 37.1%), fear of reprisal (from 28.9% to 22.6%), and an increase in knowledge of reporting increased (from 88.8% to 94.2%) was observed.

**Supplementary figure S1: Search strategy**

1. Exp bullying
2. Exp medicine
3. Exp hospitals
4. (sabotage or mistreat\* or discredit or humiliation or harassment or demean or bully\* or belittle or intimidate or disrespect or coerce or ignore or undermine or exclude or libel or slander or criticism or overwork\*).ti
5. (Workplace or career or professional or academic or promotion\* or employment or job or profession or reputation or academia).mp
6. (medicine or residency\* or "medical school" or "clinical training" or hospital or internship or fellow\* or "junior doctor" or "house officer" or "clinical clerk" or "attending physician" or physician or doctor or clinician or hierarchical system or "clinician-scientist" or learner or faculty or "NHS").ti,ab.
7. Exp aggression
8. 1 or 4 or 7
9. 5 and 8
10. 2 or 3 or 6
11. 9 and 10



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	Has the sample frame appropriate to address the target population?	Were study participants recruited in an appropriate way?	Was the sample size adequate?	Were the study subjects and the setting described in detail?	Was the response rate appropriate to the target population?	Was the response rate adequate to answer the research question?	Were there appropriate statistical analyses?	Was the response rate managed appropriately?
Alhamedeh 2019	●	●	●	●	●	●	●	●
Ahmadiyoun 2016	●	●	●	●	●	●	●	●
Al-Shalabi 2013	●	●	●	●	●	●	●	●
Aslani 2012	●	●	●	●	●	●	●	●
Ayala 2019	●	●	●	●	●	●	●	●
Bernatche 2017	●	●	●	●	●	●	●	●
Brown 2019	●	●	●	●	●	●	●	●
Brown 2020	●	●	●	●	●	●	●	●
Carr 2000	●	●	●	●	●	●	●	●
Chadler 2016	●	●	●	●	●	●	●	●
Chandani 2018	●	●	●	●	●	●	●	●
Chenina 2005	●	●	●	●	●	●	●	●
Chenistry 2019	●	●	●	●	●	●	●	●
Chyauk 2017	●	●	●	●	●	●	●	●
Chung 2018	●	●	●	●	●	●	●	●
Colebrander 2020	●	●	●	●	●	●	●	●
Crebbin 2015	●	●	●	●	●	●	●	●
D'Almeida 2019	●	●	●	●	●	●	●	●
Dikmetas 2011	●	●	●	●	●	●	●	●
Duru 2018	●	●	●	●	●	●	●	●
Fighaly 2020	●	●	●	●	●	●	●	●
Friksen 2011	●	●	●	●	●	●	●	●
Gallo 2007	●	●	●	●	●	●	●	●
Gao 2014	●	●	●	●	●	●	●	●
Hammoud 2020	●	●	●	●	●	●	●	●
Hu 2019	●	●	●	●	●	●	●	●
Huber 2020	●	●	●	●	●	●	●	●
Imran 2010	●	●	●	●	●	●	●	●
Iqbal 2020	●	●	●	●	●	●	●	●
Jaggi 2016	●	●	●	●	●	●	●	●
Kapoor 2016	●	●	●	●	●	●	●	●
Kemp 2018	●	●	●	●	●	●	●	●
Kemp 2020	●	●	●	●	●	●	●	●
Kobayashi 2009	●	●	●	●	●	●	●	●
Kobayashi 2016	●	●	●	●	●	●	●	●
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	Was the study question or objective clearly stated?	Were eligibility/selection criteria for the study population pre-specified and clearly described?	Were the participants in the study representative of those who would be eligible for the test/service/intervention in the general or clinical population of interest?	Were all eligible participants that met the pre-specified entry criteria enrolled?	Was the sample size sufficiently large to provide confidence in the findings?	Was the test/service/intervention clearly described and delivered consistently across the study population?	Were the outcome measures pre-specified, clearly defined, valid, reliable, and assessed consistently across all study participants?	Were the people assessing the outcomes blinded to the participants' exposures/interventions?	Was the loss to follow-up after baseline 20% or less? Were those lost to follow-up accounted for in the analysis?	Did the statistical methods examine changes in outcome measures from before to after the intervention? Were statistical tests done that provided p values for the pre-to-post changes?	Were outcome measures of interest taken multiple times before the intervention and multiple times after the intervention (i.e., did they use an interrupted time-series design)?	If the intervention was conducted at a group level (e.g., a whole hospital, a community, etc.) did the statistical analysis take into account the use of individual-level data to determine effects at the group level?
Benmore 2018	●	●	●	●	●	●	●	●	●	●	●	●
Best 2010	●	●	●	●	●	●	●	●	●	●	●	●
Castillo-Angeles 2019	●	●	●	●	●	●	●	●	●	●	●	●
Cresswell 2016	●	●	●	●	●	●	●	●	●	●	●	●
Fried 2015	●	●	●	●	●	●	●	●	●	●	●	●
House 2018	●	●	●	●	●	●	●	●	●	●	●	●
Kappy 2019	●	●	●	●	●	●	●	●	●	●	●	●
Kulaylat 2016	●	●	●	●	●	●	●	●	●	●	●	●
Lind 2020	●	●	●	●	●	●	●	●	●	●	●	●
Meloni 2011	●	●	●	●	●	●	●	●	●	●	●	●

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# PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
<b>TITLE</b>			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
<b>ABSTRACT</b>			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
<b>INTRODUCTION</b>			
Rationale	3	Describe the rationale for the review in the context of what is already known.	4
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	5
<b>METHODS</b>			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	n/a
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	6
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	5
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	5
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	6
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	6
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	6
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	6
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	7
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., $I^2$ ) for each meta-analysis.	n/a



# PRISMA 2009 Checklist

Page 1 of 2

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	7
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	n/a
<b>RESULTS</b>			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	8
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	8
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	16
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	8-15
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	N/A
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	16
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	n/a
<b>DISCUSSION</b>			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	16-20
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	20-21
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	22
<b>FUNDING</b>			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	23

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit: [www.prisma-statement.org](http://www.prisma-statement.org).

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