

Microaggressions and Learning Environment Satisfaction in Medical Education: An Exploratory Cross-Sectional Survey

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Abstract

Background

Microaggressions are subtle forms of bias that may shape students' experiences within medical training environments, yet evidence on their prevalence and social patterning across medical education contexts remains limited. This study examined the prevalence of microaggression categories, subgroup differences, and associations with learning environment satisfaction among medical students. Understanding the most common forms of microaggressions and the most affected student groups is important for identifying inequities, informing targeted interventions, and fostering inclusive learning environments.

Methods

We conducted an exploratory cross-sectional survey of medical students within the International Collaboration and Exchange Program (ICEP) Global consortium in 2023, involving 36 medical schools. Of approximately 800 eligible students, 596 responded. The survey assessed eight microaggression categories adapted from Sue et al.'s taxonomy and a five-item Learning Environment Satisfaction (LES) composite. Cochran's Q was used to compare prevalence across categories. Chi-square tests examined subgroup differences by ethnicity, gender, and nativity. Mann–Whitney U tests and Spearman correlations assessed associations between microaggression exposure, frequency, and LES. Bonferroni-adjusted thresholds were applied for category-level analyses.

Results

Reported microaggression exposure varied significantly across categories ($p < 0.001$). Work and Places of Learning (63.3%), Microinvalidations (57.5%), and Alien in Own Land (56.9%) were the most reported categories, whereas Second-Class Citizen/Assumptions of Criminality (26.4%) and Denial of Individual Racism (27.7%) were least reported. Ethnic differences were observed across all categories, with the most consistent higher exposure reported among Middle Eastern/North African and mixed-ethnicity students. Women reported higher prevalence of Microinvalidations and Work and Places of Learning, while non-native students reported higher prevalence of Alien in Own Land and Assumption of Inferiority. Associations with learning environment satisfaction were generally small, with Microinvalidations showing the most consistent negative association.

Conclusions

Microaggressions were frequently reported and socially patterned across multiple domains within this ICEP sample. Ethnic disparities were widespread, whereas gender and nativity differences were more domain specific. Although associations with learning environment satisfaction were modest, Microinvalidations showed consistent relevance. These findings support the need for institutional efforts to strengthen recognition, response, and psychologically safe reporting within medical education environments.

Background

Microaggressions are subtle verbal, behavioural, or environmental indignities that communicate derogatory, dismissive, or exclusionary messages toward people from marginalised groups, often in ways that are normalised or difficult to challenge in the moment [1]. In educational settings, these experiences matter because they may shape belonging, credibility, and engagement, with prior work linking microaggressions to poorer psychological well-being, lower educational engagement, and adverse adjustment outcomes [2–5].

In medical education, these concerns are especially salient because discrimination and exclusion have long been implicated in the attrition of underrepresented students and trainees, while everyday forms of bias may be less visible but still corrosive to an inclusive learning climate [6, 7]. In a national US study, students who reported more frequent microaggressions had higher odds of depressive symptoms and lower institutional satisfaction [6]. Qualitative and mixed-methods studies in health professions education have likewise shown that racially minoritised students may encounter repeated invalidation, devaluation, outsider positioning, and stereotyped assumptions within training environments [8–10].

Despite this, there remains limited evidence on the prevalence and patterning of microaggressions across a multi-institutional medical education context. Most published studies have been based on single institutions or single-country settings, particularly the United States, and less is known about how exposure varies across demographic groups in broader international samples. In addition, although prior work has examined links with outcomes such as depression and burnout, it remains less clear how microaggressions relate to students' evaluations of the learning environment, which is a practically important concern for medical schools seeking to strengthen climate and inclusion [6]. Understanding the distribution of microaggressions across student populations is important because it can help identify groups who may be disproportionately exposed to exclusionary experiences, inform targeted institutional responses, and guide efforts to create more equitable and inclusive learning environments. International evidence is particularly valuable because it enables examination of whether patterns of exposure are shared across diverse educational and cultural contexts or are primarily shaped by local institutional circumstances.

Microaggressions may signal wider features of the learning environment. When common, socially patterned, or concentrated in specific domains, they may reflect institutional norms that affect belonging, psychological safety, participation, and perceived responsiveness. Evidence on their prevalence, distribution, and relationship with learning environment satisfaction can therefore help medical schools prioritise faculty development, reporting mechanisms, and curricular interventions effectively.

This exploratory study examined the prevalence and social patterning of eight microaggression categories among medical students in the ICEP consortium and assessed whether reported exposure was associated with learning environment satisfaction.

Methods

Study design and setting

We conducted a cross-sectional survey within ICEP Global, a consortium of medical schools designed to support cross-cultural learning. Participants were medical students from 36 consortium medical schools, although response numbers varied by site. Participant Distribution by University is given in Supplementary Material 3 (Table S4). A multi-institutional consortium enables examination of whether microaggressions recur

across a diverse educational network rather than reflecting a single institutional context. The survey was administered online via Qualtrics in February 2023 over 4 weeks. Local coordinators distributed invitation emails with study information and a unique survey link through institutional student mailing lists. Participation was voluntary and anonymous, and students provided electronic informed consent before starting the questionnaire. Two reminder emails were sent at 1-week intervals. No incentives were offered beyond the educational value of self-reflection.

Survey development and microaggression measures

The survey instrument (Supplementary File 1) was developed to assess the prevalence and types of microaggressions experienced by medical students and to assess learning environment satisfaction.

Because no single validated instrument aligned fully with the study's medical education context and the specific microaggression categories of interest, the survey used adapted category-based items informed primarily by DW Sue, CM Capodilupo, GC Torino, JM Bucceri, AM Holder, KL Nadal and M Esquilin [1] taxonomy of racial microaggressions, with refinement based on prior work on racial microaggressions and bias in academic and medical settings [2, 6, 11–13]. These categories and their operationalised definitions are provided in Supplemental Material 3 (Table S1). Each category was assessed with a single item containing 1 to 10 example behaviours in the stem, and students reported how often they had experienced each type of incident in the previous 6 months. This approach supported broad cross-institutional administration and category-level comparison. This survey was developed for exploratory use in a medical education context. Findings should be interpreted as indicative of patterns of reported experiences rather than precise estimates derived from a validated measurement scale. Content validity was supported by the established taxonomy and related measurement literature[1, 2, 13].

The Learning Environment Satisfaction (LES) measure assessed students' perceptions of institutional climate and responsiveness to microaggressions. Students rated each item on a 5-point Likert-type scale from 1, strongly disagree, to 5, strongly agree. The original 7-item item set included items relating to institutional climate, institutional responsiveness, perceived normalisation of microaggressions, and feeling unsettled by microaggressions within the school environment. Internal consistency for the full 7-item set was moderate (Cronbach $\alpha = 0.735$; standardised $\alpha = 0.737$; $n = 354$ complete cases). Five items showed acceptable corrected item-total correlations (0.630–0.773), whereas 2 items showed weak alignment with the total score: item 6, relating to the normalisation of microaggressions (0.042), and item 7, relating to feeling unsettled by microaggressions (-0.133). Deleting these items would have increased α to 0.785 and 0.829, respectively. Given their weaker psychometric performance and conceptual distinction from learning environment satisfaction, items 6 and 7 were excluded from the LES composite. The final 5-item LES score was calculated as the mean of the remaining items when at least 3 responses were available, with higher scores indicating more positive perceptions of the school's climate and response to microaggressions.

The questionnaire was adapted from a previously validated instrument to suit the objectives of the present study. The revised questionnaire underwent expert review to assess content validity, followed by pilot testing to evaluate clarity, relevance, and feasibility. Feedback from both stages informed the final version of the questionnaire.

The survey also included 3 optional open-text items (Supplementary Material 1). These asked participants to describe additional examples of microaggressions not captured by the questionnaire, reflect on how greater understanding of microaggressions might shape future behaviour, and identify any past instances in which they may have unintentionally enacted a microaggression. Responses were analysed as an embedded open-text component. The first and third items were used primarily to assess alignment with the existing categories and to contextualise how students interpreted these experiences, whereas the second was examined for recurring patterns in anticipated behavioural responses.

Lastly, the survey collected demographic and background information, including age, gender, race and ethnicity, nativity relative to the country of the student's medical school, financial support, partnership status, religious affiliation, medical school, program length, and year of study.

Data analysis

All quantitative analyses were conducted in IBM SPSS Statistics, version 31 (IBM Corp., Armonk, NY, USA). For each microaggression category, prevalence was operationalised as any exposure, defined as 1 or more incidents versus none. Prevalence estimates were calculated using valid responses for each category, with "not applicable" and blank responses treated as missing, resulting in category-specific denominators. Because the "Other" gender category had very small cell counts, it was excluded from inferential gender comparisons where appropriate.

Differences in prevalence across the 8 microaggression categories within participants were examined using Cochran's Q. Demographic differences in prevalence by ethnicity, gender, and nativity were examined using chi-square tests of independence, with Cramér V reported as an effect size. Associations between microaggressions and learning environment satisfaction were examined in 2 ways: Mann-Whitney U tests comparing LES scores between students who did and did not report exposure to each category, and Spearman rank-order correlations examining the relationship between microaggression frequency and LES scores. All tests were 2-tailed with $\alpha = 0.05$. Because 8 parallel category-level comparisons were conducted within each analytic family, we also calculated a Bonferroni-adjusted threshold of $\alpha = 0.00625$ to evaluate the robustness of statistically significant findings considering multiple testing and the exploratory nature of the category-level analyses.

Open-text responses were analysed using descriptive content analysis to supplement the quantitative findings. The first and third open-text questions were coded primarily deductively against the 8 microaggression categories used in the survey, with responses also classified as no relevant experience, not applicable, unclear, or out of scope where appropriate. The second open-text question, which asked how greater understanding of microaggressions might shape future behaviour, was analysed descriptively by grouping recurrent response patterns into practical categories, such as recognising subtle bias, reporting concerns, speaking up, communicating more respectfully, supporting others, education or advocacy, self-monitoring, emotional self-protection, and perceived constraints on responding. Counts were used to summarise broad response patterns and were not mutually exclusive where responses contained more than 1 idea. As this component was supplementary and descriptive rather than a standalone qualitative analysis, formal inter-rater reliability was not calculated.

Results

Participant characteristics

Of approximately 800 students invited, representing the total number of ICEP Global students in 2023, 596 responded, yielding an approximate response rate of 75%. Because item nonresponse varied across variables, denominators differed by characteristic. Valid sample sizes were 580 for age, 579 for gender, 563 for ethnicity, 566 for nativity, 541 for religion, and 550 for partnership status. The sample characteristics are shown in Table 1. Participants were predominantly aged 18 to 23 years, female, White or Asian, and native to the country of their medical school.

Table 1
Participant Characteristics (N = 596)

Characteristic	Category	n (%) of total N
Age Group (in Years)	18–20	302 (50.7%)
	21–23	205 (34.4%)
	24–26	58 (9.7%)
	27–29	6 (1.0%)
	30–32	3 (0.5%)
	Above 32	6 (1.0%)
	Missing	16 (2.7%)
Gender	Female	385 (64.6%)
	Male	191 (32.0%)
	Other	3 (0.5%)
	Missing	17 (2.9%)
Ethnicity	White (European/N. American/Australasian)	237 (39.8%)
	Asian (South/East/Southeast Asian)	178 (29.9%)
	Black/African/Caribbean	48 (8.1%)
	Hispanic or Latino	49 (8.2%)
	Middle Eastern/North African (MENA)	30 (5.0%)
	Mixed or multiple ethnicities	21 (3.5%)
	Missing	33 (5.5%)
Nativity	Native	457 (76.7%)
	Non-Native	109 (18.3%)
	Missing	30 (5.0%)
Note. Percentages are of the total dataset, N = 596.		

Prevalence of microaggression types

Reports of microaggressions were common in this sample. Figure 1 presents the prevalence of each microaggression category, defined as reporting at least 1 incident in the past 6 months. Work and Places of Learning microaggressions were most reported (63.3%), followed by Microinvalidations (57.5%) and Alien in Own Land (56.9%). Exoticisation/Assumption of Similarity (43.2%) and Assumption of Inferiority/Ascription of Intelligence (40.3%) were reported by approximately 2-fifths of respondents. Pathologizing Cultural Values/Communication Styles (33.7%), Denial of Individual Racism (27.7%), and Second-Class Citizen/Assumptions of Criminality (26.4%) were least reported. Prevalence differed significantly across the 8 categories, Cochran's $Q(7) = 319.65$, $p < 0.001$.

Open-text Item A, which asked participants to describe any additional microaggressions not otherwise captured in the questionnaire, broadly supported this category structure. Across valid responses ($N = 185$), most participants did not describe additional experiences ($n = 112$; 60.5%). Among the remaining responses, experiences included Second-Class Citizen/Assumptions of Criminality ($n = 18$), Assumption of Inferiority/Ascription of Intelligence ($n = 15$), and Work and Places of Learning ($n = 14$), with fewer responses coded to Alien in Own Land ($n = 7$), Microinvalidations ($n = 6$), Exoticisation/Assumption of Similarity ($n = 6$), Denial of Individual Racism ($n = 3$), and Pathologizing Cultural Values/Communication Styles ($n = 3$).

Open-text Item C, which asked participants to reflect on past instances in which they may have unintentionally enacted a microaggression, also aligned with the same framework. Of 178 valid responses, most reported no relevant experience, responded not applicable, or could not recall an incident (132 [74.2%]). Of the remaining responses, 42 were coded and 4 were excluded as out of scope. Among coded responses, the most frequent categories were Alien in Own Land ($n = 10$), Exoticisation/Assumption of Similarity ($n = 9$), and Second-Class Citizen/Assumptions of Criminality ($n = 8$).

Differences by ethnicity

Ethnic-group differences were observed across all 8 microaggression categories (Table 2). Chi-square tests were statistically significant for each category, with values ranging from $\chi^2(5) = 11.28$ to 36.09 and Cramér's V values ranging from 0.17 to 0.30. After Bonferroni correction ($\alpha = 0.00625$), all ethnicity-based differences remained statistically significant except for Work and Places of Learning, for which $p = 0.046$.

Across categories, the most consistent pattern was elevated prevalence among students identifying as Middle Eastern/North African (MENA), with mixed-ethnicity students also reporting comparatively high prevalence in several domains. The most pronounced ethnic disparities were observed for Second-Class Citizen/Assumptions of Criminality, $\chi^2(5) = 36.09$, $p < 0.001$, $V = 0.30$; Denial of Individual Racism, $\chi^2(5) = 31.86$, $p < 0.001$, $V = 0.28$; and Assumption of Inferiority/Ascription of Intelligence, $\chi^2(5) = 26.14$, $p < 0.001$, $V = 0.26$. For example, MENA students reported particularly high prevalence of Assumption of Inferiority (80.8%), Denial of Individual Racism (53.8%), and Second-Class Citizen/Criminality (69.2%), while mixed-ethnicity students also reported high prevalence of Denial of Individual Racism (58.8%) and Alien in Own Land (88.2%). By contrast, prevalence was often lowest among White or Asian students, depending on the category.

Ethnic patterning was also evident in categories with relatively high overall prevalence. For Microinvalidations, prevalence ranged from 41.7% among Asian students to 80.5% among Hispanic students, with MENA (76.9%) and mixed-ethnicity (70.6%) students also reporting high exposure, $\chi^2(5) = 26.77$, $p < 0.001$, $V = 0.26$. For Alien in Own Land, prevalence ranged from 50.0% among White students to 88.2% among mixed-ethnicity students,

$\chi^2(5) = 17.63$, $p = 0.003$, $V = 0.21$. For Work and Places of Learning, prevalence was high across all groups, ranging from 53.4% among Asian students to 80.0% among MENA students, but this difference did not survive Bonferroni correction, $\chi^2(5) = 11.28$, $p = 0.046$, $V = 0.17$.

Table 2
Percentages of Students in Each Ethnic Group Reporting ≥ 1 Incident in Each Category (Past 6 Months)

Microaggression Category	White	Asian	Black	Hispanic	MENA	Mixed	$\chi^2(df = 5)$	p value	Cramér's V
Alien in Own Land	50.0%	55.2%	53.6%	65.0%	80.8%	88.2%	17.63	0.003	0.21
Assumption of Inferiority	33.5%	35.7%	51.7%	42.5%	80.8%	58.8%	26.14	< 0.001	0.26
Denial of Racism	19.7%	22.3%	21.4%	46.2%	53.8%	58.8%	31.86	< 0.001	0.28
Pathologising Values	23.4%	37.9%	34.5%	50.0%	53.8%	35.3%	18.75	0.002	0.22
Second-Class/Criminal	17.3%	25.2%	42.9%	26.3%	69.2%	29.4%	36.09	< 0.001	0.30
Microinvalidations	59.7%	41.7%	50.0%	80.5%	76.9%	70.6%	26.77	< 0.001	0.26
Exoticisation	42.4%	31.0%	50.0%	47.4%	64.0%	70.6%	17.35	0.004	0.21
Work/Learning Environment	66.1%	53.4%	60.7%	72.5%	80.0%	76.5%	11.28	0.046	0.17

Differences by gender

Gender differences were more selective. Statistically significant differences were observed for Microinvalidations and Work and Places of Learning, and both remained significant after Bonferroni correction. Female students reported a higher prevalence of Microinvalidations than male students (63.0% vs 44.0%), $\chi^2(1, N = 418) = 13.40$, $p < 0.001$, $V = 0.18$, and a higher prevalence of Work and Places of Learning microaggressions (68.7% vs 51.1%), $\chi^2(1, N = 419) = 12.09$, $p < 0.001$, $V = 0.17$. A smaller unadjusted difference was observed for Pathologizing Cultural Values/Communication Styles, with higher prevalence among female students (37.2% vs 26.7%), $\chi^2(1, N = 412) = 4.49$, $p = 0.034$, $V = 0.10$, but this did not survive correction. No statistically significant gender differences were found for Alien in Own Land, Assumption of Inferiority, Denial of Individual Racism, Second-Class Citizen/Criminality, or Exoticisation (p values = 0.072 to 0.517). Additional subgroup results are presented in Supplemental Material 3 (Table S2).

Differences by nativity

Nativity-based differences were concentrated in 2 domains. International students were more likely than native-born students to report Alien in Own Land microaggressions (74.1% vs 52.5%), $\chi^2(1) = 12.36$, $p < 0.001$, and Assumption of Inferiority (57.7% vs 35.9%), $\chi^2(1) = 12.51$, $p < 0.001$. Both remained statistically significant after Bonferroni correction. Unadjusted nativity differences were also observed for Denial of Individual Racism (38.5% vs 25.2%), $\chi^2(1) = 5.55$, $p = 0.019$, and Microinvalidations (67.9% vs 54.5%), $\chi^2(1) = 4.74$, $p = 0.030$, but these did not remain significant after correction. No statistically significant nativity differences were found for

Pathologizing Cultural Values, Exoticisation, Second-Class Citizen/Criminality, or Work and Places of Learning (all $p \geq 0.210$). Additional subgroup results are presented in Supplemental Material 3 (Table S3).

Associations with learning environment satisfaction

Associations between microaggressions and learning environment satisfaction were examined using both prevalence-based and frequency-based analyses with the 5-item LES composite (Table 3). In the prevalence-based analyses, students who reported experiencing at least 1 incident of Microinvalidations had significantly lower LES scores than those who did not, $Z = -2.99$, $p = 0.003$, and this difference remained significant after Bonferroni correction. A lower LES score was also observed at the unadjusted level among students reporting Second-Class Citizen/Assumptions of Criminality, $Z = -2.00$, $p = 0.045$, but this did not meet the adjusted threshold of 0.00625. No other prevalence-based differences reached statistical significance.

In the frequency-based analyses, higher frequency of Microinvalidations was associated with lower LES scores, $\rho = -0.132$, $p = 0.008$, although this did not meet the Bonferroni-adjusted threshold. No other frequency-based associations were statistically significant. Overall, the findings suggest that associations between microaggression exposure and learning environment satisfaction were modest and selective, with Microinvalidations showing the clearest relationship with lower satisfaction.

Table 3
Spearman Correlations Between Microaggression Frequency and 5-item Learning Environment Satisfaction

Microaggression Frequency	ρ with LES	p value	N
Alien in Own Land	-0.009	0.863	397
Assumption of Inferiority	-0.090	0.071	399
Denial of Individual Racism	-0.044	0.386	391
Pathologising Cultural Values	-0.081	0.106	397
Second-Class Citizen/Criminality	-0.102	0.042	396
Microinvalidations	-0.132	0.008	406
Exoticisation	-0.061	0.220	401
Work and Places of Learning	-0.114	0.021	408

Anticipated behavioural responses following increased understanding of microaggressions

Open-text Item B, which asked participants how increased understanding of microaggressions might shape their future behaviour, yielded 214 responses. Most participants articulated some intended change ($n = 181$; 84.6%). Smaller groups provided no or not applicable-type responses ($n = 23$; 10.7%) or explicitly stated that they would not change their behaviour ($n = 5$; 2.3%).

Commonly reported intended responses included becoming more vigilant in recognizing subtle bias ($n = 26$), using institutional or reporting routes where appropriate ($n = 26$), speaking up or intervening more directly in the moment ($n = 26$), communicating more respectfully or de-escalating interactions ($n = 22$), supporting and validating the targeted person ($n = 21$), engaging in education or advocacy ($n = 17$), and monitoring one's own

behaviour more carefully to avoid enacting microaggressions (n = 15). Less frequently, participants described emotional self-protection or coping strategies (n = 7) and highlighted practical constraints, hesitation, or perceived risks associated with responding (n = 6). Because responses could reflect more than 1 pattern, counts are not mutually exclusive.

Discussion

Overall, this study suggests that microaggressions in medical education are not isolated or rare interpersonal events, but socially patterned experiences that are embedded within everyday learning environments. They were most commonly reported in work and learning contexts and frequently took the form of invalidation, outsider positioning, and devaluation, with clear variation across student demographic groups. The most consistently affected groups were Middle Eastern/North African and mixed-ethnicity students, while women and non-native students reported higher exposure in more specific domains. Although associations with learning environment satisfaction were modest, microinvalidations showed the clearest relationship with students' perceptions of institutional climate. Taken together, these findings indicate that microaggressions should be understood not only as individual interactions, but as learning-environment concerns that require institutional recognition, targeted support, and credible mechanisms for response.

Patterns of microaggression exposure

The high prevalence of Work and Places of Learning, Microinvalidations, and Alien in Own Land suggests that reported experiences were concentrated in training settings and commonly took the form of invalidation or outsider positioning. Convergent patterns are evident in qualitative work with racially minoritised trainees, where microaggressions are described as ongoing features of training environments and often include being treated as if one does not belong or being mistaken for perceived lower-status roles [14]. Focus group research with underrepresented medical and nursing students describes microaggressions occurring across curriculum and clinical environments, with peers, faculty, and preceptors implicated in experiences of devaluation and fostering of a hostile climate [8]. Mixed-methods evidence among Asian American medical students likewise highlights "perpetual foreigner" assumptions and invalidating interactions that can disrupt comfort and participation [10].

In contrast, the lower prevalence of Second-Class Citizen/Assumptions of Criminality and Denial of Individual Racism may reflect a combination of genuinely lower occurrence, greater ambiguity in identifying these experiences as microaggressions unless they are relatively overt, or reduced visibility in certain training contexts. Lower prevalence does not, however, imply lower significance: some domains may be more routine and embedded in everyday educational interactions, whereas others may be less frequent but still socially consequential.

The open-text findings did not reveal major additional domains among respondents who provided usable comments, suggesting that the survey captured the main domains of experience described by participants.

The open-text findings also suggested that some of the biases and assumptions captured in the survey were recognisable, in retrospect, in participants' own conduct. This supports understanding microaggressions as socially normalised interactional patterns rather than only as acts committed by a separate group of perpetrators, consistent with literature describing them as subtle, bias-shaped, and often normalised within clinical learning environments unless explicitly addressed[15–17].

Social patterning of microaggressions across ethnicity, gender, and nativity

Ethnic differences were evident across most categories, suggesting that disparities in microaggression exposure were broad rather than confined to a small number of domains. This pattern is more consistent with racialisation shaping experiences across medical training environments than with isolated category-specific differences. This aligns with prior survey evidence in U.S. medical students showing substantial racial and ethnic disparities in microaggression exposure, with higher frequencies among racially minoritised groups compared with White students [6]. The comparatively higher prevalence among Middle Eastern/North African and mixed-ethnicity students may indicate that certain groups are especially vulnerable where they are more likely to be read as ambiguous, othered, or outside dominant racial norms within training environments.

Gender differences were more domain-specific than generalised across categories. Women reported higher prevalence of Microinvalidations and Work and Places of Learning, which aligns with prior work examining microaggressions among women in medical training contexts. In a medical school survey, only 56% of students had heard the term microaggressions, yet 54% reported experiencing them, with women reporting higher rates than men [11]. Beyond overall prevalence, qualitative and mixed-methods studies suggest that female students and trainees frequently encounter gendered microaggressions that undermine professional legitimacy, particularly at the intersection of gender and race or ethnicity [18].

Nativity differences were concentrated in 2 domains: Alien in Own Land and Assumption of Inferiority. After correction for multiple testing, these were the only categories that remained statistically significant. These differences indicate that international students were more likely to endorse experiences operationalised in the questionnaire as outsider positioning and status-related devaluation.

Microaggressions and learning environment satisfaction

Associations with learning environment satisfaction were modest and selective. Microinvalidations showed the clearest relationship with lower LES scores, particularly in the prevalence-based analysis, where the association remained significant after correction for multiple testing. Smaller unadjusted associations were also observed for Second-Class Citizen/Criminality and Work and Places of Learning in the frequency-based analyses, although these did not remain statistically significant after Bonferroni correction. These findings should therefore not be interpreted as evidence that microaggressions are the sole or dominant determinant of learning environment satisfaction. Rather, they suggest that some forms of microaggression, particularly those involving invalidation, dismissal, or normalised exclusion, may form one measurable component of students' broader appraisal of institutional climate.

This pattern is nevertheless meaningful. It is consistent with prior work linking more frequent microaggressions to poorer institutional satisfaction and more negative educational experiences [6]. It also accords with Minority Stress Theory, which posits that repeated prejudiced events can accumulate into ongoing stress [19]. Qualitative studies similarly suggest that cumulative microaggressions can erode comfort and belonging in teaching and clinical environments and contribute to distraction, demoralisation, and withdrawal from learning opportunities[8, 9]. The prominence of Microinvalidations is also consistent with conceptual accounts that position invalidation as central to how bias is managed interpersonally and institutionally [1]. However, given the small effect sizes and exploratory design, broader claims about cumulative educational effects require further validation.

Open-text findings on anticipated behavioural responses

These findings suggest that microaggression literacy may matter not only for recognising problematic interactions, but also for expanding what students see as possible or appropriate responses. The coexistence of intended action and hesitation implies that awareness alone is unlikely to be sufficient where institutional hierarchy, uncertainty, or relational risk constrain response. In this sense, the findings point to microaggressions as not only an issue of perception, but also of agency within the learning environment. This aligns with work on the hidden curriculum, which emphasises that training environments communicate implicit norms about what can be noticed, voiced, or challenged [20], and with work on othering and belonging, which highlights how institutional conditions shape whether students feel able to respond to exclusion in ways [21].

Implications for faculty development and institutional response

These findings suggest that microaggressions should be addressed as everyday climate-shaping interactions within medical education, rather than as marginal or isolated interpersonal incidents. The most commonly reported categories, Work and Places of Learning, Microinvalidations, and Alien in Own Land, indicate that institutional responses should focus on the routine contexts in which students learn, communicate, receive feedback, and negotiate belonging. Faculty development should therefore move beyond overt discrimination alone and include attention to subtler forms of invalidation, outsider-positioning, and devaluation within teaching, clinical supervision, peer interaction, and placement environments.

The demographic patterning of exposure further suggests that institutional responses need to be both systemic and targeted. Ethnic differences across categories indicate that microaggressions should be treated as an equity issue linked to racialised assumptions about belonging, competence, and legitimacy. At the same time, variation between ethnic groups means that minoritised students should not be treated as a homogeneous group. Particular attention may be needed for Middle Eastern/North African and mixed-ethnicity students, who reported consistently high exposure across several domains. Similarly, higher exposure among women in Microinvalidations and Work and Places of Learning, and among non-native students in Alien in Own Land and Assumption of Inferiority, suggests that support should be responsive to the specific forms of exclusion different groups encounter.

Microinvalidations may warrant particular institutional attention because they were both commonly reported and most clearly associated with lower learning environment satisfaction. This suggests a need to help faculty and students recognise dismissive, minimising, or normalising responses to bias, especially where these responses may unintentionally communicate that students' concerns are exaggerated or illegitimate. However, recognition training alone is unlikely to be sufficient. Medical schools also need credible reporting and feedback mechanisms, psychologically safe routes for raising concerns, and visible accountability when exclusionary patterns are identified. The aim should not only be to improve individual awareness, but to strengthen the institutional conditions that allow students to participate, report concerns, and learn without repeated experiences of invalidation or outsider positioning.

Limitations and future directions

This study should be interpreted considering several limitations. Firstly, the cross-sectional design precludes causal inference, and associations between microaggression exposure and learning environment satisfaction

cannot establish directionality. Secondly, all measures were self-reported and relied on recall over 6 months, which may be influenced by memory error, differences in how students interpreted category exemplars, and social desirability.

Thirdly, the study used adapted category-level items rather than a fully validated microaggression scale. Although the items were grounded in established taxonomy and prior literature, their validity across different cultural and institutional contexts cannot be assumed. The findings should therefore be interpreted as exploratory indicators of reported experience rather than precise prevalence estimates.

Fourthly, the study was conducted within ICEP Global and should not be interpreted as representative of medical students internationally. The value of the dataset lies in its capacity to identify patterns within a multi-institutional educational network, rather than to estimate global prevalence. Although pooling across ICEP Global supported the study's aim of providing an initial multi-institutional overview, the consortium spans countries and institutions that differ in norms, reporting climates, and demographic composition. The findings should therefore not be interpreted as representative of any single country or school, particularly given uneven country-level sample sizes and relatively homogeneous settings in parts of the consortium. Cross-country comparisons were beyond the scope of this paper given uneven country-level sample sizes.

Fifthly, subgroup analyses may have been underpowered for smaller demographic groups, limiting precision and constraining intersectional analyses. Finally, nativity and ethnicity were partially confounded in this sample, so nativity differences may partly reflect ethnicity-linked patterns and local majority-minority positioning rather than birthplace alone.

Future work should use longitudinal and multilevel designs to examine change over time, test institutional moderators, and model nativity alongside ethnicity and other relevant markers of difference where feasible. Further validation work is also needed to assess how microaggression categories and item examples are interpreted across cultural and institutional contexts. More integrated qualitative work could clarify how students interpret category exemplars and how institutional responses shape learning environment appraisals. Intervention studies should also test whether efforts to strengthen recognition and response improve climate perceptions.

Conclusion

This study contributes an exploratory multi-institutional account of microaggressions within a medical education consortium, highlighting how these experiences are reported, socially patterned, and related to students' perceptions of the learning environment. Rather than providing nationally representative estimates or causal evidence, the findings show that microaggressions should be understood as learning-environment concerns that occur across everyday educational and clinical contexts, with particular relevance for equity, belonging, and institutional responsiveness. The patterns observed suggest that medical schools should move beyond treating microaggressions as isolated interpersonal incidents and instead strengthen systems for recognition, response, and accountability, while ensuring that support is responsive to the student groups and domains of experience most affected. Further longitudinal, validated, and institutionally balanced research is needed to clarify the longer-term educational implications of these experiences and to test whether targeted institutional interventions improve learning climate.

Abbreviations

ICEP

International Collaboration and Exchange Program

LES

Learning Environment Satisfaction

MENA

Middle Eastern/North African

SPSS

Statistical Package for the Social Sciences

Declarations

Ethics approval and consent to participate

Ethical approval for this study was granted by BDM Research Ethics Panel from King's College London (LRS-22/23-32219) and Columbia University's Institutional Review Board from Columbia University (AAA0003715). The study was conducted in accordance with the Declaration of Helsinki and relevant institutional ethical guidelines. Participants provided electronic informed consent before completing the questionnaire.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

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Dana A Stearns: Writing - review & editing

Geoffroy Noel: Writing - review & editing

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Figures

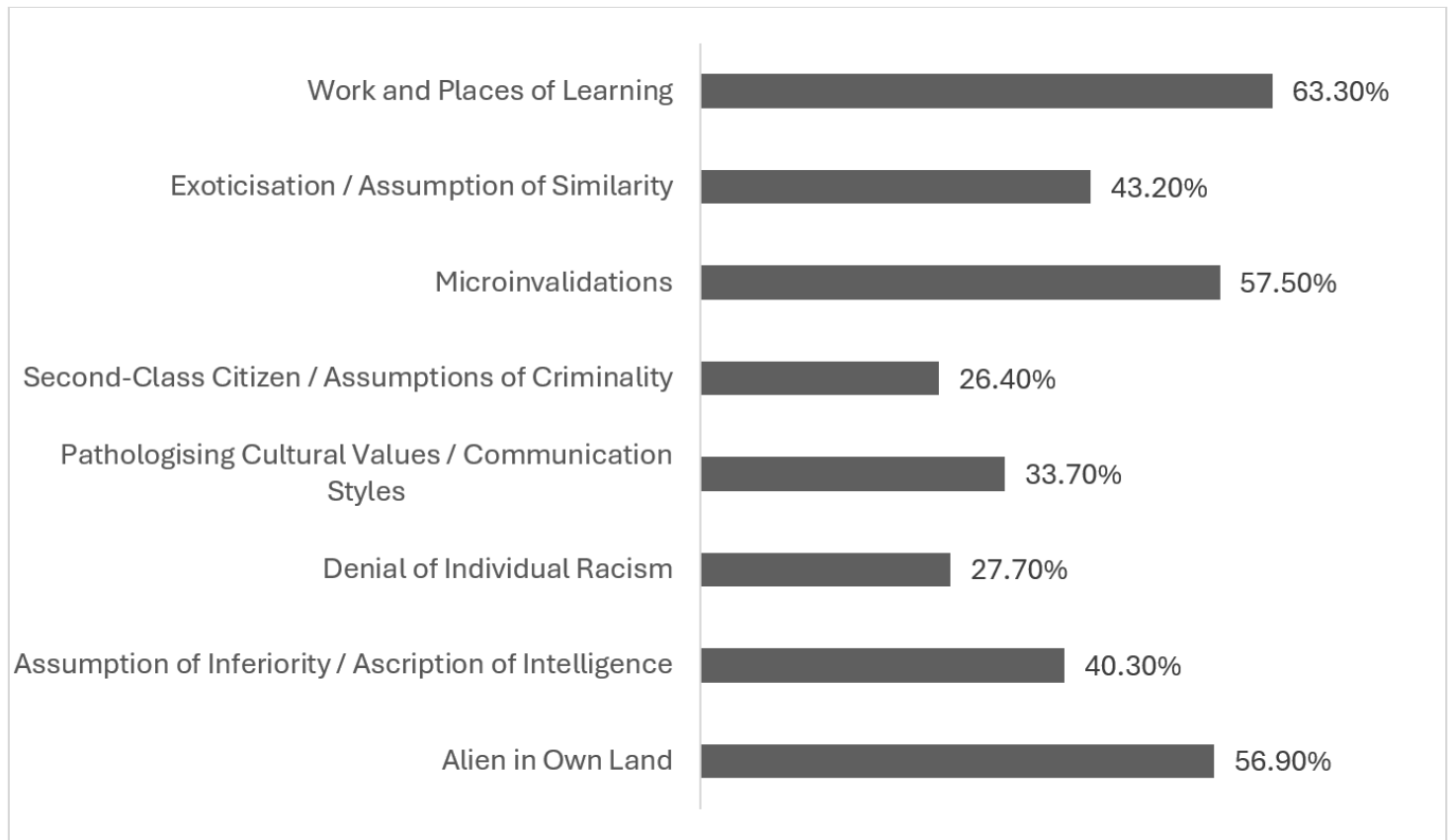


Figure 1

Prevalence of Experiencing ≥ 1 Incident of Microaggression by Types (Past 6 Months)

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [SupplementalDigitalAppendix1MicroaggressionandLESScale.pdf](#)
- [SupplementalDigitalAppendix2OpenTextQuestions.pdf](#)
- [SupplementalDigitalAppendix3AdditionalTables.docx](#)