

BMJ Open Exposure of medical students to sexism and sexual harassment and their association with mental health: a cross-sectional study at a Swiss medical school

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ABSTRACT

Objectives To assess the self-reported prevalence of sexism and sexual harassment at a Swiss medical school, and to investigate their association with mental health. Research hypotheses were an association between sexism/sexual harassment and poor mental health and a higher prevalence of sexism/sexual harassment in clinical rotations.

Design Cross-sectional study as a part of ETMED-L project, an ongoing cohort study of interpersonal competences and mental health of medical students.

Setting Single-centre Swiss study using an online survey submitted to medical students.

Participants From 2096 registered students, 1059 were respondents (50.52%). We excluded 26 participants (25 due to wrong answers to attention questions, and 1 who did not answer the sexism exposure question). The final sample (N=1033) included 720 women, 300 men and 13 non-binary people.

Measures Prevalence of self-reported exposure to sexism/sexual harassment. Multivariate regression analyses of association between being targeted by sexism or sexual harassment and mental health (depression, suicidal ideation, anxiety, stress, burnout, substance use and recent mental health consultation). Regression models adjusted for gender, academic year, native language, parental education level, partnership and an extracurricular paid job.

Results Being targeted by sexism or sexual harassment was reported by 16% of participants with a majority of women (96%). The prevalence increased with clinical work. After adjusting for covariates, we found association between being targeted by sexism/harassment and risk of depression (OR 2.29, 95% CI 1.54 to 3.41, $p<0.001$), suicidal ideation (B coefficient (B) 0.37, $p<0.001$) and anxiety (B 3.69, $p<0.001$), as well as cynicism (B 1.46, $p=0.001$) and emotional exhaustion (B 0.94, $p=0.044$) components of burnout, substance use (B 6.51, $p<0.001$) and a recent mental health consultation (OR 1.78, 95% CI 1.10 to 2.66, $p=0.005$).

Conclusions Sexism and sexual harassment, although less common than usually reported, are behaviours of concern in this medical school and are significantly associated with mental health.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This study collects precise data on mental health and gender discrimination.
- ⇒ This study includes extended information on non-binary students.
- ⇒ This study has a cross-sectional, single-centre design and a response rate below 65%, limiting causal and generalisable conclusions.
- ⇒ This study does not provide information on the perpetrators' gender, or the participants' gender expression, sexual orientation and ethnicity, preventing an intersectional understanding of the underlying mechanisms.

INTRODUCTION

Sexism, gender discrimination and sexual harassment have been described in the major medical journals since the 1990s^{1–8} as one facet of a long-standing patriarchal system. These behaviours represent the leading subtypes of mistreatment reported by medical students and residents, with a pooled prevalence of 59.6% (95% CI 49.2 to 68.0%) in a meta-analysis from 2014.³

Available data on sexism and sexual harassment in the medical field indicate a majority of male physicians as perpetrators,^{9–11} and a great majority of women as targets.^{3 11–15} Moreover, physicians reported a higher exposure to gender discrimination and sexism than medical students,¹⁵ and other studies described an increased prevalence of sexism and sexual harassment during the clinical years of medical studies compared with the preclinical years.^{9 16}

Despite guidelines existing for more than two decades⁸ and a growing interest worldwide in these issues, a lack of efficient policies against mistreatment in academic medicine, particularly

regarding sexual harassment and sexism, has led to an oppressive work climate, mistrust towards institutions^{6 16–19} and to negative health and mental health outcomes. The association between misconduct and poorer health outcomes in medical students has been shown in other political minorities (eg, non-heterosexual or racial minorities).^{20 21} Furthermore, morally harassed medical students and residents had a higher risk of burnout, sleep and anxiety disorders, risk-taking behaviours (such as substance abuse) and an increased probability of committing medical errors.^{2 6} However, quantitative studies assessing the association between sexism in medical studies and mental health outcomes are lacking.

In Switzerland, only one study assessed the prevalence of sexism and sexual harassment in the Swiss medical field.¹⁵ Authors found a prevalence of gender discrimination and sexual harassment of 22.5% among female students and of 9.8% among male students, with no gender difference seen when self-reporting as a witness.¹⁵

This study aims to investigate the exposure of medical students to sexism and sexual harassment and the potential association of such exposure with mental health. We hypothesised an association between experiencing sexism/sexual harassment and poor mental health, an increased prevalence of sexism and sexual harassment in clinical years, both predominantly targeting women and gender-diverse people, and perpetrated mainly by people in a superior hierarchical position.

METHODS

Study design and participants

This study is part of the ETMED-L project,²² an ongoing open-cohort study of interpersonal competences and mental health of medical students at the University of Lausanne (Switzerland), and aims to analyse data related to sexism/sexual harassment and mental/physical health collected between 1 November 2021 and 2 December 2021. All medical students (curriculum Years 1–6) registered at Lausanne University Medical School received an invitation to fill in an online survey via their university email account. Exclusion criteria included external students registered at the University as part of an academic exchange and participants having at least one wrong answer on one of two attention questions (eg, 'In order to check your attention, please answer 'Slightly agree' to this question.') placed in the survey. Participants fully completing the survey received a fee of 50 CHF (Swiss franc) (US\$~50). All participants provided informed consent online before starting the survey.²³

Measures

Sexism/sexual harassment

The first question assessed exposure to sexism/sexual harassment 'Have you ever faced or witnessed any sexism or sexual harassment in the context of your studies?' If yes, further information asked included the student's status (target, witness or both), the type of mistreatment (sexism, sexual harassment or both), the context (during a clinical internship, other study-related situation or

both) and the function of the perpetrator (teacher, physician, patient, student or person with other function). To avoid under-representation of micro-aggression ('brief and commonplace daily verbal, behavioural or environmental indignities'²¹), we did not introduce a definition of sexism or sexual harassment in the survey and consequently, pooled the two types of mistreatment (sexism and sexual harassment) for the analyses. Self-reporting as a target of sexism and/or sexual harassment (vs being a witness or having never been exposed) was used as the exposure of interest in the statistical analyses.

Sociodemographic data

The following sociodemographic characteristics were collected: age; self-reported gender identity (woman, man or non-binary); having Swiss origin; having French as mother tongue; parents' education level (high for higher school or university or not high); relationship status (having a partner or not); having a paid job; and receiving financial help from parents, family or other.

Results for non-binary students were reported throughout the paper except for the regression analyses, where results were pooled with women due to their small number and similar discrimination pattern hypotheses.^{24–26}

Depression, suicidal ideation and mental health consultation

We screened depression symptoms with The Centre for Epidemiological Studies-Depression (CES-D) tool.²⁷ Participants indicated how often in the last 4 weeks they had experienced depression symptoms such as 'I thought my life had been a failure' (from 0 = 'never, less than 1 day' to 3 = 'frequently, all the time (5–7 days)') with increased severity at higher scores (ranging from 0 to 60). Previous research validated cut-offs (≥ 16 for men and ≥ 20 for women), as well as the French translation of the CES-D.²⁸ We measured suicidal ideation using two questions from the validated French version²⁹ of the Beck Depression Inventory assessing suicidal thoughts and pessimism,^{30–32} each question ranging from 0 to 3, with greater suicidal risk at higher scores. Additionally, we asked participants to report whether they had seen a psychotherapist or psychiatrist for their mental health in the past 12 months.

Anxiety, stress and burnout

We used the trait subscale of the State-Trait Anxiety Inventory (STAI) validated in French^{33–36} to assess general anxiety levels. It includes 20 items (eg, 'I am worried') rated from 1 ('Not at all') to 4 ('Very much') with higher sum scores (range=20–80) indicating higher general anxiety.^{34–36} We asked participants to rate on a 10-point scale (01 = 'none' to 10 = 'extreme') their global stress level. Burnout was measured with the validated French version³⁷ of the Maslach Burnout Inventory Student-Survey (MBI-SS).³⁸ This scale quantifies academic burnout on three dimensions: Emotional exhaustion (five items); Cynicism (four items); and Academic Efficacy (six items). The students rated each item (eg, 'I

feel emotionally drained from my work’) from ‘never’ to ‘always’ on a 6-point scale with higher scores indicating higher burnout, except for Academic Efficacy with reverse dimension.

Psychoactive substance use

We quantified psychoactive substance use with the Global continuum of substance risk derived from the French validated WHO’s Alcohol, Smoking and Substance Involvement Screening Test (ASSIST).^{39 40} Its eight questions cover substance use (eg, ‘In the last 3 months how often have you consumed cocaine?’) and substance-related problems (eg, ‘Has your use of cocaine affected your usual activities?’) for 10 substances: tobacco; alcohol; cannabis; cocaine; amphetamine type stimulants; inhalants; sedatives; hallucinogens; opioids and ‘other drugs’. Higher scores indicate greater substance risk (range=0–422).

Global evaluation of health

We included a question on a global evaluation of health (‘Are you satisfied with your health?’), ranging from 0 = ‘very unsatisfied’ to 5 = ‘very satisfied’.

Data analyses

We reported categorical variables as frequency and percentage and continuous variables as mean and SD for normally distributed data and median and IQR for skewed data. Distribution of sociodemographic characteristics between students who reported being targeted by sexist or sexual harassing attitudes and those only witnessing them or never exposed to such attitudes were compared using independent sample t-tests and X^2 tests. We used Pearson X^2 tests and Kruskal-Wallis rank tests to obtain trends for prevalence of sexism and sexual harassment as well as the context, student status, perpetrator’s function and distribution of health outcomes over academic years. We further compared the frequency of reporting being a target of sexism/sexual harassment and the distribution of health outcomes according to the self-reported gender identity with Pearson X^2 tests and Kruskal-Wallis rank tests for categorical and continuous outcomes, respectively.

Non-parametric equivalent tests were used in non-normal distributions.

We computed linear regression and logistic regression models for continuous and binary health outcomes, respectively, to assess their association with self-reporting as a target. We then adjusted the models for covariates identified from both the literature and sociodemographic distribution: gender, academic year, native language, parental education level, partnership and extracurricular paid job.

The highest rate of missing values was 0.58% for ASSIST, MBI-SS, STAI and stress evaluations. As it has been shown that no information gain can be expected from imputation with missing data rates below 5%,⁴¹ missing values were ignored and listwise deletion was applied. We set statistical significance at p value<0.05 for two-sided tests and we conducted all statistical analyses with Stata software.⁴²

Patient and public involvement

Patients and the public were not involved in the design or conduct of our research. We plan to collaborate with medical student societies for reporting and disseminating our research results.

RESULTS

Demographic characteristics

From the 2096 eligible students, 1059 were respondents (50.52%). We excluded 25 participants who failed at least one attention question and one who did not answer the sexism exposure question (figure 1). Response rates varied across academic years, ranging from 34.2% in Year 1 to 66.5% in Year 6 (data not shown). Among the 1033 included students, 720 (67.8%) were women, 300 (29.0%) were men and 13 (1.3%) were non-binary. The demographic characteristics of the overall participants and according to their status are summarised in table 1.

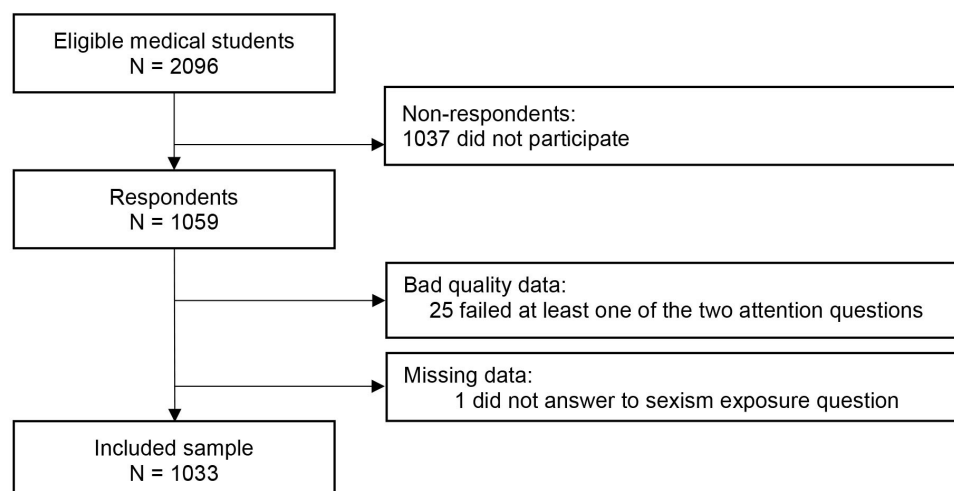


Figure 1 Study flowchart

Table 1 Demographic characteristics of participants

	All students (N=1033 100%)	Students who reported being targeted by sexism or sexual harassment (N=166 16%)	Students who did not report being targeted by sexism or sexual harassment (N=867 84%)	P value
	No. (%)	No. (%)	No. (%)	
Age (median years, (IQR))	22 (20–24)	23 (22–24)	21 (20–23)	<0.001*
Gender identity				
Women	720 (67.77)	159 (95.78)	561 (64.71)	<0.001*
Men	300 (29.04)	3 (1.81)	297 (34.26)	
Non-binary	13 (1.26)	4 (2.41)	9 (1.04)	
French-speaking	829 (80.25)	142 (85.54)	687 (79.24)	0.06
Native of Switzerland*:	789 (76.38)	136 (81.93)	653 (75.32)	0.07
Having a father with a high education level [†]	636 (61.57)	119 (71.69)	517 (59.63)	0.003*
Having a mother with a high education level [†]	653 (63.21)	116 (69.88)	537 (61.94)	0.05
Being engaged in a relationship	540 (52.27)	99 (59.64)	441 (50.87)	0.04*
Having an extracurricular paid job	344 (33.30)	68 (40.96)	276 (31.83)	0.02*
Receiving financial help from parents/family/ other people	964 (93.32)	155 (93.37)	809 (93.31)	0.98

Significant P-values in bold

*Considered Swiss native if mother tongue was Swiss-French, Swiss-Italian or Swiss-German.

†Higher school or university.

Self-reported exposure to sexism and sexual harassment

One in four students (N=267, 25.9%) reported an exposure to sexism and/or sexual harassment during their studies, either as a target and/or a witness. Exposure

prevalence increased significantly over the academic years (3.6% in Year 1 to 57.3% in Year 6, p<0.001) (table 2). Among the testimonies, 166 students (16.1%) reported being targeted by sexism and/or sexual harassment,

Table 2 Prevalence of self-reported exposure to sexism and sexual harassment and its context, student status and perpetrator function according to each academic year of medical studies

	Students all together (N=1033)	Year 1 (N=302)	Year 2 (N=156)	Year 3 (N=168)	Year 4 (N=142)	Year 5 (N=141)	Year 6 (N=124)	P value
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	
Exposure to sexism/sexual harassment (as a target or as a witness)	267 (25.85)	11 (3.64)	14 (8.97)	43 (25.60)	55 (38.73)	73 (51.77)	71 (57.26)	<0.001*
Type of mistreatment*:								
Sexism	257 (24.88)	9 (2.98)	14 (8.97)	42 (25.00)	51 (25.92)	71 (50.35)	70 (56.45)	<0.001*
Sexual harassment	39 (3.78)	2 (0.66)	1 (0.64)	8 (4.76)	8 (5.63)	7 (4.96)	13 (10.48)	<0.001*
Status of student*:								
Target	166 (16.07)	6 (1.99)	4 (2.56)	26 (15.48)	40 (28.17)	44 (31.21)	46 (37.10)	<0.001*
Witness	215 (20.81)	10 (3.31)	12 (7.69)	34 (20.24)	37 (26.06)	58 (41.13)	64 (51.61)	<0.001*
Context*:								
Internship	214 (20.72)	3 (1.00)	6 (3.85)	30 (17.86)	44 (30.99)	67 (47.52)	64 (51.61)	<0.001*
Other study-related situation	130 (12.58)	9 (2.98)	10 (6.41)	26 (15.49)	27 (30.99)	28 (19.72)	30 (24.19)	<0.001*
Perpetrator's function:								
Teacher	75 (7.26)	2 (0.66)	6 (3.85)	16 (9.52)	18 (12.68)	19 (11.35)	22 (17.74)	0.63
Physician	196 (18.97)	1 (0.33)	4 (2.56)	26 (15.48)	42 (29.58)	65 (46.10)	63 (50.81)	<0.001*
Patient	120 (11.62)	3 (0.99)	5 (3.21)	20 (11.90)	25 (17.61)	32 (22.70)	43 (34.68)	0.16
Student	59 (5.71)	7 (2.32)	5 (3.21)	11 (6.55)	14 (9.86)	19 (13.48)	15 (12.10)	0.09
Other	10 (0.97)	2 (0.66)	1 (0.64)	0	4 (2.82)	3 (2.13)	3 (2.42)	0.19

Significant P-values in bold.

*Non-mutually exclusive.

Table 3 Distribution of self-reported experiences of sexism/sexual harassment as a target and mental health outcomes and global health evaluation according to self-reported gender identity

	Students who identified as men (N=300)		Students who identified as women (N=720)		Students who identified as non-binary (N=13)		P value
	Median (IQR)* or no. (%)	Min-max	Median (IQR)* or no. (%)	Min-max	Median (IQR)* or no. (%)	Min-max	
Being targeted by sexism and/or sexual harassment (no. (%))	3 (1.00)		159 (22.08)		4 (31)		<0.001*
Students at risk of clinical depression† (no. (%))	128 (43.10)		364 (50.70)		8 (62)		0.06
CES-D score (mean (IQR))	14 (8–20)	0–45	20 (12–29)	0–58	27 (18–35)	9–42	<0.001*
Recent visit to a psychotherapist or psychiatrist (no. (%))	51 (17.00)		218 (30.28)		12 (92)		<0.001*
BDI score (two items) (mean (IQR))	0 (0–1)	0–4	0 (0–1)	0–5	2 (0–2)	0–3	0.008*
STAI score (mean (IQR))	38.5 (30–47)	20–73	47 (38–55)	21–80	52 (48–55)	37–70	<0.001*
MBI-SS score:							
Emotional exhaustion (mean (IQR))	15 (12–19)	5–29	17 (14–21)	6–29	20 (16–22)	13–28	<0.001*
Cynicism (mean (IQR))	8 (6–12)	4–24	9 (6–12)	4–24	13 (8–15)	5–20	0.01*
Academic efficacy (mean (IQR))	24 (21–28)	10–26	24 (21–27)	8–36	20 (18–23)	13–32	0.009*
Global stress level (mean (IQR))	5 (3–7)	1–10	6 (4–7)	1–10	6 (5–7)	3–9	<0.001*
ASSIST score (mean (IQR))	16 (10–27)	0–110	15 (7–26)	0–129	42 (23–79)	0–116	0.002*
Global evaluation of health (mean (IQR))	4 (4–5)	1–5	4 (3–4)	1–5	3 (2–4)	2–5	<0.001*

Significant P-values in bold.

*Mean (SD) for normally distributed data or median (IQR) for skewed data.

†Defined as CES-D score ≥ 16 for male students and ≥ 20 for non-male students.

ASSIST, Alcohol, Smoking and Substance Involvement Screening Test; BDI, Beck Depression Inventory; CES-D, Centre for Epidemiological Studies-Depression; MBI-SS, Maslach Burnout Inventory Student-Survey; STAI, State-Trait Anxiety Inventory.

including 159 women (22.1%), 4 non-binary students (30.9%) and 3 men (1.0%) ($p < 0.001$) (table 3).

Moreover, targeted students were significantly older, more often engaged in a relationship, more often had a father with a higher level of education and more often had an extracurricular paid job (table 1).

Sexism was predominantly reported over sexual harassment (24.9% vs 3.8%, respectively). The exposed students reported being targeted or witnessing sexism/sexual harassment more frequently during an internship than in other study-related situations, and physicians were over-represented among the perpetrators. These proportions increased in advanced academic years with significant trends (table 2), and during Year 6, 56.3% of women reported being targeted by sexism and/or sexual harassment (data not shown). Patients were the second most-frequently reported perpetrator group, without significant trend across academic years (eg, reported by 34.7% of students in Year 6 vs by 50.8% for physicians).

Mental health outcomes and global evaluation of health

Men, women and non-binary students displayed differences in mental health outcomes distribution and in the global evaluation of health as detailed in table 3. For all outcomes except for the dichotomised CES-D score for clinical depression, differences between non-binary, male and female students were significant. Non-binary students had worse mental health outcomes and perceived global health than women, and similarly women's were worse

than men's were. The median CES-D score for non-binary students was almost twice as high as for men (27 (IQR: 18–35) vs 14 (IQR: 8–20), $p < 0.001$). We found differences between gender identities and seeking help from mental health professionals behaviour: among students at risk of clinical depression, 29.7% of the men sought mental health consultation compared with 39.3% of women and 100% (N=8) of non-binary students ($p < 0.001$, data not shown).

Overall, 500 students (48.4%) were at risk of clinical depression with a decreasing trend over academic years (59.3% in Year 1 to 35.5% in Year 6, $p < 0.001$, see eTable 1 in the online supplemental material). Moreover, we saw this tendency towards poorer mental health in the early academic years for the other outcomes, except for substance use (ASSIST score) which increased between Year 1 and 6 and for the Academic Efficacy component of burnout (not significant).

Association between self-reported sexism/sexual harassment and mental health

Being targeted by sexism/sexual harassment increased the odds of different poor mental health outcomes (table 4) after adjusting for effects of gender, academic year, native language, parental education level, partnership and extracurricular paid job. These included: having recently visited a psychiatrist/psychotherapist (OR (odds ratio) 1.78, $p = 0.005$); having a clinical risk of depression (OR 2.29, $p < 0.001$); higher scores for suicidal ideation (B

**Table 4** Non-adjusted and adjusted bivariate regression analyses of different mental health outcomes and global health evaluation in relation to self-reporting as a target of sexism and/or sexual harassment

	Non-adjusted regression			Adjusted regression*		
	OR (SE)	95% CI	P value	OR (SE)	95% CI	P value
Recent visit to a psychotherapist or a psychiatrist	2.20 (0.39)	1.56 to 3.10	<0.001*	1.78 (0.36)	1.10 to 2.66	0.005*
Being at risk of clinical depression†	1.29 (0.22)	0.92 to 1.80	0.138	2.29 (0.47)	1.54 to 3.41	<0.001*
	Coefficient B (SE)		P value	Coefficient B (SE)		P value
Suicidal ideation (two items)	0.21 (0.09)		0.021*	0.37 (0.10)		<0.001*
STAI score	3.22 (1.02)		0.002*	3.69 (1.11)		0.001*
Global stress level	0.033 (0.19)		0.858	0.24 (0.21)		0.25
MBI-SS (emotional exhaustion)	0.93 (0.42)		0.027*	0.94 (0.47)		0.04*
MBI-SS (cynicism)	2.32 (0.38)		<0.001*	1.46 (0.42)		0.001*
MBI-SS (academic efficacy)	-0.55 (0.39)		0.166	-0.62 (0.45)		0.17
ASSIST score	4.90 (1.53)		0.001*	6.51 (1.74)		<0.001*
Global evaluation of health	-0.06 (0.08)		0.438	-0.15 (.09)		0.10

Significant P-values in bold.

*Adjusted for gender, academic year, native language, parental education level, partnership and extracurricular paid job.

†Defined as CES-D score ≥ 16 for male students and ≥ 20 for non-male students.

ASSIST, Alcohol, Smoking and Substance Involvement Screening Test; CES-D, Centre for Epidemiological Studies-Depression; MBI-SS, Maslach Burnout Inventory Student-Survey; STAI, State-Trait Anxiety Inventory.

(B coefficient) 0.373, $p < 0.001$); anxiety (B 3.69, $p = 0.001$); substance use (B 6.61, $p < 0.001$); and emotional exhaustion (B 0.94, $p = 0.044$) and cynicism (B 1.46, $p = 0.001$) as components of burnout. All associations were significant before adjustment except for dichotomised CES-D score for depression, probably due to a confounding effect of the academic year.

DISCUSSION

While there has been previous quantitative research on medical students' mental health and harassment, this study assessed specifically the association between being targeted by sexism and/or sexual harassment and mental health status among medical students. Overall, 16% of students reported being a target of sexism and/or sexual harassment, representing 22% of women, 31% of non-binary students and 1% of men. This prevalence increased in the clinical part of the curriculum, with half of the students reporting sexism and/or sexual harassment (as a witness or a target) in the last 2 years of their medical studies (52% and 57%, respectively). The corollary of this is the predominance of physicians among the perpetrators and the over-representation of internships as the discriminatory environment. In addition, we found associations between being targeted by sexism and/or sexual harassment and having recently visited a psychiatrist/psychotherapist, having a clinical risk of depression and having higher scores for suicidal ideation, anxiety, substance use and emotional exhaustion and cynicism as components of burnout.

As sexism/sexual harassment predominated at the end of medical studies, it is not surprising that targeted students were slightly older with a likely confounding

effect of age on the relationship status and extracurricular professional activity (ie, the proportion of students with a paid job and in a relationship increased in later academic years, data not shown). A potential explanation for targeted students having more frequently a father with a higher education level may be a greater awareness of discrimination as well as resource availability in higher socioeconomic classes.

The overall prevalence of sexism/sexual harassment in this study is substantially lower than that reported in Europe in the late 1990s (71%)⁴³ and in a 2014 meta-analysis of mostly north American and extra-European studies³ where almost 50% of medical students reported gender discrimination. Precautious comparison with our results is necessary as methodological assessment of sexism/sexual harassment may vary and as 'Switzerland is regarded in international comparison as a "late female mobilisation welfare state"'.⁴⁴ In this context, sexist acts or sexual harassment can be under-reported by targeted people and bystanders. Indeed, the collective awareness and media coverage of gender-based harassment in the Swiss context are relatively recent. Moreover, institutional, and political measures are still not widely implemented. Therefore, awareness of these issues is certainly lower in Switzerland compared with other countries. Situations of sexism or harassment are probably not considered as such and therefore not reported in our self-reported survey, whereas they would be in Canada or the United States of America, for example.

Nonetheless, these differences lessen when considering clinical years in our study (>30% of students self-reported being a target of sexism/sexual harassment in Years 5 and 6). This is in line with recent studies from different

continents when considering the clinical part of the medical studies^{3 4 9 45 46} and the 'teaching by humiliation' tradition reported by 74.0% of medical students during adult clinical rotations in an Australian pilot study.⁴⁷ The impact of the #MeToo movement and the late feminisation of the formal workforce in Switzerland^{15 46} may have contributed to increased awareness and to a change towards more gender equality. However, the prevalence of sexism and sexual harassment in Switzerland is disturbing as also described by Najjar *et al.*¹⁵

The association between being targeted by sexism and/or sexual harassment and negative mental health status is strong in the studied sample, especially for clinical depression (twofold increase in risk), anxiety, burnout, and substance use disorder. These results show a similarity with prevalence and associated consequences of bullying¹⁶ as well as with relative risks for depression symptoms and anxiety in non-heterosexual compared with heterosexual medical students.²⁰ The association with mental health in our study is stronger than the one related to racial discrimination described in the United States of America in a study using population-based propensity score analysis⁴⁸ and in a Canadian meta-analysis exploring consequences of general workplace sexual harassment.⁴⁹ Consistently with the literature on students' help-seeking behaviour, approximately one-third of the students at risk of clinical depression sought mental health consultation,^{50 51} even less among men.⁵² This is particularly alarming, as medical students tend to resign to the undergone violence and feel helpless towards minimising institutions.^{53–55} Oppressive learning environments have far-reaching consequences such as 'the epidemic of burnout' among residents,⁴ the lack of self-confidence^{16 55} and the unequal chances in careers.⁵⁶ Harassed students may choose medical disciplines with a higher proportion of women in senior positions,⁴⁹ or with better pregnancy and breastfeeding policies.⁴⁶

Strengths and limitations

Strengths of this study are the precise data on mental health and gender discrimination, and the available information on non-binary students, despite related methodological challenges (see below). This study has several limitations. First, its single-centre and cross-sectional design prevents causal and generalisable conclusions, as the local context is inextricably linked to gender discrimination. Second, our sample may be biased in its representativeness due to a response rate of 50.5% and sexism prevalence might be under-reported due to the low awareness prevailing in Switzerland.⁴⁴ However, we provided a financial incentive to our participants to encourage inclusion of financially disadvantaged individuals and presented our study as a study on mental health to motivate people suffering from mental health problems to increase visibility of their situation. Third, we pooled non-binary student's with women's data for statistical power in regression analyses in face of a lack of guidance for specific depression cut-offs in the non-binary student group. We acknowledge that this may

represent a violation of their identity. Fourth, we lacked information on the perpetrators' gender¹¹ and the participants' gender expression, sexual orientation and ethnicity to allow a deeper and intersectional understanding of the mechanisms involved.²⁶ Finally, a mandatory interactive prevention course on gender discrimination was implemented in our university in 2019,⁵⁷ thus students from Years 3, 4 and 5 in this study had benefited from this course.

Perspectives

An improvement in the quality of medical education is needed for equal chances and improved mental health, as expressed by Dzau and Johnson: 'sexual harassment in academic medicine is a symptom of systematic failures that prevent the medical workforce from operating at its fullest potential'.⁴ Therefore, peer-to-peer initiatives such as prevention courses for students, physicians and teachers,⁵⁷ telephone or online support antenna and prevention campaigns¹⁰ should be promoted by reference institutions and from which a 'Zero Tolerance'⁵⁸ policy is expected. The Swiss university where the present study was conducted took actions against sexism and sexual harassment. Among other measures, the Medical School implemented awareness campaigns, executive training programmes and different support centres providing a framework for listening and mediation. We will follow on how these initiatives may positively influence the situation. Sexism/sexual harassment reported as emanating from patients, represents an important and particularly sensitive topic for which the overall prevalence remains unknown.⁵⁹ Further research is required on institutional and educational strategies establishing a safe clinical environment for trainees and physicians that does not compromise the quality of care. More broadly, a change in the medical culture from its patriarchal inheritance¹ is necessary to achieve quality education for all.

Conclusions

Sexism and sexual harassment during medical studies at a Swiss University were found with a lower frequency than generally reported but significantly associated with negative mental health outcomes and concern mainly non-male students during clinical rotations.

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