

Analysis of gender discrimination in the academic environment: frequency, forms and student perspectives

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Abstract

Introduction: This study examines the prevalence and impact of gender discrimination among medical students at the Poznan University of Medical Sciences. As a pathway to highly demanding professions, medical education often exposes students to hierarchical structures and intense social interactions where discriminatory behaviors may flourish.

Aim of the research: This research aims to illuminate the systemic challenges that undermine equity in medical training and practice by exploring the frequency, nature, and consequences of such incidents.

Material and methods: A total of 209 medical students from years 2–6 participated in an anonymous survey examining the prevalence of discrimination and harassment in the academic environment. Statistical analysis was then performed using the Mann-Whitney *U* test for nonparametric variables.

Results and conclusions: According to the results of this study, women are significantly more likely than men to experience gender-based discrimination, with the disparity being most pronounced in the early years of study and decreasing over time, suggesting that prolonged exposure normalizes such experiences for both genders. Men are more often perpetrators when holding positions of power, whereas, among peers, women engage in discriminatory behavior at similar rates. The academic environment facilitates discrimination, with incidents occurring more frequently during classes than in informal settings, particularly in places where academic activities are most frequent. Both men and women perceive discrimination as detrimental to career development and mental health.

Introduction

Discrimination, as defined by the United Nations (UN), is any unfair treatment or arbitrary distinction based on a person's race, sex, religion, nationality, ethnic origin, sexual orientation, disability, age, language, social origin, or other status. Similarly, article 14 of the European Convention on Human Rights emphasizes the same definition for discrimination from an international law perspective [1].

Gender-based discrimination, in particular, has been recognized as a pervasive global issue. According to the British Medical Association's survey, 91% of women doctors had experienced sexism at work. The same survey found that unwanted sexual comments most frequently occurred in surgery and emergency medicine [2].

For healthcare professionals, experiencing gender discrimination can lead to burnout, reduced job satisfaction, and career stagnation. It discourages talented individuals from pursuing certain specialties, exacerbating gender imbalances in critical fields like surgery and emergency medicine [3]. Furthermore, discriminatory practices compromise collaboration

and trust within healthcare teams, ultimately impacting the quality of patient care.

Beyond the workplace, gender discrimination has systemic effects on healthcare policy and leadership. Women are often underrepresented in leadership roles, leading to a lack of diverse perspectives in decision-making processes. Addressing these issues is essential not only for creating equitable working environments but also for ensuring that healthcare systems operate effectively to meet the needs of diverse patient populations.

By understanding the consequences of gender discrimination in the medical field, we can better advocate for systemic reforms that promote equity, inclusivity, and respect in healthcare.

Material and methods

The study was conducted through an online survey from June 2023 to July 2024 on a group ($n = 209$) of students from the Poznan University of Medical Sciences. Participants were recruited at the university library and within the student campus. To access the survey, each respondent was required to log

in using their university email address. The primary aim of the study was to examine the extent of gender-based discrimination and sexual harassment within the academic community.

All participants gave their consent to participate in the study. The questionnaire was divided into three sections: a demographic section concerning personal data (age, gender, field of study, and year of study), a section regarding the participant's experience with discrimination (including the frequency, nature, and location of discriminatory incidents and the identity of perpetrators), and a third section that included questions assessing the participants' ability to resist discrimination and the potential impact of discrimination on their life and career. The project received approval from the Bioethics Committee at the Poznań University of Medical Sciences, resolution number 360/23.

The study included men and women aged 19–27 years. Exclusion criteria were as follows: nationality other than Polish, duration of study at the university of less than 1 year, and studying in a non-medical field of study.

The dependent variables were the responses provided in the questionnaire concerning the experience of discrimination (including frequency, nature, and location), the identity of the perpetrator, witnessing a discriminatory incident, views on the consequences of discrimination in private and professional life, the impact of the participant's gender, and the desire to have children on medical specialty choice and career progression.

The independent variables included gender, age, and year of study. The field of study was not treated as a variable but only as a criterion for qualification for the study.

A total of 209 students were included in the study, consisting of 79 men and 130 women aged 19 to 27 years ($M = 22.32$, $SD = 2.30$) (Table 1). The largest group was composed of third-year students

($n = 67$, 32.1%), followed by second-year students ($n = 56$, 26.8%). The study also included fourth-year students ($n = 20$, 9.6%), fifth-year students ($n = 35$, 16.7%), and sixth-year students ($n = 31$, 14.8%).

The study group was characterized using standard statistical methods: mean, standard deviation, percentage, minimum, and maximum values. Statistical analysis was conducted using GraphPad Prism 10. Data were analyzed using the Mann-Whitney U test for non-parametric variables.

The present study is subject to several limitations that should be carefully considered when interpreting its findings. First, the use of convenience sampling, with participants recruited within the university library and campus, may have introduced selection bias and limited the representativeness of the study population. Furthermore, the single-center design, restricted to one medical university, reduces the external validity of the results and limits their generalizability to students from other institutions, regions, or educational systems. The voluntary and online nature of the survey may have contributed to self-selection bias, as individuals with personal experiences of discrimination or a particular interest in the topic may have been more inclined to participate, potentially leading to an overestimation of the reported phenomena. In addition, the exclusion of non-Polish students resulted in a more homogeneous sample, which, while methodologically consistent, further limits the applicability of the findings to more diverse, international student populations. The reliance on self-reported data introduces the risk of recall bias, as participants may not accurately remember past events or may interpret them subjectively. Moreover, responses concerning sensitive issues such as discrimination and harassment may be influenced by social desirability bias, despite the anonymity of the survey. Finally, the cross-sectional design precludes the assessment of causal relationships, and the online format may

Table 1. Demographic characteristics of participants

Parameter	Total $N = 209$	Males $N = 79$ (37.8%)	Females $N = 130$ (62.2%)
Age, mean (SD)	22.32 (2.30)	22.93 (2.51)	21.95 (2.09)
Field of study, n (%)			
Medicine	194	73 (37.6)	121 (62.4)
Other	15	6 (40)	9 (60)
Years of study, n (%)			
2	56 (26.8)	18 (32.1)	38 (67.9)
3	67 (32.1)	17 (25.4)	50 (74.6)
4	20 (9.6)	8 (40)	12 (60)
5	35 (16.7)	14 (40)	21 (60)
6	31 (14.8)	22 (71)	9 (29)

have affected both response rates and the completeness or accuracy of the collected data. Collectively, these factors may limit the generalizability and robustness of the conclusions drawn from the study.

Results

Based on the developed questionnaire, an assessment of the risk of gender-based discrimination (Table 2) and sexual harassment (Table 3) was conducted across student groups from different years of study. The second section of the questionnaire focused on the respondents' personal experiences with discrimination and sexual harassment. The frequency of experiencing a discriminatory incident was categorized as follows: 1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = very often.

The most frequently reported forms of discrimination were the perpetrator's expectation of the respondent to perform a specific task or activity based on their gender ($M = 2.22$, $SD = 1.26$), as well as the receipt of condescending comments ($M = 2.07$, $SD = 1.10$). The least frequently experienced form of gender-based discrimination was being treated with less trust by teachers ($M = 1.63$, $SD = 0.91$). Regarding the of harassment, it was reported less frequently by the respondents than discrimination. The participants identified the most common form of harassment as receiving sexualized comments ($M = 2.03$, $SD = 1.06$), while the least common form was the experience of sexual harassment ($M = 1.11$, $SD = 0.38$) and demanding of sexual services ($M = 1.17$, $SD = 0.59$).

Women reported experiencing various forms of discrimination more often than men ($M(\text{women}) = 2.29$, $M(\text{men}) = 1.82$, $p < 0.0001$). According to the study, women more frequently than men experience the following forms of gender-based discrimination: being ignored ($p = 0.019$), meeting with no respect ($p = 0.0149$), being ridiculed ($p = 0.0007$), receiving condescended comments ($p < 0.0001$), being judged based on their clothes or appearance ($p < 0.0001$), and receiving less trust from teachers ($p = 0.0013$) or patients and their families ($p = 0.0271$). They also more frequently experience the following forms of discrimination: sexualized comments ($p < 0.0001$), intrusive touch ($p = 0.0083$), being pointed out as a sexual object ($p = 0.0042$), and being sexualized during physical examinations or other medical procedures ($p < 0.0001$). However, no statistically significant differences were found in relation to specific forms of discrimination, such as being expected to perform a task due to their gender, unfair grading by teaching assistants, experiences of sexual harassment and direct requests for sexual favors, and being harassed by the perpetrator through unwanted phone calls or social media contact. The study did not show that any form of discrimination significantly more often affected men than women.

The results regarding differences in experiences based on the year of study are particularly interesting. The group with the fewest significant differences between men and women was the sixth-year student group, with only four questions showing statistically significant differences in responses between male and female students. The form of discrimination that significantly more often affected female students across all years of study was receiving condescending comments ($p < 0.0001$).

The perpetrators of discriminatory incidents were most often academic teachers. Half of the respondents have had an experience of being discriminated against by an academic teacher in preclinical courses (Figure 1). In contrast, 46.86% of the respondents were discriminated against by academic teachers in clinical courses (Figure 2). Hospital patients were perpetrators similarly often (experienced by 45.64% of the respondents) (Figure 3). Interestingly, the gender of the perpetrator was not clearly emphasized. Men and women were discriminated against with equal frequency within the groups of younger (Table 4) and older students, but not peers (24.76% of men to 7.77% of women). Men were more often the perpetrators in the role of academic teachers and other university staff. Men were also more frequently responsible for acts of discrimination as patients, though the gender gap was less pronounced compared to academic teachers.

Discriminatory incidents most commonly occurred in places where classes frequently took place: hospital wards (60.94% of women and 42.31% of men experienced a discriminatory incident in this location), seminar rooms (55.81% of women and 35.9% of men), and operating theaters (30.16% of women and 22.37% of men) (Table 5). Discrimination was less likely to occur in locations associated with student life, such as university campuses (28.91% of women and 20.51% of men) or dormitories (5.51% of women and 11.54% of men). Delivery rooms (13.49% of women and 9.09% of men), emergency rooms (21.26% of women and 11.69% of men), and intensive care units (2.38% of women and 9.09% of men) were less frequently identified as places of discrimination, despite the high levels of stress among both staff and patients in these settings. However, students visited these locations less often during their studies. Women were more frequently the victims of discriminatory incidents in all locations except for the intensive care units and the dormitories.

Women more often answered affirmatively to questions regarding whether their gender and desire to become mothers affected their specialty of choice (56.92% of female respondents agreed, and only 30.77% of men) (Figure 4).

Women were about six times more likely to express concerns in the questionnaire that having a child would negatively impact their careers (66.92% of wom-

Table 2. Relationship between gender, year of study of the participants, and past discrimination experience

How often do you personally experience gender discrimination during medical (all forms)	Students total		2 nd year		3 rd year		4 th year		5 th year		6 th year	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Both genders	2.11	0.91	1.96	0.91	2.06	0.83	2.35	0.91	2.37	0.97	2.06	0.91
Females	2.29	0.85	2.05	0.92	2.22	0.81	2.75	0.60	2.52	0.85	2.56	0.68
Males	1.82	0.91	1.78	0.85	1.59	0.69	1.75	0.97	2.14	1.06	1.86	0.92
Mann-Whitney <i>U</i>	3527		281		244.5		18.50		107.5		56	
<i>P</i> -value M vs. F	< 0.0001		0.2629		0.0061		0.0125		0.1688		0.0405	
I was ignored												
Both genders	1.83	1.01	1.61	0.98	1.68	0.82	2.20	1.25	2.06	1.04	2.06	1.08
Females	1.94	1.01	1.63	0.96	1.80	0.87	2.75	1.09	2.14	1.08	2.44	0.68
Males	1.65	1.00	1.56	1.01	1.31	0.46	1.38	0.99	1.93	0.96	1.93	1.16
Mann-Whitney <i>U</i>	4166		317		281.5		17		132		64	
<i>P</i> -value M vs. F	0.0190		0.6278		0.0539		0.0111		0.6142		0.1228	
I was shown no respect												
Both genders	2.00	1.07	1.88	1.17	1.94	0.86	2.00	1.05	2.11	1.06	2.19	1.23
Females	2.07	0.93	2.03	1.06	1.98	0.81	2.33	0.94	2.14	0.94	2.22	0.79
Males	1.87	1.25	1.56	1.30	1.82	0.98	1.50	1.00	2.07	1.22	2.18	1.37
Mann-Whitney <i>U</i>	4161		225.5		366.5		28		132		86	
<i>P</i> -value M vs. F	0.0149		0.0230		0.3693		0.1365		0.6129		0.5755	
I was ridiculed												
Both genders	1.77	0.99	1.63	0.97	1.69	0.85	1.95	1.02	2.06	1.17	1.74	0.95
Females	1.90	0.95	1.82	1.02	1.74	0.84	2.08	0.76	2.19	1.14	2.22	0.63
Males	1.54	1.00	1.22	0.71	1.53	0.85	1.75	1.30	1.86	1.19	1.55	0.99
Mann-Whitney <i>U</i>	3837		220.5		359		30.5		119		45.50	
<i>P</i> -value M vs. F	0.0007		0.0122		0.2995		0.1664		0.3289		0.0118	
I received condescending comments												
Both genders	2.07	1.10	1.88	1.00	2.04	1.10	2.35	1.11	1.26	1.11	2.10	1.17
Females	2.41	1.07	2.21	1.00	2.28	1.13	2.83	0.99	2.67	0.94	2.78	1.03
Males	1.52	0.91	1.17	0.50	1.35	0.59	1.63	0.86	1.64	1.11	1.82	1.11
Mann-Whitney <i>U</i>	2691		134		222		19.50		63.5		52.5	
<i>P</i> -value M vs. F	< 0.0001		< 0.0001		0.0018		0.0230		0.0026		0.0302	

Table 2. Cont.

How often do you personally experience gender discrimination during medical (all forms)	Students total		2 nd year		3 rd year		4 th year		5 th year		6 th year	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
I received unwelcome comments on my clothes/appearance												
Both genders	1.84	1.12	1.80	1.22	1.83	1.15	2.20	1.21	1.80	0.86	1.74	1.01
Females	2.06	1.18	2.05	1.32	2.00	1.18	2.58	1.11	2.00	0.93	1.98	0.87
Males	1.47	0.90	1.28	0.73	1.31	0.85	1.63	1.11	1.50	0.63	1.68	1.06
Mann-Whitney U	3558		228.5		259.5		23.5		103		82	
P-value M vs. F	< 0.0001		0.0203		0.0165		0.0518		0.1306		0.4574	
I received less trust from teachers												
Both genders	1.63	0.90	1.43	0.73	1.52	0.76	2.00	1.10	1.77	1.07	1.87	0.98
Females	1.76	0.90	1.55	0.78	1.59	0.81	2.33	1.03	1.90	1.02	2.44	0.68
Males	1.43	0.87	1.17	0.50	1.29	0.57	1.50	1.00	1.57	1.12	1.64	0.98
Mann-Whitney U	3910		247		338		22		113		43.5	
P-value M vs. F	0.0013		0.0490		0.1948		0.0291		0.2162		0.0083	
I received less trust from patients or their families												
Both genders	1.73	1.04	1.49	0.91	1.72	1.02	2.40	1.32	1.80	0.98	1.68	0.96
Females	1.84	1.06	1.59	0.97	1.84	1.08	2.67	1.31	1.86	0.89	1.67	0.67
Males	1.56	0.98	1.28	0.73	1.35	0.68	2.00	1.22	1.71	1.00	1.68	1.06
Mann-Whitney U	4267		270.5		321.5		34		125		88.5	
P-value M vs. F	0.0271		0.1723		0.0976		0.3009		0.4479		0.6424	
I was expected to do different activities from people of the opposite sex												
Both genders	2.22	1.26	1.89	0.91	1.72	1.02	2.40	1.32	1.80	0.98	1.68	0.96
Females	2.20	1.22	1.87	1.13	2.10	1.35	2.75	0.92	2.38	0.95	3.00	1.15
Males	2.27	1.32	1.94	1.27	2.41	1.33	2.13	1.27	2.14	1.12	2.55	1.41
Mann-Whitney U	5067		339.5		372		35		127		77	
P-value M vs. F	0.8674		0.9723		0.4240		0.3230		0.5207		0.3315	
I was unequally graded for doing the same activity, test, or task as a person of the opposite sex												
Both genders	1.80	1.12	1.71	1.06	1.55	0.94	2.25	1.41	1.80	1.04	2.20	1.28
Females	1.85	1.10	1.82	1.12	1.61	1.01	2.50	1.38	2.00	0.93	2.11	0.99
Males	1.71	1.16	1.50	0.90	1.35	0.68	1.88	1.36	1.50	1.12	2.24	1.38
Mann-Whitney U	4555		295.5		367		36.50		93		93	
P-value M vs. F	0.2005		0.3455		0.3973		0.3564		0.0430		0.9632	

Values are presented as mean (M) ± standard deviation (SD). Statistical comparisons were performed using the Mann-Whitney U test. A p-value < 0.005 was considered statistically significant.

Table 3. Relationship between gender and year of study of the victim and past sexual harassment experience

How often have you personally experienced sexual harassment during your medical education?	Students total		2 nd year		3 rd year		4 th year		5 th year		6 th year	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Both genders	1.11	0.38	1.02	0.13	1.11	0.39	1.20	0.51	1.14	0.42	1.16	0.45
Females	1.14	0.43	1.03	0.16	1.14	0.45	1.33	0.62	1.19	0.50	1.22	0.42
Males	1.05	0.27	1.00	0.00	1.00	0.00	1.00	0.00	1.07	0.26	1.14	0.46
Mann-Whitney <i>U</i>	4661		314.5		360		36		136		87	
<i>P</i> -value M vs. F	0.1062		> 0.9999		0.3245		0.2421		0.5461		0.5595	
How often have you personally experienced sexualized comments during your medical education?												
Both genders	2.03	1.06	1.82	0.92	2.00	1.11	2.35	1.06	2.20	1.09	2.06	1.05
Females	2.29	1.06	2.05	0.96	2.22	1.15	2.83	0.99	2.52	0.96	2.33	0.82
Males	1.60	0.91	1.33	0.58	1.31	0.58	1.63	0.70	1.71	1.10	1.95	1.11
Mann-Whitney <i>U</i>	3092		184.5		225.5		17.5		70		72	
<i>P</i> -value M vs. F	< 0.0001		0.0045		0.0045		0.0161		0.0056		0.2483	
How often have you personally experienced inappropriate contact through social media, emails, or by phone?												
Both genders	1.38	0.83	1.33	0.76	1.47	0.86	1.45	0.92	1.26	0.77	1.40	0.88
Females	1.42	0.82	1.34	0.80	1.58	0.92	1.50	0.87	1.14	0.47	1.44	0.68
Males	1.32	0.85	1.29	0.67	1.13	0.48	1.38	0.99	1.43	1.05	1.38	0.95
Mann-Whitney <i>U</i>	4438		314.5		284.5		39.50		129.5		82.5	
<i>P</i> -value M vs. F	0.0963		0.9313		0.0335		0.5788		0.4297		0.6119	
How often have you personally experienced intrusive touch?												
Both genders	1.45	0.78	1.30	0.65	1.39	0.74	1.65	0.73	1.63	0.90	1.52	0.91
Females	1.54	0.79	1.37	0.70	1.46	0.81	1.92	0.76	1.76	0.75	1.67	0.82
Males	1.31	0.76	1.17	0.50	1.19	0.39	1.25	0.43	1.43	1.05	1.45	0.94
Mann-Whitney <i>U</i>	4168		0.298.5		346		25		92		81	
<i>P</i> -value M vs. F	0.0083		0.2960		0.3239		0.0672		0.0432		0.4081	
How often have you personally experienced being pointed out as a sexual object?												
Both genders	1.61	0.94	1.43	0.80	1.67	1.01	1.80	0.93	1.66	0.95	1.61	0.97
Females	1.73	0.97	1.53	0.88	1.84	1.08	2.08	0.95	1.76	0.87	1.44	0.68
Males	1.40	0.84	1.22	0.53	1.13	0.33	1.38	0.70	1.50	1.05	1.68	1.06
Mann-Whitney <i>U</i>	4034		280.5		253		27.5		111.5		90.5	
<i>P</i> -value M vs. F	0.0042		0.1935		0.0114		0.1118		0.2030		0.6851	

Table 3. Cont.

How often have you personally experienced sexual harassment during your medical education?	Students total		2 nd year		3 rd year		4 th year		5 th year		6 th year	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
How often have you personally experienced the sexualization of/during physical examination or other medical activities?												
Both genders	1.57	1.03	1.36	0.82	1.56	1.06	1.80	1.25	1.77	1.10	1.55	0.98
Females	1.74	1.07	1.50	0.94	1.64	1.07	2.33	1.37	2.10	1.02	1.67	0.67
Males	1.27	0.88	1.06	0.24	1.31	0.98	1.00	0.00	1.29	1.03	1.50	1.08
Mann-Whitney U	3630		246		332		20		66.5		72.5	
P-value M vs. F	< 0.0001		0.0608		0.1887		0.0147		0.0017		0.1845	
How often have you personally experienced demands for sexual services?												
Both genders	1.17	0.59	1.13	0.38	1.15	0.53	1.15	0.48	1.23	0.76	1.23	0.79
Females	1.15	0.48	1.08	0.27	1.20	0.61	1.25	0.60	1.14	0.47	1.00	0.00
Males	1.21	0.72	1.22	0.53	1.00	0.00	1.00	0.00	1.36	1.04	1.32	0.92
Mann-Whitney U	5012		310.5		344		40		139.5		85.5	
P-value M vs. F	0.8531		0.2679		0.2791		0.4947		0.8117		0.5375	

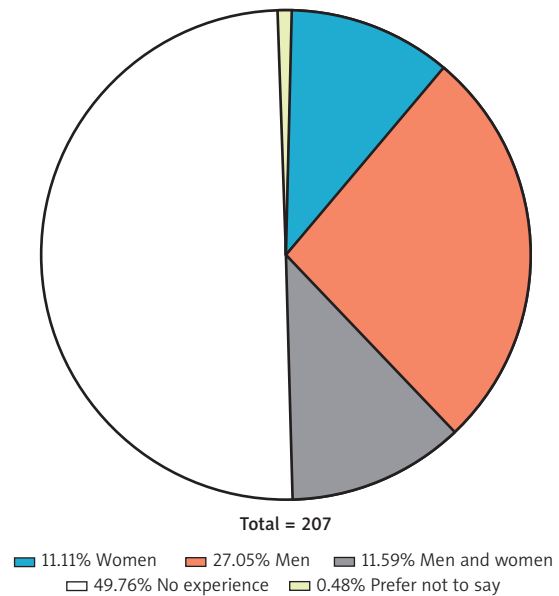


Figure 1. Academic teacher (preclinical) as the perpetrator

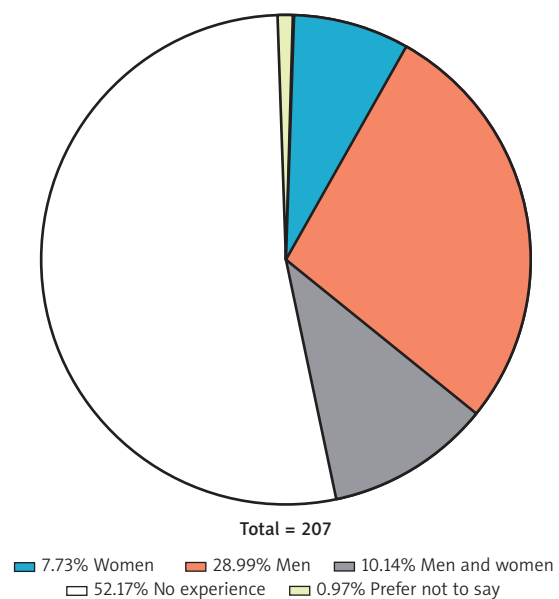


Figure 2. Academic teacher (clinical) as the perpetrator

en agreed, and only 11.54% of men). Men disagreed with this statement (34.57%) much more often than they agreed, while the opposite trend was observed among women (Figure 5).

An interesting set of results comes from the section of questions dedicated to views on the consequences of discrimination. No statistically significant gender differences were observed across all age groups throughout this section. Both men and women strongly agreed that discrimination negatively impacts job satisfaction, patient care, and the victim's mental

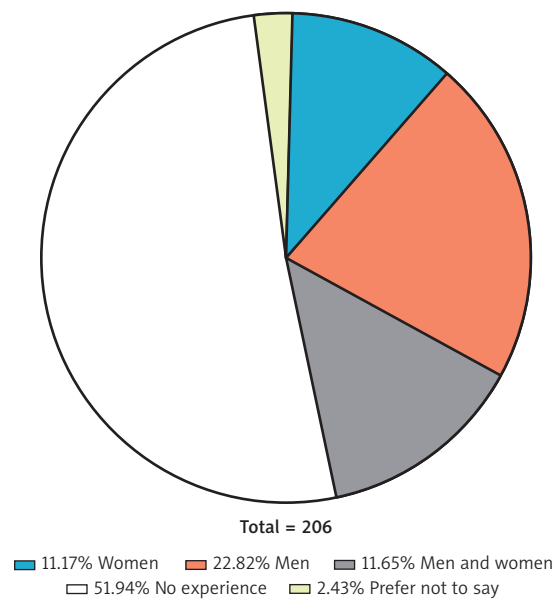


Figure 3. Hospital patient as the perpetrator

health and that it leads to burnout and reduces employees' confidence (Table 6).

Conclusions

Women are significantly more likely than men to be victims of gender-based discrimination. The gender disparity is greater in the earlier years of study and decreases over time, suggesting that prolonged exposure to discrimination increases its frequency among students of both genders. Men are more often perpetrators when they hold a position of power or higher status than the victim (e.g., when they are the victim's teacher or university staff). In groups of "equals" (e.g., peers and patients), women are perpetrators as frequently as men. The academic environment fosters discrimination. Peers and other students are more likely to engage in discriminatory behavior during classes than in informal contexts (e.g., in dormitories and on campus). Discrimination most frequently occurs in places where classes are held (e.g., hospital wards and seminar rooms). Discriminatory incidents are per-

Table 4. The identity of the perpetrator

Who was the perpetrator?	Man	Woman	Both sexes	No experience	Prefer not to say
Academic teacher (preclinical courses)	27.05%	11.11%	11.59%	49.76%	0.48%
Academic teacher (clinical courses)	28.99%	7.73%	10.14%	52.17%	0.97%
Peer	24.76%	7.77%	5.34%	61.65%	0.49%
Older student	6.67%	7.62%	0.95%	80.95%	
Younger student	2.93%	3.41%	0.98%	91.71%	0.98%
Patient	22.82%	11.17%	11.65%	51.94	2.43
Nurse	2.44%	24.88%	0.98%	70.73%	0.98%
Administration officer/staff member	7.28%	1.94%	0.97%	89.32%	0.49%

Table 5. Relationship between the gender of the victim, frequency of gender discrimination, and location of discrimination act

Variable	No experience		Once a year		Once a month		Once a week		More than once a week	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
University campus	79.49	71.09	11.54	17.97	2.56	8.59	5.13	0.78	1.28	1.56
Hospital ward	57.69	39.06	25.64	28.91	12.82	21.88	2.56	9.38	1.28	0.78
Operating theater	77.63	69.84	14.47	8.73	6.58	13.49	1.32	7.14	0.00	0.79
ER	88.31	78.74	6.49	8.66	2.60	9.45	1.30	2.36	1.30	0.79
Delivery room	90.91	86.51	5.19	3.97	2.60	7.14	1.30	2.38	0.00	0.00
ICU	90.91	97.62	5.19	2.38	2.60	0.00	1.30	0.00	0.00	0.00
Seminar room	64.10	44.19	21.79	31.01	8.97	20.93	3.85	1.55	1.28	2.33
Dormitory	88.46	94.49	7.69	2.36	1.28	2.36	1.28	0.00	1.28	0.79

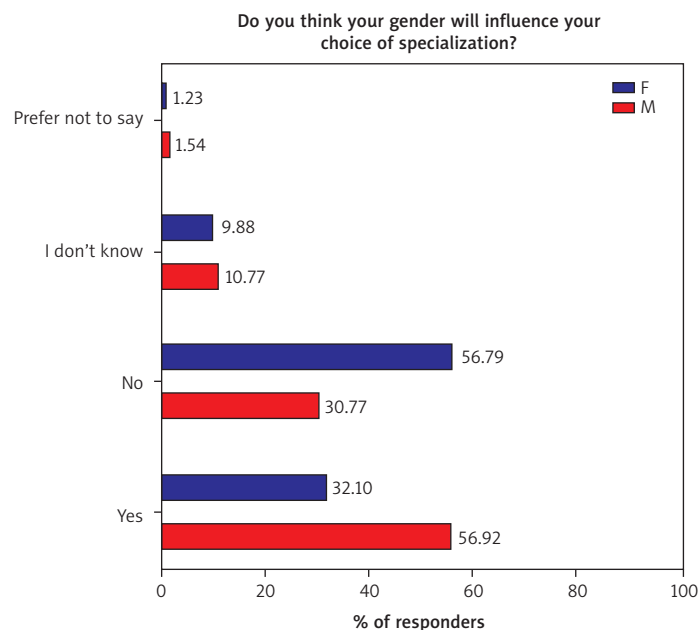


Figure 4. The impact of gender on the choice of specialty

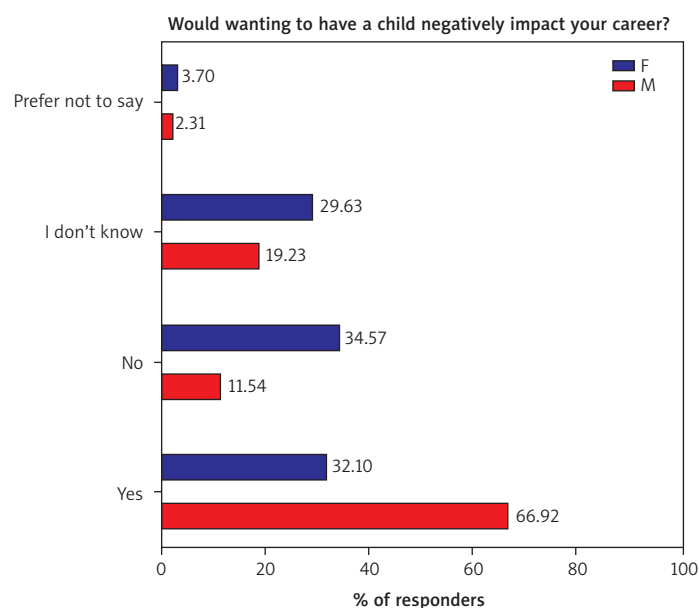


Figure 5. The impact of having a child on a career

ceived as negative and destructive to both career development and mental health by both men and women.

Discussion

This study aimed to examine the prevalence and impact of gender discrimination among medical students at our university. Furthermore, it was aimed at drawing the attention of the authorities of the Poznan University of Medical Sciences to the gender-based discrimination. The results are supposed to encour-

age the authorities to form a particular policy that may counteract these behaviours among academic environment, including students. A survey was used as a research method. We gathered 209 responses from students of the Poznan University of Medical Sciences. This group comprised 130 women and 79 men. The study excluded English Division students due to language barriers in hospital wards.

The study was conducted on a precisely defined population using clear inclusion and exclusion crite-

Table 6. Students' perspectives on the impact of discrimination on psychological and professional well-being

Variable	Students total		2 nd year		3 rd year		4 th year		5 th year		6 th year	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
In your opinion, to what extent can discrimination based on gender affect professional satisfaction?												
Both genders	3.62	1.22	3.63	1.09	3.45	1.36	4.05	1.02	3.83	1.13	3.45	1.24
Females	3.74	1.17	3.79	1.03	3.46	1.37	4.25	1.01	4.10	0.68	3.56	1.07
Males	3.42	1.29	3.63	1.09	3.45	1.36	4.05	1.02	3.83	1.13	3.45	1.24
Mann-Whitney <i>U</i>	4435		262.5		411.5		33.50		120.5		95.50	
<i>P</i> -value M vs. F	0.0870		0.1513		0.8390		0.2608		0.3564		0.9077	
In your opinion, to what extent can gender discrimination affect the quality of patient care?												
Both genders	3.00	1.28	2.93	1.33	2.91	1.36	3.25	1.04	3.15	1.26	2.97	1.12
Females	2.97	1.26	3.03	1.37	2.88	1.35	3.00	0.91	3.14	1.08	2.78	0.92
Males	3.04	1.32	2.93	1.33	2.91	1.36	3.25	1.04	3.15	1.26	2.97	1.12
Mann-Whitney <i>U</i>	6113		296		404.5		25.50		134		83	
<i>P</i> -value M vs. F	0.4862		0.4145		0.7726		0.0678		0.9212		0.4741	
In your opinion, to what extent can gender discrimination affect your well-being?												
Both genders	3.89	1.26	3.79	1.11	3.78	1.36	4.40	1.02	4.17	1.08	3.65	1.45
Females	4.01	1.17	3.89	1.07	3.88	1.38	4.50	0.76	4.33	0.78	3.78	1.13
Males	3.68	1.37	3.79	1.11	3.78	1.36	4.40	1.02	4.17	1.08	3.65	1.45
Mann-Whitney <i>U</i>	4479		288.5		332		46		133.5		96.50	
<i>P</i> -value M vs. F	0.1028		0.3342		0.1624		0.8774		0.6292		0.9342	
In your opinion, to what extent can gender discrimination affect the risk of burnout?												
Both genders	3.59	1.28	3.41	1.28	3.48	1.34	4.35	1.01	3.85	1.03	3.39	1.29
Females	3.71	1.21	3.53	1.16	3.58	1.39	4.42	0.76	4.05	0.79	3.44	1.07
Males	3.40	1.36	3.41	1.28	3.48	1.34	4.35	1.01	3.85	1.03	3.39	1.29
Mann-Whitney <i>U</i>	4466		301.5		341		46.50		109		98	
<i>P</i> -value M vs. F	0.1374		0.4789		0.2144		0.9686		0.3041		0.9622	
In your opinion, to what extent can gender discrimination affect a lack of self-confidence?												
Both genders	3.76	1.27	3.68	1.23	3.69	1.40	3.95	1.20	4.00	1.10	3.65	1.26
Females	3.88	1.20	3.87	1.13	3.78	1.40	3.83	1.14	4.19	0.73	3.78	1.03
Males	3.56	1.37	3.68	1.23	3.69	1.40	3.95	1.20	4.00	1.10	3.65	1.26
Mann-Whitney <i>U</i>	4495		257		352.5		40		131.5		94	
<i>P</i> -value M vs. F	0.1158		0.1263		0.2789		0.5622		0.5789		0.8406	

ria, which resulted in a group with strong internal consistency. By including students from the 2nd to the 6th year of study, it was possible to identify trends, and the multi-section nature of the survey enabled a comprehensive assessment of the phenomenon under study. Data were analyzed with non-parametric statistical methods (Mann–Whitney *U* test) using GraphPad Prism 10, allowing appropriate comparison between groups despite non-normal distributions. According to our knowledge, this is the first study of its kind conducted in Poland, which highlights the need

for similar research to be carried out at other institutions. The results of this study could potentially be incorporated into guidelines designed to combat discrimination, thereby increasing its practical value.

Results have shown that women experience gender-based discrimination more often than men. This phenomenon has been observed in numerous branches, especially in healthcare. In this study, women reported that the most common forms of discrimination are the perpetrator's expectation of the respondent to perform a specific task or activity based

on their gender, and the receipt of condescending comments. The former form of discrimination might affect career pathways and decisions on motherhood. A study conducted in German universities by Stock and Kaifie showed that about 70% of female students were told not to pursue a career in a certain specialty because of their gender [3]. It revealed that gender-based stereotypes are still an integral part of medical education, even in a modern, more emancipated society. Furthermore, a systematic review on female neurosurgeons has shown that women choosing this specialty have to find a balance between work and home duties. In recent years, this task has been made easier through social solutions, for example, maternal leave policies [4].

Interestingly, data collected from female participants shows that gender-based discrimination frequency decreased with consecutive years of study. These data clash with the results of recent studies that reported that discriminatory behavior mainly occurs during clinical classes, thus, in the later years of study [3]. This may result from a modernizing academic community at the Poznań University of Medical Sciences, but this issue could be more complex and needs further research. This issue/matter could be discussed along with a representation of female students and clinical tutors, which could provide comprehensive improvement of studying conditions.

Another important observation made in this study is that men are more often perpetrators when they hold positions of power or higher status than the victim. Today, women reach leadership positions more often but still represent a minority. A study by Wells and Fleshman describes beliefs that women are not capable of leading but only of following [5]. This view has been sustained in workplace culture by holding supportive roles as nurses or secretaries in the past. Additionally, since childhood, women have been told to be “protective” or “less assertive”. Even a small act of assertion is perceived as “bossy”.

Our study has shown that 27.05% of preclinical teachers and 28.99% of clinical teachers were men as perpetrators. A study by Ibrahim and Riley shows that all perpetrators were men. However, there are some limitations in this study, such as the number of participants (17) or the participants’ gender (all of them identified as female) [6].

It is worth mentioning that in groups of “equals”, women are perpetrators as often as men. Additionally, our results have suggested that younger female students are perpetrators more frequently than their male peers. There is a lack of studies that could reinforce our results. This topic should be explored in the future.

Another key point extrapolated from our data is that discriminatory behavior is more common in formal medical settings than in informal ones, suggesting that the medical academic environment fos-

ters discrimination. Places such as hospital wards, seminar rooms, and operating theatres were locations where discriminatory incidents were most common. In contrast, areas associated with student life, such as university campuses or student dormitories, presented lower rates of discriminatory behavior. In all these locations, women were more frequently the victims of discrimination, except for the intensive care units and student dormitories.

Formal medical settings have been well documented in research as areas of frequent discriminatory behavior [3, 7–10]. However, no research papers provide numerical data about discrimination in informal settings outside of the classroom. These data are essential to gauge the role of student-student interactions in the development and upkeep of discriminatory culture in medical education and should be a topic of interest for future research.

Lastly, our study highlights that both men and women perceive discrimination to have profound and far-reaching implications regarding career development and mental well-being. Research shows that it influences career choices and opportunities, and leads to higher rates of burnout, stress, and depression [3, 11–13].

Regarding career progression, a study conducted by Aziez et al. shows that from 225 questionnaires collected from radiation oncologists and residents in France, gender was considered to be detrimental to career progression by 65% of women and 12.7% of men. From this group, 62% of women experienced inappropriate behavior or sexual harassment in their workplace. Additionally, 38% of women felt that having children significantly affected their careers, compared to 8.5% of men [11]. These data show that gender is considered to be detrimental to career progression by both men and women; although more common in women, it highlights the perceived role of gender discrimination in hampering the career development of both genders.

In a different study conducted by Stock and Kaifie, in which they analyzed the effect of discrimination on the choice of medical specialties among 759 medical students, 10.6% stated that they ruled out a medical specialty due to perceived gender discrimination [3]. These data show how the perceived anticipation of discrimination in specific fields can change decision-making processes and discourage medical students from pursuing certain specialties. Curiously, no research paper analyzed whether men and women viewed discrimination as detrimental to mental well-being.

Despite the abundance of research papers assessing the direct impacts of discrimination on career progression and mental well-being, rarely do they mention whether men and women perceive discrimination as harmful. This topic should undergo further examination.

At the end, there is a prospect of encouraging the university authorities to form a particular policy that counteracts these behaviors. Moreover, we strongly believe this study would incite discussion about gender-based discrimination in the Polish academic community.

Availability of data and material

The database on which this work is based has been made available on the Zenodo platform and has the following DOI number: 10.5281/zenodo.15109956

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Ethical approval

Approval number: 360/23.

Conflict of interest

The authors declare no conflict of interest.

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