Assessment of Well-being Differences by Gender in Medical Students at a Midwest Public University-Based Medical School

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ABSTRACT

Introduction: Ensuring the well-being of medical students, including historically marginalized groups, is essential for individual success and the vitality of the medical field. Beyond considerations of equity, enhancing the well-being of women in medicine strengthens the effectiveness and diversity of the medical workforce. Existing research has identified distinct stressors faced by women medical students, prompting investigation into gender disparities in stress, the hidden curriculum, and the minority tax.

Methods: A survey was conducted among medical students enrolled at the University of Wisconsin School of Medicine and Public Health in August 2023. Questions assessed stress levels and experiences related to the hidden curriculum and minority tax.

Results: Findings revealed a significant gender-based stress gap, with women reporting higher stress levels than men. While not statistically significant, gender differences in the impact of the hidden curriculum trended towards statistical significance (P=.09). Perceptions of minority tax burden were similar between women and men.

Discussion: Recommendations to reduce the gender disparities include establishing student-led peer support groups, implementing preclinical workshops to demystify the hidden curriculum, offering regular stress management and resilience-building sessions, and providing faculty diversity training to foster an inclusive learning environment. Future directions include expanding the project's scope through focus groups and longitudinal, multisite studies to explore intersecting identities – such as race, parenthood, caregiving responsibilities, leadership roles, and lesbian, gay, bisexual, transgender, and queer/questioning (LGBTQ+) status – and their impact on well-being.

Conclusions: Gender parity in medical school matriculation has not eliminated disparities in student well-being. System-level interventions and targeted support for women medical students are needed to promote equity and foster an inclusive educational environment.

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INTRODUCTION

As future physicians, current medical students play a pivotal role in shaping the future of patient care and sustaining society by delivering high quality health care. Therefore, ensuring their engagement and well-being is essential. Well-being in the context of medical education encompasses the ability to effectively manage the demanding rigors of knowledge acquisition and clinical and communication skill development while maintaining quality of life to reduce the risk of burnout and related health challenges.[1,2] Studies consistently underscore the high prevalence of mental health issues among medical students, highlighting well-being as a critical concern during medical education.[3,4]

The number of women entering medical school in the United States has risen over the past 2 decades. In 2017, for the first time, women outnumbered men in medical school matriculation.[5] Even so, women continue to experience disparities in medicine. For example, although women now matriculate at rates equal to men, most leadership positions in academic medicine – such as dean or department chair – remain held by men.[6] Additionally, a gender-based pay gap persists among physicians.[7] As the number of women pursuing medical careers rises and disparities remain, it is imperative to examine the experiences of women throughout medical school, residency, and beyond. Recent research indicates that women physi-

cians may experience distinct stressors and higher rates of burnout, warranting closer examination.[3]

Although numerous studies have identified personal, institutional, and societal factors contributing to well-being challenges among women, few have specifically explored the experiences of women during medical school in recent years. A recent literature search revealed that published studies have not examined how gender affects women medical students' experiences of stress, the hidden curriculum, and the minority tax. In *The Hidden Curriculum in Higher Education*, Eric Margolis defines the hidden curriculum as "the norms, values, and belief systems embedded in the curriculum, the school, and classroom life, imparted to students through daily routines, curricular content, and social relationships."[8] The minority tax has been defined as "the burden of time and resources placed on minority persons to represent and advocate for their communities"[9] and refers to additional burdens placed on those who identify as underrepresented in medicine (URiM), often in the name of increasing diversity. More research is needed to determine how gender may influence medical student perceptions and experiences.

This quality improvement (QI) project sought to address this gap by investigating the effect of gender disparities on the well-being of women medical students at a single public university-based medical school. Specifically, the goal was to explore how gender informs medical students' experiences of stress, the hidden curriculum, and the minority tax to help prioritize efforts to create a more equitable experience for women medical students.

METHODS

Quality Improvement Project Design

During summer 2023, a QI project was developed to explore the well-being of medical students at a public university medical school in the Midwest (University of Wisconsin [UW] School of Medicine and Public Health). The survey included a total of 16 questions: multiple-choice items assessing student satisfaction, stress levels, and the impact of the hidden curriculum and minority tax on well-being, as well as optional open-ended questions soliciting feedback and recommendations for improving existing well-being support structures. Because of its QI design, the UW Madison QI/Program Evaluation Self-Certification tool determined that this project did not require institutional review board review or approval, as it did not meet the federal definition of research (certification date March 9, 2023). Informed consent was obtained at the beginning of the survey, which explained the voluntary nature of participation. To maximize anonymity, demographic questions were optional and limited to gender, URiM status, identification with a historically excluded group, first-generation status, and underresourced background.

Participant Recruitment

The online Qualtrics survey was emailed to all enrolled medical students at UW School of Medicine and Public Health in August 2023, excluding students who matriculated in academic year 2023-2024. A total of 146 medical students across 3 classes consented to participate (response rate: approximately 27%). Among respondents, 82% (119 students) answered optional demographic questions.

Table 1. Demographic Data of Survey Respondents

Demographic Information	Man (n = 42)	Woman (n = 74)
URiM (n = 46)	15 (33%)	29 (63%)
Historically excluded group (n = 42)	15 (36%)	25 (60%)
Underresourced background (n = 43)	18 (42%)	23 (53%)
First-generation medical student (n = 103)	37 (36%)	64 (62%)
First-generation college student (n = 33)	13 (39%)	19 (58%)

Abbreviation: URiM, underrepresented in medicine.

Data Analysis

The project employed a two-fold approach to examine stressors affecting medical students: analysis of primary stressors and quantification of adverse effects related to the hidden curriculum and minority tax. Most multiple-choice questions used a disagree/agree scale: "agree" and "strongly agree" responses were grouped to indicate agreement with stress-inducing factors. Two-sample *t* tests assuming unequal variance were conducted using Python to assess gender differences for each identified stressor. Additionally, qualitative analysis was performed on open-ended responses to identify themes and recommendations for improving equity in medical education. This analysis included manual topic modeling of responses from the Shapiro survey.

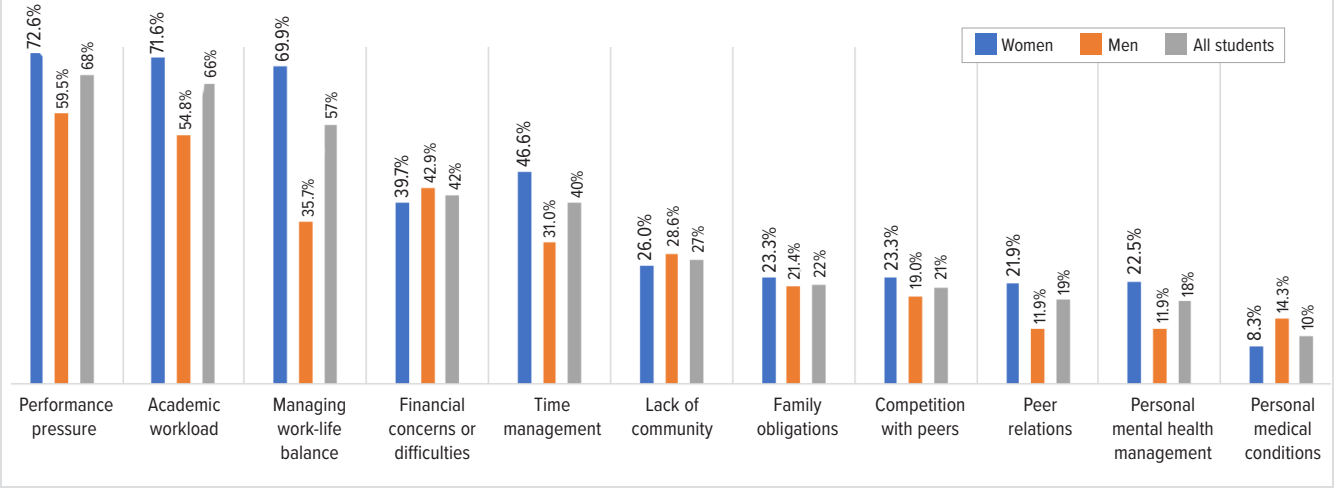
RESULTS

Table 1 presents demographic data for survey respondents. Among 146 respondents, 74 were women (subsequently referred to as women/an for clarity); 28 identified as URiM, 24 as belonging to a historically excluded group, and 22 as coming from an underresourced background. Sixty-three respondents identified as first-generation medical students, and 42 respondents were men (hereafter referred to as men/an for clarity).

Of the 74 women respondents, 62% reported their stress level as "significant, but manageable," compared with 45% of men ($P = .016$). Additionally, 15% of women characterized their stress as "severe, and debilitating," whereas only 7% of men selected this response. Figure 1 illustrates this difference: 34% more women than men reported experiencing "a great deal" or "a significant amount" of stress related to work-life balance ($P < .001$). Regarding reasons for stress, women selected performance pressure at statistically significant higher rates compared with men.

When asked about the effect of the hidden curriculum on their well-being, 53% of women and 36% of men reported a negative impact ($P = .09$). Additionally, 38% of women reported feeling burdened by a "minority tax," and only 36% of these students felt

Figure 1. Stressors for Medical Students Show Gender-based Differences in Multiple Areas



that the school provided adequate support to mitigate its negative impact. Similarly, 36% of men reported experiencing the minority tax burden.

Several recommendations for creating a more equitable environment for women medical students at our institution emerged from the survey. Forty percent (40%) of all respondents called for greater transparency, awareness, and communication to demystify the hidden curriculum (Figure 2). Students also expressed a desire for more time off for self-care, flexible scheduling for counseling appointments, increased peer networking opportunities, and greater diversity in school leadership.

Table 2. *P* values for *t* Tests Show Significant Differences in Gender in Three Areas: Overall Stress Level, Performance Pressure, and Managing Work-Life Balance

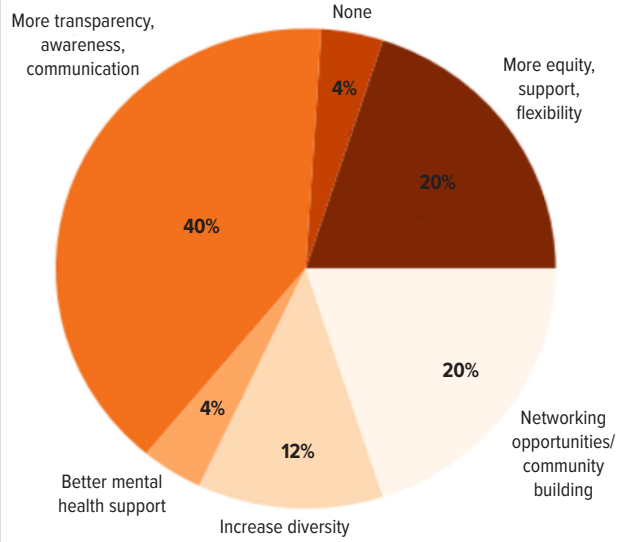
Metric	*P* value	Interpretation
Hidden curriculum	0.09	Not significant
Minority tax	0.78	Not significant
Overall stress level	0.02	Significant gender difference
Individual stressors		
Performance pressure	0.02	Significant gender difference
Academic workload	0.06	Not significant
Managing work-life balance	<.001	Significant gender difference
Financial concerns	0.65	Not significant
Time management	0.22	Not significant
Lack of community	0.88	Not significant
Family obligation	0.08	Not significant
Competition with peers	0.19	Not significant
Peer relations	0.23	Not significant
Mental health	0.15	Not significant
Medical conditions	0.48	Not significant

DISCUSSION

Although the survey was distributed to all medical students to assess stress levels and well-being, the findings revealed a clear gender disparity in experiences related to stress, performance pressure, and work-life balance. Women medical students reported higher stress levels than men. Moreover, women were more likely to describe their stress as severe and debilitating. In contrast, rates of feeling burdened by the minority tax were similar between groups.

The question arising from these data is why women medical students experience more stress than men peers despite equal or greater representation in medical schools. Prior studies have suggested increased burnout among women medical residents due to unconscious gender bias from patients, faculty, and colleagues.[10] It is reasonable to assume that similar gender bias may contribute to burnout at the medical school level. The increased stress observed among women in our study may be due to a perception that they must work harder than men to overcome unconscious

Figure 2. Student-Identified Areas of Improvement



bias. Notably, women selected performance pressure as a reason for stress at statistically significant higher rates than men.

Medical students undergo ongoing evaluations from attending physicians. In clinical settings that are often hierarchical, the additional identity of being a woman may amplify stress when those higher in the hierarchy are of a different gender. One student wrote: "as a woman, I have been lucky to have a female attending, resident, and older med student mentors. Having someone at every level is game changing. Even just one makes a difference… I have had to defend myself to many male colleagues, mostly ones who 'rank' higher than me…From my female mentors, I have gathered that gender differences are real and exist and can be overcome to some extent but with difficulty and a lot of extra energy and time investment, which detracts from other aspects of life."

At the UW School of Medicine and Public Health during the survey period, women in department chair positions reached their highest proportion. As of November 2024, 44% of department chairs were women. Even with increased representation in leadership, significant disparities in well-being among women medical students persist. This may be partly because the growth of women chairs has occurred gradually over the past 2 decades, only recently approaching parity. Two decades ago, there were no women chairs; in 2014, according to school records, women accounted for 30% of department chairs. This suggests that the lack of a longstanding history of women leaders as role models, combined with systemic, structural, and societal factors within and beyond the learning environment, continues to affect women's well-being. Recent societal factors–such as demonstrated gender bias in political leadership, highlighted by voter preferences in the November 2024 presidential election–underscore challenges women may face outside of school that could contribute to stress.[11]

Although not statistically significant, more women reported being negatively affected by the hidden curriculum, with a *P* value trending toward significance. One respondent wrote,

> *"People with exposure to this field through personal contacts have a giant leg up and are well connected and understand the process from day 1. They understand the system and don't have to waste their time learning it but rather can focus on how to thrive within it."*

The intersection of identities–such as being a woman and first-generation in medicine–may create additional barriers to navigating the hidden curriculum.

Comments suggest an unfamiliarity with the culture of medicine that is necessary to be successful. Another student wrote:

> *"I felt it the most at the beginning of rotations where there were all these cultural norms of being in a hospital that I just didn't know. It greatly impacted how I performed and how I was a part of the team. It took a long while to learn. And it changes per rotation. It is difficult to try to understand the new hidden curriculum in every rotation and get it right."*

Additionally, while 38% of women reported feeling burdened by the minority tax–defined as additional responsibilities placed on individuals underrepresented in medicine, often in the name of diversity–36% of men reported similar experiences. This suggests that the minority tax may not account for the increased stress observed among women medical students.

A study exploring medical students' experiences of imposter syndrome found that 65.4% had clinically significant imposter syndrome, with women scoring higher on the Clance Imposter Phenomenon Scale.[12] Although our project did not specifically assess imposter syndrome, it is likely a contributing factor to increased stress among women medical students.

While the precise causes of increased stress among women medical students remain unclear, these findings indicate that achieving parity in matriculation between men and women has not eliminated disparities in medical education experiences. System-level change is likely necessary to achieve equity across genders.

Interventions and Recommendations

Prior literature suggests one of the most powerful approaches to improving medical student wellness is multifactorial.[1,13] Several interventions identified in the literature focus on creating collaborative environments that foster camaraderie and reduce feelings of isolation among students.

Peer-mentoring programs are consistently cited as essential components of wellness, providing both psychosocial and academic benefit.[14] Although such programs exist at many institutions, including ours, they may be underutilized.[15] Intentional matching of students based on shared lived experiences may offer additional guidance and support in navigating the challenges of medical education.

The literature also highlights general strategies to reduce distress, such as maintaining hobbies, building social connections, cultivating a positive mindset, avoiding delayed gratification, developing resilience, and selecting a medical career aligned with personal interests.[1,13] Collectively, these findings emphasize the importance of implementing a combination of curricular changes and support systems to promote medical student well-being. However, wellness interventions specifically focused on women medical students are notably absent from the literature. Considering the findings of this project, several recommendations can be made to enhance the well-being of women medical students at the School of Medicine and Public Health and beyond. Implementation of these measures requires careful consideration of potential barriers to ensure equitable access for all women medical students. Collaborative efforts, institutional support, and a commitment to gender equity are essential for success.

To ensure effective implementation, a phased approach is proposed. First, establish student-led peer support groups or dedicated mentoring programs specifically designed for women medical students. These groups would serve as safe spaces for discussing

challenges, sharing experiences, and providing mutual emotional support—particularly during clinical rotations. They could also function as platforms for peer-led advocacy to raise awareness of gender disparities in medicine and promote policy-level change. Second, conduct workshops prior to clinical rotations to demystify the hidden curriculum, clarify institutional norms, and offer guidance on professional etiquette and expectations. Involving women faculty and senior women students as workshop leaders who can share their experiences and insights may be highly beneficial. Third, implement regular stress management and resilience-building workshops to help students cope with the pressures of medical education. These workshops should be responsive to needs across the gender spectrum. Finally, faculty should continue to receive comprehensive diversity training aimed at enhancing cultural competence, mitigating biases, and fostering a welcoming atmosphere for all students. This prioritization aims to address the most pressing needs first while providing a roadmap for sustained improvement.

There are existing programs for women faculty in academic medicine that provide a model for student-focused initiatives. For example, the American Academy of Medical Colleges (AAMC) offers early and mid-career women faculty leadership summits.[16,17] Similarly, the Executive Leadership in Academic Medicine (ELAM) at Drexel University College of Medicine is a yearlong fellowship for women faculty focused on the challenges faced by this community.[18] In addition, school-sponsored symposia and seminars sponsored by the Group on Women in Medicine and Science geared toward faculty over the past 5 years and the student-led group, Women in Medicine, have provided information, shared insights, and created community to help elevate and address the needs of women. These successful programs offer a blueprint for creating initiatives focused on women medical students. Intervening earlier in students' careers may facilitate the leadership development and advance gender equity in academic medicine. Specific women-only spaces and programs will likely remain necessary until gender disparities in well-being are reduced.

Limitations

Limitations of this project include the relatively small number of survey respondents which may limit generalizability. Additionally, not all respondents provided demographic data, which may have affected results. Selection bias is possible, as 62.2% of those who reported gender were women. Because comprehensive demographic data were not collected, the sample may not represent the broader medical student population. Institutional factors unique to the School of Medicine and Public Health may also contribute to stress but could not be identified given the quantitative nature of data collection. Future research should consider longitudinal studies and institutional comparisons to address these limitations and provide richer insights.

Future Directions

Future research methodologies could include mixed-methods approaches to capture quantitative and qualitative effects of gender disparities. Longitudinal students across multiple medical schools with larger sample sizes would improve generalizability and may identify institutions where gender disparities are less pronounced, offering opportunities to learn effective mitigation strategies. Conducting extensive focus groups with diverse cohorts of women medical students would help clarify underlying causes of stress in the learning environment. Specifically, investigating the intersection of identities—including race, parenthood, caregiving responsibilities, leadership roles, and lesbian, gay, bisexual, transgender, and queer/questioning (LGBTQ+) status—may reveal more nuanced insights that inform more precise recommendations and targeted interventions. Such findings could guide the development of programs that promote equity in medical education and, ultimately, faculty leadership positions. This project contributes to ongoing medical education reform aimed at creating a more inclusive and equitable environment for women in medicine.

CONCLUSIONS

To ensure equitable experiences for all medical students, it is critical to understand the unique challenges faced by women medical students. Findings from this quality improvement project indicate that women experience higher levels of stress than men. Oher identities, such as URiM status or being first generation in medicine—appear to intersect with gender and influence experiences related to the hidden curriculum and minority tax. These compounded identities may contribute to the increased stress observed by women respondents, although additional data are needed to further investigate these relationships. Ultimately, these findings underscore the need for medical education environments to critically examine existing practices and prioritize inclusivity, equity, and well-being as cornerstones.

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