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Original Research Article

Barriers and facilitators for under-represented in medicine (URiM) medical students interested in surgical sub-specialties

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A B S T R A C T

Background: Little is known on drivers and detractors underrepresented in medicine (URiM) medical students face.**Methods:** Using the nominal group technique (NGT), we explored experiences that strengthen or weaken the enthusiasm to pursue a career in surgery among URiM medical students (October 2021–April 2022); participants voted on the three most important experiences (weight of 3 = top rated, = 1 for the lowest rated). Responses from NGT with at least one vote were weighted, ranked, and categorized.**Results:** Seventeen students participated. Experiences that strengthen enthusiasm (36 responses with at least one vote) involved mentorship and role models (weighted sum percentage, 35%), demonstrating grit (15%), lifestyle (15%), patient interactions (14%), technical skills (11%), community and team (10%), and intellectual stimulation (1%). Experiences that weaken enthusiasm (33 responses with at least one vote) include the minority experience (weighted sum percentage, 51%), quality of life (25%), toxic environment (13%), lack of information (7%), and finances (5%).**Conclusions:** Mentorship, demonstrating grit, and feeling a sense of community were important positive experiences or attitudes. The minority experience, toxic environment, perceptions of self-worth, and lifestyle misconceptions perceived by URiM must be addressed to increase diversity, equity, and inclusion.

1. Introduction

In the United States, the diversity composition of the healthcare workforce does not parallel the population distribution – hence recruitment of underrepresented in medicine (URiM) groups is a priority.^{1–4} The lack of representation of people who identify as Black or African American, Hispanic or Latino or of Spanish origin, Native Hawaiian or Pacific Islander, American Indians or Alaska natives is well described in the literature.^{5–8} Furthermore, surgical subspecialties in particular have a stark deficiency in the number of URiM residents and subsequently practicing surgeons.⁷ The Association of American Medical Colleges (AAMC) supports diversification of the workforce; however, recent studies showed no differences in trends of URiM matriculants to surgical subspecialties in the last 10 years.^{8–10}

Factors contributing to underrepresentation of racial and ethnic

minorities in surgery are not well understood. For example, Ulloa et al.¹⁰ identified facilitators and barriers among practicing African American and Latino surgeons; three major themes emerged in their analysis: creating a path to medicine, surgical culture, and mentorship. Creating a path to medicine was facilitated by family support and internal motivation; however, it was hindered by negative personal experiences and unsupportive social environment. Examples of the surgical culture and mentorship were listed as both facilitators and barriers.¹⁰ Expert opinion and survey data also suggest important barriers, including training environment, lack of information regarding career options, discrimination, lack of positive images or role models, and perceived lack of balance of familial obligations.^{5,11–13} In addition, the surgical specialties are among some of the most competitive in which to match, which may magnify barriers for underrepresented minorities.¹⁴ Experiences by URiM medical students, both positive and

Abbreviations: URiM, underrepresented in medicine.

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negative, interested in surgery have not been well studied.

In this study, we explored experiences that strengthen or weaken the enthusiasm to pursue a career in surgery or surgical sub-specialties among URiM medical students using a consensus development technique (nominal group technique, NGT). Exploring such experiences could thus help inform local and national strategies to improve recruitment and retention.

2. Methods

We used the nominal group technique (NGT) to explore experiences that strengthen or weaken the enthusiasm to pursue a career in surgery or surgical sub-specialties among under-represented in medicine (URiM) students. NGT is a semi-quantitative structured process that helps a group reach consensus about the relative importance and/or priority of important issues or ideas using a weighted ranking process.^{15,16} The technique provides equal participation, eliminates the effects of dominant or shy personalities, avoids group-think responses, and allows for efficient acquisition of ranked responses.

2.1. Setting and participants

Between October 2021 and April 2022, we recruited medical students from US medical schools with a self-reported interest in pursuing a general surgery or surgical sub-specialty residency and who self-identify as URiM. We used the AAMC classification of URiM (Black or African American, Hispanic or Latino or of Spanish origin, Native Hawaiian or Pacific Islander, American Indians or Alaska natives).¹⁷

We utilized a multistep approach for recruitment. First, we recruited students enrolled at the Heersink School of Medicine at the University of Alabama at Birmingham (with campuses in Birmingham, Huntsville, Montgomery, and Tuscaloosa) and used distribution lists of surgical interest groups as well as local chapters of the Student National Medical Association (SNMA) and the Latino Medical Student Association (LMSA). Second, we contacted surgery residency program directors at institutions from the Southeastern Surgical Congress (SESC) consortium; founded in 1930, the SESC represents institutions from Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Puerto Rico, Florida, South Carolina, North Carolina, Virginia, West Virginia, Delaware, New Jersey, Pennsylvania, Maryland, and Washington D.C. We chose the Consortium as we wanted to better understand local and regional experiences. Last, we tagged the Twitter handles of the SNMA and the LMSA. All students who responded to the recruitment email or Twitter (outlining the above inclusion criteria) and completed the NGT sessions were included in the study.

2.2. Question development

We built on our prior experience on defining the positive and negative experiences which may influence career decisions in primary care.¹⁶ Similarly, the authors designed the questions to explore barriers and facilitators for URiM medical students to pursue surgical training. All but two of the authors are URiM.

2.3. Data gathering

Following NGT principles, we planned to conduct 4 NGT sessions with an idea of reaching a target of 8–10 participants/session, lasting an hour each. Given the intent to reach a broader sample and local social distancing restrictions due to the COVID-19 pandemic, sessions were conducted virtually. We created a facilitator guide specifically for this study and pilot tested responses and usability.

The sessions were facilitated online using an institutional software system developed for conducting nominal groups. To minimize biases, the facilitator asked participants to turn off cameras and change their respective screen names.

To minimize social desirability bias, the facilitator was not related to the surgical department. The facilitator asked the first question: “During medical school, what sorts of experiences strengthen your enthusiasm to become a surgeon?” This process was repeated for the following question: “During medical school, what sorts of experiences weaken your enthusiasm to become a surgeon?”

Sessions were recorded as a backup procedure for data analysis. Unfortunately, funding was not available to provide incentives for participation. After each session, we intended to collect participants’ characteristics (age group, race/ethnicity, gender/sexual orientation, medical school region); however, we could not do so due to logistical reasons.

Following a brief introduction to describe the process, participants provided answers to the two questions based on their own experiences, knowledge, and perspective. Each participant wrote down his or her responses to the question during a 5-min silent period. They then contributed a single idea expressed as a phrase or brief sentence in a round-robin format. Each contribution was captured verbatim and displayed for all to see as part of a list of contributed items. This process was repeated until the group felt that all significant ideas had been captured. The list of responses was then reviewed to ensure that all participants had a shared understanding of the items. Participants then selected the three most important/significant response items, from their own perspective, and ranked them in order of importance. The item that each participant perceived as most important was assigned a weight of 3, the second most important assigned a weight of 2, and the third assigned a weight of 1. These votes were then automatically tabulated and presented to the group, who were asked to share their impressions about the overall ranking of the group.

2.4. Data analysis

First, the items on each list were ranked in order of their relative importance to the students. We used an iterative consensus agreement process among the authors to categorize the responses into main themes. The weights for each of the selected responses were summed across participants to derive a percentage for each item and an overall percentage for each theme. We also identified the top three responses for each session. The main outcome is the main themes of responses to the questions (expressed as weighted sum percentage).

The Institutional Review Board at our institution approved the study.

3. Results

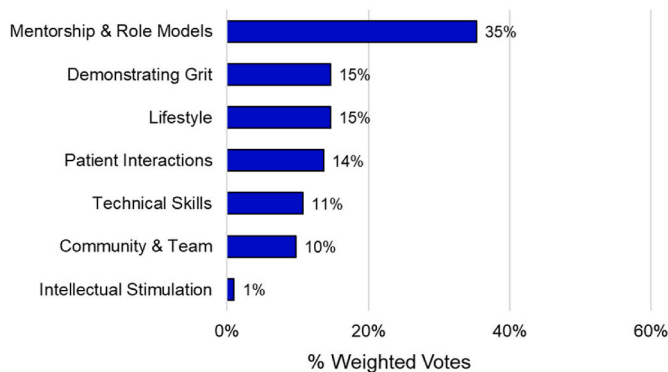
Between October 2021 and April 2022, 17 of 24 students who signed up participated in one of the four NGT sessions (each with 3–5 participants, 29% attrition). Overall, participants submitted a total of 55 responses to the strengthen enthusiasm question (36 of which received at least one vote) and 51 responses to the weaken enthusiasm question (33 of which received at least one vote).

3.1. Strengthen enthusiasm in surgery

Overall, experiences that strengthen enthusiasm in surgery involved mentorship and role models (weighted sum percentage, 35%), demonstrating grit (15%), lifestyle (15%), patient interactions (14%), technical skills (11%), community and team (10%), and intellectual stimulation (1%) (Fig. 1, top panel; Table 1).

Table 1 shows statements with at least one vote. For each session, the top three responses for mentorship and role models included mentorship by faculty and other residents of color, shadowing experiences, experiences during surgery clerkships, and attending conferences. Similarly, for demonstrating grit, ability to overcome adversity and reflection were in the top three responses. Others in the top three included lifestyle (seeing black surgeons who are happy with their careers and life choices), technical skills (desire to be as hands-on as possible), and being

During medical school, what sorts of experiences *strengthen* your enthusiasm to become a surgeon?



During medical school, what sorts of experiences *weaken* your enthusiasm to become a surgeon?

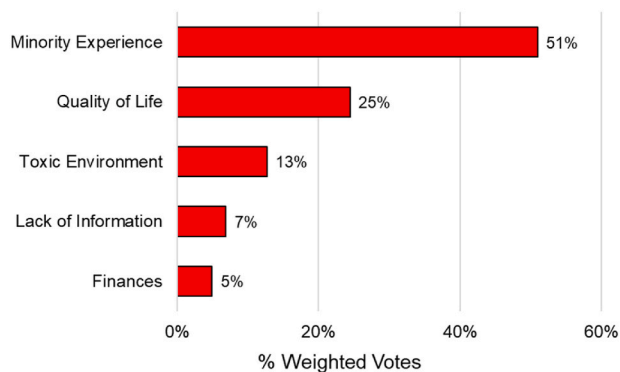


Fig. 1. Experiences that strengthen (top) or weaken (bottom) enthusiasm of pursuing a career in surgery among under-represented minority medical students.

part of community and team (working on a functioning team, making friends with other [people like me]). Appendix A shows statements mentioned that did not receive any votes.

3.2. Weaken enthusiasm in surgery

Overall, experiences that weaken enthusiasm in surgery include the minority experience (weighted sum percentage, 51%), quality of life (25%), toxic environment (13%), lack of information (7%), and finances (5%) (Fig. 1, bottom panel; Table 2).

Table 2 shows statements with at least one vote. For each session, the top three responses for minority experience included lack of diversity, lack of inclusion, lack of mentorship, discrimination (racism, sexism, and homophobia), and lack of confidence or self-efficacy. Similarly, for quality of life, work-life balance (family responsibilities, demands of the profession), and length of training were in the top three responses. For toxic environment, emotionally abusive attendings and residents and [observing] toxic traits such as liking to overwork or being rude to their co-workers weakened enthusiasm towards surgery. Other themes that made it to the top three individual sessions included the financial and reputational risk associated with bad patient outcomes. Appendix B shows statements mentioned that did not receive any votes.

4. Discussion

We utilized an innovative method to perform a needs assessment or gap analysis in medical education.^{15,16,18} The NGT is a potentially better method to explore URiM experiences that has not been used in surgical

Table 1

During medical school, what sorts of experiences *strengthen* your enthusiasm to become a surgeon? Statements with at least one vote.

Participants voted on the three most important experiences (weight of 3 = top rated, = 1 for the lowest rated). Percentages represent weighted votes for items that received at least one vote.

Theme/Statement	Top 3 for each Session	% of total votes	Sum Total
Mentorship/Role Models			35%
• Mentorship	3	5%	
• Attending conferences such as SBAS and LSS provided information on the diverse paths that can be taken to become a surgeon	2	4%	
• Being mentored by surgeons and residents of color	2	4%	
• Shadowing other surgeons/the surgery environment	2	3%	
• Experiences during the 6-week surgery clerkship	1	5%	
• Being able to meet minority surgeon scientists who have significant accomplishments		2%	
• Surgeons taking an interest in my learning		3%	
• Classes or lectures that are led by surgeons		2%	
• Meeting a diverse set of mentors that seem human to you because they reflect similar background and experience		3%	
• Meeting mentors that generally believe and/or invest time in you		3%	
• OR experiences or classes led by surgeons who look like me		1%	
• Selecting surgical electives in third year of med school		1%	
Demonstrating Grit			15%
• Being able to overcome adversity	2	4%	
• Personal insight and reflection	1	6%	
• Seeing the lack of minority surgeons		4%	
• A desire to change the culture		1%	
Lifestyle			15%
• Seeing black surgeons who are happy with their careers	1	6%	
• Seeing surgeons that are happy with their life choices	1	6%	
• Observing surgeons that have a balanced lifestyle		2%	
• Seeing surgeons who are also happy as parents		1%	
Patient Interactions			14%
• Improving quality of life for diverse patient populations	1	6%	
• Being able to connect with my patients		3%	
• Having patients of color thank me for being part of their care team while on surgery rotation		2%	
• Seeing surgeons who connect with their patients		2%	
• Seeing the connection that diverse patients have with diverse surgeons		1%	
Technical Skills			11%
• Desire to be as hands-on as possible	3	3%	
• Being invited to participate in hands-on experiences in the OR	2	3%	
• Attending suturing and other workshops; i.e. practicing hands-on skills		2%	
• Being actively involved in OR cases		1%	
• Being told that I have some form of natural ability when in the OR [e.g. picking up on techniques and practices]		1%	
• Learning about anatomy and procedures based on that section of anatomy		1%	
Community & Team			10%
• Working on a smooth functioning team during my rotation [e.g., good open communication between members]	3	3%	
	2	3%	

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Table 1 (continued)

Theme/Statement	Top 3 for each Session	% of total votes	Sum Total
<ul style="list-style-type: none"> • Making friends with other medical students who are under-represented in medicine and interested in surgery 		2%	
<ul style="list-style-type: none"> • Increased presence of surgery residencies and programs on social media makes the field more accessible and exposes me to a lot of environments 		2%	
<ul style="list-style-type: none"> • Receiving positive feedback from other members of the surgical team 			1%
Intellectual stimulation			
<ul style="list-style-type: none"> • Experiencing other medical specialties and recognizing that they are not for me 		1%	
Total		100%	100%

education. During NGT, participants contribute equally, the process allows for individual reflection as well as fostering creativity by building on ideas proposed by other participants during the round-robin phase. NGT is less resource intensive as compared to other methods, such as surveys or focus groups.

In this study, we identified specific experiences that strengthen or weaken the enthusiasm to pursue a career in surgery or surgical specialties among URiM medical students. Exceptional mentorship, supportive role models, and prior experiences demonstrating grit strengthen the enthusiasm towards surgery. The minority experience, quality of life, and toxic environment weaken the enthusiasm toward surgery.

4.1. Experiences that strengthen enthusiasm among URiM students

The positive mentorship experiences and interactions with surgeons of color in different settings were meaningful and actionable. For example, attending specialty conferences, seeing minorities succeeding as scientists, and being mentored by surgeons and residents of color were mentioned. Other statements were mentioned once and also illustrate positive experiences and the importance of representation in leadership. For example: “having attendings who are enthusiastic about teaching me,” “specifically encountering surgeons who are female and black,” and “Director of ODI [Office of Diversity and Inclusion], a black surgeon, is very encouraging” were representative examples.

We chose the label ‘demonstrating grit’ to describe the internal motivation and desire to change the status quo. Individuals who successfully develop grit demonstrate a marked passion for their work which facilitates perseverance in the face of adversity. While grit can be developed and strengthened, modeling and self-development are required. Although ‘grit’ is not an experience but a general attitude or trait, we felt the term captures the examples mentioned during the sessions:

- “Being able to overcome adversity - I have the goal to become a surgeon but roadblocks come up and being able to advance strengthens my resolve,”
- “Personal insight and reflection,”
- “Seeing the lack of minority surgeons,” and
- “A desire to change the culture [not seeing that many surgeons of color].”

The positive aspects of a balanced lifestyle (happy surgeons), patient interactions (empathy and improving quality of life), technical skills (hands-on experiences), and community and team (high functioning team, peer support, positive feedback) were illustrated multiple times.

4.2. Experiences that weaken enthusiasm among URiM students

We highlight two main themes of experiences that weaken

Table 2

During medical school, what sorts of experiences weaken your enthusiasm to become a surgeon? Statements with at least one vote. Participants voted on the three most important experiences (weight of 3 = top rated, = 1 for the lowest rated). Percentages represent weighted votes for items that received at least one vote.

Theme/Statement	Top 3 for each Session	% of total votes	Sum Total
Minority Experience			51%
<ul style="list-style-type: none"> • Not seeing anyone in the field that looks like me 	3	4%	
<ul style="list-style-type: none"> • Lack of mentorship 	3	4%	
<ul style="list-style-type: none"> • Lack of diversity among attendings and residents in surgical specialties 	2	64%	
<ul style="list-style-type: none"> • Feeling overlooked or not included when working with the team 	2	4%	
<ul style="list-style-type: none"> • Racism, sexism, and homophobia from trainees, attendees, and mentors 	1	9%	
<ul style="list-style-type: none"> • Sometimes feeling like you don’t have what it takes after an unsuccessful attempt 	1	6%	
<ul style="list-style-type: none"> • Struggling with standardized tests, knowing it’s a huge part of evaluation for matching 		3%	
<ul style="list-style-type: none"> • Lack of minority physicians and surgeons 		3%	
<ul style="list-style-type: none"> • Lack of personal competitiveness 		3%	
<ul style="list-style-type: none"> • Being discouraged to pursue surgery (sometimes by family, sometimes by faculty) 		3%	
<ul style="list-style-type: none"> • Fluctuations in self confidence in the initial stages of adversity 		2%	
<ul style="list-style-type: none"> • Lack of diversity in chosen sub-specialty 		2%	
<ul style="list-style-type: none"> • Being the only woman or person of color on the team 		1%	
<ul style="list-style-type: none"> • Not being allowed to make the same mistakes that others are in the learning process 		1%	
<ul style="list-style-type: none"> • Hearing derogatory comments about diverse patients in the OR (specifically about Hispanic patients) 		1%	
Quality of Life			25%
<ul style="list-style-type: none"> • Challenges related to wellness, family responsibilities, and the demands of a career as a surgeon 	1	7%	
<ul style="list-style-type: none"> • Talk of having to sacrifice life outside of the hospital 	1	6%	
<ul style="list-style-type: none"> • Length of training 	1	6%	
<ul style="list-style-type: none"> • Observing miserable surgeons 		2%	
<ul style="list-style-type: none"> • The extremely rigorous nature of surgical training 		2%	
<ul style="list-style-type: none"> • Seeing surgeons or residents that “hate their lives” and are very vocal about it 		1%	
<ul style="list-style-type: none"> • Long and arduous path to become a surgeon after medical school 		1%	
Toxic Environment			13%
<ul style="list-style-type: none"> • Emotionally abusive attendings and residents 	3	3%	
<ul style="list-style-type: none"> • The main thing that weakens my enthusiasm is understanding that my future colleagues may have toxic traits of liking to overwork or be rude to their co-workers 	2	5%	
<ul style="list-style-type: none"> • Abusive hours - e.g., one rotation without a single day off 		2%	
<ul style="list-style-type: none"> • The pressure of intra-school and inter-class/nationwide comparisons 		1%	
<ul style="list-style-type: none"> • Working with surgeons who lack respectful communication skills when talking with both patients and staff 		1%	
<ul style="list-style-type: none"> • Culture of discouraging commitment to surgical specialties later in medical school (i.e., students, administrators, advisors, etc.) 		1%	
Lack of Information			7%
<ul style="list-style-type: none"> • Lack of communication of clear expectations and consistent feedback 	3	3%	

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Table 2 (continued)

Theme/Statement	Top 3 for each Session	% of total votes	Sum Total
• Having to be hands-off in the operating room	3	3%	
• Lack of formal advising, and inadequate advising		1%	
Finances			5%
• Financial and reputational risk associated with bad patient outcomes	3	2%	
• Not having the money or resources to actively compete against more wealthy students in other schools		3%	
Total		100%	100%

enthusiasm among URiM students: the minority experience and witnessing a toxic environment. We interpreted and labeled as ‘minority experience’ the many negative interactions experienced by URiM students, accounting for 51% of the weighted votes (or 41.2% of all responses, 21 of a total of 51). We conceptualized several components of the minority experience: microaggressions, lack of mentorship, lack of representation and diversity, low confidence and self-efficacy, and feeling invisible.

Microaggressions experienced by URiM students have been amply documented in the literature.¹³ In our study, we observed similar findings and were appalled to still hear experiences such as “*racism, sexism, and homophobia from trainees, attendees, and mentors*,” “*hearing derogatory comments about diverse patients in the OR (specifically about Hispanic patients)*,” and “*patients not wanting me to be involved with their case because of my race and/or gender*” among others.

Our findings of lack of mentorship and direction from white faculty is similar as reported in other studies among medical students.⁸ Similarly, the lack of representation and diversity was prominently displayed in several examples: “*not seeing anyone in the field that looks like me*,” “*being the only woman or person of color on the team*,” and “*lack of minority physicians and surgeons [in chosen sub-specialty, among residents/trainees]*.”

The lack of confidence and self-efficacy - given the highly competitive nature of the specialty - were also amply illustrated: “*struggling with standardized tests ...*,” “*being discouraged to pursue surgery (sometimes by family, sometimes by faculty)*,” “*not being allowed to make the same mistakes that others are in the learning process*,” “*lack of personal competitiveness*,” and “*sometimes feeling like you don’t have what it takes after an unsuccessful attempt*,” and “*feeling like there is a glass ceiling in surgery (even more so than the medical field in general)*.” Participants also described being ‘invisible’ to the medical team (“*feeling overlooked or not included when working with the team*”). This study adds more granularity to the minority experience examples identified by others¹⁰ (minorities discouraged to pursue surgery and requirement to exceed milestones before promotion).

Experiences illustrating the ‘toxic environment’ were jarring (ex: “*emotionally abusive attendings and residents*,” “*... my future colleagues may have toxic traits of liking to overwork or being rude to their co-workers*”). The term ‘toxic’ has been mentioned by participants in other studies.⁸

In closing, the negative minority experiences which start early in the students’ personal and professional development, are internalized and is seldom shared with other peers. The cumulative cascading of events leads to the amplification of such experiences.

4.3. Context and implications

Our study adds to the literature by providing convergent validity, using a different methodology, and including an understudied group of what is called the ‘leaky pipeline’ – URiM medical students with expressed interest in pursuing a surgical career. We also expand on the types of negative perspectives of the minority experience and toxic

environment.

We are aware of a single study examining barriers URiM medical students face to pursue a surgical career. Roberts et al.⁸ examined barriers among 16 African American medical students at an elite medical school using semi-structured interviews conducted by an African American medical student from the same institution. The authors identified 7 main themes: lifestyle, finances, having to work in a white environment, lack of mentorship, feelings of having to prove oneself, stressful environment, and concerns of being a minority female. The authors recognized that interviews done by a fellow student may have biased the responses; we think differently, given the richness of the responses, students may have felt more comfortable sharing their opinions. Experiences that motivate students to pursue a surgical career were outside the scope of their study.

Other studies have examined factors influencing career decisions among students in general. Schmidt et al.¹⁹ summarized the main factors that influence medical students to pursue careers in surgery in a systematic review of the literature. The authors found important themes including mentorship and role model by faculty and residents, experiences during clerkships, stereotypes and misconceptions, and others (lifestyle, sex discrimination, finances). However, none of these 38 studies specifically addressed issues faced by URiM. The study by Lindeman et al.²⁰ provides an important perspective. The authors examined curricular experiences and needs of students applying to surgery residencies with a survey distributed to all applicants at a single institution and to clerkship directors of a national surgical education listserv. Applicants identified mentorship, clerkship experience, and education on technical skills as important experiences. Data specific for URiM was not examined.

Chau and Aziz²¹ compared factors that influence decision to pursue a career in surgery (and vascular surgery in particular) using a 23-item survey comparing medical students interested in such careers vs. ones who were not at a single medical school. Positive factors include year in medical school (3rd year students more likely to be interested), surgical mentorship, and opportunity to complete training within 5 years. Negative factors include burnout, stress, work hours, and stressful lifestyle. Data specific for URiM was not examined.

Other studies have examined experiences among practicing African American and Latino surgeons,¹⁰ discrimination in surgery programs,¹³ suggestions to attract women and URiM in urology,²² and training experiences and accomplishments among URiM plastic surgery faculty.²³

Locally, the Heersink School of Medicine and the Department of Surgery continue to develop and build programs to enhance diversity, equity, and inclusion (DEI). For example, the Department offers scholarships for URiM students from other institutions to rotate during clerkships. The Pre-College Research Internship for Students from Minority Backgrounds (PRISM) provides shadowing opportunities to foster careers in surgery. Surgery faculty promote involvement with the Society of Black Academic Surgeons and the Latino Surgical Society; both societies allow the students to gain access to mentors from similar backgrounds or experiences. Our medical school launched affinity faculty groups – including African American, Hispanic/Latinx, Asian, and most recently LGBTQ+. Dean’s awards now include a dedicated award for DEI for junior and senior faculty. Last, local research is underway to better understand the surgical culture and determinants of burnout,^{24–27} educational interventions to mitigate micro-aggressions from patients,²⁸ and strategies to promote women in leadership positions.²⁹ The present study provides data for locoregional and perhaps national implementation of programs to attract URiM medical students to surgery.

4.4. Limitations

First, recruitment was challenging, as students have many demands on their time, and it was noted that at least two national recruitment efforts targeted at URiM surgical residents or incoming residents were occurring at the same time. The ideal size for the small group structured

interview is usually twice the sample we obtained; we addressed this limitation by having an expert facilitator conduct the sessions and we did not observe new themes among the unranked statements (suggesting saturation of responses). Second, we could not estimate a response rate and participants’ characteristics were not obtained.

5. Conclusions

Meaningful mentorship, demonstrating grit, and feeling a sense of community were important positive experiences and perspectives among URiM medical students interested in surgery. Surprisingly, life-style was mentioned as both a positive and negative experiences – perhaps suggesting that the culture is changing, the stereotype is being dissipated, or students are embracing the balance. The minority experience, toxic environment, and assessments of self-worth perceived by URiM must be addressed for the profession to increase diversity, equity, and inclusion.

Author contributions

All authors contributed to this manuscript at various stages including study design (ES, ML, CAE, CM, BC), data collection (RO, ES, ML), data interpretation (ES, ML, CAE, JDLT, RO, CM, BC), writing of the manuscript (ES, ML, CAE, JDLT, RO, CM, BC) and critical review of the manuscript (ES, ML, CAE, JDLT, RO, CM, BC).

Disclaimers

The opinions expressed in this article are those of the authors alone and do not reflect the views of the Department of Veterans Affairs.

Previous presentations

The Society of Black Academic Surgeons (SBAS), 32nd Annual Meeting, hosted by Sidney Kimmel Medical College at Thomas Jefferson University, Philadelphia, PA. September 15–18, 2022 [Oral Quick Shots]. Educational Research & Innovations in Clinical & Health Sciences (ENRICH) Week Annual Meeting, The University of Alabama at Birmingham, Birmingham, AL. September 20, 2022 [Poster].

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Declaration of competing interest

The authors of this manuscript have no conflicts of interest.

Appendix A. During medical school, what sorts of experiences *strengthen* your enthusiasm to become a surgeon? Statements with no votes

Theme/Statement
<p>Mentorship/Role Models</p> <ul style="list-style-type: none"> • A surgeon that encourages interactive learning in the OR • Meeting surgeons with the same racial background as me • The mentors’ program that allowed me to do a week of shadowing • Getting to shadow an African American surgeon during my first year • Having attendings who are enthusiastic about teaching me • Specifically encountering surgeons who are female and black • Seeing surgeons who are truly passionate about what they do • Director of ODI, a black surgeon, is very encouraging • Seeing diverse residents and faculty representation • Discussions with our M4 tutors during small group meetings centered around clinical skills <p>Demonstrating Grit</p> <ul style="list-style-type: none"> • Seeing more advocacy and transparency regarding issues in surgical training (diversity, parenthood, work-life balance) <p>Patient Interactions</p> <ul style="list-style-type: none"> • When patients have good outcomes after surgery • Standardized patient experiences • Receiving encouragement from diverse patients <p>Technical Skills</p> <ul style="list-style-type: none"> • Attending and participating in anatomy lab <p>Community & Team</p> <ul style="list-style-type: none"> • Mentoring other students from diverse backgrounds - sharing experiences and providing example • Ability to participate in surgery interest groups both locally and at a national level <p>Intellectual stimulation</p> <ul style="list-style-type: none"> • Surgical research opportunities sparked my interest and inspired me • Subject matter like anatomy and MSK classes excited me more than others

Appendix B. During medical school, what sorts of experiences *weaken* your enthusiasm to become a surgeon? Statements with no votes

Theme/Statement
<p>Minority Experience</p> <ul style="list-style-type: none"> • Discrimination in research opportunities and behavior at conferences • Double standards - inter-school bigotry or condescension (e.g. asking a student from our school to do an extra year) • Patients not wanting me to be involved with their case because of my race and/or gender • Lack of mentorship and direction from white faculty • Lack of diversity among surgical trainees • Feeling like there is a glass ceiling in surgery (even more so than the medical field in general)

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Theme/Statement
Quality of Life
• The amount of sacrifice needed to conclude the education process
Toxic Environment
• The pressure of intra-school and inter-class/nationwide comparisons
• Attendings treating me as if being a parent is a disadvantage
• Frequent verbal abuse, belittling, and/or invalidating that drives me away
• When other members of the team treat you harshly or act irritably
• Toxicity in the OR
• Poor teaching and limited patience in the OR on the part of attendings
Lack of Information
• Lack of research opportunities, mentorship, and other support
Finances
• Decreasing compensation/purchasing power in some surgical fields
Other
• The way anatomy is organized - decompressed anatomy blocks
• The lack of contextualization to what we learn in surgery
• Limited accommodations for scrubbing in, e.g. single sized scrub caps

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