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Article abstract

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Methods: Between 2020-2021, individual semi-structured video interviews were conducted with 15 Canadian medical students in this qualitative descriptive study. Inductive analysis proceeded concurrently with data collection until no new dominant concepts were identified. Data were iteratively coded and grouped into themes.

Results: Participants described internal and external factors that moulded shadowing experiences, arising tensions between intended and perceived experiences, and how these lived experiences impacted their wellness. Internal factors associated with shadowing behaviour included: 1) aspiring to be the best and shadowing to demonstrate excellence, 2) shadowing for career exploration, 3) shadowing as learning opportunities for early clinical exposure and career preparedness, and 4) reaffirming and redefining professional identity through shadowing. External factors were: 1) unclear residency match processes which position shadowing as competitive leverage, 2) faculty messaging that perpetuates student confusion around the intended value of shadowing, and 3) social comparison in peer discourse, fuelling a competitive shadowing culture.

Conclusions: The tension between balancing wellness with career ambitions and the unintended consequences of unclear messaging regarding shadowing in a competitive medical culture highlights issues inherent in shadowing culture.

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Overshadowed by shadowing: exploring how Canadian medical students experience shadowing

Éclipsé par l'observation : comment les étudiants en médecine canadiens vivent-ils l'observation ?

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Abstract

Background: Preclinical medical students commonly perceive shadowing as beneficial for career exploration. However, research is sparse on the broader impact of shadowing as a learning strategy. We explored students' perceptions and lived experiences of shadowing to understand its role and impact on their personal and professional lives.

Methods: Between 2020-2021, individual semi-structured video interviews were conducted with 15 Canadian medical students in this qualitative descriptive study. Inductive analysis proceeded concurrently with data collection until no new dominant concepts were identified. Data were iteratively coded and grouped into themes.

Results: Participants described internal and external factors that moulded shadowing experiences, arising tensions between intended and perceived experiences, and how these lived experiences impacted their wellness. Internal factors associated with shadowing behaviour included: 1) aspiring to be the best and shadowing to demonstrate excellence, 2) shadowing for career exploration, 3) shadowing as learning opportunities for early clinical exposure and career preparedness, and 4) reaffirming and redefining professional identity through shadowing. External factors were: 1) unclear residency match processes which position shadowing as competitive leverage, 2) faculty messaging that perpetuates student confusion around the intended value of shadowing, and 3) social comparison in peer discourse, fuelling a competitive shadowing culture.

Conclusions: The tension between balancing wellness with career ambitions and the unintended consequences of unclear messaging regarding shadowing in a competitive medical culture highlights issues inherent in shadowing culture.

Résumé

Contexte : De manière générale, les étudiants en médecine préclinique considèrent que l'observation présente une occasion intéressante d'explorer les possibilités de carrière. Cependant, peu de recherches ont été menées sur l'impact plus large de l'observation comme stratégie d'apprentissage. Nous avons exploré les perceptions et les expériences vécues des étudiants en matière d'observation afin de comprendre son rôle et ses répercussions sur leur vie personnelle et professionnelle.

Méthodes : Dans le cadre de cette étude qualitative descriptive, entre 2020 et 2021, des entretiens vidéo individuels semi-structurés ont été menés avec 15 étudiants en médecine canadiens. L'analyse inductive s'est déroulée simultanément à la collecte des données jusqu'à ce qu'aucun concept dominant nouveau n'apparaisse. Les données ont été codées de manière itérative et regroupées en thèmes.

Résultats : Les participants ont décrit les facteurs internes et externes qui ont façonné leur expérience de l'observation et les tensions qui en ont découlé, ainsi que l'impact de ces expériences sur leur bien-être. Les facteurs internes associés au comportement d'observation sont les suivants : 1) vouloir être le meilleur et faire de l'observation pour montrer son excellence, 2) faire de l'observation dans le but d'explorer les débouchés de carrière, 3) faire de l'observation pour apprendre par l'exposition clinique précoce et pour se préparer à la carrière, et 4) réaffirmer et redéfinir l'identité professionnelle par l'observation. Les facteurs externes sont 1) le manque de clarté dans les processus de jumelage des résidents pouvant donner l'impression que l'observation est un atout, 2) le discours enseignant qui entretient la confusion des étudiants quant à la valeur de l'observation, et 3) la comparaison sociale dans le discours des pairs, alimentant une culture de l'observation compétitive.

Conclusions : La difficulté de trouver un équilibre entre le bien-être et les ambitions professionnelles, et les conséquences involontaires d'un discours peu clair concernant l'observation dans le contexte d'un climat compétitif mettent en évidence les problèmes inhérents à la culture de l'observation.

Introduction

Shadowing is a common medical student experience during which learners observe a physician's daily work routine, including clinical activities. Medical students are required throughout preclerkship training to shadow a specific number of hours. Shadowing in medical school curricula varies from formal faculty-arranged experiences with mandatory hours-based or specialty-based requirements to optional student-organized opportunities during unscheduled time. Medical students perceive shadowing as beneficial for career exploration and as such, it is a potential focus of curriculum renewal.^{1,2} While there is abundant literature on the importance of shadowing to develop clinical competence, provide exposure to specialties, facilitate professional socialization, and connect with mentors,^{1,2} research on the learning environment of shadowing is sparse.³

A learning environment is a space where students engage with other students, faculty, and school culture.⁴ Its social and cultural tone can influence students' academic performance, future outlook, and career planning behaviours.¹ Understanding the complexity of the interactions within the learning environment and acknowledging the cultural context and people who comprise a curricular program is pivotal for improving students' learning while supporting their well-being.^{5,6} Students' life experiences and expectations inform their choices, but their behaviours are swayed by external factors such as instructional methods and institutional values, all of which can be targets for improving the learner experience. Medical schools are responsible for learning environments that align with students' goals, including compatible informal curricula to support medical students' well-being and facilitate their professional identity development.⁷⁻¹¹

Medical students have been experiencing decreasing mental and emotional health levels over recent years, with 44-50% of students facing symptoms of burnout.¹² The current culture of medicine is competitive, and research has shown that medical students actively seek achievements such as shadowing hours and that shadowing may sometimes feel repetitive or pointless.¹³⁻¹⁵ Moreover, anxieties surrounding indirect and external influences of the learning environment of shadowing may complicate its intended benefits as students reconcile the conflict between agency (their individual free will) and structure (the external influences that limit choices and

opportunities).¹⁶ This link between shadowing and impact on wellness has not been thoroughly explored.

To better understand the perception of shadowing, we explored how medical learners experience shadowing. We delineated components of the learning environment that influence students' decisions around shadowing as potential elements of curricular improvement. Our aim was to initiate conversation at the institutional level to foster a healthy learning environment.

Methods

Study design

We applied qualitative descriptive methodology¹⁷ within a social constructivist paradigm¹⁸ to understand the students' shared experiences. We conducted semi-structured interviews—a flexible approach enabled us to capture a rich description of preclerkship students' experiences of shadowing, producing results with practical application.¹⁹

Researcher perspectives informed the design and implementation of our study. The lead authors (MKL, GX) are medical students with lived experience, having witnessed and experienced the unintended and unacknowledged pressures of shadowing cultures and tensions between the intended curriculum and student shadowing behaviour. These experiences prompted our team's interest in this topic. Our research team also included a leader (ML) involved in curriculum development at the institutional level, a research coordinator (PV) experienced in health education research, and an education scientist (MM) with expertise in conducting theory-oriented qualitative research in medical education. We received ethics approval from the University of Toronto Research Ethics Board.

Study sample and setting

We distributed recruitment information to preclerkship students across all 14 English-speaking Canadian medical schools through representatives from the Canadian Federation of Medical Students via class email lists and official Facebook or other online community groups corresponding to each school. We initially conducted purposive maximum variation sampling to recruit a diverse group of participants²⁰ who were in second year of preclerkship or had recently finished preclerkship. We selected this population because preclinical shadowing is intended for preclerkship students as they participate in shadowing prior to taking on a full clinical role and

responsibilities. We ensured that participants represented a range of school geography, program size, program length, gender, year of training, hours of shadowing, and specialties of interest (Table 1). We adjusted our interview guide iteratively with ongoing purposive theoretical sampling to generate a better understanding of identified themes. Sampling continued until we reached the point in data collection at which no new dominant concepts informing our understanding of the experience of shadowing were identified during the analysis.²¹ This resulted in 15 participants from eight programs. Participants received a gift card honorarium for their participation.

Table 1. Participant demographics

Participant ID	School	Year of training	Pronouns	Specialties of interest
1	S1	3	she/her	Internal medicine, family medicine
2	S1	2	he/him	Neurosurgery, anaesthesia
3	S1	3	he/him	OB/GYN, general surgery
4	S1	2	she/her	Orthopaedic surgery, OB/GYN
5	S1	2	she/her	Family medicine, psychiatry, internal medicine
6	S2	3	she/her	Undecided
7	S3	2	she/her	Internal medicine, family medicine
8	S4	2	they/them	Family medicine, urology, plastic surgery
9	S5	3	he/him	Internal medicine, family medicine
10	S6	3	she/her	General surgery, urology
11	S7	2	she/her	Family medicine, OHNS
12	S8	2	he/him	Internal medicine
13	S8	2	he/him	Cardiology, cardiac surgery
14	S4	3	she/her	Previously OB/GYN, now unknown
15	S3	2	she/her	Neurology, internal medicine

Abbreviations: OB/GYN = Obstetrics and Gynecology; OHNS = Otolaryngology – Head and Neck Surgery

Data collection and analysis

From August to December 2020, we (MKL, GX) conducted individual semi-structured interviews ranging from 40 to 65 minutes. Interviews were recorded via videoconferencing and transcribed verbatim, with a confidential identification number assigned to each transcript to de-identify the data.

We wrote field notes regarding observational or contextual details not captured by the recording, which helped formulate our understanding of the data.

We entered transcripts into NVivo 12 (QSR International, Doncaster, Australia) to organize the data and employed a constant comparative analysis approach, whereby analysis occurred in tandem with data collection. For example, we would typically conduct two interviews and then hold a team analysis meeting to review transcripts, identify codes and adjust the interview guide (Appendix B) in order to address concepts requiring further refinement or elaboration. This ongoing analysis informed subsequent data collection by guiding our theoretical sampling of participants who might offer diverse or contrasting perspectives. After two team meetings and five interviews, we collectively developed a thematic framework that one author (PV) applied line-by-line coding to the remaining transcripts. We (MKL and GX) then organized coded data into categories, finally collating them into broader themes.

Results

Participants were from eight medical schools across Canada; three (20%) were from three-year programs. Nine (60%) were in second year, and six (40%) were in third year. Nine (60%) participants used she/her pronouns, five (33%) used he/him, and one (7%) used they/them. Participants had a variety of specialty interests (Table 1). Our analysis identified internal and external factors associated with shadowing behaviour that influenced participants' wellness. We acknowledge that the concepts of "internal" and "external" may not be discrete or unique characterizations and may, in fact overlap, thus illustrating the dynamics of how students experience shadowing. Internal factors included: 1) aspiring to be the best and employing shadowing to demonstrate excellence, 2) engaging in shadowing for career exploration, 3) perceiving shadowing as learning opportunity for early clinical exposure and career preparedness, and 4) reaffirming and redefining professional identity through shadowing. Students also described external factors: 1) feeling pressured to shadow for competitive leverage due to unclear residency match processes, 2) feeling confusion regarding faculty messaging on the intended value of shadowing, and 3) social comparison in peer discourse, thus fueling a competitive shadowing culture. Figure 1 is a visual representation of themes, and Appendix A contains additional representative quotes.

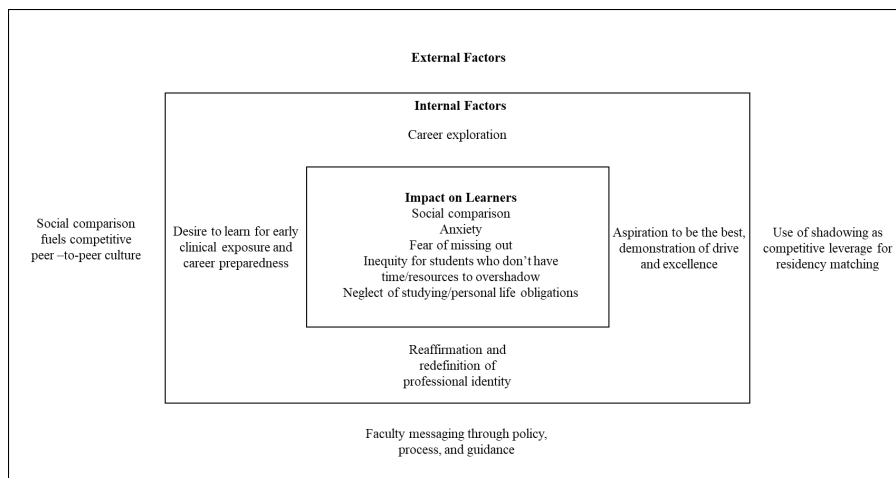


Figure 1. Internal and external factors associated with shadowing behaviour

Internal factors

Medical students aspire to be the best and shadow to demonstrate drive and excellence. Many participants commented on medical students having ambitious personalities that encourage high time and energy investment into shadowing for career development.

It may come back to the nature of medical students always wanting to be ahead, wanting to be prepared and not wanting to get things wrong. So, it may just be stemming from people's anxiety of wanting to perform well, look good, and make a good impression. (#12)

They attributed this drive, in part, to the medical school admissions process, which participants mentioned seems to select achievement-oriented individuals, resulting in a group of students with an internal drive for success and who are sensitive to the pressure to excel. This appeared to manifest in a choice to shadow more frequently and sometimes excessively. Some participants portrayed a trade-off of neglecting other responsibilities (i.e., class, studying, social events, self-care activities) to pursue shadowing, especially during unscheduled time. Some students depicted feeling drained or burnt out and had a perception of diminishing value from over-shadowing:

[It] created the sense of meaninglessness that I don't think I would have wanted out of any shadowing experience. (#4)

Some students viewed shadowing as a differentiator of ambition. As some medical schools only report pass-fail in transcripts, participants remarked that students no longer use grades as markers of academic success as they have no bearing on their residency match or later careers. Instead,

choices related to time investment in shadowing were thought to influence a student's professional journey.

People were vying for the best clinical experiences and the best extracurriculars, and the best connections to doctors ... in medical school, since everything is pass-fail, there's no real way to make yourself stand out with grades. (#5)

However, some participants spoke about an unlevel playing field due to inequities in accessing shadowing opportunities. For example, having pre-existing social connections (knowing or not knowing doctors), having other responsibilities and time commitments, and geographic distance or transportation availability limited or supported the ability to access and engage in shadowing. Some suggested limiting the number of hours to facilitate more equitable distribution of opportunities.

Medical students shadow for career exploration. Most participants labelled shadowing as a process to explore a personalized path to survey prospective disciplines. Some students discussed casting a wide net, while others described seeking out shadowing opportunities in specialties in which they already had an interest. Some participants viewed shadowing as necessary, while others exemplified it as optional.

The reality is that, for more competitive specialties, you need to essentially commit fairly quickly, and shadowing is that way for you to be able to quickly rule in or rule out things. (#2)

A few participants elaborated on how shadowing helped them make decisions about specialties, thus enabling them to focus their educational pursuits (through research and extracurriculars) earlier. This was perceived to afford a competitive advantage. By helping to narrow potential

career paths, some portrayed shadowing as a way to alleviate anxiety. In contrast, many students in three-year programs expressed heightened anxiety due to feeling pressured to start shadowing earlier to make their career choices.

In first year, when you don't have something to work towards, people get very, very stressed because they're not used to coping with uncertainty. And I think that's why shadowing is a great way to mitigate that. (#3)

Several students shared how they ruled out specialties based on work culture observed during negative shadowing experiences (e.g., being ignored or receiving negative feedback). Some noted that even a single poor shadowing experience could impact how they viewed a particular discipline.

People who've been in the [operating room] with a crusty surgeon or scrub team, [...]people can carry those experiences with them [...] I've never gone back to that [operating room] again. (#10)

Medical students perceive shadowing as a learning opportunity for early clinical exposure and career preparedness. Most students designated shadowing as a way to gain more clinical experience in order to feel more prepared for their future careers. Many delineated that some of the most valuable takeaways of shadowing included gaining non-medical expert knowledge and skills (e.g., effectively communicating with patients, learning about aspects of the hidden curriculum such as hospital culture, and navigating institutional processes). Not only does clinical learning complement classroom learning, some participants also proclaimed that it added a level of engagement.

You're not just reading about the case of a patient, you're actually seeing a patient, you're putting a face [to it], and you remember those patients a lot better. (#14)

Many participants expressed feeling excited and revitalized in moments when they could connect traditional didactic learning to a patient's case. Some students spoke about shadowing as a rewarding break from the monotony of school.

Several students shared the benefits of using shadowing, a low-stakes non-evaluative activity, to gain clinical knowledge and familiarity with hospital culture. They saw this as getting a head start for clerkship, a time when

evaluations are important. Some remarked that this pressure to gain early clinical experience is exacerbated in condensed three-year programs.

If we can get used to that whole hospital environment and be a good clerk before we start clerkship, then we'll have an advantage compared to our classmates. (#11)

On the other hand, despite the low-stakes expectations of shadowing, a few students also expressed anxiety about building a negative reputation due to their inexperience or making mistakes during the experience. This concern seemed more salient to students attending schools in smaller towns where the medical community was tight-knit.

If people are, you know, very green and want to go into the hospital, but make a really bad impression on a physician, and that physician kind of carries it forward, I think that would be a disadvantage. (#12)

Medical students use shadowing to reaffirm and redefine their professional identity. Many students commented on the role of shadowing in their professional identity development. In some instances, shadowing contributed to defining how participants perceived themselves as medical trainees in terms of their values (e.g., what kind of physician they want to be), their emotional processing (e.g., how they react in emotionally tense situations), and their style of work (e.g., how much professional distance they desire in their relationships with patients).

Moreover, a few students remarked that shadowing alleviated stress and burnout. It enabled them to take on a macroscopic perspective and reminded them of the initial reasons to pursue medicine. Shadowing allowed students to feel engaged in the clinical setting, and simple behaviours invoked a feeling of belonging to the profession in a few participants.

When you wear scrubs, you feel like a doctor [...] it starts to sink in a bit more. (#14)

Some participants commented on how shadowing reminded them of the meaning of their work in helping patients. These internal rewards of satisfaction seemed to empower students to seek additional shadowing opportunities.

In contrast, some participants voiced feeling stress due to the unclear or limited role of the learner in the clinical environment. Due to a lack of experience and inadequate

understanding of hierarchical structures in the learning environment, several participants described a tension between students' expectations of their preceptor's behaviour and the preceptor's actions in certain patient interactions.

[...] we had a woman come in, who was actively miscarrying [...] And that was quite difficult to watch as a student and to know, like, what is my place here as a shadower. [...] I feel like I want to go in there and be with her not just like, leave her alone, but as a shadower or not feeling like that, that's kind of my place. [...] You're kind of stuck in this weird place of, 'I'm just here to be an observer. I'm not here as an actual medical practitioner. So, I can't really do anything, but I'm uncomfortable with what I'm witnessing'. (#7)

External factors

Medical students feel pressured to use shadowing as competitive leverage due to the unclear nature of the residency match process. Most participants remarked that competition is ingrained in the medical culture and that the residency match process exacerbates pressure to stand out.

The way that people try to control their competitiveness in the [residency match] process and control their chances of career success is through things like shadowing. (#5)

Participants articulated unclear or hidden criteria for matching to each specialty or school as exacerbated by conflicting messages from peers, clerks, residents, career panels and faculty, including the value to attribute to shadowing. This uncertainty about how to be competitive applicants provokes anxiety.

The fact that they don't explicitly tell us more detailed information about shadowing and how it directly affects people later on down the road [puts] a lot of undue stress on students. It leads to people trying to get more shadowing [they don't] necessarily need and puts shadowing on a pedestal [...] it lets a lot of misinformation guide students' decisions. (#11)

Some participants recommended that schools be more transparent about residency committees' valuing of a candidate's shadowing hours to alleviate such anxiety.

Many viewed shadowing as a tangible differentiator for matching, and some also saw shadowing as a bridge to build a network for a competitive advantage. All

participants noted that shadowing opened doors to research opportunities, personal mentorship, electives advice and reference letters, all of which are perceived to be crucial for residency matching.

The actual experience itself became less important than the connotations of shadowing. [...] there is this hidden motivation to shadow for networking opportunities or for personal connections. (#4)

Lastly, participants described how interest in a competitive specialty fostered pressure for early and continued shadowing. This pressure also seemed heightened for participants in three-year programs as they had less time before the residency match.

I certainly feel the pressure more in a three-year program; you need to make up your mind faster...there's only so much time we have to shadow. (#7)

Medical students described how faculty perpetuated confusion around the intended value of shadowing through mixed messaging conveyed in policy, process, and guidance. Students' perception of the value, purpose and necessity of shadowing appeared to be influenced by the school's formal communication about the role of shadowing and the perceived support from the school to shadow. Many students suggested that explicit messaging focused exclusively on the benefits of shadowing.

It's favoured for students to go shadow, and I think faculty kind of pushes us to. But they keep reinforcing the point that they're not mandatory. (#15)

Participants at some schools remarked that the mandatory nature of shadowing inherently assigned value, but lack of clarity regarding implications of exceeding the minimum requirement left students guessing how much was necessary and assuming 'more is better.'

By simply making it a requirement, there's some pressure attached to it [...] it was difficult for me to avoid the temptation of trying to figure out, like, 'okay, if I just hit the number on the dot, does that mean I'm just performing adequately as a medical student, or do I have to exceed this?' (#1)

Participants attending schools with no mandatory requirements seemed to attribute less value to it. In these instances, it was perceived to be an optional component. Some participants mentioned examples of informal advice from preceptors, career panels and career planning

advisors encouraging students to shadow to enhance chances of residency matching. This messaging was said to contradict the higher-level Faculty messaging from curriculum directors to shadow in moderation.

The protected time afforded at some schools for things such as personal wellness, extracurriculars and shadowing left students wondering how much of this time they should allocate of this protected time for shadowing.

Whenever we had those days off, shadowing would definitely be listed as one of the things you can do. And it seemed, again, as if Faculty built in those days for them to say, 'Hey, we gave you time to career-explore, so if you didn't, that's on you. (#1)

Participants from schools with formally scheduled shadowing time noted that this clarified the expected role and reduced administrative burden on students by accommodating shifts within their class schedules. Schools' arranging of shadowing opportunities was met by mixed reactions; some participants noted they appreciated the equity this promoted, while others described frustration with a first-come-first-served process that appeared to breed competition.

We're not allowed to contact preceptors directly. [...] sometimes [opportunities are] first-come-first-served. That puts a lot of pressure on us to constantly check our emails and just be very competitive with each other in order to get these very limited spots...it made me want to shadow a lot less. (#11)

Some participants disclosed reacting to this discordance by arranging their opportunities in defiance of the rule and skipping class to shadow despite the consequences.

Social comparison from peer discourse fuels the culture of competitiveness in shadowing. All participants implied that social comparison (regarding progress in career exploration, hours spent shadowing, and the extent of involvement during shadowing) relative to peers strengthened feelings of inadequacy and compelled students to match or attempt to outdo peers in shadowing for fear of falling behind.

As with a lot of aspects of medical school, shadowing is just one area where it becomes an Olympics...it was very hard not to interpret conversations with the lens of, 'oh my god, someone is doing X number of hours a week, what am I doing'. (#1)

Many highlighted that hearing others' stories induced panic and feelings of jealousy or insecurity, culminating in a sense of anxiety that led them to arrange additional shadowing, thus perpetuating a competitive culture. Although some interviewees noted benefits from hearing about their fellow students' experiences (e.g., vicarious learning), others avoided social comparison by not sharing their own shadowing experiences.

Many participants mentioned a performative aspect of sharing shadowing stories through social media. They emphasized competitive undertones in these posts, with students tending to share only positive, exciting experiences and exaggerating their involvement.

Someone told me literally like the third day of medical school that they had delivered a baby...the damage is that, to students who feel like less confident, they're like, 'why haven't I done that yet? Am I doing something wrong?' It makes them feel insecure. (#10)

Discussion

We explored medical students' experiences of shadowing as one aspect of the learning environment through a series of interviews. Our findings illustrate how shadowing may "overshadow" student wellness by contributing to students' feelings of uncertainty, anxiety, and stress. Participants described the detrimental effects of social comparison (as an unintended consequence of shadowing), in which students evaluated their own shadowing experiences by comparing them to their peers'. This led to anxiety for many participants. High-distress and high-achieving medical students tend to compare themselves to their peers more frequently, leading to a feedback loop of stress due to social comparison.^{14,22,23} Additionally, "knowing people" and having connections (or lack thereof) contributed to inequity in access to shadowing opportunities, which compounded negative feelings. Social capital in medical school enables students to take advantage of resources such as shadowing that are unknown or inaccessible to other students, leading to a competitive edge.²⁴ While medical schools may intend shadowing as an opportunity for career exploration; its purpose has been expanded by some students who overshadow at the expense of other priorities or for unintended reasons. Our participants acknowledged that shadowing "off-label" or for unintended purposes is unnecessary. However, given the phenomenon of social comparison, they still felt internal pressure from peers,

faculty, and the medical education system to do so at the expense of academic and personal responsibilities.

The current perception of the value of shadowing is largely positive.^{1,2} However, our findings demonstrate that associated tensions can compromise the learning experience that shadowing is perceived to provide. Studies show that early clinical experience enables students to find role models, adapt to professional settings, and contextualize classroom learning.^{25,26} Our study highlighted that while students perceive value from shadowing from a learning perspective, its execution is disparate and not without challenges. The mixed messaging and variability in implementation suggest that there is work to be done for schools to successfully and equitably integrate shadowing into the curriculum. Setting a clear purpose for shadowing enables students to have realistic expectations and for preceptors to tailor their teaching approaches.²⁷

As with other aspects of medical education, without a formalized approach to shadowing, the intent and execution of shadowing may be hindered by the informal and hidden curricula.⁵ Few studies have reported on the experiences of medical students participating in poor quality shadowing activities that are lacking meaningful learning.^{13,27} Participants raised suggestions for redefining shadowing into a supportive learning environment. An unlevel playing field (e.g., three- vs. four-year programs; having previous connections), stress due to unclear learner roles, and inadequate transparency (e.g., residency match process, the necessity of shadowing) all require attention to preserve the value of shadowing while improving the learner experience and learner environment. Additional research could consider how medical training reproduces social inequalities and how this impacts student wellness. The interaction of shadowing and student wellness with medical culture is a topic for continued future study.

Our study raises a variety of issues that medical schools can attend to. Importantly, consistent messaging to students about the value and necessity of shadowing is needed. This includes a more balanced representation of the value of shadowing from programs and their faculty, thus painting a more realistic expectation for students. With such expectation management, messaging also needs to highlight alternatives to reduce anxiety around career uncertainty (e.g., physician chats, career counselling, self-reflection for professional identity development). If shadowing is to have a prominent position in student learning, then it needs to be part of the formal curriculum with attention to the potential negative impact of the

informal curriculum. A more formalized approach to shadowing will help alleviate students' anxiety around expectations to shadow and reduce inequitable access. There is also a need to modify the learning environment to allow for optimal shadowing implementation and address the social comparison issue. The learning environment around shadowing may be optimized by pedagogical training for preceptors, consistency in messaging and provision of experiences from leadership, and continuous evaluation and improvement.¹¹ To create a more supportive learning environment, it is pivotal to address competitive influences acting on all learning environment elements, including mentee, mentor, institution, and curriculum.²⁸ The rampant social comparison within shadowing culture is borne out of the productivity-focused and reward-oriented culture of medicine.^{29,30} Supportive leadership and institutional changes will result in a shift in student culture with healthier views of shadowing.^{31,32} Changing policies and practices of elements within medical school curricula such as shadowing can shift the perception of medicine towards a more humanistic and collaborative culture.³³

Conclusions

This is the first study to critically examine factors related to and consequences of medical student shadowing. We reported findings from a diverse sample of students representing schools across Canada and initial specialty interests. The analysis was completed with a team experienced in qualitative research and education scholarship. While our study focused on Canadian medical students, we anticipate that our results will have relevance for other jurisdictions. Further research in this area will provide insight into balancing the positive intended values of shadowing with unintended consequences and contribute to a positive learning environment that prioritizes learner wellness and aligns with student goals.

Participants' rich descriptions of their experiences demonstrate the inherent issues associated with shadowing. Given internal aspirations to be the best and "stand out" amongst their peers, accompanied by the uncertainty and anxiety associated with external processes and messaging, medical students are challenged to develop a healthy professional identity. There is work to be done in the learning environment. Restrictions on in-person shadowing imposed by COVID-19 provide a timely opportunity to reconsider the role and messaging in medical school curricula on the value of shadowing,

perhaps serving as a wakeup call to realign faculty curriculum design with student interpretation and behaviour.³⁴

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Appendices

Appendix A. Representative quotes

Theme and Paragraph Number	Quotes
<p><i>Medical students aspire to be the best, and shadow to demonstrate drive and excellence</i></p> <p>Paragraph 1</p>	<p>"Think of it like 'well, I'm shadowing so you should be shadowing', and putting that pressure on someone else. And I think, yeah, I'm just so tired of like, the constant pressure to be the best." (#7)</p> <p>"It may come back to the nature of medical students always wanting to be ahead and wanting to be prepared and not wanting to get things wrong. So, it may just be stemming from people's anxiety of wanting to perform well and look good and make a good impression." (#12)</p> <p>"Ever since I've wanted to get into medicine, I've always had this sense of you need to do more and you need to be better. I think we're all like that. [...] My mentality is kind of like, if you don't do the work, someone else is doing it." (#13)</p>
<p><i>Medical students aspire to be the best, and shadow to demonstrate drive and excellence</i></p> <p>Paragraph 2</p>	<p>"It pushed me, I think, to adopt unhealthy study habits. So, for example, cramming for exams, and doing things as last minute as I could get away with just because I was trying to use our [unscheduled time] off to do productive things like shadowing. And so, I think that it contributed to a little bit of anxiety at the beginning of the year in terms of academics. [...] there were still definitely times where I felt bad about canceling plans with friends, just because I just heard back from the shadowing experience, and there were times where I felt kind of the burden of prioritizing myself over seeing my friends in an emotional way. So, it definitely, I think it came up and the emotional burden of prioritizing shadowing came up, but it wasn't as troubling to me as prioritizing shadowing over academics or over other mandatory experiences." (#4)</p> <p>"I did an overnight OB shift [...] And that was valuable too. But it did mess up my sleep schedule. And I was really tired the next day. I think that overall, like shadowing, those two weeks was a bit draining for me." (#5)</p> <p>"I just remember, there was one time where I was shadowing, I don't remember exactly what subspecialty it is, that is enough to probably tell you a lot about where this burnout comes from... And I was thinking of all of the other things I could have been doing my time. So, I remember we had a bellringer the following week, and I was a little bit nervous about that. Because it was one of our first ones. And I just was standing there and like realizing that I could have spent that time studying. And I could have spent that time doing other things that I probably would have gotten more benefit from. And having that realization while still being in a shadowing environment, I think... created the sense of like meaninglessness that I don't think I would have wanted out of any shadowing experience." (#4)</p> <p>"I was shadowing definitely, I think, every week, or like once a week. And then some days, those were like afternoons or mornings, they had free, early mornings, or some days, those were like weekends. And so that was definitely draining." (#15)</p> <p>"Sometimes it's hard to coordinate observerships, especially if you want to get like to a specific OR with a specific preceptor. So sometimes people will just like, skip class time to go do those observerships." (#10)</p>
<p><i>Medical students aspire to be the best, and shadow to demonstrate drive and excellence</i></p> <p>Paragraph 3</p>	<p>"Instead of people vying for the best grades, now, people were vying for the best clinical experiences and the best extracurriculars and the best connections to doctors. And so, I feel like in medical school, since everything is pass-fail. There's no real way to make yourself stand out with your grades. I think that the way that people try to control their competitiveness and the [residency matching] process and control their chances of career success is through things like shadowing." (#5)</p> <p>"I think there's an association of doing more of anything in medicine [...] that includes shadowing, it portrays yourself as the more keen student and an active proactive learner." (#9)</p>
<p><i>Medical students aspire to be the best, and shadow to demonstrate drive and excellence</i></p> <p>Paragraph 4</p>	<p>"We all have different schedules in life, I think some of us have family commitments, home commitments, etc.... And like, I think that's just like, it's not a med student period, that's just like life, right? Like, some of us have more capacity to do things extra and some of us don't." (#3)</p> <p>"If you have any kind of personal connection to a specialty, it's always easier. there are students who [have] these awesome personal connections and privilege [...] I think that does create a kind of unfair, not unfair, but unequal access to shadowing for some students." (#7)</p> <p>"I know somebody who walked to the clinic...that was like, a 45-minute walk one way, and then back. And that was because of financial issues like, [they] weren't able to afford like Uber or something all the time. So that's a lot of extra added time commitment, like an hour and a half." (#9)</p>

<p><i>Medical students shadow for career exploration</i></p> <p>Paragraph 1</p>	<p>"The reality is that for, let's say, more competitive specialities, you need to essentially commit fairly quickly and shadowing is that way for you to be able to quickly rule in or rule out things ... It's simply a way of getting a better understanding of what this career is." (#2)</p> <p>"The rigors of clerkship, it is so demanding, I would say that I didn't want to show up to my first rotations still not having an idea of what I wanted. And I think I would have had less pressure if I was more confident in whether I wanted surgery or medicine." (#3)</p> <p>"Your horizons are so broad, and you can go anywhere from neurosurgery to psychiatry, and there's so many paths you can take. So, for me, the biggest thing is just trying to cross things off my list. So, figuring out what I don't want to do, and then trying to find a little niche and figure out what my interests are. And how can I build on those interests. So, for me, the biggest reason that I started shadowing ...[was] to figure out what I don't want to do in terms of specialty." (#13)</p>
<p><i>Medical students shadow for career exploration</i></p> <p>Paragraph 2</p>	<p>"I think the whole point of it is just to have a good understanding of what clinics are, what surgeries are like, what a day in the life of a doctor really is and how it actually looks. So, I think it's more but those aspects and, and seeing whether or not you sort of like the environment of a certain specialty." (#9)</p> <p>"It kind of gives you a snapshot of the day in the life of that specialty, and what they do. And you get to talk with attendings and residents and meet them to lifestyles like, and just, I guess, find your people." (#15)</p> <p>"Shadowing is just for us med students to alleviate our own anxieties of not knowing where we're going. [...] in first year, when you don't have something to look towards, work towards, people get very, very stressed because they're not used to coping with uncertainty. And I think that is why shadowing is a great way to mitigate that." (#3)</p> <p>"I think there's a lot more pressure to shadow and to just get exposure early on. Like, there's almost this kind of myth or this understanding that maybe people should know what they want to do, or at least have their top two or three picks, very early on in first year...So, I think there's a lot more pressure and I think shadowing is like, considered one of the best ways to get exposure to a career." (#15)</p>
<p><i>Medical students shadow for career exploration</i></p> <p>Paragraph 3</p>	<p>"One of the negative experiences I had was I found that some of the people were really mean, and they don't really want you to be there ...I kind of left that day being like, I don't really want to do Gen Surg like I feel like everyone's really mean. And I think that impression almost changes over time as we get more exposure." (#8)</p>
<p><i>Medical students perceive shadowing as a learning opportunity for early clinical exposure and career preparedness</i></p> <p>Paragraph 1</p>	<p>"As much as the faculty has lectures on soft skills, these aren't skills that you can learn in the classroom, they're skills that you build through experience. And that's what shadowing does." (#9)</p> <p>"You also get the experience that can't be taught just like knowing how to navigate the hospital, knowing the customs and norms and cultures of the unit and like how to interact with different healthcare professionals and that kind of thing." (#12)</p> <p>"I think probably the most valuable piece of shadowing will be to learn how to be comfortable with patients... when I had my first interview, like history, I got pretty nervous, honestly. And there's a lot of questions that I should have asked, but I didn't because I got a little nervous. And so, I think that's, that's my biggest thing for me is just being comfortable asking questions and being comfortable with the fact that like, this is what you need to learn to do. And this is really important, because if you don't, then you may miss something, and that patient could get harmed." (#13)</p> <p>"They're like, good learning experiences and adjuncts to what you're learning, but I think we put more weight into them as students than what they're actually intended for. And we stress ourselves out over them when we're really going to have those experiences once we get the clerkship anyways, so it's not a race to who gets to do what first." (#10)</p>
<p><i>Medical students perceive shadowing as a learning opportunity for early clinical exposure and career preparedness</i></p> <p>Paragraph 2</p>	<p>"Honestly, for me, what I loved about shadowing last year was being able to break up the monotony of just having lectures in school, of having the opportunity to say, you know what, one day a week I'm going to be spending, actually applying what I'm learning." (#8)</p> <p>"Everything kind of feels really boring and hopeless, you're not doing anything. And then when you get in the hospital, and you know, they start talking about things that you read about, you're like, oh, I know what that is. It feels good to come out. You're like, oh, I actually like I'm doing something with my life right now. And then also, like, you know, if, if you knew, which is also kind of superficial, too, but like, you get pimped, they asked you a question. And you knew the answer. Miraculously, you feel like Superman, because you're like, oh, I know everything now. Or you got to do something, you have to learn something, I think that makes you feel really good." (#10)</p> <p>"There's so much we have to learn in pre-clinical years, and so many lectures, and so many so much like, just information being thrown at you. And when you don't see the clinical significance of it. And when you don't see it in real life, and why it matters. It's so easy to want to ignore that information. You're like, why I have to learn this, I don't care about this. And you will burn out eventually...So, I think in that sense, it's valuable because it helps you put things into perspective and keeps that you know, excitement and joy that we come into medical school with alive." (#14)</p>

<p><i>Medical students perceive shadowing as a learning opportunity for early clinical exposure and career preparedness</i></p> <p>Paragraph 3</p>	<p>"I think it's just an untapped part of the curriculum that we just haven't progressed into yet. So it's kind of like tricky to say, because I feel like someone who hadn't done any observerships at all, they're still going to get that knowledge once they get the clerkship, it's just a later time and they kind of have to start from like baseline, as opposed to people who've been doing observerships, maybe have a little bit of a leg up, they've already figured out a couple things." (#10)</p> <p>"Because [our school] has a more condensed program, the way that our electives are structured...it's a lot more challenging for us to be prepared later on as a good clerk on elective. So, we're really pressured to get clinical experience earlier, because our electives are earlier and not after a core. So, if we can get used to that whole hospital environment and be a good clerk before we start clerkship, then we'll have an advantage compared to other, our classmates." (#11)</p> <p>"I don't want to step into clerkship knowing absolutely nothing. And like...slowing my supervisors down. So, I think that comes with the pressure of just not being a prepared student." (#13)</p>
<p><i>Medical students use shadowing to reaffirm and redefine their professional identity</i></p> <p>Paragraph 1</p>	<p>"I think just personally, it's been awesome, just on my own kind of career exploration journey. And, you know, for myself of just figuring out: what do I value? What do I value in my practice too, like what kind of practitioner do I want to be? And what are some practical ways to be that you know, to show compassion or to be, you know, patient centered, whatever those things are, just when you actually get to see that in real life or the opposite of it, it really helps you solidify that so?" (#7)</p> <p>"I think shadowing opportunities really get me into a different mindset of thinking from the other perspective. And certain cases will just really stick with me. Like, like the cases of where I was in the room of Breaking Bad news when someone's mother was going to die or something like that. Like, those cases stick with me. Because it's also so early on, where you don't have a lot of experiences. And so, like they, they really stick out." (#9)</p>
<p><i>Medical students use shadowing to reaffirm and redefine their professional identity</i></p> <p>Paragraph 2</p>	<p>"Like if I was feeling stressed out about something, I could go and shadow and I would then be able to – It almost feels like you're a part of the circle of care. You really aren't, because you're shadowing, so you can't really do too much, but in a way you see the patients, you see what the physicians are doing and you walk in the wards, for example, with the staff. It feels like it's – I don't know, it's like a preview of what's to come. So, in that way I found it just a place I could kind of escape to when I felt like my stress levels got too high. It reminds you why you're doing the things that you're doing and why you're pursuing medicine." (#2)</p> <p>"And I think that I had a lot of opportunities to do things I never would have had the opportunity to do like, previously in my life, like shadowing OB, I got to help deliver. Well, I didn't deliver the baby, but I helped pull the placenta out during labor and delivery. And that was one of the coolest things that I've ever done. Yeah, so I think in that moment, there's almost a sort of adrenaline rush, and you're just learning and trying to absorb as much as you can." (#5)</p> <p>"I think it's still really valuable, especially for your pre-clinical years where you're getting so little clinical exposure anyways, it's like, it reminds you of why you're in medicine and it like gives you a little bit of excitement, you know, like, oh, I'm excited to go do this shadowing shift and like, see what these I don't know anaesthesia drugs do or how intubation is done." (#14)</p>
<p><i>Medical students use shadowing to reaffirm and redefine their professional identity</i></p> <p>Paragraph 3</p>	<p>"So, yeah, I think I've had like that kind of experience a couple of those experiences where I just, you know, you're kind of stuck in this weird place of, okay, I'm just here to be an observer. I'm not here as an actual medical practitioner. So, I can't really do anything, but I'm uncomfortable with what I'm witnessing." (#7)</p> <p>"You know, and there's things that I would say, or whatever, like, I just, I totally knew that. But you know, as this medical student, I just felt like, okay, I can't, because I'm supposed to be under this guy's supervision, like, I'm not practicing under my own registered nursing license. I'm under this person's, you know, I'm under his supervision. And, you know, I also just really don't want to look like that student who just doesn't know where their boundaries are. And his perception of me is that I'm yeah, like two months into medical school, and what do I know, about communicating with a patient? So, I think in that situation, I just how did I make the decision of what I did, I think I just, I don't know, I think I just felt like I had really no choice. Like, I just had to just shadow him, like, I had to stick to his side, I can't go off on my own, when I'm shadowing, I need to just, you know, be his little shadow." (#7)</p> <p>"I guess one thing that I have been concerned about is not being so inexperienced, or like a new medical student, and being in the clinical environment where you could potentially make mistakes and harm patients... it's still like a concern that I have sometimes especially in higher risk settings, or like in the or if you're not comfortable doing things and you're not comfortable, or you don't know how to tell your preceptor you're not comfortable doing things." (#11)</p>
<p><i>Medical students use shadowing to reaffirm and redefine their professional identity</i></p> <p>Paragraph 4</p>	<p>"Ironically, I think a lot of people who don't gun in their academic life end up gunning, like through shadowing, and through extracurriculars, and through research. And that's because I think within medicine and within pre-med culture, students just need something to flex about to make themselves stand out from the crowd." (#5)</p>

	<p>"The selection process of who gets into medical school and that type of personality you need to have to get here. It's really hard to get into medical school, unless you're a perfectionist. And feel like you need to be the best and have a bit of competitive edge to you. And how do you turn that off? Once you get into medical school? It's hard." (#7)</p> <p>"I think it is so ingrained in medical students' personality; I think that's how I like I think that's how people get to medical school is just being anxious of performing well...people want to be ahead." (#12)</p> <p>"It's also simply a numbers game. Like if I look at how many residents they accept and it's very few, I kind of implicitly know it's going to be a competition." (#2)</p>
<p><i>Medical students feel pressured to use shadowing as competitive leverage due to the unclear nature of the residency match process</i></p> <p>Paragraph 2</p>	<p>"This whole aspect of having to give your resume and that's just very intimidating, I think because I don't know what they want to see on it." (#6)</p> <p>"A lot of that stress in the beginning of first, like, in first year was about like, not understanding what [CaRMS] was, and therefore thinking it was this disastrous process...like the stresses that I had towards shadowing. I just didn't know if it was something we needed to do, should be doing, if it was valuable, or a waste of my time." (#3)</p>
<p><i>Medical students feel pressured to use shadowing as competitive leverage due to the unclear nature of the residency match process</i></p> <p>Paragraph 3</p>	<p>"One of the reasons I think people want to shadow so much is because they have so much pent-up anxiety over being a good candidate for their residency. And we don't get too much information in preclerkship at all about what CaRMS is looking for. I think that we get some conflicting messages from different sources. So, when people don't know what they have to do in order to match, they're definitely going to kind of try to, make sure that they're doing everything that they should be, i.e., shadowing, and getting connections. I think that at the end of the day, it boils down to worrying about CaRMS and worrying about if your resume is going to be good enough." (#6)</p> <p>"You can't expect to match to something niche in CaRMS if you never showed up once to the hospital, you've never done any research in the area, no one really knows who you are. Because how can anyone vouch for you, right? So, shadowing is the way, in preclerkship or before you manage to get research, you kind of show your interest...when it comes to matching for the residency position it becomes that much easier when people know who you are, know you're a trustworthy person." (#2)</p> <p>"You'll intentionally try to book the observership with like the same person... So maybe, if you know, I end up on a rotation with them, they already know who I am, they already know what I can do. And that bodes well for reference letters." (#10)</p>
<p><i>Medical students feel pressured to use shadowing as competitive leverage due to the unclear nature of the residency match process</i></p> <p>Paragraph 4</p>	<p>"If I was interested in a less competitive specialty, I think that I would pursue shadowing more so for its own sake, and I would pursue shadowing in more diverse fields." (#4)</p> <p>"For somebody who wants to go into, like a really competitive specialty [,] I think shadowing does actually play, could play a very important role in figuring out what you want earlier on. So, you can like spend the next three years sort of catering your application more towards it." (#9)</p>
<p><i>Medical students described how faculty perpetuated confusion around the intended value of shadowing through mixed messaging conveyed in policy, process, and guidance</i></p> <p>Paragraph 2</p>	<p>"By simply making it a requirement, there is some pressure attached to it, right?...whether it be shadowing or another activity, whenever it's presented to you as something that is required, but also to some degree optional... I think it was difficult for me, at least, to avoid the temptation of trying to figure out, like, okay, if I just hit the number on the dot, does that mean I'm just performing adequately as a medical student who is curious about specialties, or do I have to exceed this?" (#1)</p> <p>"No one really is told what to do, or how many hours of shadowing do or what is a good amount. And so, everyone just thinks that the more you do, the better." (#11)</p>
<p><i>Medical students described how faculty perpetuated confusion around the intended value of shadowing through mixed messaging conveyed in policy, process, and guidance</i></p> <p>Paragraph 3</p>	<p>"We're a three-year program, it's really kind of up to us to arrange shadowing on our own time...this past year, we had a newly implemented career exploration days kind of program where the school would organize, I think, for half days for us to shadow and then we were able to rank our specialties. And that was new, because I think previous students had given the feedback that there wasn't enough formal shadowing in our program...it was built into our curriculum. So, I think that protected time really helped." (#15)</p>
<p><i>Medical students described how faculty perpetuated confusion around the intended value of shadowing through mixed messaging conveyed in policy, process, and guidance</i></p> <p>Paragraph 4</p>	<p>"I think that shadowing is one of the most important things that you can do in pre clerkship. And because our opportunities are so limited, and we have so many barriers, like white tape...[our class] didn't feel like [admin] were on our side, and were just trying to promote their own interest. And that's been the case for most of our shadowing experiences." (#11)</p> <p>"I generally found that I would learn more actual clinical experience. So, I didn't go to that lecture. And it was fine. I learned a lot from the clinical experience, and I definitely don't regret it, I've done it multiple times...I do know people who have gotten professionalism meetings...[which] are apparently very intense...I think it does discourage people from doing that. For me, I feel like the risk is worth the benefit that I would get." (#11)</p>

	<p>"Most people would probably be okay to, like, learn lecture material on their own time and like, review the slides after and not watch, not be there present for a lecture if it means that they can go and shadow. Because as I said, it's a more rare opportunity that takes a lot of work out of us to arrange. I think we give shadowing more value because of that reason." (#14)</p> <p>"Preclerkship education in class is de-emphasized a lot, both by my peers and also by faculty....And so that sort of conflict, I think is what leads me to forcing myself sometimes to de-prioritize school, even when it kind of makes me anxious, so that I can get more clinical experience and more extracurriculars that I can put on my CV. So, I think that's why I sometimes choose to forego school for shadowing." (#15)</p>
<p><i>Medical students described how faculty perpetuated confusion around the intended value of shadowing through mixed messaging conveyed in policy, process, and guidance</i></p> <p>Paragraph 5</p>	<p>"There is definitely, I think, a subconscious drive in the hidden curriculum for students to shadow for purposes that aren't just to enrich their educational experience...the identity of the institution itself pushes students to shadow for reasons that further up their academic career....people were kind of just using shadowing as a proxy for how driven they were. And that's not kind of the intention of shadowing at all under [our school's] branding. So, I think that that's where the hidden curriculum really came through." (#4)</p> <p>"[Our school] was founded with the idea to create more family physicians in [geographic area]..they were going through accreditation this past year...I think they were told to do a better job at allowing students to have more opportunities to explore more careers other than like rural generalism, or family medicine." (#12)</p>
<p><i>Social comparison from peer discourse fuels the culture of competitiveness in shadowing</i></p> <p>Paragraph 1</p>	<p>"I have heard multiple times from my peers that they feel pressured to shadow more because of hearing about other people's experiences. And so that's something I've personally felt...Everyone's shadowing so much. I feel like I should be doing more. And I know that people have reached out to doctors to shadow just because their friends have." (#5)</p> <p>"It becomes like, this tally, especially someone's observerships started, was like a tally of who had done the most observerships, and who's about to do the most...So, you do what you can, but then like, if you hear someone's like, going every week to Emerg department or to surgery with this person, and they got to do this, and that, and this and that. I think it's like, I think it gets to people, it definitely got to me before one day, oh, should I be doing more observerships?...that's stressful." (#10)</p>
<p><i>Social comparison from peer discourse fuels the culture of competitiveness in shadowing</i></p> <p>Paragraph 2</p>	<p>The nature of [social media] is that people only post good things about themselves or their experiences. Nobody, in general, nobody's going to post about like, I don't know, their negative experiences with shadowing, for example. And they would tend to over exaggerate their contributions to the work or over exaggerate certain things to show the world that they are competent, that they are medical students who are smart, and going to be doctors and all that." (#9)</p>
<p><i>Social comparison from peer discourse fuels the culture of competitiveness in shadowing</i></p> <p>Paragraph 3</p>	<p>"I was on the extreme at the beginning, where maybe it was doing more than my peers are doing. And I felt like I needed to maybe hold back on sharing some of these things...knowing that people were already talking about how, what they felt bad that other people around them were shadowing...you didn't really want to add to that." (#8)</p> <p>"What I've noticed is the stress in others when they hear that I got to find someone to shadow...they realize like, oh, crap, like, I still don't have anything...I felt that same stress when one of my friends found a shadowing experience like two months ago...that jealousy kind of builds up, right?...I don't look at people anymore and look at them and say to myself, I need to be better than you...but it creeps up sometimes." (#13)</p>
<p><i>Social comparison from peer discourse fuels the culture of competitiveness in shadowing</i></p> <p>Paragraph 4</p>	<p>"Someone will bring out like "Oh, geez. X person is doing this. And I've just been hanging out recently. I haven't done any of that. Should I start? Do I need to -?" Then it's the classic you open up the laptop, you start searching up different physicians and you get into this panic mode." (#2)</p> <p>"I do think that it puts a strain on relationships, for sure. And I think I would be the kind of person that is just like, I just, I can't have that extra stress in my life of that constant comparison, which sucks. Like that's such a bad strain put on friendships." (#7)</p>

Appendix B. Interview Guide

Hello, my name is (interviewer). I am interested in hearing your thoughts related to shadowing. If you feel uncomfortable in any way during our conversation you are free to end participation in the research. Before we get started, do you have any questions for me?

Demographics

What is your level of medical training?

What specialty/specialties are you interested in?

1. How do you define shadowing?

Probe

- *What do you think is/should be the role of shadowing?*

2. Tell me about your experience with shadowing.

Probes

- *What are your reasons for engaging in shadowing? What is its purpose?*

- *What has influenced your decisions about shadowing?*

- *What have you done?*

- *How much do you shadow?*

- *How do you find time for shadowing?*

- *How did you arrange your shadowing opportunities?*

- *How do you feel about shadowing?*

3. How has shadowing affected your life?

Probes

- *Ask about the following effects: Academic? Personal? Future career?*

- *How do you balance conflicting responsibilities/demands personally vs professionally?*

- *How have you dealt with negative feelings? Negative impact?*

- *Have you experienced burnout? If so, how has it affected you personally and your life?*

4. What are the benefits of shadowing? What are the disadvantages of shadowing?

Probes

- *How necessary is it? E.g., to secure residency position, for future career opportunities*

- *What would happen if you chose not to do it? What is the impact or potential impact?*

- *How important is career exploration to you at this stage?*

- *Do you feel pressure about the residency/CoRMS match right now?*

- *In what ways have you responded to this?*

- *What, if anything, are you doing to improve your career prospects?*

- *Have your thoughts changed based on the (perceived) competitiveness of the specialty you intend to pursue?*

5. What advantages or disadvantages do some students have over others for engaging in shadowing or seeking out and securing shadowing opportunities?

6. Tell me about the culture of shadowing in medicine - the values, norms, expectations.

Probes

- *What is your sense of how your colleagues/other students think about shadowing?*
- *Do you talk about it with others? Do you like talking about it with your peers?*
- *What are your reactions / your peers' reactions when you hear about others shadowing?*
- *Do you help each other?*
- *How has the culture of shadowing influenced your own experiences with shadowing?*
- *Do you feel pressure to do it?*

7. What is your impression regarding your medical school's position on shadowing?

Probes

- *Is shadowing valued or not?*
- *What is the messaging around how important or necessary shadowing is?*
- *How supportive (or not) is your school? In attitude; in helping arrange opportunities?*

8. What can be done to address the issues of shadowing you mentioned?

Probes

- *Such as the negative aspects of the culture of shadowing?*
- *Such as addressing burnout?*

9. Do you have any other comments you would like to share about the topics we have discussed today?

END OF INTERVIEW.

THANK YOU FOR YOUR PARTICIPATION!