Equity, diversity and inclusion of pediatric clinician–scientists in Canada: a thematic analysis

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Abstract

Background: Underrepresented voices and perspectives are missing from academic and clinical health sciences. We aimed to define the unique opportunities and challenges of pediatric clinician–scientists related to equity, diversity and inclusion; and to identify key components of training needed to support people from equity-seeking groups as emerging and early-career pediatric clinician–scientists to generate diverse health research leaders in knowledge generation, implementation and translation.

Methods: Using a qualitative descriptive approach, we examined the experiences of clinician stakeholders. Semistructured interviews were conducted with pediatric clinician–scientist stakeholders. Thematic analysis was performed.

Results: We interviewed a total of 39 individuals. Our analysis resulted in 4 interrelated themes: the pervasiveness and invisibility of sexism; the invisibility and visibility of racism; proposed individual-level solutions to the sexism and racism; and proposed institutional and system-level changes to address the porous and leaky pipeline. These themes acknowledged that, ultimately, system change is required for addressing equity, diversity and inclusion in clinical and academic training environments.

Interpretation: These findings highlight the importance of addressing systemic biases that limit the inclusion of women and racialized individuals in pediatric clinician–scientist careers. Further research is needed to explore the problem of exclusion, which will, in turn, inform education of pediatric clinician–scientists and inform better ways to promote equity, diversity and inclusivity; these steps are needed to foster systemic change in the cultures that perpetuate exclusivity in both academic and clinical communities.

Diversifying the clinician–scientist workforce is a critical step toward improving care for underserved populations and reducing existing disparities in a variety of health outcomes.[1] The training in both health care and research enables clinician–scientists to be specialists in both biomedical research and translational bench-to-bedside medicine.[2] Clinician–scientist training is nonlinear and cross-disciplinary in manner. Clinician–scientists are essential members of scientific teams addressing grand challenges in health care and bench-to-bedside medicine.[3]

Women and racialized individuals are underrepresented among pediatric clinician–scientists.[4,5] The underrepresentation of women and racialized individuals in pediatric clinician–scientist roles may be due to notable biases against women and racially diverse individuals despite their having credentials comparable to those of their white male counterparts.[6,7] Research demonstrates substantial challenges extending beyond the early career phase, including that women of colour are the least likely to secure research funding;[8,9] that biases affect publishing and the grant evaluation processes;[10] that women and racialized individuals entering the faculty rank are poorly compensated compared with males;[11] and that mentorship and role models may be harder for women to secure than their male counterparts.[12–14]

Our recent scoping review found that research exploring the training and career paths of pediatric clinician–scientists from equity-seeking groups does not currently exist.[15] The individual- and system-level factors that will enhance equity, diversity and inclusion (EDI) among pediatric clinician–scientists are urgently needed to inform the evaluation frameworks and curricular content for pediatric clinician–scientist training programs.[4,16] A lack of understanding of individual and systemic barriers to diversity is a critical gap in published literature and further perpetuates the inequity of women and racialized individuals. It is vital to improve knowledge regarding the factors limiting EDI among pediatric clinician–scientists to improve health outcomes for diverse populations. Race and gender concordance between pediatric clinician–scientists and patients has the potential to improve communication and trust, with higher rates of

patients accessing preventive care and clinician–scientists who are more likely to work in communities of need, thus making their inclusion in public health important.[17–21]

Overall, racialized university professors increased from 17% in 2006 to 21% in 2016. Growth in the proportion of Black university professors increased from 1.8% to 2.0% during this same time frame. Women are becoming better represented among university professors, albeit more so in lower ranks, with women making up 48.5% of assistant professors and 27% of full professors. University professors who are racialized, Indigenous and women are less likely to have full-time positions. Racialized women are the most underrepresented among full-time employees. The wage gap is deepest for racialized women professors, who are earning an average of 68 cents on every dollar earned by their white male counterparts.[22]

The impetus for the current study was the innovation and reconfiguration of the Canadian Child Health Clinician Scientist Program (CCHCSP); identifying current gaps and strengths within the program was deemed a priority for this process. Based on the findings of this main study, there seemed to be a huge gap around EDI for women and ethnic minorities. The research team felt there was a need to write a separate paper focusing on these aspects.

The objective of this study was to explicate the barriers to and facilitators of EDI by exploring the perspectives of a variety of pediatric clinician–scientist stakeholders in child and mental health. The specific aims were to define the unique opportunities and challenges of pediatric clinician–scientists related to EDI, and identify key components of pediatric clinician–scientist training needs to support women and ethnic minorities as emerging and early career pediatric clinician–scientists to generate diverse health research leaders in knowledge generation, implementation and translation.

Methods

Employing a qualitative descriptive approach,[23,24] we analyzed our data using a thematic analysis approach[25–27] and followed the Consolidated Criteria for Reporting Qualitative Research.[28] Guided by an interpretivist paradigm, the research team sought to explore clinician–scientists' perspectives of the educational, institutional and relational factors that influence their experiences as clinician–scientists to pursue and remain in this field.[29]

Participant recruitment

We used purposive and snowball sampling procedures to recruit key pediatric clinician–scientist stakeholders, including early-career trainees, decision-makers, funders, leaders and department chairs in university settings and the health care system. Recruitment material was disseminated via email through pediatric clinician–scientist training programs in Canada, the United States and the Netherlands. We included countries with pediatric clinician–scientist programs "identical" to the CCHCSP to make sure the identified issues were not only related to Canada but universal.

Although the distribution of interviews was heavily skewed to Canadian participants (as the main aim was to understand the Canadian landscape), the US and Dutch participants (who are familiar with the CCHCSP) were used to identify global issues and differentiate these potential local Canadian issues. A sampling frame was created to ensure maximum variation in our sample and to recruit participants from different geographical regions in Canada, and to recruit trainees and participants with career trajectories from early career to senior leadership and from diverse disciplines and settings.

Inclusion criteria

Individuals were invited to participate if they met the following inclusion criteria: they identified as trainee, early-career, mid-career or senior child health clinician–scientists, or were in administrative and leadership positions, supporting the training and retention of clinician scientists. We also included decision-makers in health care and clinician–scientist training programs in Canada and internationally (US and the Netherlands).

Exclusion criteria

We excluded clinician–scientists working outside of child health or primarily in the adult population.

Data collection

A semistructured interview guide (Appendix 1, available at www.cmajopen.ca/content/10/4/E911/suppl/DC1) was established with input from pediatric clinician–scientist content experts and included open-ended questions about opportunities and challenges in training and in pursuing and sustaining a clinician–scientist role in different academic settings and contexts. Between July and December 2020, we, G.D., K.S.B. and L.P., all white female PhD-prepared researchers with experience in interviewing participants and qualitative analysis, and all trained clinicians (social work, nursing and physical therapy, respectively), individually conducted 45-minute to 1-hour interviews via Zoom, which were recorded and transcribed. Interviews were analyzed as they were conducted, which then informed subsequent interviews until theoretical saturation (i.e., no additional data were being found) occurred.

Analysis

Thematic analysis is a qualitative method used to identify, describe and interpret the meaning and importance of patterns in data[26] and uses 6 phases: familiarization, initial coding, theme development, theme refinement, defining and naming themes, and writing up the themes with a preliminary report.[27] After familiarization, coding and theme development, the core research team (L.P., G.D. and K.S.B.) met to share their preliminary impressions and observations of initial patterns across and within interviews. The research team used memoing and regular meetings to discuss the codes and, through consensus, agreed on the final themes. There were no conflicts or disagreements over the codes and themes established. The themes were further refined and named while simultaneously being written up with supportive quotations from the participant interviews. We followed the step-by-step approach for conducting a trustworthy

thematic analysis outlined by Nowell and colleagues,[30] including memoing decisions about the coding process and the process for establishing themes.

Ethics approval
Research ethics boards at the University of Calgary and University of Alberta approved this study.

Results

We interviewed 39 individuals, including 26 women (66.7%) and 9 (23.1%) racialized participants (Table 1). All 9 participants who identified as racialized met our inclusion criteria for being child health clinician–scientists.

This thematic analysis resulted in 4 interrelated themes: the pervasiveness and invisibility of sexism; the invisibility and visibility of racism; proposed individual-level solutions to the sexism and racism; and proposed institutional and system-level changes to address the porous and leaky pipeline (Table 2).

The pervasiveness and invisibility of sexism
Regardless of gender, all participants commented on the challenges that most female pediatric clinician–scientists experience in their doctoral and postdoctoral training and while obtaining and securing academic and pediatric clinician–scientist positions. The participants in this study viewed and experienced sexism as prevailing because of tensions between their public and private lives, including family responsibilities.

Work–life balance
Numerous examples of sexism were related to pregnancy, scant information on parental leave policies and limited access to pediatric clinician–scientists to discuss the optimal timing of starting a family. Most female participants were reluctant to share experiences of sexism with other pediatric clinician–scientists, career and research mentors, and senior leaders within their organizations and training institutions because of fear of reprisals or their concerns being dismissed. Participants noted that few, if any, female pediatric clinician–scientists talked openly about their children or family life with academic colleagues, contributing to the concealment of wanting to have a child. Some participants felt that gender inequities were trivialized by men and women alike, with jokes about parenting and efforts to achieve work–life balance. As one participant poignantly said, "joking about it doesn't make it okay, or at least it doesn't for me. And I find a lot of our current research investigators still do that where they joke about not spending enough time with their kids" (P2). Perhaps the most insidious problem for women is the perceived expectation that they publish, secure grants and maintain their clinical duties all while caring for their children.

Participants shared "constant tensions" between biological and psychological drives to care for children and meet the demands of a career as a pediatric clinician–scientist. Some of our participants shared that, out of necessity, at various stages in their training and careers they could not take maternity leave. Some women gave up part of their work, slowed down

Table 1: Participant characteristics	
Characteristic	No. (%) of participants n = 39
Sex	
Female	26 (66.7)
Male	13 (33.3)
Racial group	
Black	1 (2.6)
Chinese	3 (7.7)
Latin American	2 (5.1)
South Asian	2 (5.1)
Southeast Asian	1 (2.6)
White	30 (76.9)
Country	
Canada	32 (82.1)
Western, n = 20	
Central, n = 10	
Eastern, n = 1	
Not reported, n = 1	
Netherlands	5 (12.8)
United States	2 (5.1)
Discipline	
Dentistry	1 (2.6)
Dietetics	1 (2.6)
Medicine	19 (48.7)
Emergency, n = 3	
Gastroenterology, n = 1	
Immunology, n = 5	
Nephrology, n = 5	
Psychiatry, n = 2	
General pediatrics, n = 2	
Respirology, n = 1	
Nursing	3 (7.7)
Psychology	4 (10.3)
Rehabilitation	6 (15.4)
Physical therapy, n = 2	
Occupational therapy, n = 3	
Speech language pathology, n = 1	
Social work	2 (5.1)
No clinical discipline	1 (2.6)
Not reported	2 (5.1)
Academic position	30 (76.9)
Academic career stage, n = 30	
Early (< 5 yr)	3 (10.0)
Mid (5–15 yr)	7 (23.3)
Late (> 15 yr)	20 (66.7)
PhD trained	24 (61.5)
Currently engaging in clinical practice	22 (56.4)
Currently in leadership position	18 (46.2)
Currently a research trainee	6 (15.4)
PhD, n = 4	
PDF, n = 2	
Experience with clinician–researcher training programs	27 (69.2)

Note: PDF = postdoctoral fellow.

Table 2 (part 1 of 3): Themes and quotations	
Theme	Representative quotations
The pervasiveness and invisibility of sexism	
	"This research endeavour is so painful, and then you add in all the other layers around sex and gender. It's harder, it's just harder for a woman to become a clinician–scientist. I see it. … they have to work harder, they have to be better, they have to sacrifice more, it's just harder. (P21) ".. doing this type of intensive training, especially for a woman, this might be the time when you would be thinking about starting a family, so there are all the challenges that go along there too, so you understand, you know what the challenges are. I had, I was in the US doing my fellowship, doing my research training, I had both of my kids when I was doing that and it's challenging, it's very challenging cause you're trying to, you know, adjust to all of that, figure all of that out and that's the time when your colleagues would be really generating lots of data as a trainee and even as junior faculty." (P24)
Work–life balance	"I mean, in medicine, in all the health sciences, even with the majority of women there is still this sense of you can have it all, right, you can't — you can have a family, be healthy, and still be a brilliant scientist and produce medicine science, right? So there's a heavy weight on that I think, and yeah, it's the type of pressure and biases that I think will only go away the minute we acknowledge and keep talking about it until it becomes a place where it's acceptable". (P13) "If you are a woman [who wants children], at some point you have to take a break from whatever it is that you are doing. The thing is that any career that is demanding is something that doesn't intuitively open up these opportunities, it's something that you really have to carve out and really work the timing perfectly and it's something that I think you have to realize that you are entitled to, because no one around you will give you the legitimacy of doing it". (P6) "I can't afford to lose those connections by taking a year off [for maternity leave], … it's just our bodies are made for babies unfortunately, so our husbands, they can do lots of the other things like cooking and cleaning maybe, but they're not physically breast feeding, especially in those first few months, the baby is all on you and your body." (P22) "I've been at my institution for 17 years — lots of amazing women being recruited with an interest in being a clinician–scientist but eventually giving up the research piece because, you know, the barriers were too great as they had children, I mean not unlike what I chose to do, right? Something has to go. In my case I gave up the clinical piece, but often people are choosing to give up the research side, and that's a huge loss, after years of training and we need all those brains and ideas at the table." (P23)
Compromises to career and family	"At some point, early in my career I had to recognize, this is all I can do and put boundaries and say, look, I work 8 to 6, Monday to Friday. I'm happy with the success I can achieve within those hours in terms of productivity. I will not let that spill into my weekends or my evenings because I have young children and they need me all day everyday all that they can, they need food, they need entertainment, they need their mother." (P25)
The invisibility and visibility of racism	
	"Is it a welcoming, diverse field? Or, you know, would people of Indigenous [background], would they feel comfortable or not? And our ways of doing science, are we being inclusive enough, or are we very cut to the Western traditional scientific way of thinking? Or if someone with Indigenous ways of knowing wanted to engage in research, would we be 'yeah that's good'?" (P7)
Uneasiness challenging racism and bias	"We don't really talk about culture or race or ethnicity. It's so unclear to me why. It might be its uncomfortable for supervisors to have that conversation, it might be uncomfortable for classmates and peers to have that conversation. I understand that it could be really uncomfortable for some people, but I also think what that ends up doing is just kind of quieting the voices of others." (P20) "I think it doesn't make me feel very comfortable talking in classes for sure, stops me when it comes to issues of diversity depending on who I know is in the classroom. I often will not say anything because I know that there's specific people, I don't really feel safe sharing my experiences with." (P20)
Questioned credibility	"This has happened to me on numerous occasions and continues to happen to me on a daily basis, even at this level, where because of my appearance, my intellect is not appreciated or dismissed right from the beginning until I open my mouth, so that has to stop." (P25) "So that's always a consideration as a minority or especially for someone who's not proficient in the language. Sometimes I second guess myself if I misinterpreted this message so and I say that I would convince myself not to participate in a conversation that I feel like I have not fully understood. So that's more internal, and my experience is that that's not uncommon for ESL [English as a second language] speakers. So, what then translates in a clinical setting or a training program is that because of, you know, communication difficulties, sometimes we come across as not as engaging of a learner or not as collaborators of a team. So that is something, it is more of an awareness, I would say, and I think that translates to cultural differences too." (P13)

Table 2 (part 2 of 3): Themes and quotations	
Theme	Representative quotations
Proposed individual-level solutions to the pervasive problems of sexism and racism	
Identifying mentors with shared experiences	"I think having a female mentor also helps — I only had women supervisors, so I don't know if that would be different for having a male supervisor in terms of — I would think so right, but perhaps it's an awareness — like 'what does it mean to have your children during your graduate studies, during your training, during your early career years?' — I always saw babies and pregnant women in the forum so I know it's a possibility, but perhaps it's a flag to make sure that this is an environment that allows for that, because those are the years that women are having children, right?" (P13) "I don't think there is a single woman of colour in my core clinical faculty, so there is no way I would ever see myself being a part of my own department after I graduate because I've been in my department for about 10 years since my undergrad and I've never seen anyone that I would be able to identify with in that way." (P20)
	"As long as you don't have role models that have you know, 'walked the walk,' as long as you don't, you know there's still not going to be any change." (P11) "I'm very fortunate to have a female supervisor in my school program who has talked to me about [parenting] you know. It's important too. She officially did her internship as a new parent and it was just like, knowing that people can go through that at all stages of having a family, I think, is important. I think there is, I would imagine, unique challenges or demands on one's time. I don't know if taking time away from the field, what does that look like as well? What professor talks about that? Not somebody I've been mentored by. But just the types of questions about publication output if you're on mat leave or things like that, I guess you just don't think about that, or what kind of support is helpful from a partner?" (P19) "EDI [Equity, Diversity and Inclusion], as we start thinking about the kinds of mentors in EDI it's become a much more prominent topic … you know people with colour et cetera, they may choose to have mentors that have some of that lived experience that can help them navigate that portion of their career, that again someone who hasn't had that can't help them with, right? So, I think we need very different mentors and different mentors at different stages in our careers, so I think mentors are really, really important." (P17) "I think there is lots of structural and systemic reasons why the majority of our trainees are white and then that re-perpetuates itself at the post-doc level and it re-perpetuates itself at the faculty level. We have, I honestly can't think of a clinician–scientist who is in a leadership position who is a member of black, Indigenous or people of colour community, at least in our department." (PC9)
Proposed institutional and system-level solutions to address the pervasive problems of sexism, racism and the leaky pipeline	
	"I am known for being highly supportive of female graduate students. All my graduate students, they all say the same thing, 'we want to work with you because you are very pro female academics, we can do this,' and I think because I had children, I am a better researcher. I think that my work is viewed in a different light in the public because people know that I am a mother and I think it is only helping the academy, it's not a hindrance." (P3)
Individual efforts to create safe spaces and meaningful conversations	"I think I've incorporated this as part of my lab culture, like I think we need to have this type of training because it's the real reality and we end up grouping all sorts of different trainees with the same realities right, women, and having their kids during their training." (P13) "I have been having conversations where a lot of people were uncomfortable, there was a lot of eye-rolling, and I felt very much defeated coming out of those conversations, but those same people who were somewhat defensive are now putting together grand rounds about EDI and inclusivity and anti-racism and medicine. And so, I'm thinking okay maybe they had a hard time digesting when I put it out, but it did stay with them and influenced their activities and their planning. So, sometimes you don't get the positive feedback as you do this work, but you need to keep on going." (P10) "I do think that cultural change is critical and there's little pieces that we don't even realize that are impacting certain populations more than others. Certain ways we think, certain ways we act, certain conclusions we come to that it's not a short-term fix, it has to be consistent." (P4) "Now we spent the summer doing journal club on anti-racism, and we are implementing an extra set. So, we use the usual checklist for our critical appraisal of articles, but now we also add an extra set which there is no checklist, so that might be an area we can actually innovate here is the critical appraisal checklist — none of them have anything about race, now we're adding critical race theory to the checklist, so when we review any articles on any topic we will spend some dedicated time to look at the race question and how the research was designed to include or not include elements of race and how racism may play in the research." (P1) "Safe and comfort are not the same thing and there's no way that if you're really engaged in any of this work and you really want to make change that you cannot feel uncomfortable — you have to feel uncomfortable and that's not the same as safe. And so, when we talk about safe spaces, I had this conversation with a department chair last week who really wanted to make sure we were creating these safe spaces for people to challenge, so we went and we talked about this and it's not really about safe spaces, it's about brave spaces." (P24)

Table 2 (part 3 of 3): Themes and quotations	
Theme	Representative quotations
Strategies to address the leaky pipeline	"A lack of diverse mentors makes it so that individuals who do enter a pediatric training pathway don't see, you know, physician scientists as something that is possible for them to achieve because they don't see mentors that look like them. Again, they don't have mentors who necessarily see all of the biases and hurdles they are facing, that they might not have faced in their pursuit of a clinician–scientist career." (P4) "I do think that sometimes it can feel like too much and why would you want to put yourself in an environment where it's already hard. Grad school's already really difficult and to have an added stress that maybe others aren't experiencing might not make it work." (P20) "And I think women, I think are a special issue, you know trying to have a family at the same time that you're in graduate school, this is really tough, really tough, so I think we lose women as well, and I think that's a real pity and a problem, so we need to sort of fix that leaky pipeline." (P18) "…we need to recognize that because of that implicit bias many people are rooted out right from the beginning, they're not even given the opportunities that somebody else may know how to work the system, has the right contacts and get moving up. So, that is something that I think we need to work on, provide opportunities early in training for people to see what is possible in an academic career, that's important." (P25) "I think certainly for people of colour and women of colour, you know one of the major challenges are that there are no, there are so few role models out there that you don't really have necessarily folks, well you don't have folks that look like you who you can say, you know what? That's who I aspired to be, or I aspired to be like that and that is true not only in your home institution, but that is true at conferences, and so all of that networking." (P24)
The need for institutional change	"Several sources will suggest that one needs to be really active at trying to recruit people you know, people of colour, people that have been marginalized and haven't been and not, because the easy thing to say is well we put this out there and nobody applied, so this is what we've got, right?" (P17) "I think first of all, and I know this isn't changing current faculties' mindset, but I think it, well it might but I think a big thing is hiring more faculty members that are more diverse in their identities." (P20) "I think that if I can speak to my own kind of ethnic background, I think that, you know, we should try and make these positions, these opportunities more easily available and accessible to people from ethnic minorities and to women, and there should be a very dedicated effort towards that. But I hope that in 10 years ... a legacy of [clinician–scientist training programs] is … who we trained should look very different than the first 20 years. So, that is what I hope all this work will lead to — that there is an equalization and an acceptance of all types of scientists and the value we place on them." (P25) "Make exceptions to the usual admissions process and pluck these people and really support them. So, we had a, and I kick myself on this, we had a young man from Africa who was interested in research, and he just did not do well, it did not work out. And as I reflect upon it now, it is because I think we all treated him with the same lens we would with all clinician–scientists and did not make an exception for him. He needed more time, for example, he needed to publish more … and I just don't think we gave him the, we didn't accommodate him and we should have accommodated him and I'm upset with myself about that." (P18) "The evidence suggests that the best way to compose those committees are both with people of colour, but also with people that haven't had lived experience, you know so we work together as a team, that you shouldn't say, well, I haven't personally had lived experience in this particular thing so, I can't be passionate about that, of course you can. But the other thing is that you know, we don't always know what someone's experience was." (P17) "We rely too much on recruiting American and recruiting British clinician–scientists and do not grow our own, and I think Canada suffers as a result of that. So, I think we need to work more closely with the residency postgraduate training programs, the graduate training programs like psychology and social work and educate them about the crisis in training a clinician–scientist and particularly those of colour, Aboriginal, et cetera, and start a conversation about what we can do to improve the situation." (P18) "Where are these people going, where are we losing them, how are we turning them away? It's incredible just the systemic barriers and challenges, so I think that this is a space that I am interested in taking much more a critical eye to within our own funding opportunities … I mean, there are so many barriers and so how do we address each one of those throughout the system, how do we recruit more people with diverse backgrounds, how can we be more inclusive, how do we retain, how do we acknowledge the different needs of different groups?" (P23) "The one the faculty must embrace is, technically there has to be pipeline programs, you know, [you] can't just start this when you're 30 years old, or 28, this has got to come when they're, they're beginning, they're getting into their original schooling, I don't mean like kindergarten early. But I do mean when somebody's coming into school of social work, so number one it's got to be clear that the [faculty] ... has an openness around what it means to embrace diversity and to have an admissions process that in the most obvious way recognizes the diverse backgrounds that people come from and the pathways that they can take, so it's not just cookie cutter admissions … I think all of that is important for generating diversity. Otherwise, people are just locked out." (P17)

their training or declined opportunities for career advancements to care for their children. They struggled to find ways to carve out time in their career, experiencing great tension between this need and their academic goals. Although male and female participants disclosed struggling to manage clinical and research responsibilities and family life, the burden of child care primarily fell on women in this sample of participants. Participants described the considerable clinical and research demands resulting in long days, and evening and weekend shifts, pressuring women to make difficult choices about what aspects of their personal life or clinical responsibilities need to be curtailed.

Compromises to career and family

Several interviewees described the compromises between their career and family life, acknowledging this may have reduced their output of publications and grants, and most were accepting of the choices made. Some participants were unable to travel during the latter part of their pregnancy and when their children were very young. In addition to being penalized for not attending a professional conference, interviewees noted decreased numbers of presentations and invited talks on their CV, and the loss of opportunities for networking, building collaborations and learning of emerging advancements in their fields.

The invisibility and visibility of racism

These interviews took place in 2020, during a time when issues of institutional racism had risen to the forefront of public consciousness in Canada.[31] Participants noted that the focus on racism in the news was accelerating conversations in academia about implicit bias and underrepresentation of minority populations as participants in health research. Despite this elevated social consciousness, many participants shared that racism was insidious and difficult to name, even among academics identifying as racialized individuals. Some participants went further and commented that we needed to question our whole way of conducting science to make more room for alternative and a range of viewpoints.

Uneasiness challenging racism and bias

Participants noted that they experienced both overt and covert racism because of their skin colour, accents and the origin of their names. The participants in this study felt they were not being invited past the submission phase for trainee and academic positions because they were being screened out of the hiring process based on the origin of their name and their international training background. Another example of racism described by participants was experiencing microaggressions, such as being seen and treated differently by patients, and overt aggression, such as being spat on by a patient who refused to be treated by them. Participants perceived that some colleagues prioritized comfort and safety over the uneasiness, awkwardness and conflict that comes with challenging racism and implicit biases. Several participants

commented that, because of this discomfort, they felt they did not have a voice or a safe space in which to discuss racial issues. Other participants shared that they often found it challenging to navigate difficult discussions about racism with their colleagues, especially those in leadership positions. Even in interactions with their peers, many reported being afraid to confront racism during their training seminars out of concern about being ostracized.

Questioned credibility

Some expressed concerns that their colleagues, mentors and even patients questioned their credibility because they were not white. The fear of lacking credibility with colleagues and patients was magnified for participants for whom English was a second language. The participants highlighted 2 competing ideas in their training and academic careers: the importance of intersectionality and compounded oppression; and heterogeneous experiences of oppression and, for others, privilege. Many of the participants identified barriers while simultaneously recognizing privilege in other aspects of their lives. One participant shared that women who are also visible minorities are confronted with numerous systemic barriers and a profound sense of isolation moving through the education and professional pipeline. This participant described that her female (and male) colleagues could relate to the experiences of sexism. However, few could understand what it might be like to simultaneously experience sexism and racism from both colleagues and patients. She described how, throughout her career, she received negative messages and shock from clients and students alike for being a Black, female scientist, who was a principal investigator on tricouncil grants and in a senior administrative position. Another female participant who was East Asian described experiencing racist and sexist comments from patients who refused to receive care from her for being a visible minority and a woman. Finally, 3 other female participants who identified as either Asian or Spanish described experiencing discrimination not only for their gender but also for their skin colour and having a strong accent. They were less likely to be called on to speak in class, and their examples of working with underrepresented groups in their communities received less attention and interest from their professors, mentors and supervisors. Participants who were people of colour and female further described incidents where they were erroneously identified as individuals holding service-level jobs within their institutions, or at national or international meetings rather than clinicians and scientists.

Proposed individual-level solutions to the pervasive problems of sexism and racism

Identifying diverse mentors with shared experiences

Identifying mentors was particularly challenging for women, individuals identifying as racialized individuals and newcomers to Canada. Pediatric clinician–scientists from underrepresented groups commented that they had trouble relating with

senior faculty who could not identify with their experiences of sexism and/or racism.

Participants elaborated on the need for a more diverse group of mentors with a greater breadth of lived experience as a woman or from a visible minority. Some participants commented on how they had been motivated by earlier challenges they had experienced with finding mentors to try to become better role models and mentors to junior colleagues and trainees. For example, women who experienced sexism early in their careers made a conscious decision to become strong and positive mentors to early-career researchers.

Proposed institutional and system-level solutions to the pervasive problems of sexism, racism and the leaky pipeline

Participants noted the need for institutional and system-level changes, including the need to create courses led by senior female and racialized scientists aimed at discussing pregnancy and parenting during doctoral, postdoctoral and pediatric clinician–scientist positions.

Individual efforts to create brave spaces and meaningful conversations

Many of the participants argued for the creation of brave spaces for pediatric clinician–scientists and trainees to discuss EDI issues. The development of these brave spaces in academic and clinical settings is a way to promote authentic and deliberate dialogues among clinician–scientists about their experiences of racism, sexism and other forms of oppression. Such brave dialogues must occur regardless of whether conversations elicit discomfort, strong emotions and fierce debates with those who hold power and privilege.[32–34] Several female scientists valued the opportunity to discuss maternity leaves, pregnancy and parenting. Many argued that transparent discussions about mothering will help bring to the forefront that it is feasible to start a family and choose a pediatric clinician–scientist career path. Some participants suggested that mentors invite trainees and early-career researchers to discuss the pros and cons of when to have children if they were contemplating this decision.

Other interviewees emphasized the need for safe spaces to discuss issues related to race and ethnicity. One participant commented that the discomfort created by uncomfortable conversations about race was critical and potentially pivotal in facilitating change. Other participants similarly emphasized the need for brave spaces to engage in discussions about implicit racial biases. One participant shared that she created a safe space for her trainees to talk about their daily challenges and experiences with discrimination that they and their patients experience. She and other participants noted the need for everyone, including senior leadership, to demonstrate their willingness to engage in conversations about racism and sexism to make it easier and safer for students to openly discuss these issues. A supervisor of one participant took interest in the cultural background of members of their laboratory and

demonstrated cultural sensitivity, such as identifying a space where Muslim laboratory members could perform daily prayers. Another participant created a journal club that explored issues regarding equity and diversity. Additionally, participants argued for uncomfortable discussions with those who may be in positions where they have directly and indirectly benefited from power imbalances in our health and academic systems. Participants demonstrated efforts to challenge racism and sexism by creating opportunities to disrupt narratives and practices that reinforce and conceal inequities and discrimination.

The porous and leaky pipeline

Many prospective pediatric clinician–scientists reported they struggled to launch their career given many structural barriers in postsecondary education and earlier in their career. This was particularly true of racialized individuals and women, who often face disparities at every stage of their academic and professional training. Explicit, implicit and overt biases lead to racialized individuals and women being less likely to be invited for interviews, to be offered positions, to find a mentor or to advance in their career. Some participants pointed to critical career stages in which the "pipeline" to a pediatric clinician–scientist career is particularly porous. For example, many promising candidates do not even make it to the stage of writing their application for entry into specialized pediatric clinician–scientist programs for a variety of reasons. Some pointed to women starting their family as a frequent "drop-off" from graduate school. Others noted that at each stage, nonwhite applicants may fail to advance for a range of reasons. For example, implicit bias prevents them from making critical connections with senior faculty or mentors who could provide references. Some elaborated on how the diversity within academia is considerably less than the diversity in the general population. Others emphasized the importance of not just recruiting more scientists into the pipeline but ensuring continued support at all stages of the pipeline.

The need for institutional change

Many participants offered suggestions for institutional changes to address the porous and leaky pipeline that is fueled by sexism and racism. Others commented on the need for targeted recruitment to academic positions to rectify EDI issues. Some focused on changes to pediatric clinician–scientist training programs at the institutional level, as well as supporting individuals emotionally (fostering feelings of trust and being valued) and instrumentally (spending time with someone and providing them with resources) during their training. Participants emphasized the importance of providing education about why differential treatment might be necessary for those receiving training from underrepresented groups. In fact, individuals who were in leadership positions noted that underrepresented pediatric clinician–scientists might need additional support because they have been historically disadvantaged.

Training programs could work with graduate and residency programs to nurture future pediatric clinician–scientists and to address EDI issues. Concrete suggestions included incentives for department chairs to select residents from minority groups and alumni mentorship programs. Some participants focused even further "upstream" on undergraduate or professional programs before research training begins. One concrete suggestion for addressing diversity issues to retain pediatric clinician–scientists included targeted funding opportunities. From individual- to system- and structural-level changes, participants identified ways to recruit equity-seeking individuals pursuing a career as a pediatric clinician–scientist and supporting those in such positions to thrive and not just barely survive.

Interpretation

Findings from this study highlighted various individual- and system-level factors that impede and facilitate the training, career and academic development of pediatric clinician–scientists, especially those from equity-seeking groups.

Clinician–scientists are considered an "endangered species" because of inadequate resources, training and employment opportunities.[35] The pipeline for pediatric clinician–scientists, including graduate students, is riddled with substantial biases against women and underrepresented minorities despite their having credentials comparable to those of their white male counterparts.[36] These groups continue to face challenges as they proceed in their academic career with poorer funding and limited prospects for publishing.[37–39]

Our findings suggest that female academics often experience overt and covert sexism around family planning and caring for children that profoundly affects their career development and identity as pediatric clinician–scientists. This is consistent with previous research that describes women's work in the private sphere as invisible and the inequities and structural barriers embedded within academic medicine and the pediatric clinician–scientist field as pervasive.[9,13,14,40,41] Caring responsibilities remain highly gendered, regardless of the number of caregivers in the home,[12] and women are expected to maintain the responsibility for household chores and to be the primary caregiver.[42]

Consistent with our findings, graduate students, trainees, academics and clinicians of ethnic minorities face racism, discrimination and ongoing racial microaggressions within academic departments at every stage of the path during their training and practice.[43–45] Understandably, high levels of negative race-related experiences lead to increased emotional distress and reduced sense of belonging for ethnic minorities,[46] often resulting in poor well-being and performance, lower academic engagement and reduced likelihood of program completion.[43] The results of our research are congruent with research about clinician–scientists in other fields, such as radiation[36] and kidney disease,[47] that show that there are many personal and systemic barriers that hinder underrepresented minorities from pursuing the role of clinician/physician–scientist.

Women and racialized individuals experience difficulties publishing early in their career, a lack of mentorship from diverse role models and reduced access to social networking venues. Similar to the importance placed on individual- or system-level mentorship strategies found in this study, other researchers have advocated for structured mentorship programs for trainees that boost networking and collaborations with more experienced clinician–scientists.[48,49]

The issue of a thin and porous pipeline, specifically the recruitment and retention of women and racialized individuals to pediatric clinician–scientist positions, requires the availability of women and ethnic minorities to be mentored and hired into these positions. Small increases in the representation of previously excluded groups in undergraduate and graduate programs may contribute to improved program recruitment and students' tenacity.[50] Although improved program recruitment and summer programs aimed at providing research experiences to students from a variety of backgrounds are important, they are not a substitute for addressing systemic institutional barriers and for creating a more inclusive academic culture. Changing academic cultures requires the examination of discriminatory recruitment, hiring practices and research evaluations as well as addressing the culture that influences the development of social identity, career choice and academic persistence. Longstanding institutional structures, practices and patterns of discrimination perpetuate inequalities and discrimination that limit opportunities for marginalized individuals and contribute to gaps in employment and wages. One way to better understand the problem and measure progress would be for postsecondary institutions to improve reporting on employment and pay equity as well as data on successful and unsuccessful applicants, retention, tenure and promotions. These data will assist in measuring change and determining whether institutions are living up to their principles of EDI policies and practices. Potential solutions for gender inequities and women's departure from academia include recruiting diverse applicants and training search committees; mentoring, networking and professional development through women faculty networks; and improving the academic climate and environment.

Mentorship with someone of a shared diversity may be the most beneficial in early career stages, though it is also useful to have diverse mentors over the stretch of an individual's career. We recommend future research examining the unique challenges of gender minorities in pursuing and securing pediatric clinician–scientist positions. Interventions aimed at creating a climate for change rather than aiming only at changing individual attitudes or values are imperative. Research into inclusivity and diversity of programs that capitalize on people's need for autonomy, that increase contact between diverse groups, and that include all members of an organization rather than only those who are a part of the intervention group is warranted.

We suggest that future studies exploring EDI in underrepresented groups within the clinician–scientist community expand on the inclusion criteria to include any clinician–scientist.

This may allow for increased diversity of the sample and might improve data saturation of underrepresented groups such as LGBTQ2S+ people, ethnic minorities and women.

Limitations

This study had limitations. First, the findings are limited to the experiences and perspectives of a group of primarily Canadian pediatric clinician–scientists, with fewer participants being recruited from eastern Canada. Second, given that we focused on clinician–scientists in pediatric health, the findings may not be transferable to all clinician–scientists. Finally, we did not purposefully recruit gender minorities.

Conclusion

Findings from this study highlighted various individual- and system-level factors that impede and facilitate the training, career and academic development of pediatric clinician–scientists, especially those from equity-seeking groups. These findings strongly point to the importance of addressing systemic biases that limit the inclusion of women and ethnic minorities in pediatric clinician–scientist careers.

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