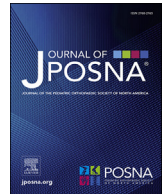




Contents lists available at ScienceDirect

Journal of the Pediatric Orthopaedic Society of North America

journal homepage: www.jposna.com

Original Research

The Women in ORTHopaedics Program Offers Early Exposure to Orthopaedic Surgery for Young Women. A Pre- and Post-Event Survey Comparison



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ARTICLE INFO

Keywords:

Women in orthopaedics
Gender equality
Diversity
Mentorship
Orthopaedic education
Early exposure

ABSTRACT

Background: In recent years, the medical field has made significant progress toward promoting gender equality. Despite this progress, orthopaedic surgery remains the least diverse specialty among other surgical specialties. In response, our Department of Orthopaedics developed a specialized orthopaedic curriculum, Women in ORTHopaedics (WORTH), tailored specifically for young women in high school. This program offers early exposure and mentorship opportunities within the orthopaedic field.

Methods: Participants were asked to complete a preliminary survey prior to the workshop. Subsequently, a corresponding survey was administered following the workshop, mirroring the questions from the pre-event survey. Participants shared their impressions of orthopaedics, interest in pursuing a career in this field, and awareness of available career pathways within this specialty.

Results: In both workshops, the consensus among participants in the pre-event surveys included a sense of novelty and a desire to learn more about orthopaedics. However, post-workshop responses revealed a shift in perceptions, with participants expressing that orthopaedics encompasses a much broader array of subjects than initially expected. A comparison between pre- and post-survey responses indicates a heightened interest in pursuing a career in orthopaedics following the workshop. Additionally, 100% of attendees expressed their intention to participate in future WORTH events.

Conclusions: Findings indicate that WORTH played a constructive role in guiding young women toward trajectories beyond secondary education. Additionally, it provided insights into the multitude of career options available in Orthopaedics apart from surgery, including physiotherapy, occupational therapy, nursing, research, and biomedical engineering.

Key Concepts:

- (1) Early exposure and mentorship allow for increased representation and retention of women in orthopaedics.
- (2) Representation of women in orthopaedics improves patient care and contributes to a more holistic approach to healthcare.
- (3) Outreach initiatives influence participants' interest and perceptions of pursuing a career in orthopaedics.

Level of Evidence: Level IV

Introduction

Gender equality has been a long-standing human rights issue that has emerged in recent years across domains, including medicine. Despite significant efforts to promote gender equality in the medical field, orthopaedic surgery falls behind with the lowest female representation

among all surgical specialties. From 2004 to 2019, there has been a steady but slow increase in women choosing to go into orthopaedic residency, from 9.8% to 15.4% in the United States [1]. In 2017, a study showed 81.2% of female medical students indicated a lack of interest in orthopaedic surgery, with only 7.3% expressing orthopaedics as one of their top 5 choices [2]. Additionally, between 2018 and 2019, a study

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<https://doi.org/10.1016/j.jposna.2024.100139>

Received 9 July 2024; Received in revised form 22 November 2024; Accepted 30 November 2024

Available online 9 December 2024

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revealed that 11.9% of orthopaedic surgeons across Canadian institutions were women, with females being inadequately represented in leadership positions [3]. Despite this progress, orthopaedic surgery continues to rank as the specialty with the lowest female representation, with women comprising 16% of residents in 2020 [4]. Although the number of female orthopaedic surgeons is rising, there remains a distinct absence of female leaders in academic faculty roles and leadership positions, creating a mentorship void.

Mentorship is imperative for young female trainees. The role of a mentor is not only to provide clinical care training but also to provide support and reassurance throughout the trainee's medical profession [5]. Programs such as The Perry Initiative have shown that early mentorship and exposure can positively influence young women's career choices in this field. Through its outreach programs, the Perry Initiative has reached over 12,000 high school and medical school female students combined [6]. Women who participated in these programs are entering orthopaedic surgery at a match rate of 20%, higher than the current 17% of women entering orthopaedic residencies [6,7]. Exposure to female mentors is crucial for recruiting and retaining female surgeons, which impacts both specialty selection and career progression of medical students and orthopaedic residents [8]. Creating a diverse and equitable future benefits the specialty and positively impacts patient care.

Inspired by The Perry Initiative, our Department of Orthopaedics envisioned and developed an early mentorship program, Women in ORTHopaedics (WORTH), for high school students from grades 10 to 12. In the Canadian education system, students typically enter grade 10 at around 15–16 years old, grade 11 at around 16–17 years old, and grade 12 at around 17–18 years old [9]. This age group was chosen as most high school students begin their post-secondary planning during their grade 10 year. This program aims to deliver early exposure to different career options within orthopaedic surgery and provide access to resources for skill development and knowledge acquisition. The inaugural workshop provided young women with their first look into the field of orthopaedic surgery. In particular, this workshop sought to inspire and cultivate participants' interest in pursuing careers within this specialty. This paper will examine how the workshop influenced attendees' knowledge and perceptions of orthopaedics, evaluating any changes in their understanding and attitudes via pre- and post-event surveys. By fostering engagement across different levels, we aim to establish a network of mentorship that promotes diversity and inspires leadership from high school students to orthopaedic surgeons.

Materials and methods

Participant outreach

We disseminated poster advertisements to secondary school career counsellors and school district superintendents throughout the province to reach female-identifying and gender-diverse high school students from grades 10 to 12 interested in orthopaedic surgery and/or engineering. Moreover, we launched social media campaigns on various platforms and featured advertisements on our Department of Orthopaedics website.

Workshop interventions

The inaugural WORTH workshop was held on June 10, 2023. This workshop was a day-long event led by female professionals in orthopaedics. It consisted of five hands-on sessions: Saw Bones, Orthopaedic Devices, Research, Casting, and Engineering Applications; followed by career panel discussions featuring female professionals from various disciplines within orthopaedics. Participants had the opportunity to ask female experts on a range of topics, such as obstacles encountered as a woman in a male-dominated field, strategies to sustain a healthy work-life balance, a typical day in the life of an orthopaedic surgeon, and advice for aspiring female orthopaedic surgeons. A total of 128 high school female students attended the inaugural workshop. A follow-up

workshop was held on October 28, 2023. We expanded our participant population to include the entire province, providing a virtual option for those outside the lower mainland to participate remotely. This half-day workshop opened with an orthopaedic case, guiding participants through the roles involved in patient treatment and care. As we navigated the case, we elucidated the comprehensive circle of care, spotlighting the various career roles and requisite educational pathways within the orthopaedic field. Similarly, we concluded this workshop with career panel discussions led by female representatives within orthopaedics. This workshop aimed to equip young women with insights into science and medicine, offering valuable information about potential career trajectories. A total of 164 high school female students attended the subsequent workshop.

Survey content and administration

To assess the impact of WORTH, two separate surveys were administered at each event. First, participants were asked to complete a preliminary survey at the beginning of both workshops. Then, another survey was administered immediately after workshop participation. Surveys were disseminated on Qualtrics, which participants accessed via QR code at the beginning and end of both workshops. Given that this workshop was an educational initiative, participants provided informed consent as part of their agreement to complete the survey. The survey was developed to evaluate whether the workshop design meets the established learning objectives and for participants to self-reflect post-workshop. Both pre- and post-event surveys asked participants to share their impression of orthopaedics, interest in pursuing an orthopaedic-related career, and awareness of career pathways within this discipline. The specific survey questions can be found in the Appendix. Additionally, the post-event survey included questions regarding event experience to gauge the participants' inclination toward future participation and to assess changes to implement for future WORTH events. All responses were obtained at scheduled workshops. Missing responses were excluded. Demographic information such as participants' pronouns, grade level, mode of attendance, and geographic location was also obtained.

Results

Workshop participant demographics

Most participants were in grades 11 and 12 (Table 1). Of the attendees in the second workshop ($n = 164$), 26 students returned from the initial workshop, while 138 were new participants. The majority were from the lower mainland (97%), with a small fraction joining from the British Columbia interior region (3%).

Table 1.
Participant demographic data.

	June 10, 2023: Hands-on interactive workshop ($n = 128$)	October 28, 2023: Career pathways info session ($n = 164$)
Pronoun(s)	She/Her: 124 (97%) They/Them: 3 (2%) Both: 1 (1%)	She/Her: 157 (96%) They/Them: 7 (4%) Both: 0 (0%)
Grade level	Grade 10: 11 (9%) Grade 11: 58 (45%) Grade 12: 59 (46%)	Grade 10: 43 (26%) Grade 11: 69 (42%) Grade 12: 52 (32%)
Mode of attendance	In-person: 128 (100%) Virtual: 0 (0%)	In-person: 156 (95%) Virtual: 8 (5%)
Geographic location	Lower Mainland: 128 (100%) British Columbia Interior: 0 (0%) Vancouver Island: 0 (0%)	Lower Mainland: 159 (97%) British Columbia Interior: 5 (3%) Vancouver Island: 0 (0%)

Survey responses

A total of 128 high school female students attended the inaugural WORTH workshop. Of the 128 attendees, 104 (81%) completed the pre-event survey, while 56 (44%) completed the post-event survey. A total of 164 female students attended the subsequent workshop, 143 (87%) of whom completed the pre-event survey, and 101 (62%) of whom completed the post-event survey. 27 of the total participants were past WORTH attendees.

Impressions of orthopaedics

The survey results indicated a shift in participants' perceptions of orthopaedics. Initial responses revealed a lack of familiarity. Pre-event impressions of orthopaedics included sentiments such as "being new to this field" and "wanting to learn more." However, following the workshop, respondents reported that "[orthopaedics] encompasses a much larger range of subjects than expected" and "[is] a surprisingly diverse field with many opportunities for those with different interests." A few participants also noted in the pre-event survey of the second workshop that they "had no clue what orthopaedics [encompassed] until [they] signed up [for the previous workshop] and learned a new career that interested [them]."

Interest in a career in orthopaedics

Survey data revealed a positive shift in participants' interest in pursuing a career in orthopaedics following both workshops (Figs 1 and 2). In our inaugural workshop, the pre-event survey indicated that 55% of respondents expressed a desire to pursue orthopaedics, which increased to 66% in the post-event survey. Similarly, in the subsequent workshop, the pre-event interest was recorded at 56% and rose to 64% in the post-event survey. Additionally, participants noted after attending the workshops that "all of the doctors and researchers inspired me" to "make an impact within patients' lives," and being able to "help people return to their normal life" seems like "a fulfilling career."

Awareness of available careers in orthopaedics

In both workshops, pre-event survey responses indicated a limited understanding, with participants expressing sentiments such as "not [knowing] too much about the careers" or "[are] only aware of orthopaedic surgery." However, the post-event survey findings demonstrated a

notable shift, with participants expressing a heightened awareness of the diverse roles within orthopaedics. Some expressed that they are "now more aware of the roles of researchers [as they] have never heard much about their roles in healthcare, and now [understand] their importance, even in orthopaedics." Moreover, after workshop participation, participants realized that "[there are] different ways to help patients non-surgically," such as "physical therapists, biomedical engineers, registered nurses, and nurse practitioners." Notably, many expressed that "the cast technician was a new career" for them and are now "aware of the amazing cast program and [understand the educational pathway] to get into casting."

General feedback

Post-event survey results yielded valuable insights into participants' experiences and sentiments. During the June event, positive aspects highlighted in responses included appreciation of "[hearing] everyone's unique stories" and "[engaging] in the hands-on activities" such as casting and saw bones. During the October event, participants expressed satisfaction with "the [pediatric orthopaedic] case study" as it was an excellent way to "help understand the roles [healthcare professionals] play in a patient's life." Furthermore, participants found the "[question and answer] period informative" and gave them a "bigger view of careers in [orthopaedics]." Constructive feedback centred around suggestions for improvement, with recommendations for more interactive sessions and increased hands-on activities (Table 2). Encouragingly, 100% of the attendees for both workshops expressed a keen interest in attending future workshops.

Discussion

The results of the pre- and post-event surveys align closely with the overarching objectives of WORTH. Prior studies found that negative perceptions deterred women from considering orthopaedic surgery, including an uninviting culture toward women and the perceived difficulty of balancing family life [10,11]. The findings suggest that WORTH can play a pivotal role in positively influencing these perceptions, creating a pathway for young women to participate and thrive in the field of orthopaedics. Existing literature has shown successful recruitment of female trainees to orthopaedics through mentorship and early exposure to the profession [12,13]. In particular, having a role model of the same sex has been reported to be more crucial for women than men in pursuing a career in orthopaedic surgery [14]. Outreach initiatives should

Percentage of Participants' Interest in Pursuing a Career in Orthopaedics

June 10, 2023: Hands-on Interactive Workshop

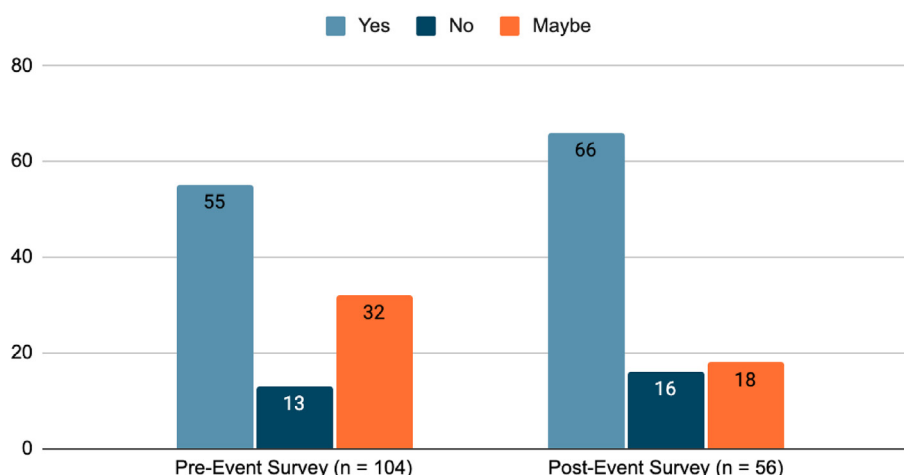


Figure 1. Percentage of participants' interest in pursuing a career in orthopaedics at the inaugural workshop.

Percentage of Participants' Interest in Pursuing a Career in Orthopaedics
October 28, 2023: Career Pathways Info Session

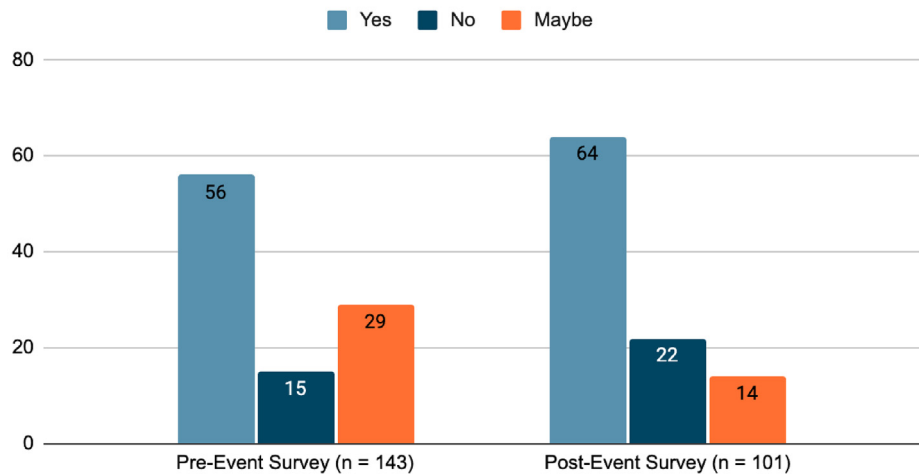


Figure 2. Percentage of participants' interest in pursuing a career in orthopaedics at the subsequent workshop.

encompass practical, hands-on experiences and mentorship opportunities facilitated by current female professionals in the field. WORTH allows high school students to connect with female leaders and gain practical experience in orthopaedic care, offering insights into the diverse array of career opportunities within Orthopaedics beyond surgery, encompassing various professions such as physiotherapy, occupational therapy, nursing, research, and biomedical engineering.

A recent study explored barriers that exist for women in orthopaedic surgery. The five barriers to gender equality identified included constrained communication, unequal standards, male culture, lack of mentoring, and workplace harassment [15]. Two studies have examined the challenges female orthopaedic surgeons encounter in their workplace and reported that more than 70% of female orthopaedic surgeons experienced workplace conflict or sexual harassment attributed to their gender [16, 17]. Notably, the themes of male culture and lack of mentoring go hand in hand, as female orthopaedic surgeons reported that the scarcity of female mentors and leaders presents challenges in professional development and a sense of isolation, limiting them from being heard [15].

While the study provides valuable insights, one notable challenge was the retention of responses from pre- to post-event surveys, particularly evident in the first workshop. Despite efforts to encourage participants to complete both surveys, there was a decline in responses between the two time points. Several factors may have contributed to this limitation. First, participants may have experienced time constraints or competing priorities. Given that the survey was administered at the end, its timing may have coincided with participants' eagerness to leave, potentially impacting their readiness to engage fully with the questionnaire. Additionally, survey fatigue could have played a role. Participants may have felt overwhelmed having to complete multiple surveys during the workshop. Since both the pre- and post-event surveys consisted of the

same questions, participants may have found them repetitive, leading to fewer responses for the post-event survey than the pre-event survey. Second, response bias is a critical consideration, potentially distorting the interpretation of findings. This inclination to participate in the survey may be influenced by factors such as enthusiasm for the subject matter or a pre-existing curiosity about orthopaedic surgery. Thus, the findings may not accurately reflect the broader population, with a predisposition toward orthopaedics or a greater propensity to engage with academic and career-related initiatives. Third, the surveys capture short-term effects immediately post-workshop. Given that our participants are high school students, their career paths are still in the early stages, and they have several years of training ahead before entering medical school and eventually matching into residency programs. Long-term impacts on participants' career choices and sustained interest in orthopaedics may not be fully understood without extended follow-up assessments. Lastly, online participation dynamics might create a different dynamic for participants compared to those attending in person. Factors such as engagement levels, networking opportunities, and overall experience may vary between the two modes of attendance.

A further limitation is the absence of statistical analysis. As the primary objective was to inform the development of the program, the survey was designed to gather preliminary feedback without linking responses to individual participants. Thus, it was not possible to assess the changes in interest within respondents or the decrease in response rates from the pre- to post-event surveys. Given the smaller post-survey pool, there may be less significance to the different percentages reported. In future iterations of this program, we plan to collect participants' names to evaluate the impact of the workshops statistically.

Creating a diverse workplace is vital for enhancing patient care. Diversity encompasses a spectrum of backgrounds, experiences, and perspectives, contributing to a more holistic and patient-centered approach to healthcare. Achieving a critical mass of 30% representation within a specific population is recognized as the threshold necessary to yield a noticeable impact and influence [18]. Moreover, participants value concordance with their care provider in race, sex, or language [19]. A recent study reported that concordant visits are positively associated with patient satisfaction with care [20]. Thus, continued efforts to enhance gender diversity within orthopaedic surgery should remain a primary goal.

Future work will focus on the creation of a student leadership group. This will provide an opportunity for our participant population to get involved in the planning of the subsequent years' programming. Selected participants will be able to partake in content generation and work

Table 2.
Workshop content preference from participants.

October 28, 2023: Career pathways info session (n = 164)	
Post-event survey	n = 101 (%)
Educational content	(54)
Interesting cases	(59)
Career pathways	(54)
Hands-on events	(71)

Note: These numbers in this table do not sum up to 100% as participants were able to select multiple options from the provided choices. Each percentage indicates the proportion of participants who independently chose each option.

alongside female leaders within orthopaedics. Additionally, we plan on implementing a comprehensive mentorship program, connecting students with female professionals in the field of orthopaedics and expanding our mentorship program to include global connections. To assess the impact on participants' educational and career trajectories, we will also track their progress and outcomes over time.

Overall, despite this program being in its initial stages, our findings indicate that targeted outreach to women during their early post-secondary planning stages can positively influence their interest and perceptions of pursuing a career in orthopaedics. Following the model of the Perry Initiative, which has shown promising results in recruiting women into orthopaedics, WORTH aims to empower and inspire young women to excel in orthopaedics, breaking barriers and fostering diversity in a traditionally male-dominated profession.

Additional links

- POSNAcademy: [Interview with a Pedipod - Corinna Franklin, MD](#)
- AAOS Orthopaedic Video Theatre: [Developing Gender Diversity in Residency](#)

Consent for publication

The author(s) declare that no patient consent was necessary as no images or identifying information are included in the article.

Ethics approval and consent

This program is an educational/quality program that did not require IRB approval. Participant consent was granted with program registration and the intent of the survey was stated in the survey introduction.

Author contributions

Marianna Hsu: Writing – review & editing, Writing – original draft, Formal analysis, Data curation, Conceptualization. **Hayley Spurr:** Writing – review & editing, Supervision, Conceptualization. **Anthony P. Cooper:** Writing – review & editing, Conceptualization. **Emily K. Schaeffer:** Writing – review & editing, Validation, Supervision, Methodology, Conceptualization.

Funding

No funding was received for the conduct of this study.

Declarations of competing interests

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Emily Schaeffer reports a relationship with I'm A HIPpy Foundation that includes: funding grants. Emily Schaeffer reports a relationship with Peterson Fund for Global Hip Health that includes: funding grants. Emily Schaeffer reports a relationship with OrthoPediatrics that includes: funding grants. Anthony Cooper reports a relationship with OrthoPediatrics that includes: funding grants. Anthony Cooper reports a relationship with Pediatric Orthopaedic Society of North America that includes: board membership and funding grants. Anthony Cooper reports a relationship with BC Children's Hospital Foundation that includes: funding grants. Anthony Cooper reports a relationship with CFRI Investigator Grant Award Program that includes: funding grants. Anthony Cooper reports a relationship with Canadian Institutes of Health Research that includes: funding grants. Anthony Cooper reports a relationship with War Amps that includes: funding grants. Anthony Cooper reports a relationship with Canadian Orthopaedic Association that includes: board

membership. Anthony Cooper reports a relationship with Limb Lengthening and Reconstruction Society that includes: board membership. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jposna.2024.100139>.

References

- [1] Van Heest AE, Agel J, Samora JB. A 15-year report on the uneven distribution of women in orthopaedic surgery residency training programs in the United States. *JB JS Open Access* 2021;6(2):e20. <https://doi.org/10.2106/JBJS.OA.20.00157>. 00157.
- [2] Rao RD, Khatib ON, Agarwal A. Factors motivating medical students in selecting a career specialty: relevance for a robust orthopaedic pipeline. *J Am Acad Orthop Surg* 2017;25(7):527–35. <https://doi.org/10.5435/JAAOS-D-16-00533>.
- [3] Hunter J, Grewal R, Nam D, Lefavre KA. Gender disparity in academic orthopedic programs in Canada: a cross-sectional study. *Can J Surg* 2022;65(2):E159–69. <https://doi.org/10.1503/cjs.008920>.
- [4] Haffner MR, Van BW, Wick JB, Le HV. What is the trend in representation of women and under-represented minorities in orthopaedic surgery residency? *Clin Orthop Relat Res* 2021;479(12):2610–7. <https://doi.org/10.1097/CORR.0000000000001881>.
- [5] Enson J, Malik-Tabassum K, Faria A, Faria G, Gill K, Rogers B. The impact of mentoring in trauma and orthopaedic training: a systematic review. *Ann R Coll Surg Engl* 2022;104(6):400–8. <https://doi.org/10.1308/rcsann.2021.0330>.
- [6] Harbold D, Dearolf L, Buckley J, Lattanza L. The Perry initiative's impact on gender diversity within orthopedic education. *Curr Rev Musculoskelet Med* 2021;14(6):429–33. <https://doi.org/10.1007/s12178-021-09717-4>.
- [7] Harris AB, Vankara A, McDaniel C, Badin D, Laporte D, Aiyyer A. Match rates among underrepresented minority and female applicants to orthopaedic surgery residency programs from 2011 to 2021: how are we doing? *JB JS Open Access* 2023;8(3):e23. <https://doi.org/10.2106/JBJS.OA.23.00049>. 00049.
- [8] Winfrey SR, Parameswaran P, Gerull KM, LaPorte D, Cipriano CA. Effective mentorship of women and underrepresented minorities in orthopaedic surgery: a mixed-methods investigation. *JB JS Open Access* 2022;7(4):e22. <https://doi.org/10.2106/JBJS.OA.22.00053>. 00053.
- [9] Gretchen C, Canadian Education Report. National center on education and the economy. 2005.
- [10] Bernstein J. Male practice: gender inequality in orthopaedic surgery. *Clin Orthop Relat Res* 2013;471(6):1754–7. <https://doi.org/10.1007/s11999-013-2978-7>.
- [11] Bucknall V, Pynsent PB. Sex and the orthopaedic surgeon: a survey of patient, medical student and male orthopaedic surgeon attitudes towards female orthopaedic surgeons. *Surgeon* 2009;7(2):89–95. [https://doi.org/10.1016/S1479-666X\(09\)80023-1](https://doi.org/10.1016/S1479-666X(09)80023-1).
- [12] Chambers CC, Ihnow SB, Monroe EJ, Suleiman LI. Women in orthopaedic surgery: population trends in trainees and practicing surgeons. *J Bone Joint Surg Am* 2018;100(17):e116. <https://doi.org/10.2106/JBJS.17.01291>.
- [13] O'Connor MI. Medical school experiences shape women students' interest in orthopaedic surgery. *Clin Orthop Relat Res* 2016;474(9):1967–72. <https://doi.org/10.1007/s11999-016-4830-3>.
- [14] Hill JF, Yule A, Zurakowski D, Day CS. Residents' perceptions of sex diversity in orthopaedic surgery. *J Bone Joint Surg Am* 2013;95(19):e1441–6. <https://doi.org/10.2106/JBJS.L.00666>.
- [15] Hiemstra LA, Kerslake S, Clark M, Temple-Oberle C, Boynton E. Experiences of Canadian female orthopaedic surgeons in the workplace: defining the barriers to gender equity. *J Bone Joint Surg Am* 2022;104(16):1455–61. <https://doi.org/10.2106/JBJS.21.01462>.
- [16] Giglio V, Schneider P, Madden K, Bond Z, McKay P, Bozzo A, et al. Perpetrators of gender-based and sexual harassment in the field of orthopaedic surgery. *JB JS Open Access* 2022;7(1):e21. <https://doi.org/10.2106/JBJS.OA.21.00098>. 00098.
- [17] Rodarte P, Kammire MS, Israel H, Poon SC, Cannada LK. The other side of conflict: examining the challenges of female orthopaedic surgeons in the workplace. *Am J Surg* 2023;225(1):46–52. <https://doi.org/10.1016/j.amjsurg.2022.09.027>.
- [18] Harrington MA, Rankin EA, Ladd AL, Mason BS. The orthopaedic workforce is not as diverse as the population it serves: where are the minorities and the women? AOA critical issues symposium. *J Bone Joint Surg Am* 2019;101(8):e31. <https://doi.org/10.2106/JBJS.18.01010>.
- [19] Peterman NJ, Macinnis B, Stauffer K, Mann R, Yeo EG, Carpenter K. Gender representation in orthopaedic surgery: a geospatial analysis from 2015 to 2022. *Cureus* 2022;14(7):e27305. <https://doi.org/10.7759/cureus.27305>.
- [20] Thornton RL, Powe NR, Roter D, Cooper LA. Patient-physician social concordance, medical visit communication and patients' perceptions of health care quality. *Patient Educ Couns* 2011;85(3):e201–8. <https://doi.org/10.1016/j.pec.2011.07.015>.