

# Leadership development training for orthopaedic trauma surgeons: an international survey

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**Purpose:** This study examined the leadership development themes that global orthopaedic surgeons in differently resourced countries perceive as essential components and evaluated barriers to attending leadership development programs.

**Methods:** This multinational, 45-question survey engaged orthopaedic surgeons (one expert per country). The questionnaire collected participants' demographics, perception of effective leadership traits, and valuation of various leadership themes based on importance and interest.

**Results:** The survey was completed by 110 orthopaedic surgeons worldwide. Respondents most commonly reported holding a leadership position (87%) in hospital settings (62%), clinical settings (47%), and national orthopaedic societies (46%). The greatest proportion of participants reported having never attended a leadership course (42%). Participants regarded "high performing team-building," "professional ethics," and "organizational structure and ability to lead" as the most important leadership themes. No significant ( $P \leq 0.05$ ) differences were identified among perceived importance or interest in leadership themes between income levels; however, statistically significant differences were identified in the questionnaire; respondents in low- and middle-income countries (LICs/LMICs) demonstrated a stronger interest in attending a leadership course than those in high-income countries (HICs) (98% vs. 79%,  $P = 0.013$ ), and fewer surgeons in LICs/LMICs had taken personality assessment tests than those in HICs (22% vs. 49%,  $P = 0.019$ ). The most common barriers to attending leadership courses were lack of opportunities and invitations (57%), difficulty missing work (22%), and cost of course attendance (22%).

**Conclusions:** These findings can better inform the development of effective curricula and provide a framework for a successful model for the future.

**Level of Evidence:** V.

**Keywords:** leadership development, orthopaedic surgery, capacity-building, didactic needs, instructional barriers

## 1. Introduction

Globally, there is a high demand for formal leadership development training for physicians.<sup>1–4</sup> Leadership development programs aim to support physicians' skills in communicating between support staff, managing conflict resolution, and

fostering a team approach to problem solving—all of which are fundamental to the delivery of high-quality care.<sup>5–7</sup> Although many high-income countries (HICs) have started to integrate formal leadership programs into physician training,<sup>8–13</sup> few articles have described the availability of these courses across differently resourced settings and in a multinational context.

The need for accessible and relevant leadership education within highly specialized fields such as orthopaedic surgery is paramount.<sup>14,15</sup> In both hospital and clinical settings, orthopaedic surgeons frequently oversee faculty development, mentor and motivate colleagues, and maintain a safe and positive workplace culture, all while advocating for their patients. These demands are challenging and require coordinated teamwork and organizational management, among other skills. Although some surgeons may possess fundamental leadership and management skills, additional leadership development opportunities could help refine their ability to effectively lead high performing clinical teams.<sup>16</sup> However, the importance of educational leadership programs and interest in related themes, as perceived by orthopaedic surgeons worldwide, has not been well-described.

This study examined leadership development themes that orthopaedic surgeons worldwide view as essential to becoming more effective leaders and identified obstacles to participating in such courses. Identifying which themes are perceived as most important and interesting to orthopaedic surgeons and determining gaps in leadership training can better inform the development of future curricula. Responses were further stratified

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across country income groups to determine whether there were differences in opportunities across diverse resource settings.

## 2. Methods

This multinational survey consisted of 45 questions. One hundred and fourteen orthopaedic surgeon-leaders from 114 countries (one expert per country), identified from 1 of 3 orthopaedic network databases, were invited to participate in this study. These participants were selected as individuals who were recognized as surgeon-leaders, serving as active members of national and international orthopaedic organizations, and who would be aware of potential leadership opportunities in their countries. These organizations included the Orthopaedic Trauma Association (OTA),<sup>17</sup> AO Trauma, and AO Alliance,<sup>18</sup> each of which has extensive orthopaedic trauma surgeon membership networks from countries of varying income groups. The questionnaire was anonymous and collected information about participants' demographics, current and past leadership positions, previous training opportunities, perception of effective leadership traits, and valuation of various leadership themes based on importance and interest. Importance was queried to determine perceptions of how critical leadership topics were to the development of a curriculum. Interest was assessed to evaluate individuals' desire to know about a particular topic. Leadership development themes in the survey were based on a review of the literature, including those from low-income and low-and middle-income countries (LICs/LMICs) and course curricula from major business schools (ie, University of Southern California Marshall Business School and Northwestern University Kellogg School of Management). To include any new topics not identified in the survey, an open text field was provided for respondents. Although the survey was designed by independent experts from HICs and developed by author consensus from the University of California, San Francisco (UCSF), the survey used was not validated. Survey reminders were sent to participants biweekly. The survey was open for 3 months. The study was distributed electronically through REDCap (Research Electronic Data Capture)<sup>19</sup> and designated as exempt from review by the local Institutional Review Board.

### 2.1. Statistical Analysis

The study used a weighted mean from a 5-point Likert scale to evaluate orthopaedic surgeons' perceived level of importance and interest in various leadership development themes. This psychometric response scale allowed respondents to specify their level of agreement to each of the statements in 5 points (1 = strongly agree, 2 = agree, 3 = undecided, 4 = disagree, 5 = strongly disagree). Furthermore, country income levels were classified in accordance with 2021 World Bank Country and Lending Groups<sup>20</sup> data to determine statistically significant differences ( $P \leq 0.05$ ) in perceived importance of and interest in leadership themes across differently resourced settings: LICs/LMICs, upper-middle-income countries (UMICs), and HICs. Analysis was performed using the Kruskal-Wallis test comparing means across various subgroups with STATA SE version 17 (StataCorp).

## 3. Results

### 3.1. Demographics

Of the 114 orthopaedic surgeon-leaders invited to complete the survey, 110 orthopaedic surgeons responded, yielding a 97%

response rate. These respondents represented 110 different countries across 6 continents. Forty-one surgeons (37.3%) represented LICs/LMICs, 30 surgeons (27.3%) represented UMICs, and 39 surgeons (35.4%) represented HICs (Fig. 1). The greatest proportion of survey respondents were male (98%), with over 20 years in practice (46%), and had held a leadership position (89%) for more than 6 years (62%). Respondents reported holding various leadership positions in hospital settings (62%), clinical settings (47%), national orthopaedic societies (46%), international orthopaedic societies (27%), and regional orthopaedic societies (20%) (Table 1).

### 3.2. Survey

The greatest proportion of participants had never attended a leadership course (42%). Twenty percent of respondents had attended one course, and 36% had attended 2 or more throughout their career. Over two-thirds (68%) had never taken a leadership personality assessment (Myers-Briggs Type Indicator, Gallup Strengths Finder, etc.). Most orthopaedic surgeons were interested in attending a leadership course (89%) and were comfortable attending a program offered in English (95%). Survey results revealed small group work (68%), interactive plenary sessions (59%), and simulation exercises (55%) as the 3 most engaging learning methods. The most commonly reported barriers to attending leadership courses were "lack of opportunities and invitations" (57%), "difficulty missing work" (22%), and "cost associated with the course" (22%) (Table 2).

Overall, participants regarded "high performing team-building," "professional ethics," and "organizational structure and ability to lead" as the 3 most important themes for leadership development. Similarly, the themes deemed most interesting were "high performing team-building," "organizational structure and ability to lead," and "personal development." Notably, respondents rated the majority of leadership topics as both important and interesting. Ninety-three percent of respondents believed (strongly agreed/agreed) they had the qualities to be an effective leader, and 77% of respondents reported being fully aware (strongly agreed/agreed) of the qualities that make leadership successful (Fig. 2).

### 3.3. Comparison Between Income Groups

Ratings were stratified by the income group (LICs/LMICs, UMICs, and HICs) to determine whether there were differences in orthopaedic surgeons' perceived importance and interest in leadership development themes. Statistically significant differences were identified in the survey, in which respondents in LICs/LMICs demonstrated a stronger interest in attending a leadership course designed for orthopaedic surgeons than those in HICs (98% vs. 79%,  $P = 0.013$ ). Furthermore, fewer surgeons in LICs/LMICs had taken personality assessment tests than those in HICs (22% vs. 49%,  $P = 0.019$ ) (Table 3). No significant differences in perceived importance or interest in leadership themes were identified between income groups (Table 4).

## 4. Discussion

Orthopaedic surgeons are expected to lead in multidisciplinary and high performing environments, whether in the operating room, clinic, or with patient care teams. Strong leadership skills among surgeons can increase morale and team performance, enhance learning and self-awareness, and improve patient outcomes,<sup>21-24</sup> all of which contribute to the overall organizational success.

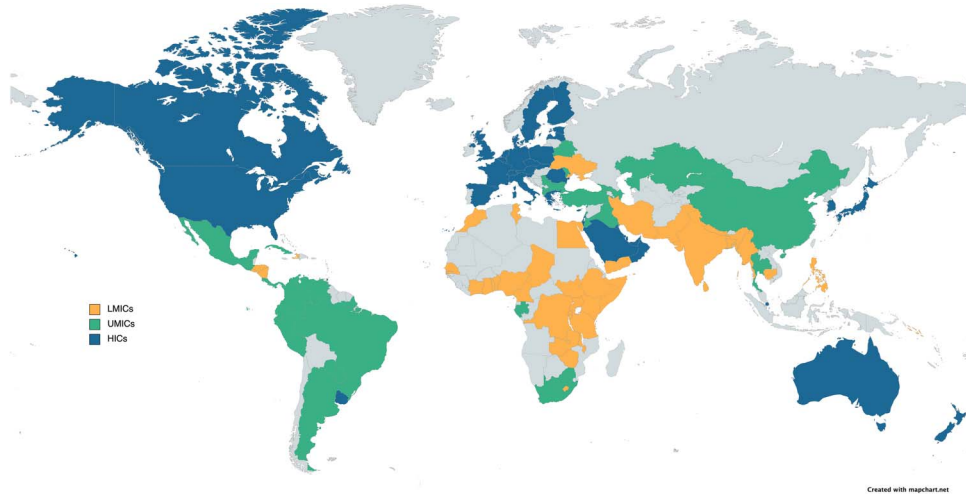


Figure 1. Map of survey respondents by country demonstrating LICs/LMICs, UMICs, and HICs.

Despite the recognized benefits of leadership development, the number of these programs for orthopaedic surgeons does not meet the growing demands worldwide,<sup>14</sup> and there is a paucity of literature describing studies on leadership programs for orthopaedic trauma surgeons globally. Identifying the importance and barriers to educational leadership programs for orthopaedic surgeons is an important first step toward developing effective curricula and providing more accessible programs.

In this study, most orthopaedic surgeons had been in practice for over 20 years and held leadership positions in their field; however, nearly half of these respondents had never received leadership development training throughout their career and predominantly attributed this to a lack of available opportunities. These findings demonstrate a desire for more leadership training

programs within the field of orthopaedic surgery. Although studies have found that experiential learning showed similar skill acquisition to well-designed leadership interventions,<sup>25,26</sup> DeRue et al<sup>27</sup> noted that learning plateaus; work experience and leadership positions are positively correlated with the development of strategic and cognitive skills; however, without further challenges in this role, it is less likely that one will continue to advance these skills beyond a certain threshold. This suggests that leadership development programs or a blended approach of experiential learning and didactics may be advantageous. Further research on the efficacy of the relationship between these 2 methods is needed.

In addition, ratings were stratified by income groups to determine whether there were differences in orthopaedic

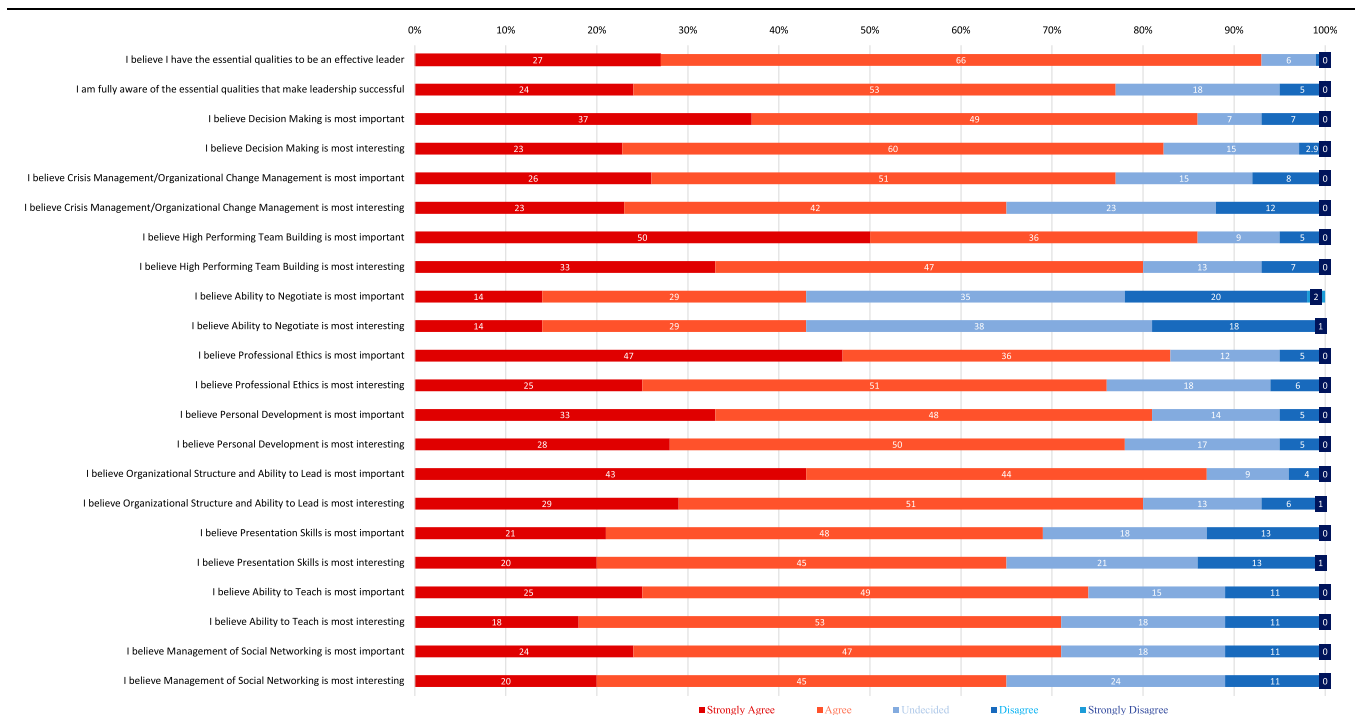


Figure 2. Global orthopaedic surgeons' perceived the level of importance and interest in leadership themes using Likert scale survey questions.

**TABLE 1.**  
**Demographic Data of Survey Respondents\***

Characteristic	Overall N (%)
Total	110 (100)
Sex	
Male	108 (98)
Female	2 (2)
Years in practice	
0–5	17 (15)
6–10	11 (10)
11–15	15 (14)
16–20	16 (15)
More than 20	51 (46)
Currently hold a leadership position?	
Yes	98 (89)
No	12 (11)
Years in a leadership position	
0–2	12 (12)
3–5	25 (26)
>6	60 (62)
Leadership role†	
Hospital setting	77 (70)
Clinical setting	52 (47)
National orthopaedic society	51 (46)
International orthopaedic society	30 (27)
Regional orthopaedic society	24 (22)
Other	6 (5)

\* Various demographic data not reported for all respondents.  
† Multiple responses selected.

surgeons’ responses. Notably, 2 statistically significant differences were identified; respondents in LICs/LMICs demonstrated a stronger interest in attending a leadership course than those in HICs, and surgeons in LICs/LMICs less commonly performed personality assessment tests than those in HICs. These results are likely due to the higher number of leadership development opportunities that already exist for physicians in HICs.<sup>14,28</sup> Personality assessment tests can provide surgeons with insight into their personal skills and strengths and areas for development, which can be useful to a mentor, leader, and team member. These tests have been recognized as cost-effective and valuable for orthopaedic surgery training in higher-resourced settings, particularly when valued by the user, and also could be an effective tool for orthopaedic surgeons in lower-resource settings.<sup>29</sup> Conversely, there were no significant differences in the perceived importance of and interest in leadership development themes between income groups, demonstrating a shared appreciation across the surgical specialty.

Overall, respondents regarded “high performing team-building,” “professional ethics,” and “organizational structure and ability to lead” as the 3 most important leadership themes. These topics reflect the multifaceted responsibilities of surgeon-leaders and have been recognized by other leadership studies of surgical specialties<sup>14,24,30,31</sup>; Rosengart et al<sup>32</sup> underscored collaboration and cooperation, humanized relationships and mentorship, and operational and organizational efficiency as 3 tenets of leadership programs by members of the Society of Surgical Chairs. Furthermore, team building, communication, emotional intelligence, and interpersonal skills were rated as major competencies among orthopaedic department chairs in the United States.<sup>33</sup> Moreover, 144 orthopaedic trauma surgeons in Latin America identified professional ethics, crisis management/organizational change management, and high performing team

**TABLE 2.**  
**Leadership Course Needs Assessment\***

	Overall N (%)
Total	110 (100)
How many leadership courses have you attended previously?	
None	46 (42)
1	24 (22)
2 or more	40 (36)
Are you interested in attending a leadership course for surgeons?	
Yes	98 (89)
No	12 (11)
Are you comfortable taking a leadership course in English?	
Yes	104 (95)
No	6 (5)
Have you ever taken a personality test?	
Yes	35 (31)
No	75 (68)
What teaching methods are the most engaging?†	
Small group work	75 (68)
Interactive plenary session	65 (59)
Simulation exercises	60 (55)
Lectures	52 (47)
Other	5 (4)
What are the main barriers to participating in a leadership course?†	
Lack of opportunities/invitations	63 (57)
Difficulty missing work	25 (23)
Cost	25 (23)
Calendar conflicts	24 (22)
Other	11 (10)
Early in career	3 (3)

\* Various demographic data not reported for all respondents.  
† Multiple responses selected.

building as the most important topics for leadership development.<sup>34</sup> Finally, a meta-analysis concluded that the ability to initiate structure within a team was the most influential leadership skill for surgeons.<sup>35</sup> The major leadership themes identified in this study were consistent with those previously recognized in other reports.<sup>24</sup> Cited best practices indicate that course curriculum is most effective when tailored to regional needs and specialty interests.<sup>36,37</sup>

With the increased use of digital platforms in health care, particularly with the onset of the coronavirus disease (COVID-19) pandemic, there was a growth in the development of online learning programs, which has led to a larger geographic reach.<sup>38</sup> Leadership development programs for surgeons through virtual, asynchronous formats can provide for a larger number of attendees at a relatively lower cost.<sup>39</sup> The accessibility of online training opportunities also could alleviate many of the barriers reported in this study, including cost for course registration and travel, calendar conflicts, and lack of opportunities. Moreover, online formats, such as webinars or teleconferences, could encourage collaboration among learners across income groups, promote equitable training models, and facilitate bidirectional knowledge exchange and capacity building.<sup>40,41</sup>

One strength of this study was the high response rate. This may have been due, in part, to the study design, which targeted interested participants and subsequently solicited their responses. However, this study also had several potential limitations. First, it is not clear whether the overall positive ratings for leadership

**TABLE 3.**  
**Comparison Analysis of Orthopaedic Surgeons' Needs Stratified by Income Groups\***

	LICs/ LMICs N (%)	UMICs N (%)	P	LICs/ LMICs N (%)	HICs N (%)	P	UMICs N (%)	HICs N (%)	P
Total	41 (100)	30 (100)		41 (100)	39 (100)		30 (100)	39 (100)	
How many leadership courses have you attended previously?									
None	21 (51)	14 (47)	0.928	21 (51)	11 (28)	0.056	14 (47)	11 (28)	0.176
1	9 (22)	7 (23)		9 (22)	8 (21)		7 (23)	8 (21)	
2 or more	11 (27)	9 (30)		11 (27)	20 (51)		9 (30)	20 (51)	
Are you interested in attending a leadership course for surgeons?									
Yes	40 (98)	27 (90)	0.304	40 (98)	31 (79)	0.013†	27 (90)	31 (79)	0.327
No	1 (2)	3 (10)		1 (2)	8 (21)		3 (10)	8 (21)	
Are you comfortable taking a leadership course in English?									
Yes	39 (95)	28 (93)	1.000	39 (95)	37 (95)	1.000	28 (93)	37 (95)	1.000
No	2 (5)	2 (7)		2 (5)	2 (5)		2 (7)	2 (5)	
Have you ever taken a personality test? (Myers–Briggs type indicator, gallup strengths finder, etc)									
Yes	9 (22)	7 (23)	0.890	9 (22)	19 (49)	0.019†	7 (23)	19 (49)	0.045†
No	32 (78)	23 (77)		32 (78)	20 (51)		23 (77)	20 (51)	
What teaching methods are the most engaging?‡									
Small group work	28 (68)	20 (67)	0.478	28 (68)	27 (69)	0.928	20 (67)	27 (69)	0.821
Interactive plenary session	24 (59)	20 (67)	0.486	24 (59)	21 (54)	0.673	20 (67)	21 (54)	0.282
Simulation exercises	23 (56)	14 (47)	0.432	23 (56)	23 (59)	0.795	14 (47)	23 (59)	0.309
Lectures	23 (56)	14 (47)	0.432	23 (56)	15 (38)	0.114	14 (47)	15 (38)	0.494
Other	2 (5)	0 (0)	0.505	2 (5)	3 (8)	0.671	0 (0)	3 (8)	0.252
What are the main barriers to participating in a leadership course?‡									
No opportunities or invitations	27 (66)	18 (60)	0.613	27 (66)	18 (46)	0.076	18 (60)	18 (46)	0.254
Difficulty missing work	8 (20)	5 (17)	1.000	8 (20)	12 (31)	0.245	5 (17)	12 (31)	0.261
Cost	14 (34)	7 (23)	0.324	14 (34)	4 (10)	0.015†	7 (23)	4 (10)	0.190
Calendar conflicts	6 (15)	5 (17)	1.000	6 (15)	13 (33)	0.067	5 (17)	13 (33)	0.168
Other	1 (2)	4 (13)	0.155	1 (2)	6 (15)	0.054†	4 (13)	6 (15)	1.000
Early in career	1 (2)	2 (7)	0.570	1 (2)	0 (0)	1.000	2 (7)	0 (0)	0.185

\* Various demographic data not reported for all respondents.

†  $P < 0.05$ .

‡ Multiple responses selected.

**TABLE 4.**  
**Comparison Analysis of Perceived Level of Importance and Interest in Leadership Themes Stratified by Income Groups\***

	LIC/LMIC Mean	SD	UMIC Mean	SD	HIC Mean	SD	P
The most important leadership topic is							
Decision making	1.80	0.93	1.63	0.56	1.97	0.85	0.27
Crisis/management and organizational change	2.10	0.92	1.89	0.78	2.13	0.86	0.61
High performance team building	1.61	0.80	1.60	0.67	1.87	1	0.50
Negotiation	2.70	0.98	2.46	0.86	2.74	1.2	0.55
Professional ethics	1.56	0.74	1.76	0.82	1.89	0.94	0.23
Personal development	1.82	0.77	1.78	0.78	2.07	0.85	0.27
Organizational structure and ability to lead	1.75	0.74	1.69	0.71	1.77	0.87	0.95
Presentation skills	2.12	0.87	2.10	0.76	2.43	1.1	0.28
Ability to teach/mentor	2.15	0.94	1.87	0.77	2.26	0.96	0.25
Communication and social networking	2.02	0.85	2.30	1.1	2.20	0.83	0.55
The most interesting leadership topic is							
Decision making	2.02	0.79	2.13	0.94	2.07	0.78	0.92
Crisis/management and organizational change	2.21	0.96	2.28	0.85	2.26	1.0	0.91
High performance team building	2.02	0.85	1.83	0.83	1.95	0.84	0.56
Negotiation	2.75	0.97	2.30	0.79	2.78	1.1	0.06
Professional ethics	1.90	0.73	2.06	0.79	2.18	0.88	0.37
Personal development	1.88	0.75	1.96	0.78	2.12	0.86	0.42
Organizational structure and ability to lead	1.92	0.78	2.03	1.0	2.00	0.82	0.95
Presentation skills	2.19	0.95	2.20	0.86	2.46	1.0	0.34
Ability to teach/mentor	2.26	0.88	2.00	0.89	2.36	0.84	0.20
Communication and social networking	2.18	0.82	2.21	1.0	2.41	0.91	0.52

\* Weighted mean and SD using a 5-point Likert scale (1 = strongly agree, 5 = strongly disagree).

themes reflect a general interest in all themes or simply a lack of specificity identified by the respondents between the topics. Second, although the selection method of choosing one surgeon expert per country allowed for the inclusion of respondents from broad geographical and economical regions, the results were not intended to be fully representative of any single country. Additional investigation is necessary to evaluate the importance of and interest in leadership themes from individual countries. Although the respondents may not have been fully aware of all the leadership opportunities available in their countries, they were selected for participation in the study through their engagement in major international orthopaedic trauma organizations. Finally, the respondents were mostly male, well-established in their careers, and already engaged in leadership positions. Further examination of the attitudes toward leadership training among early career and female orthopaedic trauma surgeons is necessary, both of which groups are critical to engage in this training.

In summary, these findings demonstrate a gap between interest in and opportunities for leadership development within the field of orthopaedic surgery. Barriers exist to these opportunities, particularly in resource-limited environments. This study demonstrated a general agreement among orthopaedic surgeons regarding the most important leadership themes. Understanding the topics that orthopaedic surgeons seek from leadership development programs worldwide and identifying barriers can better inform the development of effective curricula across differently resourced countries.

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