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# Otolaryngology–Head and Neck Surgery Training and Service Delivery: An International Survey

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**Received:** 7 November 2024 | **Revised:** 21 January 2025 | **Accepted:** 22 January 2025

**Funding:** The authors received no specific funding for this work.

## ABSTRACT

**Importance:** Highlighting the global disparities in otolaryngology training and, ultimately, service delivery, emphasizing the need for equitable access to training resources and programs.

**Objective:** To describe the relationship between the quality, content, and location of otolaryngology–head and neck surgery training and education and the resulting impact on the delivery of otolaryngology care globally.

**Design:** An online cross-sectional survey to otolaryngologists, gathering information on their training and education experiences, and factors influencing their choice of training location and practice.

**Setting:** The online survey was available in multiple languages, distributed via national and international professional otolaryngology societies, snowballing and social media.

**Participants:** The respondents were practicing otolaryngologists representing all seven World Health Organization regions.

**Exposures:** World Bank income groups classification.

**Main Outcomes and Measures:** Our expected outcome was that subspecialty training and access to educational resources were significantly readily available to respondents from high-income countries, leading to more confidence in performing complex procedures post training.

**Results:** A total of 91 participants were included in the analysis, with 47 (52%) practicing in high-income countries and 44 (48%) in low- and middle-income countries. Sixty-one participants (67%) were male. Subspecialty training and access to educational resources were significantly less available in low- and middle-income countries, leading to lower confidence among low- and middle-income countries physicians in performing complex procedures. High-income country respondents reported better access to diverse training resources and felt more prepared for a broader range of procedures.

**Conclusion and Relevance:** Significant disparities exist in OHNS training resources and subspecialty training opportunities between high- and low-middle-income countries. There is a critical need to integrate complementary training and educational modalities into local systems. Addressing the shortage of educational resources and promoting open-access initiatives in low-middle-income countries are essential steps toward enhancing surgical education and improving global otolaryngology healthcare outcomes.

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For affiliations refer to page 9.

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## 1 | Introduction

The need for high-quality otolaryngology–head and neck surgery (OHNS) care exists worldwide; however, access to timely, safe, and affordable OHNS service is distributed unequally across geographic regions and World Bank income distributions [1]. The 2015 Lancet Commission on Global Surgery demonstrated that at least 4.8 billion people do not have access to surgical care, including more than 95% of the population in South Asia and central, eastern, and western sub-Saharan Africa (SSA) [2, 3]. Comparatively, less than 5% of populations of high-income countries (HICs), such as Australia, North America, and Western Europe, lack access to surgical care [3]. This finding further emphasizes the need to study the reasons surrounding these disparities to work toward achieving equitable access to global OHNS care.

In a recent study, Petrucci et al. published a study identifying global disparities in the distribution of OHNS physicians [1]. For example, Africa and Southeast Asia have much lower OHNS clinician density (0.18 and 1.12 clinicians per 100,000) than Europe (5.70 clinicians per 100,000). While the causes of disparate access to OHNS care are multifactorial, a key driver of inequitable access to care is an unevenly distributed OHNS workforce directly impacted by the quality and location of OHNS training programs [1]. A 2012 survey of Central American countries demonstrated that across the fields of OHNS, audiology, and speech-language pathology, there was a lack of training programs with an accompanying absence of services provided [4]. Given the critical link between the availability of training and education and workforce density, a comprehensive understanding of training and education is required to create interventions necessary to bolster the OHNS workforce [5, 6]. The Global Otolaryngology–Head and Neck Surgery Initiative (Global OHNS Initiative) is an international research nonprofit organization comprised of over 350 members from more than 60 countries around the world that was formed to conduct research and advocacy to increase access to high-quality OHNS care globally [7]. As part of this effort, the Global OHNS Initiative conducted a series of provider surveys completed by otolaryngologists worldwide to better characterize gaps in infrastructure, workforce, service delivery, and training/education in OHNS care globally.

We surveyed OHNS physicians from all World Health Organization (WHO) regions about their training and education experience to learn which factors influenced their decisions regarding where they pursued OHNS training and have chosen to practice. This study aims to describe the relationship between the quality, content, and location of OHNS training and education and the ultimate downstream effect on the delivery of OHNS care.

## 2 | Methods

### 2.1 | Study Population

The Global OHNS Provider Survey, which was created over 2 years ago by the Global OHNS Initiative and experts in biostatistics and survey design (Supporting Information S1), gathered information about the education and training of

otolaryngologists globally and the impact of said training on their current practices. The survey, available in English, Spanish, French, Chinese, Arabic, and Russian, took 10 min to complete. OHNS providers from the 194 WHO member states and Taiwan were eligible to participate, excluding trainees. International input ensured that the definition of “OHNS provider” was globally applicable, with an OHNS physician defined as an expert in the field of otolaryngology.

Initial drafts underwent pilot testing with 15 OHNS providers from diverse income settings and regions to ensure clarity and relevance. Feedback informed revisions to language, question framing, and response options. For instance, terms like “preparedness” were rephrased for consistency across translations. Adjustments for regional and demographic differences included translation into six WHO-recognized languages. In addition, regional experts ensured that questions addressed region-specific training structures and practices. Statistical analyses were not adjusted for regional and demographic differences.

### 2.2 | Survey Design

Respondents provided demographic information, including age, gender, country of training, country of practice, years in practice, WHO facility level, and practice setting (i.e., urban/rural, public, private, or nongovernmental organization [NGO]). Questions also covered their training experiences, including the country of training, duration, subspecialty exposure, and factors influencing their choice of training location. Participants rated how well their training prepared them for common OHNS procedures and described the resources available during their training. In addition, the survey assessed their ability to perform common OHNS procedures in their current practice settings. Participants were asked about quality of training, defined as “the effectiveness and efficiency of the residency/training program in equipping the trainee with the necessary skills and knowledge they need to offer otorhinolaryngology services” and preparedness, defined as “the state of equipping one with the skills and knowledge necessary to handle otorhinolaryngology cases.”

### 2.3 | Data Collection

The encrypted Research Electronic Data Capture (REDCap) database was used to collect informed consent and survey responses [8, 9]. The survey was disseminated through three methods: first, via national and international OHNS professional societies to their members; second, through snowball sampling by the Global OHNS Initiative's Regional Representative Team; and third, through targeted social media posts with the survey link on the platform X. The recruitment period spanned from October 2022 to June 2023.

### 2.4 | Statistical Analysis

Survey responses were analyzed based on the WHO's geographic regions (Africa, the Americas, Southeast Asia, Europe, eastern Mediterranean, and western Pacific) and the World Bank's 2023 income classifications (low-income, lower-middle-income,

upper-middle-income, and high-income) [10, 11]. Population data were sourced from World Bank estimates, with additional data for Taiwan and Niue from the Central Intelligence Agency World Factbook [12, 13].

For our analysis, responses from HICs were compared to those from low-income, lower-middle-income, and upper-middle-income countries (LMIC). A dichotomous variable denoting the World Bank income group (HIC and LMIC) was used to create stratified demographic tables. Chi-squared tests were performed for categorical variables (gender, WHO region, facility level, practice setting), while *T* tests were applied to assess continuous variables (age). Chi-squared tests also evaluated the distribution of responses for 3-point and 5-point Likert survey questions, as well as dichotomous survey questions necessitating “Yes” or “No” responses (Supporting Information S1). Effect sizes of chi-squared tests were reported using Cramer’s *V*, where values of 0.25 and below were considered “small” effect sizes, 0.25–0.50 were considered “medium,” and 0.50 and above were considered “large.” Missing data were addressed by censoring them from the corresponding categorical analysis in question if the respondent was unable to answer the specific survey question. Two-sided *p* values with an  $\alpha$  of 0.05 were calculated. Statistical analyses were performed using R version 4.2.3.

## 2.5 | Ethical Approval

This study was approved by the Mass General Brigham Institutional Review Board (Protocol 2021P000076). Online informed consent was obtained for all participants.

## 3 | Results

### 3.1 | Survey Respondent Demographics

The demographic characteristics of the study participants are summarized in Table 1. A total of 91 participants were included in the analysis, with 47 (52%) practicing in HICs and 44 (48%) in LMICs. Sixty-one participants (67%) were male and 29 (32%) were female. One participant did not specify their gender as male or female. There was not a statistically significant difference in gender distribution between the two income groups ( $p=0.541$ ), with 64% of males in HICs and 70% in LMICs and 34% of females in HICs and 30% in LMICs. The median age of participants in years was 41 (38–53) in HICs and 43 (36–52) in LMICs, with no statistically significant difference ( $p=0.099$ ). Participants came from all seven WHO regions (Table 1). Most participants practiced primarily in urban settings (54%), while only 7.7% practiced in a strictly rural setting. There was a statistically significant difference in facility level between HICs and LMICs ( $p=0.025$ ) (Table 1).

### 3.2 | Training Location

While both HIC and LMIC respondents reported local availability of primary OHNS training (94% vs. 93%,  $p>0.999$ ), subspecialty training was less available in LMICs (32% vs. 64%;  $p=0.004$ ) (Table 2). HIC respondents were more likely to complete subspecialty training in their country of origin compared to LMIC respondents (55% vs. 30%;  $p<0.023$ ) (Table 2).

### 3.3 | Factors Influencing Training Location

There were no differences between HIC and LMIC respondents regarding the relative importance of the following factors when deciding where to train, ranked from most to least important: quality of training, local availability, cost, language of practice, social factors (e.g., family, culture), and emigration opportunities. Moreover, there were no statistically significant differences between these deciding factors among HIC and LMIC candidates, except for the quality of training ( $p<0.018$ ; Figure 1).

### 3.4 | Assessment Modalities

During their primary OHNS training, respondents in HICs and LMICs were assessed primarily by written and oral exams. While there were no statistically significant differences, a high proportion of LMIC respondents reported being assessed by each modality of assessment for primary training versus HIC respondents (Table 3). Inversely, a higher proportion of HIC participants reported being assessed by almost every assessment modality except for oral examinations during subspecialty training (Table 4). Seventeen percent of HIC respondents, compared to 9.1% of LMIC respondents ( $p=0.419$ ), reported that none of the assessment modalities were used during their subspecialty training.

### 3.5 | Availability of Training Resources

Respondents from LMICs and HICs had similar access to operating theaters and clinical experiences. Outside of clinical exposure, respondents in HICs reported higher access to resources such as webinars (HIC 63% vs. 29% LMIC;  $p=0.005$ ), conferences (HIC 63% vs. LMIC 36%;  $p=0.005$ ), journals (HIC 59% vs. LMIC 29%;  $p=0.012$ ), and short courses (HIC 61% vs. LMIC; 27%  $p=0.004$ ) (Figure 2). Those trained in LMICs reported no access to virtual or hands-on simulation exercises.

### 3.6 | Management of Various Conditions by OHNS Surgeons in the Primary Employment Setting

OHNS surgeons in HICs felt more confident that OHNS providers in their primary practice setting could manage cleft lip/palate repair (HIC 60%, LMIC 32%,  $p=0.016$ ) and functional endoscopic sinus surgery compared to LMIC respondents (HIC 93%, LMIC 76%,  $p=0.042$ ). In comparison, more LMIC respondents felt that their primary setting could manage drainage of peritonsillar abscess (HIC 87%, LMIC 100%  $p=0.045$ ; Table S1).

### 3.7 | Confidence Levels in Performing Procedures Post-Training

A higher proportion of OHNS providers in HICs felt “well” or “very well” prepared post-training to perform drainage of periorbital abscesses ( $p=0.004$ ), ear foreign body removal ( $p=0.005$ ), tonsillectomy and postoperative hemorrhage control ( $p=0.009$ ), and tracheostomy ( $p=0.022$ ) compared to their counterparts

**TABLE 1** | Participants demographics by World Bank income groups.

Characteristic	N	High-income country, N= 47 (52%)	Low, middle income country, N= 44 (48%)	p
Country income group				
Gender	91			0.541
Male		30 (64)	31 (70)	
Female		16 (34)	13 (30)	
Different term/other		1 (2.1)	0 (0)	
Age	91	41 (38, 53)	43 (36, 52)	0.099
World Health Organization region	91			< 0.001
Africa		0 (0)	21 (48)	
Americas		17 (36)	6 (14)	
Eastern Mediterranean		0 (0)	2 (4.5)	
Europe		8 (17)	3 (6.8)	
Southeast Asia		1 (2.1)	7 (16)	
Western Pacific		21 (45)	5 (11)	
Income group of training region	91			< 0.001
HIC		46 (98)	1 (2.3)	
LIC		0 (0)	13 (30)	
LMIC		1 (2.1)	19 (43)	
UMIC		0 (0)	11 (25)	
Region of practice	91			< 0.001
Americas		18 (38)	6 (14)	
Western Pacific		20 (43)	4 (9.1)	
Africa		0 (0)	22 (50)	
Europe		8 (17)	3 (6.8)	
Southeast Asia		0 (0)	8 (18)	
Eastern Mediterranean		1 (2.1)	1 (2.3)	
Country income group				
World Health Organization facility level	91			0.025
3		23 (49)	33 (75)	
2		19 (40)	7 (16)	
1		5 (11)	4 (9.1)	
Urban vs. rural	91			0.843
Urban		29 (62)	25 (57)	
Urban and rural		15 (32)	15 (34)	
Rural		3 (6.4)	4 (9.1)	

in LMICs, while more OHNS providers in LMICs felt “well” or “very well” prepared to perform irrigation-debridement of the external ear canal ( $p=0.039$ ). Interestingly, a higher proportion of OHNS provider in LMICs reported feeling “very well

prepared” across all the above procedures compared to their HIC colleagues. No significant differences were observed ( $p>0.05$ ) in the perceived preparedness of OHNS surgeons between HICs and LMICs for any other procedures (Table S2).

**TABLE 2** | Characteristics of OHNS training by World Bank income groups.

Characteristic	N	High-income country, N=47 (52%)	Low-middle-income country, N=44 (48%)	p	Cramer's V effect size <sup>a</sup>
Country income group					
Local training program availability	91				
Primary OHNS		44 (94)	41 (93)	0.999	0.000
Subspecialty		30 (64)	14 (32)	0.004	0.298
Diploma-granting program		15 (32)	12 (27)	0.799	0.027
% Left home country	84	23 (8, 28)	19 (9, 31)	0.280	
Specialty training location					
Home country	91	26 (55)	13 (30)	0.023	0.238
Home continent		5 (11)	3 (6.8)	0.785	0.029
Outside continent		4 (8.5)	9 (20)	0.184	0.139
Virtual/online		1 (2.1)	1 (2.3)	> 0.999	0.000
Country income group					
Home-trained specialty	91				
General OHNS		15 (32)	3 (6.8)	0.006	0.287
Otology		16 (34)	8 (18)	0.139	0.155
Neurotology/vestibular		17 (36)	3 (6.8)	0.002	0.328
Rhinology		21 (45)	4 (9.1)	<0.001	0.374
Allergy medicine		9 (19)	2 (4.5)	0.070	0.190
Head and neck oncologic surgery		4 (8.5)	8 (18)	0.293	0.110
Pediatric OHNS		10 (21)	4 (9.1)	0.187	0.138
Facial plastics		3 (6.4)	1 (2.3)	0.657	0.047
Sleep		1 (2.1)	3 (6.8)	0.563	0.061
Other		1 (2.1)	1 (2.3)	> 0.999	0.000

<sup>a</sup>Cramer's V values were reported for chi-squared tests. Values below 0.25 are considered "small," between 0.25 and 0.50 as "medium," and above 0.50 as "large."

## 4 | Discussion

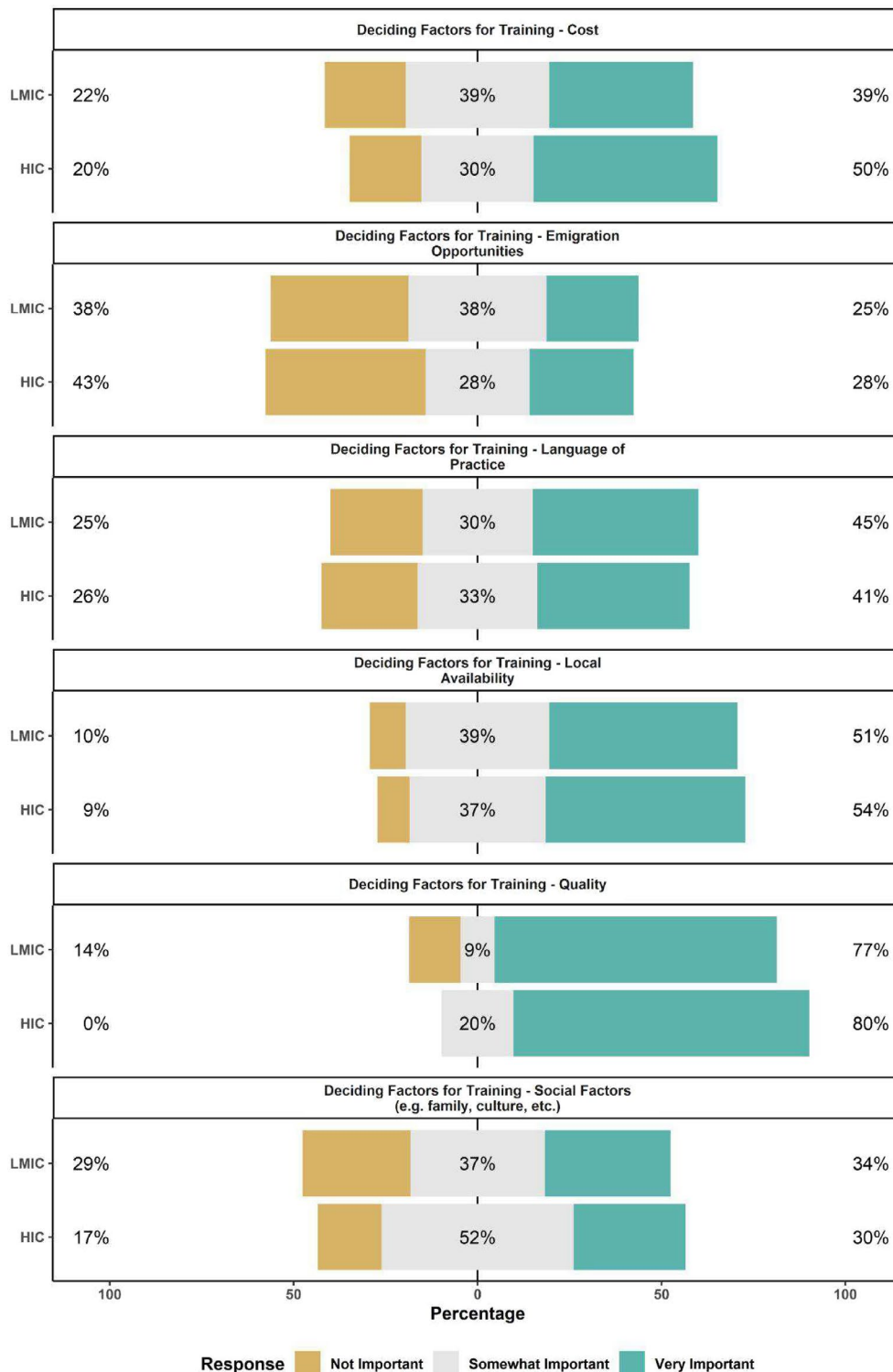
### 4.1 | Summary of Major Findings

This study highlights significant disparities in the availability of training and educational programs in OHNS between HICs and LMICs. Graduates from HICs reported higher confidence levels across a broader range of general otolaryngology procedures, including subspecialty procedures, compared to their LMIC counterparts. While both groups agreed on the key components of effective training programs, LMIC providers reported less access to local subspecialty training and more frequently sought subspecialty training abroad. Significant disparities were found in access to educational resources like webinars, journals, short courses, and simulations, with HICs having markedly better access compared to their LMIC counterparts.

### 4.2 | Brain Drain

The challenges faced by trainees and practicing physicians in under-resourced settings contribute to the "brain drain," where healthcare professionals migrate from their home countries to seek better opportunities [6, 14, 15]. These challenges include overwhelming disease burden, unreliable patient follow-up, limited access to surgical technology, insufficient operating room availability, and inadequate anesthesia and intensive care support [1, 5]. Such constraints push trainees to pursue opportunities in better-equipped institutions abroad, leading to a loss of skilled professionals in their home countries. While HIC and LMIC respondents reported similar access to primary OHNS training programs, LMIC respondents were less likely to have completed subspecialty training and reported lower availability of local subspecialty training opportunities. Our study also





**FIGURE 1** | Deciding factors for training by World Bank income groups.

demonstrated that 20% of regions have no OHNS training programs, increasing the need for LMIC trainees to seek opportunities outside of their region, with the lowest number of programs available in the western Pacific and African regions [5].

Our findings are supported by existing studies that describe the inequitable distribution of healthcare resources and opportunities within surgical care globally [2, 16, 17]. Prior research has

also consistently highlighted the pervasive disparities in the distribution of surgical training opportunities, especially in regions grappling with limited resources and infrastructure within global surgery and global OHNS. Furthermore, some estimates suggest that there are fewer than approximately less than 20 head and neck surgeons and two fellowship training programs in SSA for a population greater than 1 billion [5, 18, 19]. The lack of training programs leading trainees to train outside their home

**TABLE 3** | Assessment modalities for primary otolaryngology–head and neck surgery (OHNS) training by World Bank income groups.

Primary training summary assessment	N = 91	Country income group		p	Cramer's V effect size <sup>a</sup>
		High-income country, N = 47 (52%)	Low-middle-income country, N = 44 (48%)		
Written exam		35 (74)	38 (86)	0.246	0.122
Oral exam		30 (64)	37 (84)	0.051	0.205
No. procedures		24 (51)	27 (61)	0.437	0.082
Skill assessments		26 (55)	27 (61)	0.710	0.039
Other		2 (4.3)	3 (6.8)	0.940	0.008
Multimodal (written + oral + skill)		9 (19)	26 (59)	0.001	0.388
Multimodal (written + oral exams)		22 (47)	36 (82)	0.001	0.341

<sup>a</sup>Cramer's V values were reported for chi-squared tests. Values below 0.25 are considered "small," between 0.25 and 0.50 as "medium," and above 0.50 as "large."

**TABLE 4** | Assessment modalities for subspecialty otolaryngology–head and neck surgery (OHNS) training by World Bank income groups.

Specialty training summary assessment	N = 91	Country income group		p	Cramer's V effect size <sup>a</sup>
		High-income country, N = 47 (52%)	Low-middle-income country, N = 44 (48%)		
Written exam		18 (38)	11 (25)	0.256	0.119
Oral exam		7 (15)	9 (20)	0.674	0.044
No. procedures		14 (30)	10 (23)	0.599	0.055
Skill assessments		15 (32)	8 (18)	0.206	0.133
Other		1 (2.1)	3 (6.8)	0.563	0.061
None of the above		8 (17)	4 (9.1)	0.419	0.085

<sup>a</sup>Cramer's V values were reported for chi-squared tests. Values below 0.25 are considered "small," between 0.25 and 0.50 as "medium," and above 0.50 as "large."

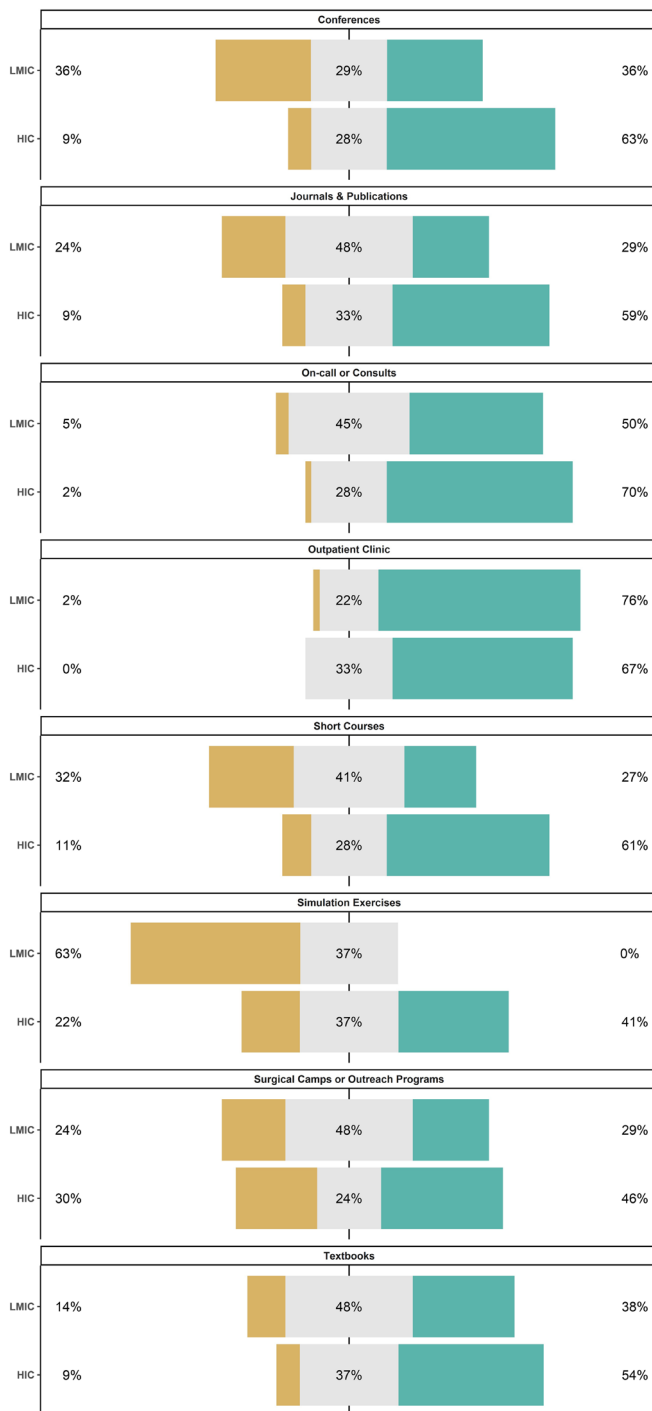
countries, likely coupled with additional barriers such as lack of infrastructure and equipment, may exacerbate the "brain drain" phenomenon.

### 4.3 | The Need for Local Programs

Local training programs are essential for retaining healthcare professionals and addressing the shortage of trained OHNS surgeons in LMICs. These programs offer familiarity with local colleagues, medical systems, and social norms, which can reduce the financial and nonfinancial costs associated with international training [5]. For instance, the College of Surgeons of East, Central, and Southern Africa (COSECSA) has shown high retention rates in its local training programs [20]. Improving retention rates and local workforce density has clinical significance. Increased workforce densities for specific surgical subspecialties have been shown to correlate with improved disease outcomes, including OHNS care [3, 21]. Developing regional centers of excellence, such as COSECSA's centers for minimally invasive surgery, cardiothoracic surgery, and pediatric orthopedics, can serve as models for local OHNS subspecialty training [22].

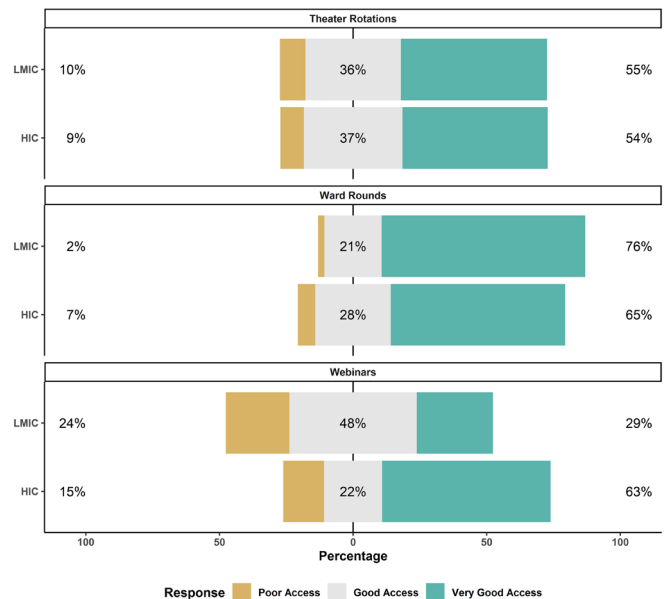
Our findings demonstrated no differences in the important factors in selecting a training program between HIC and LMIC respondents, with quality of training, local availability, and affordability cited as some of the most important factors. Importantly, we found that while these selection criteria were similar, there were differences in the availability of finding suitable OHNS training programs locally.

Although there was similar access to training, fewer LMIC physicians reported prepared post-training to manage several common procedures, such as post-tonsillectomy hemorrhage and tracheostomy, as well as less confidence to perform procedures such as FESS in their primary practice setting. HIC OHNS surgeons graduated with greater confidence across a wider range of procedures, including many subspecialty procedures such as cleft lip and palate repairs and functional endoscopic sinus surgery, while LMIC respondents reported that they were more confident in managing common conditions such as peritonsillar abscesses than their HIC counterparts. These differences may reflect discrepancies in training curricula, training personnel, physician perceptions, clinical cases seen during training, equipment availability, or subspecialty training availability.



**FIGURE 2** | Availability of training resources by World Bank income groups.

These findings underscore the need for increased local OHNS training programs, with a particular focus on building capacity for subspecialty training in LMICs. Historically, opportunities for training and education in surgery have emphasized short-term surgical trips, international fellowships, and, more recently, online fellowship opportunities and shorter clinical observation opportunities. These opportunities may not provide contextually specific surgical training and education. For example, they may not focus on locally prevalent conditions or teach resource-appropriate training. Robust training programs for primary and subspecialty OHNS care are essential to



**FIGURE 2** | (Continued)

building capacity and scaling OHNS care globally in a sustainable fashion.

#### 4.4 | Access to Educational Resources and Solutions

LMIC respondents reported lower access to educational resources such as journals, conferences, and webinars, with 24% of LMIC respondents reporting no access to journals or webinars and 36% reporting no access to conferences (compared to 8.7%, 15%, and 8.7% of HIC respondents, respectively). There is a need to improve access to educational resources in LMICs through local journals and other novel, inexpensive resources that trainees can easily access [23]. Self-reported perceived surgical exposure during training was equal across LMICs and HICs; however, this study did not evaluate the objective metrics of surgical exposure quality or volume. Future studies investigating the number and complexity of cases performed as the first assistant and primary surgeon may help better characterize differences in surgical exposure across training programs. In addition, integrating simulation into OHNS education is a vital emerging resource for both LMICs and HICs, as it provides trainees with exposure to diverse and challenging clinical scenarios, enhancing their skill set with no risk to patients [24]. Early integration of simulation into the training curricula of medical students may be particularly important in LMICs, where graduating medical students are often required to serve as general practitioners who manage a significant volume of primary presentations of OHNS conditions [25].

#### 4.5 | Health Policy Level Changes

At the health policy level, several changes can help address the disparities in OHNS training and practice. Task shifting, which involves training advanced practice providers, nurses, and general practitioners to perform specific OHNS procedures, can improve access to care in underserved areas. For instance, in underserved



areas with a shortage of specialized OHNS surgeons, nurses, community health workers, or general practitioners could be trained to perform specific procedures such as ear irrigation, foreign body extrusion for the ear/nose, or basic nasal procedures (e.g., cauterization, nasal tampon insertion) to significantly improve access to care [22, 26, 27]. Moreover, investment in local training programs and infrastructure is crucial. As local OHNS training programs are scaled, national health systems should consider a multimodality and complementary approach to surgical education. Supporting the development of robust training programs for both primary and subspecialty, OHNS care can build capacity and enhance the sustainability of OHNS services in LMICs. Engaging local governments, ministries of health, and academic centers is vital for the long-term success of these initiatives.

#### 4.6 | Strengths and Limitations

The strengths of our study include a diverse respondent pool, particularly from LMICs, which accounted for 48% of the respondents, with at least one respondent from each of the WHO regions. In addition, all respondents were OHNS providers who were able to assess the quality of the OHNS training program firsthand. Finally, the survey asked about training and education across a variety of domains, which enabled a comprehensive evaluation. However, the study was limited by a small sample size and potential response bias, given the snowball sampling method used to recruit participants and a focus on respondents from urban/tertiary centers, which may impact our conclusions by overrepresenting providers with greater access to resources or more favorable training experiences, thus painting an overly optimistic picture of training quality or preparedness. The underrepresentation of certain regions might lead to incomplete assessments of global disparities. Mitigating these limitations in future studies could involve employing randomized sampling techniques, broader dissemination strategies, and weighting responses to better reflect global demographics. Furthermore, the snowball sampling method may have overrepresented individuals affiliated with professional societies or those with internet access. This could skew responses toward individuals with higher resource access. Future studies could mitigate this by employing randomized sampling within government databases. Regions with fewer respondents (e.g., Eastern Mediterranean) may limit the generalizability of findings. Targeted recruitment strategies could help ensure equitable representation. These biases highlight the need for careful interpretation of results and improved methodologies in subsequent research.

In addition, while the study captured confidence in procedural skills, it did not evaluate the actual competence of these skills. Furthermore, the study did not specifically evaluate training for advanced practice providers, audiologists, speech-language pathologists, or multidisciplinary teams. Future research should explore the quality and volume of surgical training and its direct link to patient outcomes, as well as perspectives from audiologists and speech-language pathologists.

#### 5 | Conclusion

Significant disparities exist in OHNS training resources and subspecialty training opportunities between HICs and LMICs,

leading many LMIC providers to seek training abroad. There is a critical need to integrate complementary training and educational modalities into local systems. Addressing the shortage of educational resources and promoting open-access initiatives in LMICs are essential steps toward enhancing surgical education and improving global OHNS healthcare outcomes.

#### Affiliations

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#### Acknowledgments

We thank the International Federation of ORL Societies (IFOS) for their support in survey dissemination. We also acknowledge Mahmood Bhutta, Lauren Dillard, Keshav Shah, Isaie Ncogoza, Hudson Lin, Keith Potent, and Ibrahim Hamdoun for their contributions.

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## Supporting Information

Additional supporting information can be found online in the Supporting Information section.