Signing On: A New Chapter in Medical Education for Inclusive Care; Scoping Review

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ABSTRACT

Patients with sensory disabilities, including deafness and hearing loss (D&HH), continue to face significant communication barriers with healthcare providers, adversely affecting the quality of care they receive. Despite this, only a limited number of medical schools incorporate formal education on Deaf awareness. This review investigates how deaf competency training can be integrated into medical education to enhance student awareness and improve health outcomes for the D&HH community. Articles were sourced from PubMed, EMBASE, and OVID Medline using MeSH (Medical Subject Headings) terms and keywords. Studies were included if they were published in English, focused on medical students, and discussed the benefits of Deaf awareness and American Sign Language (ASL) training. Exclusion criteria encompassed studies not relevant to medical students, non-medical contexts, incomplete articles, and retracted studies. The review analyzed nine relevant articles spanning a total of 959 participants. It was found that professional development workshops significantly increased Deaf awareness and improved attitudes among medical students. Notably, these workshops fostered a deeper understanding of the unique challenges faced by the D&HH community, highlighting the importance of effective communication strategies in clinical settings. However, the limited literature on Deaf awareness training in medical curricula, coupled with small sample sizes in existing studies, restricts the ability to draw definitive conclusions. Future research should prioritize developing clinically relevant and specialty-specific Deaf awareness training programs, while also considering longer workshop durations to enhance effectiveness. Such initiatives could ultimately improve health outcomes for the D&HH community and promote more inclusive healthcare.

RÉSUMÉ

Les patients ayant des handicaps sensoriels, y compris la surdité et la perte d'audition, continuent d'être confrontés à d'importants obstacles à la communication avec les prestataires de soins de santé, ce qui nuit à la qualité des soins qu'ils reçoivent. Malgré cela, seul un nombre limité d'écoles de médecine intègrent un enseignement formel sur la sensibilisation à la surdité. Cette revue étudie la manière dont la formation aux compétences en matière de la surdité peut être intégrée dans l'enseignement médical afin de sensibiliser les étudiants et d'améliorer les résultats en matière de santé pour la communauté sourde et malentendante (SM). Les articles ont été recherchés dans PubMed, EMBASE et OVID Medline en utilisant des termes et des mots-clés MeSH (acronyme anglais : Medical Subject Headings). Les études ont été retenues si elles étaient publiées en anglais, si elles portaient sur des étudiants en médecine et si elles traitaient des avantages de la sensibilisation à la surdité et de la formation à la langue des signes américaine (acronyme anglais : ASL). Les critères d'exclusion comprenaient les études non pertinentes pour les étudiants en médecine, les contextes non médicaux, les articles incomplets et les études rétractées. La revue a analysé neuf articles pertinents couvrant un total de 959 participants. Il a été constaté que les ateliers de développement professionnel augmentaient de manière significative la sensibilisation à la surdité et amélioraient les attitudes des étudiants en médecine. Ces ateliers ont notamment favorisé une meilleure compréhension des défis uniques auxquels est confrontée la communauté SM, soulignant l'importance de stratégies de communication efficaces dans les milieux cliniques. Cependant, la littérature limitée sur la formation à la sensibilisation à la surdité dans les programmes d'études médicales, associée à la petite taille des échantillons dans les études existantes, limite la capacité à tirer des conclusions définitives. Les recherches futures devraient donner la priorité à l'élaboration de programmes de formation à la sensibilisation à la surdité cliniquement pertinents et spécifiques à une spécialité, tout en envisageant également des durées d'atelier plus longues pour améliorer l'efficacité. De telles initiatives pourraient en fin de compte améliorer les résultats en matière de santé pour la communauté SM et promouvoir des soins de santé plus inclusifs.

INTRODUCTION

Effective patient communication has gained significant prominence in medical education, reflecting the evolving patient-provider dynamic toward an equal partnership characterized by shared decision-making.[1] This focus is anticipated to enable medical students to cultivate positive relationships with their patients across diverse contexts.[1] However, patients with specific sensory disabilities, such as deafness and hard of hearing (D&HH), continue to face substantial communication barriers with their physicians, hindering the quality of care they receive.[2] 'Deaf' refers to individuals who use American Sign Language (ASL) as their primary mode of communication.[3]. Individuals who are D&HH frequently report feelings of isolation and mistrust in healthcare settings, while. Meanwhile, physicians often feel inadequately prepared to care for D&HH patients and exhibit limited understanding of deaf culture.[2-5] As a result, D&HH individuals frequently experience substandard patient care, contributing to significant health disparities within this population.[6] The cumulative impact of these challenges has strained the patient-physician relationship, fostering mistrust and leading to a reluctance among the D&HH community to seek healthcare services.[7] This lack of trust not only limits access to necessary medical care but also exacerbates existing health inequalities, highlighting the urgent need for improved communication strategies and culturally competent care.

The medical community has increasingly recognized the importance of sensitivity training within medical curricula. However, only a limited number of medical schools provide formal education on Deaf awareness, and there is currently no established educational standard for understanding Deaf culture.[3-5] This gap is further evidenced by the fact that most students and practicing physicians lack even basic proficiency in sign language.[8] This deficiency not only hampers effective communication with D&HH patients but also underscores the critical need for comprehensive training programs that encompass both Deaf culture and communication skills.

Research has demonstrated that Deaf culture competency training in medical education can enhance the capacity for care and appreciation for the Deaf community.[9] Following training, many students agree that formal Deaf competency training complements holistic medical practices.[3] As students develop their signing skills and demonstrate a heightened sensitivity to Deaf culture, it is anticipated that Deaf patients are more likely to feel valued and experience better health outcomes.[7] Therefore, there is a compelling rationale for incorporating Deaf competency training into medical education. By equipping future healthcare professionals with the necessary skills and cultural understanding, we can enhance communication, foster trust, and ultimately improve the quality of care provided to D&HH patients.

This review aims to investigate how Deaf competency training can be integrated into medical education to enhance student awareness and improve health outcomes for the D&HH community.

METHODS

Article Collection

The articles were collected from the electronic databases PubMed, EMBASE, and OVID Medline. The search involved MeSH (Medical Subject Headings) terms, keywords, and title and abstract searches. The following terms were used for MeSH and Keyword searches: medical education, clinical education, health education, sign language, hearing-impaired. The following terms were used for MeSH searches only: hearing loss, hearing disorder medical student, clinical competence, medical school. The following terms were used for Keyword searches only: medical train, undergraduate medical, clerkship, pre-clerkship, medical instruction, medical apprentice, medical preparation, hearing impairment, persons with hearing impairments, deaf culture, deaf, ASL, American Sign Language, hard of hearing, hearing-disabled, HOH, D&HH, deaf patient.

Article Selection

The criteria for inclusion focused on articles that 1) were published in English; 2) specifically addressed medical students and medical education; and 3) discussed the advantages of deaf awareness and ASL training for these students. Articles were excluded if they: 1) pertained to undergraduate or graduate students in higher education settings; 2) examined deaf awareness and ASL training in contexts outside of medical education (such as workplace training); 3) covered topics related to humanity that did not focus on deaf awareness or ASL; 4) were not full articles (including abstracts and posters); or 5) had been retracted. This selection process is illustrated in Figure 1.

RESULTS

After consulting the preliminary search criteria, a total of 349 papers were collected (PubMed: 188, OVID Medline: 93, EMBASE: 68). Then, 174 duplicates were removed leaving 175 papers for further screening. Next, a title review was conducted and further reduced the relevant articles to 21. An abstract review then condensed the article number to 11 and a deeper manuscript review resulted in 9 papers that were relevant to the research question and fit within the inclusion criteria. Articles were excluded based on a predetermined exclusion criterion. The article review process is detailed in Table 1.

The nine articles analyzed comprised five quantitative study designs, two qualitative study designs, one mixed-method design, and one letter to the editor. Notably, seven of the nine articles included a professional development workshop, or a similar format (such as a course or module) aimed at enhancing Deaf awareness among medical students. The remaining two articles employed survey methodologies to evaluate existing Deaf awareness and training practices across medical institutions. Each study utilized distinct metrics to evaluate or survey deaf cultural competency. Perlov and Lapinski implemented pre- and post-test surveys to measure changes in participants' beliefs and knowledge about deaf culture after participating in their workshops.[3,11] Hoang, Kung, Gilmore, and McGlade utilized a survey to explore medical students' perceptions and knowledge of Deaf culture, while also examining current strategies for integrating deaf awareness into medical education.[8-10,13] Narayan and O'Neill relied on pre-established instructor assessments to evaluate student performance during or after their workshops, providing a structured framework for gauging the effectiveness of their instructional methods.[5,12] Importantly, all variations of the professional development workshops resulted in an increase in Deaf awareness and fostered more positive attitudes toward D&HH individuals.[3,5,9-11] All studies employing pre- and post-intervention knowledge assessments revealed that medical students who completed a sign language program demonstrated greater knowledge and more positive attitudes toward Deaf culture compared to those who did not participate in the program.[9-10] Furthermore, many students reported that the professional development workshops were both enjoyable and beneficial for their peers in medical education.[2,12]

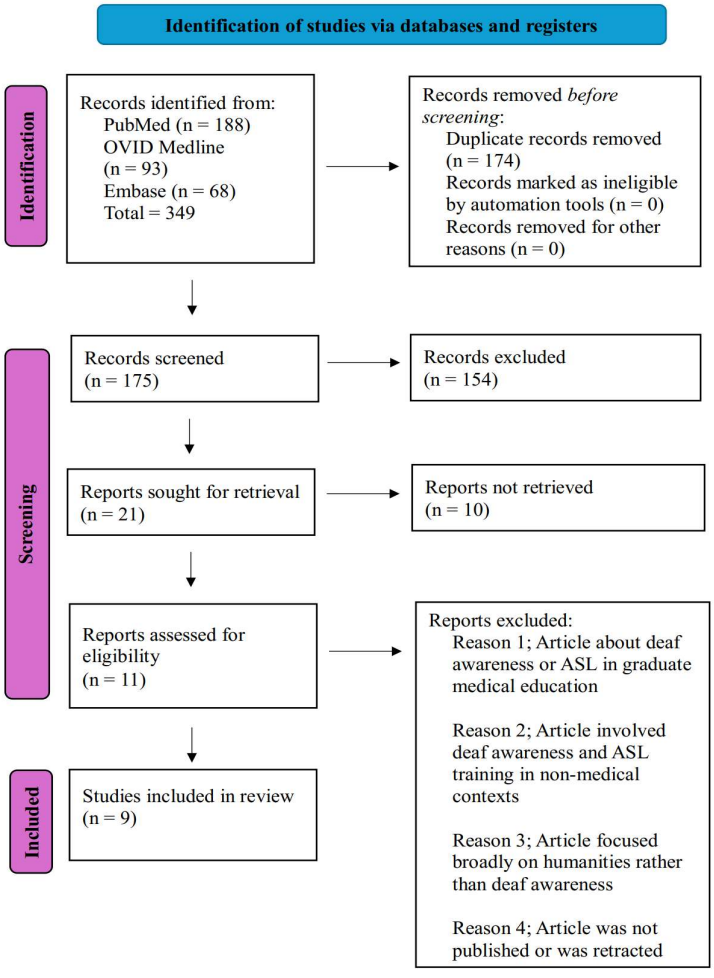

Figure 1. PRISMA flowchart for article selection

A common strength in the studies conducted by O'Neill, Gilmore, Lapinski, Narayan, Hoang, Smith and Perlov were the inclusion of clear goals for the successful implementation of each professional development workshop.[2-3,5,9-12] Moreover, the attainment of these goals was systematically evaluated in each respective study. A notable strength of the literature by Kung was its comprehensive assessment of Deaf awareness across all four years of medical school (n=158), while McGlade conducted a survey encompassing all medical schools in the UK and Ireland (n=38) for a broader analysis.[8,13] The studies conducted by Narayan and Smith demonstrated a notable strength in their incorporation of patient-interviewing training within their workshops, which significantly enhanced the practical applicability of Deaf awareness training.[2,5] This comprehensive approach underscores the importance of longitudinal evaluation and diverse training methods in fostering effective communication between healthcare providers and D&HH patients. However, several limitations were evident in the studies by Smith, Perlov, Lapinski, and O'Neill, particularly the relatively short duration of the workshops, which

Table 1. Summary of how medical schools have implemented deaf awareness training into medical education (9 articles)

Author	Modality	Reported Advantages	Reported Disadvantages
Smith and Hasnip[2]	Professional development course	Increasing deaf awareness Promotes reflective attitudes Improves clinical communication skills Increasing empathy by role-playing	Course lasts one day so attitudes may not persist Self-selection bias
Lapinski et al.[3]	Professional development workshop	Increasing proficiency in ASL Increasing deaf awareness Increasing appreciation and interest for the deaf community	Workshop started very early and lasted more than one day Low sample size (n=33) Difficult to assess clinical application No follow-up test for knowledge retention Lack of control group Self-selection bias
Narayan[5]	Professional development course	Improving proficiency in ASL Increasing deaf culture awareness Improving clinical interviewing skills Promotes empathy	Low retention due to busy school schedule
Kung et al.[8]	Questionnaire-based survey	Assessing deaf awareness across all four medical school years	Self-selection bias
Hoang et al.[9]	Professional development program	Improving knowledge on deaf culture Promotes reflective attitude	Low sample size (n=22) Self-selection bias Lack of specificity in survey questions
Gilmore et al.[10]	Professional development module	Improving deaf awareness Promotes positive attitude towards deaf persons Promotes knowledge sharing through teaching methods	Knowledge and attitude do not persist over time Low response rate (15.7%) Module is biased toward students who had a pre-existing interest in sign language Less accessibility due to non-universal sign language Self-selection bias
Perlov et al.[11]	Professional development course	Increasing deaf culture awareness	Knowledge across some facets of deaf culture did not differ after course Low sample size (n=<98)
O'Neill et al.[12]	Professional development module	Improving communication with deaf patients Increasing awareness of the impact of deafness on peoples' lives and deaf culture	Low Sample Size (n=54)
McGlade et al.[13]	Questionnaire-based survey	Surveys deaf training practices across a broad range of medical institutions	N/A

ranged from 4 to 72 hours (24 hours, 10 hours, 4 hours, and 72 hours respectively).[2-3,11-12] These time constraints could limit the depth and long-term impact of the training. Additionally, Smith's study lacked an objective assessment to evaluate the overall effectiveness of the Deaf awareness course, a significant weakness that diminishes the ability to measure the true efficacy of the training program.[2]

A detailed account of survey questions and knowledge tests was a strength in Kung and Hoang's study, respectively.[8-9] A common problem cited by Gilmore, Lapinski, Hoang, Perlov and O'Neill were a low sample size (n=52, 33, 22, 98, 54 respectively).[3,9-12] Additionally, both Gilmore and Perlov reported low response rates (15.7% and 15% respectively).[10-11] In addition to a low sample size, the voluntary participation of the individuals in Lapinski, Kung, Gilmore, Hoang and Smith's study may have contributed to self-selection bias.[2-3,8-10] The results are shown in Table 1.

Overall, medical students who participated in the deaf awareness workshops gained an increased understanding of deaf culture and developed a more positive attitude towards D&HH people.[2-3,5,9-12] In some workshops, students gained direct proficiency in ASL and reported satisfaction in being able to communicate with deaf patients.[3,12] Finally, some workshops allowed students to gain direct skills in clinical interviewing and communication while promoting reflective attitudes and empathetic role-taking.[2-3,5,9,12]

DISCUSSION

As of 2017, individuals who are Deaf and Hard of Hearing (D&HH) represent 15.9% of the adult population in the United States, making ASL the third most commonly used language in the country.[6,14] Despite this significant demographic presence, D&HH individuals encounter numerous language and educational barriers that hinder their ability to access information and receive equitable healthcare.[6]

Deaf awareness training aims to address these disparities by enabling medical students to cultivate a deeper understanding of the D&HH community, equipping them with the skills necessary to deliver culturally competent care in future practices.[6] This training not only emphasizes the unique linguistic and cultural aspects of the D&HH community but also fosters empathy and effective communication strategies that can enhance patient-provider interactions. Through hands-on activities, such as role-playing and shadowing interpreters, students can gain practical insights into the challenges faced by D&HH individuals in healthcare settings.

This article explores various methods of implementing Deaf awareness training within medical institutions. Each method will be evaluated based on its strengths, such as the capacity to deliver real-time feedback and foster interactive learning experiences, as well as its limitations, including potential challenges related to accessibility and participant engagement. Through an analysis of these varied approaches, this article aims to identify effective strategies for incorporating Deaf awareness training into medical education, with the ultimate goal of enhancing health outcomes for the D&HH community and addressing disparities in healthcare access and quality.

Professional Development Workshop

Surprisingly, the most common method of delivering Deaf awareness training identified in the reviewed articles was through professional development workshops. These workshops varied in their structure but generally incorporated a blend of elements designed to enhance participants' understanding and skills. Components typically included lectures, knowledge assessments, American Sign Language (ASL) training, clinical skills development, reflective exercises, and role-playing activities.[2-3,5,9-12] While each of these workshops demonstrated positive outcomes in increasing Deaf awareness among participants, there were notable limitations across the studies that should be considered.

A significant drawback noted in many of the studies was the small sample sizes or low response rates, which raised concerns about the generalizability of the findings.[3,9-11] Many of the studies relied on participants who voluntarily opted in, which may introduce bias by attracting individuals with a pre-existing interest in Deaf culture or a background in related training.[2-3,8-10] This self-selection bias means that the participants in these studies may not accurately represent the broader population of medical professionals, potentially skewing the results toward individuals already more attuned to issues pertaining to Deaf awareness. Additionally, researchers did not always screen participants for previous exposure to Deaf awareness training, further complicating the ability to assess the true impact of the workshops. This lack of screening could mean that some participants already had a foundational understanding of the subject, influencing the overall outcomes and limiting

the ability to measure the training's effectiveness in a more diverse group of healthcare professionals.

Given these limitations, it is crucial for future research to address these biases by implementing more rigorous participant recruitment strategies, such as random sampling or ensuring a more balanced representation of healthcare professionals with varying levels of prior knowledge. Additionally, studies should consider controlling for prior exposure to Deaf awareness training to better isolate the effects of the intervention itself. These improvements could lead to more reliable conclusions regarding the effectiveness of different training approaches and their applicability to a wider range of healthcare providers.

Clinical Application

Gathering and providing information to patients has been a fundamental principle of physician communication.[15] However, many physicians are not adequately prepared to deliver linguistically competent care to Deaf patients.[9] Narayan aimed to address this gap by incorporating clinically relevant training into the professional development workshop.[5] Students were afforded the opportunity to practice their clinical interviewing skills in ASL and shadow a medical interpreter to gain insights into the nuances of Deaf medical communication (n=89).[5] In a study conducted by Smith, students practiced formulating simple diagnostic questions in ASL and interpreting responses (n=415).[2] Subsequently, they engaged in a role-playing scenario where they were tasked with reaching a diagnosis through clinical consultation with a Deaf participant.[2] This approach provides students with the opportunity to apply their newly acquired ASL skills in a realistic and practical context, enhancing the relevance and utility of the training. In a meta-analysis conducted by Hattie, 51 studies were reviewed to evaluate how various teaching interventions impact student learning outcomes.[16] The findings exemplified that a high degree of learning and cognitive awareness is achieved when training is conducted in conjunction with a simulated, real-world context.[16] This suggests that medical students, when exposed to sign language training within simulated clinical environments, are more likely to effectively transfer their skills to real clinical situations involving Deaf and hard-of-hearing patients. Such immersive learning experiences enable students to bridge the gap between theoretical knowledge and practical application, ultimately improving their ability to communicate with Deaf patients in a way that is both efficient and empathetic. Therefore, incorporating sign language training into medical curricula alongside clinical simulations could be a highly effective strategy for enhancing both the competence and confidence of healthcare professionals in providing care to the D&HH community.

Specialty-specific training

Certain medical specialties necessitate more frequent day-to-day communication than other disciplines, which include interactions with patients or families who may be D&HH. Therefore, Deaf communication training should be tailored to each clerkship rotation in medical school to ensure that students are adequately prepared to communicate effectively in sign language across all medical disciplines. Customizing training in this manner will help future physicians develop the necessary skills to provide inclusive care, fostering accessibility.

In a study conducted by Zelesniak, physicians ranked various medical specialties based on the level of social interactive competency required, with radiology receiving the highest ranking. This finding highlights the importance of incorporating Deaf communication training across a variety of specialties, as even fields traditionally perceived as less interactive may encounter situations where effective communication with D&HH patients is essential. By equipping medical students with tailored training that aligns with the specific demands of their future specialties, medical education can better prepare them for real-world clinical scenarios, ultimately improving patient care and satisfaction for the D&HH community.[17] Consequently, a sign language course specifically designed for radiology could emphasize key terminology and phrases that are commonly used within that specialty.

Limitations

There are several limitations to this scoping review. Firstly, there is a paucity of literature concerning the implementation of deaf awareness training in medical curricula, which limits the ability to draw definitive conclusions about the efficacy of such training. As new research emerges, the findings of this review may evolve. Additionally, the search criteria employed may have inadvertently excluded relevant and insightful articles, particularly those focused on different dialects of sign language that could enrich our understanding.

Among the articles selected for inclusion, many were brief and did not adequately address their own limitations, mak-

ing it challenging to evaluate their results comprehensively. Moreover, the variability in the quality of the studies reviewed poses a challenge in synthesizing findings across different contexts.

To improve the effectiveness of Deaf awareness training in medical curricula, future research should consider extending the duration of workshops to allow for a more thorough assessment of long-term learning outcomes and the overall efficacy of the training. Longer, more sustained interventions could provide participants with greater opportunities to internalize and apply key concepts related to Deaf culture and communication, ensuring that the knowledge gained is both retained and utilized in clinical settings. Additionally, extended training periods may allow for more comprehensive evaluations, including the assessment of real-world impact on patient interactions and healthcare outcomes for Deaf and hard-of-hearing individuals.

Future studies should explore a wider range of delivery methods for Deaf awareness training. This could include variations in the format (e.g., in-person workshops, online modules, or hybrid models), the integration of interactive components (e.g., role-playing or simulations), and the use of diverse teaching tools (e.g., video case studies, guest speakers from the Deaf community, or immersive experiences). By examining the effectiveness of these different approaches, research will be better positioned to provide robust, evidence-based recommendations for integrating Deaf awareness training into medical education. Such studies could also identify best practices for overcoming challenges related to accessibility, engagement, and learner retention, ultimately ensuring that healthcare professionals are equipped with the knowledge and skills necessary to provide high-quality care to Deaf and hard-of-hearing patients.

CONCLUSION

This review underscores the substantial benefits of integrating Deaf awareness training into medical education, highlighting its potential to enhance the overall quality of healthcare delivery. As medical institutions continue to explore innovative strategies for fostering a more holistic and comprehensive approach to education, it is essential to recognize Deaf awareness training as a key component of the curriculum. By incorporating such training, medical schools can better equip future physicians with the skills and knowledge necessary to address the diverse needs of their patients, particularly those who are Deaf or hard-of-hearing.

In doing so, institutions can expand the scope of care that medical professionals are prepared to provide, creating a more inclusive and responsive healthcare environment. This approach not only strengthens students' communication skills but also cultivates a deeper understanding of the unique challenges faced by D&HH individuals. Such a perspective is crucial for developing empathy and improving the quality of care provided to this community. Ultimately, embracing Deaf awareness training leads to better patient outcomes, as healthcare providers are better positioned to meet the needs of all patients, particularly those from marginalized groups who may otherwise experience barriers to equitable care.

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Conflicts of Interest Disclosure
There are no conflicts of interest to declare.