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Can you hear me? Physicians' attitudes and knowledge on the principles of communicating with hearing-impaired older adult

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Abstract

Background Hearing impairment is a prevalent barrier to communication that significantly affects older adults. This study explores family physicians' knowledge and attitudes towards communicating with hearing-impaired older patients.

Methods A cross-sectional study was conducted among family physicians at Clalit Healthcare Services clinics in southern Israel. The study included a video illustrating 12 common errors made when communicating with hearing-impaired older patients.

Results Among the 101 participating family physicians, only 15.8% reported adequate training in medical school on treating these patients, and 17.8% during residency. On average, physicians identified 2.25 ± 1.35 errors of the 12 possible ones shown in the video. Ten physicians (9.9%) failed to identify any errors. Twenty-three (22.8%) identified one error, 25 (24.8%) found two, and 24 (23.8%) identified three, thirteen (11.9%) four, and 6 (5.9%) found five mistakes. No participant identified six or more mistakes. The only statistically significant variable for identifying more than three communication errors was the physician's perceived low or very low comfort level with communication skills during visits with hearing-impaired older adults (OR = 0.337, 95% CI: 0.126—0.900, $p = 0.030$).

Conclusions The findings highlight the importance of ongoing medical education programs to improve communication strategies for healthcare providers treating hearing-impaired older adults.

Keywords Older adults, Hearing impairmen, Physicians, Communication

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Introduction

Hearing impairment is a common communication barrier that can have significant deleterious consequences for cognitive, social, and emotional abilities [1]. Although it is relatively rare in younger populations, the prevalence of hearing impairment increases substantially with age, due to age-related sensorineural hearing loss [2]. Among those over the age of 65, nearly 1 in 3 adults suffers from hearing loss [3]. No epidemiological data have been collected through research in Israel. However, a World Health Organization survey classified Israel as a high-income country and estimated that close to 4.6% of the population suffered from hearing impairment as of 2018 [3].

The most common cause of hearing loss among older adults worldwide is presbycusis, or age-related sensorineural hearing loss [4]. Presbycusis, whose prevalence increases with age [4], is a complex and multifactorial disorder characterized by symmetrical and progressive hearing loss over the years, that significantly impacts the quality of life of millions of older adults.

Effective communication between physicians and patients is crucial for a successful patient- physician relationship, quality healthcare, accurate diagnosis, and patient-centered care. As stated by the International Consensus Panel in the 1990 s, "effective communication between a physician and a patient is a central clinical function" [5]. For the older adults population, communication is an essential tool for implementing person-centered care, an approach advocated by the World Health Organization [6]. Studies have also highlighted the importance of communication between caregiver and hearing-impaired older adults patients in ensuring quality, safety, and patient-centered care [7]. Proper communication involves greeting patients warmly and openly, determining their preferred communication method from the outset, minimizing background noise, ensuring adequate lighting to enhance visual cues, speaking expressively, maintaining eye contact, adjusting speech pitch as needed, clearly indicating topic changes and checking for understanding, ensuring the patient follows the conversation and no misunderstandings occur, rephrasing information when necessary, utilizing assistive hearing devices, providing written notes for clarification, periodically inquiring about communication quality, and encouraging patients to repeat key points [8]. Collaborating with patients to identify and implement effective communication strategies has been found to be effective [8]. However, many physicians do not use dedicated communication strategies for this population and some have even reported discomfort when working with hearing-impaired patients [9, 10]. Despite the potential benefit, many individuals with hearing impairment refrain from using assistive devices, for reasons that include lack of a healthcare professional's recommendation, and discomfort wearing hearing aids [11]. The severity of hearing impairment also plays a significant role in the efficiency of communication with healthcare providers [12, 13]. The challenges faced by deaf and hearing-impaired individuals in various medical settings, from waiting rooms to physical examinations, consultations, and delivery of instructions, have been documented [14]. Despite the crucial role of medical training in preparing physicians to effectively manage hearing-impaired patients, medical schools and residency programs often fall short in providing adequate instruction on communication strategies for this population [15]. This deficiency, coupled with a widespread lack of awareness among physicians regarding the importance of identifying and addressing hearing impairment in patients, contributes to significant gaps in patient care [15, 16].

A comprehensive review of the medical literature published in 2017 by Cohen et al. revealed a scarcity of research on hearing impairment and its impact on patient-physician communication. Of 409 articles identified using the key phrase "older patient-physician communication," only 16 studies (3.9%) addressed hearing impairment, and only three explored the direct relationship between hearing impairment and quality of communication. Notably, only one study investigated interventions aimed at improving communication with hearing-impaired patients [16].

There is a clear gap in physician training and preparedness to communicate effectively with hearing-impaired older patients. Despite the growing prevalence of hearing impairment in the aging population and its significant impact on quality of care, many physicians lack the necessary skills and strategies to ensure effective communication with these patients. Addressing this gap is crucial for improving patient outcomes, promoting person-centred care, and enhancing the overall quality of healthcare for individuals with hearing impairments. This study was designed to gain an understanding of family physicians'(FP) knowledge and attitudes toward these communication challenges.

Methods

Setting

This cross-sectional study was conducted at Clalit Healthcare Services Organization (CHS) primary care clinics in southern Israel.

Study population

The study population was comprised of resident and board-certified FP, who worked at one of the study clinics.

Data collection

At weekly clinic staff meetings, a short video was shown depicting a brief interaction between a physician and a hearing-impaired older adult patient, who was accompanied by a caregiver. After viewing the video, physicians were asked to complete a structured questionnaire.

Private viewings of the video were held at the clinics, following the staff meetings, for FPs who were unable to attend the staff meeting. In addition, the video was shown and questionnaires were completed during an academic day for family medicine residents at Ben-Gurion University of the Negev in Beer Sheva.

Research Tools

A brief video, that highlighted common mistakes made during a meeting with a hearing-impaired older patient, was prepared by the research team. Three FPs participated in the video: one as a FP, the second as a hearing-impaired older patient, and the third as the patient's son. The FP made the following errors:

1. She greeted the patient from behind as she entered, without facing her.
2. She failed to ask the patient about her preferred mode of communication.
3. Throughout the meeting, the FP's face was hidden behind the computer screen.
4. The FP sat with her back to the window, resulting in poor lighting on her face, making it difficult for the patient to see her.
5. She did not check if the patient brought a hearing device.
6. After the patient mentioned her hearing device, the FP did not check if it was working properly.
7. Although there was a voice amplifier on her desk, the FP did not use it.
8. The FP did not verify the patient's understanding. When the patient explicitly said she did not understand, the physician raised her voice (increasing high frequency tones).
9. When raising her voice failed to aid in communication, the physician approached and shouted directly into the patient's ear, preventing her from seeing her face and lips.
10. When these methods failed, the FP turned to the patient's son and conversed exclusively with him.
11. At the end of the conversation, the FP failed to address the issue of hearing impairment. She did not suggest that the patient undergo a hearing test, adjust her hearing device, or use a voice amplifier.
12. The patient was not given an explanation or asked for her consent before a physical examination.

After watching the video, participants were asked to fill out an anonymous structured 21-item questionnaire (Appendix 1). The questionnaire was developed specifically for this study. It featured an open-ended question that asked physicians to enumerate all the communication errors they noticed in the video. This was followed by inquiries regarding the physicians'training, their confidence in communicating with hearing-impaired older adult patients, their general knowledge of hearing loss in older adults, and demographic information.

Data analysis

Data analysis was performed with IBM SPSS Statistics software, version 29. A descriptive data analysis was conducted to assess the physicians'perspective on communication with hearing-impaired older adult patients. Continuous variables are presented as mean ± standard deviation (SD), while categorical variables are presented as frequencies. The sum of the communication errors identified by each physician in the video was calculated and then the FP were divided into two groups: those who identified fewer than a median of two communication errors, and those who identified three or more communication errors.

The knowledge and attitudes towards hearing-impaired older adult patients were compared between these subgroups based on professional status (resident vs. board-certified), gender (male vs. female), and country of graduation from medical school (Israel vs. abroad). Continuous variables were compared using the t-test, and categorical variables using the chi-square test.

A logistic regression model was developed to predict physicians who identified three or more communication errors. Statistical significance was set at $p < 0.05$ for all tests.

The research was conducted in accordance with the Declaration of Helsinki (75 th WMA General Assembly, Helsinki, Finland, October 2024). It was exempt from IRB approval by the ethics Committee of "Meir" Medical Center, Kfar-Saba, Israel, which also granted an exemption from the requirement for signed informed consent. Participants were asked to watch the video and complete the questionnaire, and their willingness to do so was considered consent to participate in the study.

Results

Socio-demographic characteristics of the study population

A total of 101 physicians (67% response rate), completed the study questionnaire. Their mean age was 44.5 ± 10.9 years, with 55 (54.5%) males, 58 (58.0%) born in Israel, and 38 (38.0%) who completed their medical education in Israel. Forty eight (47.5%) were board-certified in family

medicine, and the mean seniority in primary care was 12.2 ± 10.1 years (Table 1).

Knowledge on hearing-impaired older adult patients

The training and knowledge of the respondents concerning patients with hearing impairments are detailed in Table 2. A low level of training or guidance on treating hearing-impaired patients was reported during medical school (15.8%) and family medicine residency (17.8%). Only 41 (40.6%) expressed a high or good level of confidence in treating hearing-impaired adults. Only 12 (11.9%) answered both knowledge questions correctly. i.e., the prevalence of hearing impairment among patients aged 65 and above (one in three patients), and the most common type of hearing impairment in older adults (sensorineural hearing impairment).

Table 1 Socio-demographic characteristics of study population ($N = 101$)

	N	%
Gender		
Male	55	54.5%
Female	46	45.5%
	101	
Age		
Mean ± SD	44.5 ± 10.9	
Median	41	
Range	27–70	
	100	(mis = 1)
Country of birth		
Israel	58	58.0%
Abroad	42	42.0%
	100	(mis = 1)
Number of years in Israel (for foreign-born)		
Mean ± SD	22.4 ± 10.8	
Median	25	
Range	2–35	
	41	(mis = 1)
Country of graduation from medical school		
Israel	38	38.0%
Abroad	62	62.0%
	100	(mis = 1)
Years of experience in primary care		
Mean ± SD	12.2 ± 10.1	
Median	9	
Range	0–40	
	96	(mis = 5)
Professional status		
Resident in family medicine	41	40.6%
Board-certified in family medicine	48	47.5%
General practitioner	7	6.9%
Specialist in another field	5	5.0%
	101	

Attitudes toward hearing-impaired older adults

Most participants had a positive comfort level when communicating with hearing-impaired older adults (Table 2), with 13.9% feeling very comfortable, and 35.6% feeling quite comfortable. In contrast, 28.7% reported not feeling very comfortable, and 8.9% indicated feeling not comfortable at all.

Board-certified physicians felt less comfortable or not comfortable at all compared to residents in communicating with hearing-impaired older adults (49.1% vs. 25.0%, $p = 0.002$). Female physicians felt less comfortable or felt not comfortable at all compared to male physicians (48.9% vs. 27.3%, $p = 0.004$). There was no statistically significant difference between those who graduated medical school in Israel and abroad.

We assessed agreement with the statement that hearing-impaired older (Fig. 1) adults require twice the time for a physician visit to address their problems adequately. Furthermore, 57.4% agreed that hearing impaired older adults should bring a companion to the clinic to assist in communication. While 32.7% agreed that as people grow older they should lower their expectations regarding hearing quality, 45.5% mostly disagreed or completely disagreed with this notion. Most (70.3%) felt that digital tools should be used to improve communication between healthcare professionals and hearing-impaired older patients. Regarding the perception of quality of life for older hearing-impaired adults, 67.3% mostly disagreed or completely disagreed that it is almost impossible for hearing-impaired older adults to lead a normal life.

Identifying communication errors

There were substantial challenges to identifying communication errors in the interaction between the FP and the hearing-impaired older adult (Table 3). Ten physicians (9.9%) did not identify even one of the 12 errors presented in the video, 23 (22.8%) one error, 25 (24.8%) two, 24 (23.8%) three, and 13 (11.9%) found four errors. Six physicians (5.9%) excelled by identifying five errors. None of the physicians identified six or more errors. The overall mean number of errors was 2.25 ± 1.35. One error that was identified by 67.7% of the FPs, was the inappropriate focus on the patient's son for medical consultation and management, while 59.6% noticed that the physician's face in the video was obscured by the computer screen. Only 6.1% recognized that the physician failed to inquire if the patient had brought a hearing device, and merely 2% saw that, even after the patient mentioned bringing the device, the physician did not check its operational

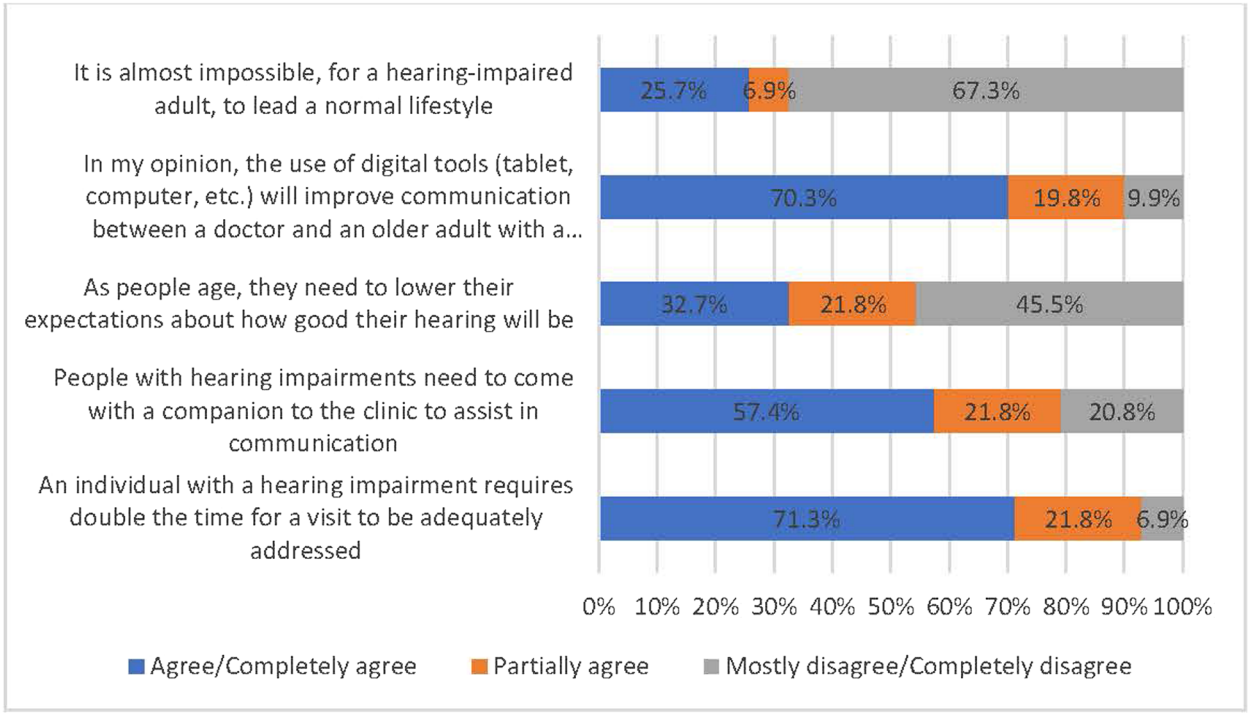
Table 2 Knowledge regarding hearing-impaired older adult patients

	N	%
During your studies at medical school, did you receive training or guidance on how to treat hearing-impaired older adult patients?		
Yes	16	15.8%
No	85	84.2%
	101	
During your family medicine residency, did you receive training or guidance on how to treat hearing-impaired older adult patients?		
Yes	18	17.8%
No	83	82.2%
	101	
Do you feel you have sufficient professional knowledge to treat hearing-impaired older adult patients?		
High level	38	37.6%
Good level	3	3.0%
Moderate level	39	38.6%
Low level	21	20.8%
	101	
How common do you think hearing impairment is among patients aged 65 and above?		
One in two patients	6	5.9%
One in three patients	30	29.7%
One in five patients	41	40.6%
One in ten patients	23	22.8%
One in twenty patients	1	1.0%
	101	
Which is the most common type of hearing impairment in older age:		
Sensorineural hearing impairment	36	35.6%
Conductive hearing impairment	10	9.9%
Mixed hearing impairment	55	54.5%
	101	
Knowledge score (from two previous questions):		
No correct answers	47	46.5%
One correct answer	42	41.6%
Two correct answers	12	11.9%
	101	
When a hearing-impaired older adult visits you, how comfortable do you feel with your communication skills?		
Very comfortable	14	13.90%
Quite comfortable	36	35.60%
Neither comfortable nor uncomfortable	13	12.90%
Not very comfortable	29	28.70%
Not comfortable at all	9	8.90%
	101	

status. None of the participants noticed that the FP was sitting with her back to the window, casting her face in shadow.

Statistically significant differences were found for only two communication errors in the sub-group analyses. Female physicians identified the error "Despite having a voice amplifier on her desk, the physician did not use it" more frequently than male physicians (30.4% vs. 13.2%, $p = 0.049$). Physicians who graduated from medical school in Israel were more likely than those who graduated abroad to notice the error "The physician did not verify if the patient understood her" (26.3% vs. 6.7%, $p = 0.015$). Additionally, more physicians who graduated from medical school in Israel identified over 3 communication errors than those who graduated abroad (57.9% vs. 32.3%, $p = 0.022$).

The logistic regression model aimed to identify physicians capable of finding more than three communication



It is almost impossible for a hearing-impaired adult to lead a normal life.

In my opinion, the use of digital tools (tablets, computers, etc.) would improve communication between doctors and hearing-impaired older adults.

No change needed

Hearing-impaired patients should come to the clinic with a companion to assist in communication.

Hearing-impaired patients require twice the time for a clinic visit to have their problem addressed satisfactorily.

Fig. 1 Attitudes towards hearing-impaired older adults

errors is presented in Table 4. The analysis considered various factors, including gender, age, medical education in Israel, professional status as a board-certified physician, knowledge scores, and comfort level during visits with hearing-impaired older adult patients. The only statistically significant variable was the level of comfort with communication skills during these visits (feeling uncomfortable/very uncomfortable) (OR =0.337, 95% CI: 0.126—0.900, $p = 0.030$), indicating a decreased likelihood of being able to identify more than three communication issues in these situations.

Discussion

FPs were insufficient in communication with hearing-impaired older adult patients, a factor that likely played a pivotal role in the finding that only half of the errors showcased in the video were detected by the physicians. Most (71.3%) were unable to identify more than four errors, and none identified six or more communication errors, underscoring the considerable gap in theoretical proficiency in this study population.

Although the importance of positive patient-physician communication is widely recognized, the results of our

Table 3 Identification of communication errors with hearing-impaired older adult patients

Communication error	*N*	%
1. The physician greeted the patient when she entered the room and accompanied her from behind	9	9.1%
2. The physician did not elicit the patient's preferences on communication	23	23.2%
3. During the meeting, the physician's face was hidden by the computer screen	59	59.6%
4. The FP sat with her back to the window so that her face was unlit, and the patient was blinded	0	0.0%
5. The physician did not check if the patient brought hearing devices	6	6.1%
6. After the patient mentioned her hearing devices, the physician did not verify if they were operational and functioned properly	2	2.0%
7. Despite having a voice amplifier on her desk, the physician did not use it	21	21.2%
8. The physician did not check if the patient understood her	14	14.1%
9. When it became evident that the patient did not understand (she herself said several times that she did not understand), in the first stage, the physician raised her voice (thus raising the frequency), and after this method failed, she approached the patient and started shouting into her ear (so she could not see her face and lips)	5	5.1%
10. When these methods failed, the physician turned to the patient's son and conducted the conversation with him alone	67	67.7%
11. At the end of the conversation, the physician did not address the issue of hearing impairment and did not suggest the patient undergo a hearing test, adjust hearing devices, and use a voice amplifier	4	4.0%
12. Permission and explanation before the physical examination	13	13.1%
	99	(mis = 2)
Number of communication errors identified		
Mean ± Standard Deviation	2.25 ± 1.35	
Median	2	
Range	0–5	
0–2	57	57.6%
3 +	42	42.4%
	99	(mis = 2)

Table 4 Logistic regression model for predicting physicians with ability to identify more than three communication errors with hearing-impaired older adults

Variables	OR	95%CI		*p*value
Gender (Male)	0.474	0.183	1.227	0.124
Age (Years)	0.974	0.927	1.024	0.306
Country of graduation from medical school (Israel)	2.202	0.892	5.438	0.087
Professional status (Board-certified)	1.658	0.573	4.801	0.351
Knowledge score (one or two correct answers)	1.556	0.642	3.774	0.328
Comfort level with communication skills during visits with hearing-impaired older adults (Feeling uncomfortable/very Uncomfortable)	0.337	0.126	0.900	0.030

study show a worrisome gap in FP communication with hearing-impaired older adults. This gap is in line with reports in the literature of limited awareness, inadequate access to services, and insufficient training options for healthcare providers, leading to suboptimal patient care [9, 10]. Previous studies have also emphasized the importance of communication between caregivers and patients, particularly for hearing-impaired older adults. Earlier papers found that effective communication can significantly improve health outcomes [5, 16].

The challenges faced by physicians in treating hearing-impaired older adults [14] in medical settings are relevant to our present assessment of communication difficulties. There is an urgent need to design appropriate training for physicians to meet these challenges. Previous research indicates that the lack of training among physicians caring for hearing-impaired patients has a negative impact on the quality of care [8, 10]. The inadequacy of medical training on this issue is confirmed by our results, emphasizing a persisting gap in the training of healthcare providers to effectively communicate with this population. Our study showed that only 15.8% reported a high level of training during medical school, indicating a systemic issue that supports the call for targeted medical education [15], [16]. To address this, we recommend the implementation of structured communication training

programs specifically designed for healthcare providers who work with older adults. These programs should incorporate best practice in communicating with hearing-impaired older patients and utilize role-playing exercises to enhance practical skills.

In addition, we found a significant discrepancy between healthcare providers' confidence levels in their knowledge compared to their actual practice in treating hearing-impaired older adults. Although a substantial percentage expressed high confidence in their professional knowledge, only a minority correctly answered questions on basic knowledge. For example, while 37.6% expressed a high level of confidence in treating hearing-impaired older adults, only 11.9% correctly answered two basic knowledge questions. Moreover, more than half of the mistakes made by the physician in the video were overlooked by the study participants. Our findings are in line with those of previous studies indicating that many healthcare providers lack knowledge on this subject [16]. This result highlights the need for targeted interventions such as educational workshops focused on the fundamentals of hearing impairment management, to bridge the knowledge-confidence gap among healthcare providers.

Our findings also disclose knowledge disparities among various subgroups, notably the lack of training or guidance during medical school and family medicine residency. These disparities underscore the urgency of tailored educational interventions, especially during the formative stages of medical training. For instance, board-certified physicians in our study felt less comfortable communicating with hearing-impaired adults than residents, showcasing a critical gap that requires specific attention. To address this gap, we propose the establishment of mentorship programs that pair experienced clinicians with residents to foster knowledge-sharing and practical skill development in communicating with hearing-impaired older patients.

There are several potential limitations in this study. The use of a video where physicians observed the situation on a recording may create a gap between the observations regarding the video and actual practice in real-world scenarios. This approach may enhance the identification of gaps in knowledge or participants' attention rather than accurately reflecting the physicians' ability to handle these situations in a real clinical environment. The participants were instructed to remain quiet during the video and questionnaire completion. Our impression was that participants were cooperative and did work on their own. However, it is important to acknowledge that the presence of other individuals in the room may have influenced responses in subtle, unintentional ways, or affected the seriousness with which the video was taken compared to viewing it alone. Moreover, the study population of physicians in the Beer Sheva district of CHS constitutes a limited subset, making it difficult to draw comprehensive insights about the situation for physicians in other regions in Israel. Nonetheless, this subset does represent a substantial number of physicians, providing some understanding of the situation and allowing for the tailoring of specific training initiatives in Beer Sheva and its surrounding area, the central medical hub for the entire Negev region. Another potential limitation of this study is that participants were required to complete a questionnaire after watching the video, introducing a potential memory bias. Thus, responses to the questionnaire may not fully mirror the actual capabilities of the physicians, potentially affecting the accuracy of the conclusions drawn from the study.

In the video, we used an earpiece to illustrate a hearing aid. In retrospect, we recognize that this choice was misleading, as it was unclear whether the patient was using a hearing aid or simply answering a phone call. Clearly, we should have used a device that was unmistakably identifiable as a hearing aid. Unfortunately, this error cannot be corrected.

A significant limitation of the study is that the video was not validated or piloted with professionals in the field of cognitive decline, such as audiologists or ENT specialists.

Another significant limitation of the study is that the research tool was also not validated. We could have assessed the reliability of the tool through test–retest reliability by presenting the video to a subset of family practitioners and evaluating whether they consistently identified the same or additional errors.

Despite these limitations, it is important to highlight the strengths of the study. First, this is a unique study in that it utilizes a video presentation as a tool to assess physicians' knowledge on communication with hearing-impaired older patients. This innovative approach provides a unique advantage compared to other studies on this subject. Also, it includes a relatively large and diverse participant pool, encompassing both residents and board-certified physicians. This diversity contributes to the research's overall accuracy and representativeness in addressing the communication challenges that physicians face in the context of hearing impairment.

It is imperative for healthcare systems globally to address these challenges. Targeted interventions, informed by our study findings, could enhance healthcare providers' communication skills, bridging existing gaps and ensuring equitable and patient-centered care for hearing-impaired older adults. Furthermore, implementing a feedback mechanism where healthcare providers receive input from patients

regarding their communication experience could be invaluable. Such mechanisms could help identify specific areas for improvement and foster a more patient-centered approach. The identified disparities in knowledge and confidence level underscore the need for continuous medical education and training programs focused on effective communication strategies for this vulnerable population segment. Specifically, we propose an ongoing assessment and refinement of these educational programs to ensure they meet the evolving needs of healthcare providers and the populations they serve.

Conclusions

Our study reveals significant gaps in training among physicians on communication with hearing-impaired older patients. There is an urgent need for improvement, both in medical education and within family medicine specializations. Targeted interventions, based on our findings, could facilitate positive changes and improve the care provided to this vulnerable patient group. This is in line with our study's focus on addressing key challenges, underlining the necessity for worldwide attention to the increasing prevalence of hearing loss, and supporting the demand for inclusive healthcare systems proficient in communication, tailored to meet the specific needs of hearing-impaired older adults.

Abbreviations

FP	Family physicians
HMO	Health Maintenance Organization
CHS	Clalit Healthcare Services

Supplementary Information

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Supplementary Material 1.

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None.

Authors' contributions

ES designed the study, collected data, analyzed data and wrote the article. AB designed the study, collected data, and wrote the article, TF designed the study, analyzed data and wrote the article. TS designed the study and wrote the article. YP designed the study, analyzed data and wrote the article. All authors approved the submitted version, and agreed both to be personally accountable for the author's own contributions and to ensure that questions related to the accuracy or integrity of any part of the work.

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Data availability

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

The research was conducted in accordance with the Declaration of Helsinki. It was exempt from IRB approval by the ethics Committee of "Meir" Medical Center, Kfar-Saba, Israel, which also granted an exemption from the requirement for signed informed consent forms. Every participant in the study provided their consent to participate in the study.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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References

1. Haile LM, Kamenov K, Briant PS, Orji AU, Steinmetz JD, Abdoli A, et al. Hearing loss prevalence and years lived with disability, 1990–2019: findings from the Global Burden of Disease Study 2019. The Lancet. 2021;397(10278):996–1009.
2. Lin FR, Niparko JK, Ferrucci L. Hearing loss prevalence in the United States. Arch Intern Med. 2011;171(20):1851–2.
3. Addressing the rising prevalence of hearing loss. Geneva: World Health Organization; 2018. Licence: CC BY-NC-SA 3.0 IGO. https://www.who.int/publications/i/item/addressing-the-rising-prevalence-of-hearing-loss.
4. Nelson EG, Hinojosa R. Presbycusis: a human temporal bone study of individuals with downward sloping audiometric patterns of hearing loss and review of the literature. Laryngoscope. 2006;116(9 Pt 3 Suppl 112):1–12.
5. Stewart MA. Effective physician-patient communication and health outcomes: a review. CMAJ. 1995;152(9):1423–33.
6. Kegl B, Fekonja Z, Kmetec S, McCormack B, Reljić NM. 8 Elements of person-centred care of older people in primary healthcare: a systematic literature review with thematic analysis. Innovative Nursing Care: Education and Research. 2023:103.
7. Shukla A, Nieman CL, Price C, Harper M, Lin FR, Reed NS. Impact of hearing loss on patient–provider communication among hospitalized patients: a systematic review. Am J Med Qual. 2019;34(3):284–92.
8. Barnett S. Communication with deaf and hard-of-hearing people: a guide for medical education. Acad Med. 2002;77(7):694–700.
9. Cohen SM, Labadie RF, Haynes DS. Primary care approach to hearing loss: the hidden disability. Ear Nose Throat J. 2005;84(1):26–44.
10. Contrera KJ, Wallhagen MI, Mamo SK, Oh ES, Lin FR. Hearing loss health care for older adults. J Am Board Fam Med. 2016;29(3):394–403.
11. Franks I, Timmer BH. Reasons for the non-use of hearing aids: perspectives of non-users, past users, and family members. Int J Audiol. 2023:1–8.
12. Smith S, Nordin MAB, Hinchy T, Henn P, O'Tuathaigh CMP. Impact of hearing loss on clinical interactions between older adults and health professionals: a systematic review. Eur Geriatr Med. 2020;11(6):919–28.
13. Iezzoni LI, O'Day BL, Killeen M, Harker H. Communicating about health care: observations from persons who are deaf or hard of hearing. Ann Intern Med. 2004;140(5):356–62.
14. Bailey T, Lavery C. Good Practice? London: AoHL; 2018.
15. Bentur N, Valinsky L, Lemberger J, Moshe YB, Heymann A. Primary care intervention programme to improve early detection of hearing loss in the elderly. J Laryngol Otol. 2012;126(6):574–9.
16. Cohen JM, Blustein J, Weinstein BE, Dischinger H, Sherman S, Grudzen C, et al. Studies of physician-patient communication with older patients: How often is hearing loss considered? A systematic literature review. J Am Geriatr Soc. 2017;65(8):1642–9.

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