Literature Review

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Adherence and continuity to the use of hearing aid: scope review

Adesão e continuidade ao uso de aparelho de amplificação sonora individual: revisão de escopo

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ABSTRACT

Purpose: To identify the reasons that lead the individual to follow or not the recommendation to use the hearing aid and its use over the years. **Research strategy:** Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) recommendations were followed. The databases searched were: Pubmed, Pubmed Central, Scopus, Embase, Web of science and Cochrane, using the following descriptors: "Hearing Aids", "Patient Compliance" and the Boolean indicator AND. **Selection criteria:** primary original articles with prospective, retrospective, observational or experimental designs; that raise, report, verify or analyze the reasons for adherence or not to the use of hearing aids, regardless of being an experienced user or not; carried out with the young, adult and elderly population; with individuals with any degree, type and configuration of hearing loss; with unilateral or bilateral adaptations and in Portuguese, English and Spanish. **Results:** 27 studies were included in the analysis. There were two distinct situations in the auditory rehabilitation process: acceptance of the indication of the use of HA and the continuity of the effective use. Thus, the aspects that positively, negatively or do not interfere in these two phases were compiled and presented. **Conclusion:** the most relevant factors in the non-adherence to HA were: perception of low cost-benefit, lack of understanding of the real need and difficulty in accepting its use; while the ones that most impacted the continuity of use were: HA sound quality, handling difficulties and perception of little benefit.

Keywords: Hearing aid; Patient compliance; Hearing; Hearing loss; Treatment adherence and compliance

RESUMO

Objetivo: identificar os motivos que levam o indivíduo a seguir ou não a recomendação da necessidade do uso do aparelho de amplificação sonora individual (AASI) e a utilização desse dispositivo ao longo dos anos. **Estratégia de pesquisa:** orientações do *Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews* (PRISMA-ScR) foram seguidas. As bases de dados pesquisadas foram: Pubmed, Pubmed Central, Scopus, Embase, Web of Science e Cochrane, utilizando os seguintes descritores: "*Hearing Aids*", "*Patient Compliance*" e o indicador booleano *AND*. **Critérios de seleção:** artigos originais primários com desenhos prospectivos, retrospectivos, observacionais ou experimentais; que levantassem, relatassem, verificassem ou analisassem os motivos de adesão ou não ao uso de AASI, independentemente de ser usuário experiente ou não; realizados com a população jovem, adulta e idosa; com indivíduos com qualquer grau, tipo e configuração de perda auditiva; com adaptações unilaterais ou bilaterais e em português, inglês e espanhol. **Resultados:** incluídos 27 estudos na análise. Verificaram-se duas situações distintas no processo de reabilitação auditiva: aceitação à indicação do uso do AASI e a continuidade do uso do dispositivo de maneira efetiva. Os aspectos que auxiliaram positivamente, negativamente ou não interferiram nessas duas fases foram compilados e apresentados. **Conclusão:** os fatores de maior relevância para a não aquisição do AASI são: percepção de baixo custo-benefício, falta de entendimento da real necessidade e dificuldade de aceitação do uso, enquanto que os que mais impactam na continuidade do uso são: qualidade sonora do AASI, dificuldades de manuseio e percepção de pouco benefício.

Palavras-chave: Auxiliares de audição; Cooperação do paciente; Audição; Perda auditiva; Cooperação e adesão ao tratamento

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INTRODUCTION

The World Hearing Report published in 2021 projected that, by 2050, 2.5 million people will suffer of some degree of hearing loss and at least 700 million will need some auditory rehabilitation services[1].

Several types of interventions can rehabilitate individuals with hearing loss who seek to reduce their limitations and favor better communication strategies, as well as propose environmental changes to soften the negative consequences of hearing loss[2]. The most common interventions are: guidance, use of assistive hearing technology, communication strategies and Hearing Aids (HA)[3]. Among the available options, HA HA is often recommended[4] for allowing the person to access sounds lost due to hearing loss.

The process of hearing rehabilitation starts before inserting the HA, i.e., since an individual starts their trajectory in search of help with a hearing assessment, thus being recommended the use of the device. There is a combination of important factors (audiological and non-audiological) for the success of the process[5]; however, not all of those who need HA accept its prescription and acquire and use the device.

Research has shown that one third of the patients did not acquire the HA as recommended[6] due to insufficient income, lack of knowledge about grants programs, lack of interest in hearing improvement, stigma/prejudice, poor medical care by the otolaryngologist and/or audiologist, unsatisfactory previous experiences, unsatisfactory experiences of family members or friends, intercurrent health problems, and fear[6-8]. The wrongful perception of caretakers of individuals with hearing loss on the importance of the HA is another key factor for delayed treatment seeking[9].

The European Hearing Instruments Manufacturers Association (EHIMA), called EuroTrak, has conducted similar studies to the ones conducted by the Hearing Industries Association (HIA), in the United States, known as MarkeTrak[10]. These are comprehensive studies that introduce some relevant findings on the market of HA and its users. According to a study from 2009[11], the most significant decisive factors for treatment adherence and HA use were the severity of the impairment, the opinion of the otolaryngologist and audiologist, and the relationship with them, as well as the family environment. Another report[12] indicates that the most significant seven decisive factors were ease of use, meeting of expectations, cost, degree of hearing loss, quality of the HA service, the experience of family members and friends, and efficacy of potential alternative treatments. The main and most convincing reason for HA use acceptance was the need to communicate properly[13]. However, all the above-mentioned factors reveal the importance of redirecting attention to psychological and social aspects as well[6].

However, some individuals acquire the HA but do not use it effectively (for more than or equal to eight hours a day). Whereas the international literature indicates that non-adherence to HA should reach up to 30% of the patients[14], the actual figures are around 40% in the United Kingdom[15], 50% in Australia[16], 60% in Switzerland[17], 39% in the United States[18], and 57% in China[19]. Another research has revealed a 21.7% rate of HA use discontinuance among patients in a 30-month analysis[20].

Even though the effective use of the HA was thought to increase as non-linear digital technologies developed[3,15], introducing numerous resources and algorithms, little has been seen in practice. Since the 1980s, users have most often mentioned that HA effective use is hampered by background noise, lack of perception of the need, problems with earmolds/couplers, problems with glasses, non-effective HA, aesthetic issues, too noisy, mechanical problems, and low sound quality[21]. In 2010, the MarkeTrak V pointed out the following reasons from the most frequently to less frequently mentioned: lack of benefit in silence and noise, the difficulty of adaptation and comfort, negatives effects of hearing loss, costs of repairs, the need of help with o HA, poor sound quality, difficulty handling the volume control, acoustic feedback, irritability, poor care by the audiologist and stigma[22].

The top reasons generating such a low percentage of HA use effective include complaints concerning the understanding of speech in noisy environments, perception of little benefit, and issues of discomfort with sound quality, in addition to difficulties handling, esthetic stigmas and poor assistance of health professional[3].

Hence, specific actions must be undertaken to favor the device use, not only for the benefit of the user but also to reduce money waste in health services[15]. Research has highlighted the importance of guiding patients toward distinguishing common problems from those that can be resolved. Thus, recovery planning should be proposed based on previously scheduled follow-up sessions[23]. Studies have pointed out that even after ten months of adaptation, some patients presented simple difficulties that could be solved with follow-up and guidelines[6].

The literature has addressed the importance of understanding the factors that influence HA treatment adherence for decades. Nonetheless, the combination of factors that leads patients to adhere to and effectively use the device should also be identified and indicated, despite varying considerably[8].

PURPOSE

Main objective: To learn the reasons for a patient accepting or not the recommendation of using HA and understand their use over the years.

Secondary objectives

- To learn the aspects that encourage the patient to follow the recommendation of using HA.
- To learn the aspects that discourage the patient from following the recommendation of using HA.
- To learn the elements that favor the continuation of HA.
- To learn the elements that discourage the continuation of HA use.

RESEARCH STRATEGIES

Our guiding question is based on the mnemonic P (population), C (concept), and C (context), as follows: "Why do HA users adhere or not to the device?." The population refers to individuals with hearing loss who do or do not use the device; the concept is the HA, and the context concerns HA use.

We followed the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR)[24,25] – a tool that has been increasingly adopted in research of the health area[26]. A scoping review aims to map the literature in a given field of interest[26] and is suitable for comprehensive topics for gathering different study designs to learn the evidence produced[27].

Scoping reviews differ from systematic reviews by allowing the mapping of more comprehensive topics with different study designs; however, it does not imply a lower level of evidence since careful, methodological rigor is equally involved[28]. To meet our research goals, we enlarged the search of studies addressing the reasons for HA use not only as the main objective.

Authors have suggested that scoping reviews organize, summarize, and disseminate findings of other research identifying potential gaps in the literature[27]. Thereby, aligned with our objective, the scoping review is the most suitable method for our research.

Procedures

The studies were searched in June 2021 by a librarian who assisted in the process along with the researcher in charge. The following databases were searched: Pubmed, Pubmed Central, Scopus, Embase, Web of Science, and Cochrane.

We applied the following descriptors: "Hearing Aids" AND "Patient Compliance", in addition to their alternative terms, which are indexed keywords, fundamental for a scoping review.

The descriptor "Patient Compliance" was chosen for referring to the voluntary cooperation of the patient regarding the prescribed conduct, in this case, HA use, thus comprehending the patient's adherence to hearing recovery.

The PubMed, PubMed Central, and Cochrane Library bases follow the vocabulary of subjects MeSH – Medical Subject Headings. In turn, since the Embase follows the Emtree, the preferred descriptor was Hearing Aid (without "s" at the end). Scopus and Web of Science have no defined vocabulary of subjects; therefore, the MeSH terms were also preferred.

We used a particular search strategy following the criteria of each base (Chart 1).

SELECTION CRITERIA

We adopted the instrument Rayyan, developed by the Qatar Computing Research Institute, to assist in the process of inclusion and exclusion of the papers for final analysis. Such an instrument was chosen due to its availability in the Web platform, thus generating a high portability rate, in addition to being intuitive and free, valuable and useful features for this step of the scoping review.

All studies included in this review respected the following criteria: primary original papers with prospective, retrospective, observational, or experimental designs; studies surveying, reporting, identifying, or analyzing the reasons for adherence or not to the use of Hearing Aid, regardless of the user experience; studies focused on young, adult, and elderly populations, studies involving individuals with any degree, type, or configuration of hearing loss, with unilateral or bilateral adaptations, and studies in Portuguese, English, and Spanish.

We excluded material produced by papers that were neither complete nor published, abstracts, other types of reviews, and theses/dissertations. We also excluded papers that addressed other amplification technologies, such as cochlear implants and bone-anchored prostheses.

Our results were not limited to the period described and had no restrictions concerning the study design. In addition, we analyzed papers of free and restricted access.

DATA ANALYSIS

Two independent reviewers with expertise in the area were responsible for analyzing the 517 studies selected in the first step. Once all duplicates were excluded, 236 papers remained. The papers were selected according to the following two steps: evaluation of the title and abstract and reading of the full text. All decisions were based on the inclusion and exclusion criteria adopted herein. The conflicts presented in the first step (29 studies) were solved by a third reviewer, who was assigned to resolve disagreements. The papers were selected and included in the first step and conflicts were solved in three months (from June to August 2021).

After the exclusion of the papers in the first step, two independent reviewers read 78 papers in full. The conflicts that emerged in the second step (three studies) were solved by a third reviewer, assigned to resolve disagreements. This process started in September 2021 and ended in February 2022 (Figure 1).

RESULTS

The final survey included 236 papers. Some papers were excluded after reading and analysis of the titles and abstracts, thus 78 studies were eligible for a full reading. Out of these, 51 were excluded for not meeting the criteria established herein. Hence, 27 studies were selected for analysis (Figure 1).

The review and reading of the papers revealed background aspects to the process of hearing recovery that predominantly determine whether the patient seeks to solve their problem of hearing deprivation, thus accepting the recommendation of HA use. In turn, some post-acquisition aspects also emerged and referred to use and rehabilitation process continuation. These results were organized into two tables (Tables 1-2) for a better understanding of the reasons.

The number of studies combined from the two tables was higher than that selected for analysis since some are listed in both for introducing different data.

DISCUSSION

Changes and technological advances are constant in the field of audiology, requiring professionals to be able to manage the available solutions properly, regarding device technologies and the larger dissemination of previous knowledge and information for users[29,30]. However, the processes of selection and adaptation to HA are well-defined and go far beyond only defining the physical and electroacoustic features of the device. Several aspects that precede the HA influence the adherence

Chart 1. Search strategy according to the database

Source	Strategy
PubMed	((Hearing Aids[MeSH Terms]) OR ("Hearing Aids"[Title/Abstract] OR "Aid, Hearing"[Title/Abstract] OR "Aids, Hearing"[Title/Abstract] OR "Hearing Aid"[Title/Abstract] OR "Ear Molds"[Title/Abstract] OR "Ear Mold"[Title/Abstract] OR "Mold, Ear"[Title/Abstract] OR "Molds, Ear"[Title/Abstract])) AND ((Patient Compliance[MeSH Terms]) OR ("Patient Compliance"[Title/Abstract] OR "Compliance, Patient"[Title/Abstract] OR "Patient Adherence"[Title/Abstract] OR "Adherence, Patient"[Title/Abstract] OR "Patient Cooperation"[Title/Abstract] OR "Cooperation, Patient"[Title/Abstract] OR "Client Compliance"[Title/Abstract] OR "Client Compliances"[Title/Abstract] OR "Compliance, Client"[Title/Abstract] OR "Client Adherence"[Title/Abstract] OR "Adherence, Client"[Title/Abstract] OR "Treatment Compliance"[Title/Abstract] OR "Compliance, Treatment"[Title/Abstract] OR "Treatment Compliances"[Title/Abstract] OR "Therapeutic Compliance"[Title/Abstract] OR "Compliance, Therapeutic"[Title/Abstract] OR "Therapeutic Compliances"[Title/Abstract] OR "Patient Non-Compliance"[Title/Abstract] OR "Non-Compliance, Patient"[Title/Abstract] OR "Patient Non Compliance"[Title/Abstract] OR "Patient Noncompliance"[Title/Abstract] OR "Noncompliance, Patient"[Title/Abstract] OR "Patient Nonadherence"[Title/Abstract] OR "Nonadherence, Patient"[Title/Abstract] OR "Non-Adherent Patient"[Title/Abstract] OR "Non Adherent Patient"[Title/Abstract] OR "Non-Adherent Patients"[Title/Abstract] OR "Patient, Non-Adherent"[Title/Abstract] OR "Patient Non-Adherence"[Title/Abstract] OR "Non-Adherence, Patient"[Title/Abstract] OR "Patient Non Adherence"[Title/Abstract]))
PubMed PMC	((Hearing Aids[MeSH Terms]) OR ("Hearing Aids"[Title/Abstract] OR "Aid, Hearing"[Title/Abstract] OR "Aids, Hearing"[Title/Abstract] OR "Hearing Aid"[Title/Abstract] OR "Ear Molds"[Title/Abstract] OR "Ear Mold"[Title/Abstract] OR "Mold, Ear"[Title/Abstract] OR "Molds, Ear"[Title/Abstract])) AND ((Patient Compliance[MeSH Terms]) OR ("Patient Compliance"[Title/Abstract] OR "Compliance, Patient"[Title/Abstract] OR "Patient Adherence"[Title/Abstract] OR "Adherence, Patient"[Title/Abstract] OR "Patient Cooperation"[Title/Abstract] OR "Cooperation, Patient"[Title/Abstract] OR "Client Compliance"[Title/Abstract] OR "Client Compliances"[Title/Abstract] OR "Compliance, Client"[Title/Abstract] OR "Client Adherence"[Title/Abstract] OR "Adherence, Client"[Title/Abstract] OR "Treatment Compliance"[Title/Abstract] OR "Compliance, Treatment"[Title/Abstract] OR "Treatment Compliances"[Title/Abstract] OR "Therapeutic Compliance"[Title/Abstract] OR "Compliance, Therapeutic"[Title/Abstract] OR "Therapeutic Compliances"[Title/Abstract] OR "Patient Non-Compliance"[Title/Abstract] OR "Non-Compliance, Patient"[Title/Abstract] OR "Patient Non Compliance"[Title/Abstract] OR "Patient Noncompliance"[Title/Abstract] OR "Noncompliance, Patient"[Title/Abstract] OR "Patient Nonadherence"[Title/Abstract] OR "Nonadherence, Patient"[Title/Abstract] OR "Non-Adherent Patient"[Title/Abstract] OR "Non Adherent Patient"[Title/Abstract] OR "Non-Adherent Patients"[Title/Abstract] OR "Patient, Non-Adherent"[Title/Abstract] OR "Patient Non-Adherence"[Title/Abstract] OR "Non-Adherence, Patient"[Title/Abstract] OR "Patient Non Adherence"[Title/Abstract]))
Scopus	(TITLE-ABS-KEY ("Hearing Aids" OR "Aid, Hearing" OR "Aids, Hearing" OR "Hearing Aid" OR "Ear Molds" OR "Ear Mold" OR "Mold, Ear" OR "Molds, Ear") AND TITLE-ABS-KEY ("Patient Compliance" OR "Compliance, Patient" OR "Patient Adherence" OR "Adherence, Patient" OR "Patient Cooperation" OR "Cooperation, Patient" OR "Client Compliance" OR "Client Compliances" OR "Compliance, Client" OR "Client Adherence" OR "Adherence, Client" OR "Treatment Compliance" OR "Compliance, Treatment" OR "Treatment Compliances" OR "Therapeutic Compliance" OR "Compliance, Therapeutic" OR "Therapeutic Compliances" OR "Patient Non-Compliance" OR "Non-Compliance, Patient" OR "Patient Non Compliance" OR "Patient Noncompliance" OR "Noncompliance, Patient" OR "Patient Nonadherence" OR "Nonadherence, Patient" OR "Non-Adherent Patient" OR "Non Adherent Patient" OR "Non-Adherent Patients" OR "Patient, Non-Adherent" OR "Patient Non-Adherence" OR "Non-Adherence, Patient" OR "Patient Non Adherence"))
Web of Science	TOPIC: ("Hearing Aids" OR "Aid, Hearing" OR "Aids, Hearing" OR "Hearing Aid" OR "Ear Molds" OR "Ear Mold" OR "Mold, Ear" OR "Molds, Ear") AND TOPIC: ("Patient Compliance" OR "Compliance, Patient" OR "Patient Adherence" OR "Adherence, Patient" OR "Patient Cooperation" OR "Cooperation, Patient" OR "Client Compliance" OR "Client Compliances" OR "Compliance, Client" OR "Client Adherence" OR "Adherence, Client" OR "Treatment Compliance" OR "Compliance, Treatment" OR "Treatment Compliances" OR "Therapeutic Compliance" OR "Compliance, Therapeutic" OR "Therapeutic Compliances" OR "Patient Non-Compliance" OR "Non-Compliance, Patient" OR "Patient Non Compliance" OR "Patient Noncompliance" OR "Noncompliance, Patient" OR "Patient Nonadherence" OR "Nonadherence, Patient" OR "Non-Adherent Patient" OR "Non Adherent Patient" OR "Non-Adherent Patients" OR "Patient, Non-Adherent" OR "Patient Non-Adherence" OR "Non-Adherence, Patient" OR "Patient Non Adherence") Indices=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Estimated timeframe=Every year
Embase	'hearing aid'/syn AND 'patient compliance'/syn
Cochrane Library	("Hearing Aids" OR "Aid, Hearing" OR "Aids, Hearing" OR "Hearing Aid" OR "Ear Molds" OR "Ear Mold" OR "Mold, Ear" OR "Molds, Ear"):ti,ab,kw AND ("Patient Compliance" OR "Compliance, Patient" OR "Patient Adherence" OR "Adherence, Patient" OR "Patient Cooperation" OR "Cooperation, Patient" OR "Client Compliance" OR "Client Compliances" OR "Compliance, Client" OR "Client Adherence" OR "Adherence, Client" OR "Treatment Compliance" OR "Compliance, Treatment" OR "Treatment Compliances" OR "Therapeutic Compliance" OR "Compliance, Therapeutic" OR "Therapeutic Compliances" OR "Patient Non-Compliance" OR "Non-Compliance, Patient" OR "Patient Non Compliance" OR "Patient Noncompliance" OR "Noncompliance, Patient" OR "Patient Nonadherence" OR "Nonadherence, Patient" OR "Non-Adherent Patient" OR "Non Adherent Patient" OR "Non-Adherent Patients" OR "Patient, Non-Adherent" OR "Patient Non-Adherence" OR "Non-Adherence, Patient" OR "Patient Non Adherence"):ti,ab,kw

or not to use it. The process of hearing recovery is complex and extensive and cannot be solved only by inserting the HA.

In this context, the results of this scoping review, unlike that from the literature, present the aspects that influence HA acquisition separate from those that influence its effective use. Such an organization was chosen by considering that, despite being interconnected, we assume that the approach to problem-solution is different in each step of the process.

Table 1 shows the factors that influence HA acquisition. The most frequently mentioned factor pointed out as an enabler for HA use is the need to communicate properly and overcome the impacts of hearing loss on daily life activities, as well as the

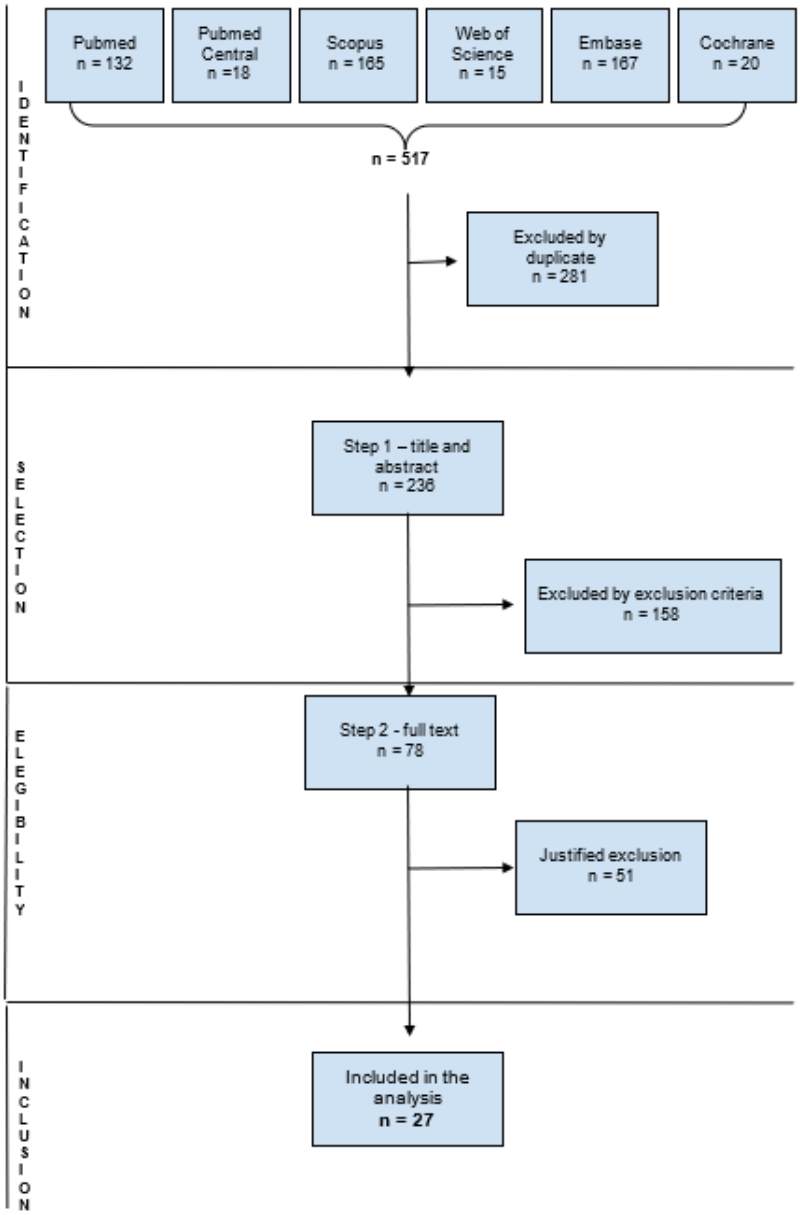

Figure 1. Flowchart of the scope review process
Subtitle: n = The number of papers

personal expectation of improvement in quality of life[12,31,32]. However, studies have explored the reasons for not acquiring the HA much more. The most mentioned aspects were overpricing, perception of little benefit, stigma and prejudice, discomfort with physical features and electroacoustics, uncomfortable sound quality during the test, don't feel the need of use, and attitude of the health professionals[6,7,12,13,29,32,33].

When patients understand their situation and the device use is indicated, cost-benefit begins to be considered, as well as the impact on daily life. At this moment, strategies for user loyalty and establishing a bond with the health professional are extremely important. The authors have pointed out three key factors for treatment adherence: a realistic evaluation of the patient's knowledge and understanding of the process of hearing rehabilitation, clear and effective communication between health professionals and patients, and building confidence in the relationship therapeutic[34].

Patients' adherence to treatment can be improved. According to a research study[35], the first step would be to establish a bond by learning what led the patient to seek treatment and their goals. Firstly, the obstacles to acceptance should be discussed; therefore, motivation must be addressed since it is a key element to investing in improved hearing. The authors report that demonstrating to the patient the importance of using the HA is related to convincing them that the ideal moment to act toward solving their problem is now. The second step would be to plan a detailed and well-structured process to test and introduce information to patients. This demands a mutual understanding of each step of the way. Concurrently, health professionals should be friendly and warm but also a respected

Table 1. Factors that influence the acquisition of the hearing aid

Author and year	Factors for acquiring*,**	Factors for not acquiring*,**
Alberti & Brown (1980)[6]		· Little benefit (n=10). · Difficulty handling (n=8). · Noisy sound quality (n=5). · Overpricing (n=8). · Resistance to use (n=6). · Don't feel the need (n=4). · Appearance ("too visible") (n=4). · Other impairments ("I am too old and sick").
Franks & Beckmann (1985)[29]		· Overpricing. · Stigma and prejudice. · Fear of being "tricked" by the sales team. · Noisy sound quality. · Discomfort with the HA physical features. · Difficulty handling. · The attitude of the otolaryngologist or audiologist. (Aiming at commercialization and not health) · Lack of access to services for hearing recovery. · High-pitched sounds – uncomfortable.
Chukuezi (1992)[13]	· Need to communicate properly.	· Discomfort with the HA physical features. · Stigma and prejudice. · Overpricing. · Noisy sound quality. · Awaiting medicines for hearing loss treatment.
Gussekloo et al. (2003)[31]	· Degree of hearing loss. · Difficulty communicating. · Impacts of hearing loss on daily life activities. · Coping strategies.	· Stigma and prejudice.
Cohen-Mansfield & Taylor (2004)[32]		· Don't feel the need (n=15). · Overpricing (n=3).
Meister et al. (2008)[33]	· Perception of hearing difficulty. · The expectation of improving quality of life.	· Stigma and prejudice. · Overpricing.
Laplante-Lévesque et al. (2010)[12]	· (1) Convenience. · (2) Adherence and expected results. · (3) Financial costs. · (4) Hearing impairment. · (5) Nature of the intervention. · (6) Experiences, recommendations, and support of others. · (7) Preventive and temporary solution. These factors influenced both positively and negatively the adoption of HA.	· (1) Convenience. · (2) Adherence and expected results. · (3) Financial costs. · (4) Hearing impairment. · (5) Nature of the intervention. · (6) Experiences, recommendations, and support of others. · (7) Preventive and temporary solution. These factors influenced both positively and negatively. the adherence to HA prescription.
Abdellaoui & Huy (2013)[7]	· Specialist's guidance (37%). · Price (30%). · Effectiveness test (18%).	· Overpricing (n = 27). · Lack of actual interest in hearing improvement (n=20). · The attitude of the otolaryngologist or audiologist (n = 2). · Unsatisfactory experiences of family members or friends (n = 1). · Other intercurrent health problems (n = 3). · Fear of being "tricked" by the sales team (n = 2).

*A reason appears in more than one column when it might influence more than one way; **The absence of "n" or percentage (%) indicates that neither was mentioned in the study

Subtitle: HA = Hearing Aid; n = Study sample; % = Percentage

authority. In addition, the patient needs to be made aware and understand that the HA is needed, and scientific evidence should be trusted. The audiologist who acts in this area should be responsible for instructing the patient throughout the process.

Furthermore, it is clear the urgent need for actions and interventions that might favor use also due to some financial waste involved in the services. As a potential solution, some authors have suggested carrying out motivational interviewing for an overview to improve HA use adherence[15].

In addition to the above mentioned factors, several reports have demonstrated that even after acquiring the HA, patients do not use it effectively. Table 2 shows the factors that influence HA use;

Table 2. Factors that influence the use or not of the hearing aid

Author and year	Factors that influence negatively***,****	Factors that influence positively***,****	Factors that are indifferent***,****
Surr et al. (1978)[21]	· Discomfort in noise situations (32%).	· Perception of the need.	
	· Don't feel the need (31%).	· Training.	
	· Discomfort with the HA physical features.	· Monitoring and follow-ups.	
	(Issues with its shape) (9%).	· Motivation	
	· Perception of little or no benefit (4%).	(Extra-acoustic and psychosocial aspects).	
	· High-pitched sounds – uncomfortable (4%).		
	· HA technical faults (3%).		
	· Uncomfortable sound quality (2%).		
	· Stigma and prejudice (4%).		
	· Other (not described) (6%).		
Sorri et al. (1984)[36]	· Age: elderly individuals use the product less than younger individuals.		
	· They feel unable to use it.		
Amedofu et al. (2004)[37]	· Don't feel the need ("very good hearing") (29%).		
	· Stigma and prejudice ("acceptance issues") due to difficulty handling (21%).		
	· Difficulty handling.		
	· HA technical faults.		
	· Lack of motivation.		
Cohen-Mansfield & Taylor (2004)[32]	· HA technical faults (n=12).		
	· Discomfort with the HA physical features (n=7).		
	· Difficulty handling (n=14).		
	· Costs of maintenance and repair.		
Kaplan-Neeman et al. (2012)[38]	· Discomfort in noise situations.		
	· Perception of little or no benefit.		
Linssen et al. (2013)[39]	· Perception of little or no benefit.		
	· Inadequate expectations regarding HA Inadequate HA adjustments.		
	· The attitude of the otolaryngologist or audiologist.		
	· The pressure of others to use the HA.		
Salonen et al. (2013)[40]	· Discomfort in noise situations (73.7%).		
	· Discomfort with the HA physical features (10.5%).		
	· Acoustic feedback (17.5%).		
	· Difficulty handling (3.5%).		
	· Costs of maintenance and repair (i.e.: the price of the batteries) (22.8%).		
	· Don't feel the need ("I am so alone that I do not need a hearing device") (5.3%).		
	· Stigma and prejudice (7%).		
	· The pressure of others to use the HA (17.5%).		
	· Feel unable to use it (3.5%).		
Guerra-Zúñiga et al. (2014)[41]	· Fear of losing the HA (use only in particular situations).	· Support of the family.	
	· Individuals with severe loss degrees adhere less (perception of little benefit).	· Sharing social activities.	

***A reason appears in more than one column when it might influence more than one way; ****The absence of "n" or percentage (%) indicates that neither was mentioned in the study

Subtitle: HA = Hearing Aid; n = Study sample; % = Percentage

Table 2. Continued...

Author and year	Factors that influence negatively***,****	Factors that influence positively***,****	Factors that are indifferent***,****
Iwahashi et al. (2015)[42]	· Do not attend the follow-up care sessions · Uncomfortable sound quality (29.8%). · Perception of little or no benefit (17%). · Difficulty handling (14.9%). · HA technical faults (14.9%). · Inadequate HA adjustments (10.6%). · Other impairments (8.5%). · Fear of losing the HA (4.3%).		
Lee & Noh (2015)[43]	· Type of HA. · Signal processing method. · The number of channels. · Social and/or work activities. · Sociobehavioral factors. · Monitoring and follow-ups.	· Type of HA. · Signal processing method. · The number of channels. · Social and/or work activities. · Sociobehavioral factors. · Monitoring and follow-ups.	
Aazh et al. (2015)[15]	· Discomfort in noise situations (59%). · Don't feel the need (can manage without them) (39%). · Negative consequences of the use (i.e.: itch, earwax accumulation) (26%). · Discomfort with the HA physical features (22%). · Difficulty handling (18%). · Perception of little or no benefit (18%). · Appearance ("I do not like what they look like") (10%). · Stigma and prejudice ("It makes me feel old") (9%). · Other (not described) (53%).		
Maeda et al. (2016)[44]		· Subjective improvement in quality of life.	· Audiological parameters alone · Age · Speech recognition
Bennett et al. (2016)[45]			· Continuity of the same audiologist *bias of the research being carried out in the same center where the professionals are the same
Carrasco-Alarcón et al. (2018)[14]	· Discomfort in noise situations. · Perception of little or no benefit. · Discomfort with the HA physical features. · They do not have batteries.		
Gallagher & Woodside (2018)[8]	· Difficulty handling. · Don't feel the need (They believe they hear well) – They suggest that adherence to regular use occurs when the hearing loss reaches a certain limit (interfering with daily activities, for example).		
Ho et al. (2018)[9]	· The older, the less prone to use it. · The better the hearing, the less prone to use it.		

***A reason appears in more than one column when it might influence more than one way; ****The absence of "n" or percentage (%) indicates that neither was mentioned in the study

Subtitle: HA = Hearing Aid; n = Study sample; % = Percentage

Table 2. Continued...

Author and year	Factors that influence negatively***,****	Factors that influence positively***,****	Factors that are indifferent***,****
Solheim et al. (2018)[46]	· Difficulty handling (25.4%). · Uncomfortable sound quality (26.0%). · Don' feel the need (18.8%). · Perception of little or no benefit (2.8%). · Discomfort with the HA physical features (2.2%) · Costs of maintenance and repair (i.e.: the price of the batteries) (4.4%). · HA technical faults (8.3%). · Fear of losing the HA (2.8%). · Stigma and prejudice (1.1%). · Other impairments (9.9%). · Other (not described) (10.5%).		
Fuentes-López et al. (2019)[20]	· Perception of little or no benefit (18.2%). · Discomfort in noise situations (18.2%). · Inadequate HA adjustments (15.6%). · Difficulty handling (ex.: control of volume) (15.6%). · Quality sound uncomfortable (5.2%). · Consequences negative of the use (i.e.: itch, earwax accumulation, skin rashes) (5.2%). · Don't feel the need (2.6%). · Other (not described) (53.2%).		
Fuentes-López et al. (2019)[47]		· Self-efficacy.	

***A reason appears in more than one column when it might influence more than one way; ****The absence of "n" or percentage (%) indicates that neither was mentioned in the study

Subtitle: HA = Hearing Aid; n = Study sample; % = Percentage

once again, the negative factors are more expressive. The most mentioned negative impact refers to issues of uncomfortable sound quality and discomfort in noisy environments.

This study does not limit the search period aiming to establish an actual timeframe concerning the factors that influence HA use. Additionally, Tables 1-2 were described in chronological research order. Despite understanding that such factors would change as technologies advanced, we observed that many of them were preserved throughout the years studied.

Table 1 shows a study from the 1980s introducing eight factors that influence HA acquisition[6], while another 2013[7] study indicated six reasons, out of which three were also overpricing, absence of real interest/don't feel the need, and other health problems.

In Table 2, a study from the late 1970s[21] ranked nine negative factors that influence the effective use of HA, whereas a 2019 study[20] listed eight aspects. A comparison of these two studies reveals five shared aspects: perception of little or no benefit, discomfort in noise situations, uncomfortable sound quality, don't feel the need, and others (not described).

The review and reading of the papers revealed that the aspects that would explain the low adherence to HA are diverse and multifactorial[8,32]. These factors can be subdivided into patient-related and pathology (hearing loss) related matters and issues concerning health services and professionals involved[41].

Research has pointed out the following elements that influence HA use: personal background and intrinsic aspects refer to motivation to use, expectations, individual demands, attended environments, age, support of family members, skillfulness, and motor skills[20,37,39,43]. Some factors, such as negative previous experience with HA, attitude towards difficulties presented, employment, and social activities are introduced as aspects associated with HA acquisition[41].

Questions related to the type, degree, and configuration of hearing loss, associated with the impact of hearing loss on the patient's life and how much it affects their quality of life and daily life activities are also relevant[31]. Furthermore, the stigma caused by hearing loss and the use of HA, in addition to its acquisition costs, hampers acceptance and the search for help.

Health services might also influence HA use. It is worth highlighting the implementation of different types of patient guidance and awareness regarding the device before, during, and after the prescription[41]. The attitude of health professionals might either negatively or positively influence HA acquisition[7]. Thereby, related health care should consider dealing with patients personally.

Numerous papers have reinforced the importance of an adequate follow-up program with professionals instructing users on the difficulties involved in the process and common problems to be resolved. Previously scheduled follow-up sessions should be proposed not only to offer help in case of need[23]. Research[3] has demonstrated that obstacles to using refer to difficulty handling and skillfulness with the HA, which could be evaluated, trained, and solved in the follow-ups. Support and guidance might be even more relevant than the HA technology[48].

It is also worth emphasizing that the number of papers addressing the reasons for the lack of adherence and effective use is larger. This leads us to believe that a successful hearing rehabilitation is, indeed, based on learning the reasons that lead patients to adhere to the entire process of HA selection and adaptation, in addition to understanding the guidelines and need for periodic and regular follow-ups. Making the patient satisfied with adaptation for a HA effective use might be complex since satisfaction is subjective and multifaced[49].

Researchers have highlighted the importance of a patient-centered plan of auditory rehabilitation that meets the patient's expectations, thus allowing for effective HA use and higher levels of satisfaction[5,50].

The process might be improved by analyzing HA self-efficacy, which has been suggested as one of the main factors to explain use adherence[47]. West and Smith[51] define device self-efficacy as the patient's confidence in their skill to handle the HA and use it successfully. HA self-efficacy is a key element in becoming a successful user.

The most relevant enablers of help-seeking and successful HA use were positive behavioral beliefs about HA, support of others who are important to the patients and HA self-efficacy. Another factor often indicated to influence effective recovery is the user's tolerance to hearing in the presence of background noise. However, the results on what determines a successful hearing recovery and adequate HA use still vary considerably in the studies analyzed[8].

Despite efforts to develop a comprehensive search strategy, some relevant studies may have been passed unnoticed. Likewise, materials and research that were not published in scientific journals contained in the researched databases that could provide additional information were not included herein.

As described, differently from systematic reviews, scoping reviews do not evaluate the quality of the studies for inclusion; however, these are common methodological characteristics of scoping reviews.

CONCLUSION

This scoping review allowed identifying the aspects that lead patients to follow or not the HA use recommendation comprehensively, in addition to its use over the years.

According to the applicants to HA use, the factors involved in not acquiring the device are associated with cost-benefit, difficulty accepting, and lack of understanding of its actual need. However, the most mentioned factors for effective use after the HA acquisition refers to issues of sound quality, difficulty handling, and perception of little benefit.

For better awareness, adherence and effective HA use, the attitude of health professionals is extremely relevant and should offer patient-centered reception, bonding, and planning of the auditory rehabilitation. After the adaptation process, expectations must be aligned and users must be monitored closely, with constant guidance and instruction.

The most relevant factors that influence HA use in different moments of the process of hearing recovery must be identified to develop and improve strategies for optimization, favoring a better adherence to HA use. We suggest a deeper investigation of the factors that positively influence the use of the device.

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