

**INFORMATION NEEDED TO ENSURE
EFFECTIVE USE OF THE INDIVIDUAL HEARING
AID WITHIN ELDERLY SERVICE**

A Literature Review

Seth Antwi

Degree Thesis
Human Ageing and Elderly Service
2015

DEGREE THESIS	
ARCADA	
Degree Programme:	HUMAN AGEING AND ELDERLY SERVICE
Identification number:	12874
Author:	SETH ANTWI
Title:	INFORMATION NEEDED TO ENSURE EFFECTIVE USE OF THE INDIVIDUAL HEARING AID WITHIN ELDERLY SERVICE: A LITERATURE REVIEW
Supervisor (Arcada):	Christel Gustafs
Commissioned by:	Gustafsgård
<p>Abstract:</p> <p>AIM: The aim of this study is to make a plan for an easy to use Hearing Aid (HA) care and maintenance booklet. Focus will be on finding solutions for elderly people with hard of hearing who need an individual hearing device but staff do not have adequate information on how to use, care and maintain this device. It will promote education and ensure effective networking in the care and handling of the individual hearing device. The author plans to use these research questions to find the answers:</p> <ol style="list-style-type: none"> 1. What are the reasons behind the non-use and non-proper functioning of the individual HA? 2. What information does caregivers within the elderly services need to know about the individual hearing device for effective communication in daily living with clients? <p>METHOD: Peer-reviewed scientific articles that are related to this study are analyzed in this literature review. There is in-person information from HA provider at Kuuloinva. The theory used is Person-centered approach.</p> <p>RESULTS: Hearing aids are clearly associated impressive improvements in the social, emotional, psychological and physical wellbeing of individuals with hearing impairments. One of the main reasons behind the non-use as well as the non-proper functioning of the individual hearing device is the lack of knowledge and training on how to use, care and maintain the device.</p> <p>CONCLUSION: Collaboration between clinician, audiologist, HA technician, geronomes and all categories of caregivers within the elderly care service sector is needed to produce an understandable, practical and easy to use HA brochure and video material.</p>	
Keywords:	Age-related Hearing loss, elderly, Quality of life, social participation, Individual Hearing Aid, Care of Hearing Aid, Maintenance of Hearing Aid, Non-use of Hearing Aid, Effective Communication
Number of pages:	44
Language:	ENGLISH
Date of acceptance:	18.12.2015

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1. INTRODUCTION

Population ageing is running at a faster pace than in the past. The world's population of over 60years will nearly double from 12% to 22% by the year 2050. WHO (September 2015) The rate of hearing impairment is known to be high in older populations. Unfortunately a lot of hearing impaired older individuals either do not seek professional help or fail to use their prescribed Hearing Aids (HAs) due to attitudes towards HAs. Ekberg et al (2014). Sensory losses may often be overlooked or dismissed because of the perception that it is a normal part of the aging process. Crews & Campbell (2004)

Hearing loss brings limitation in the functional capabilities of older adults and this affects their quality of life. Kuzuya & Hirakawa (2009) A hearing impaired individual have difficulties in inter-individual communication. Bergman & Rosenhall (2001)

Effective communication is very much needed in order for a person to share information, establish and maintain personal relationships. Hearing loss affects communication especially in noisy environments. This may result in poorer social networks and relationships among older individuals. A gap in communication may also lead to feelings of loneliness, exhaustion, anxiousness, depression, insecurity, and exhibition of lower self-esteem and self-efficacy in older hearing impaired individuals. Wong & Cheng (2012)

There is an undeniable fact that improvements in technology have been great to our present generation. The modification of daily used items and products into simple and more efficient means has been a major breakthrough in the field of science and technology. The WHO (2014) states that an age friendly world is a place that enables people of all ages to actively participate in community activities. Technology has not left old people out of its scope. Modern day technology seems to be geared towards an increasing usage of the term design for all.

An effective hearing rehabilitation and intervention service has the potential to improve and maintain functional independence of the elderly. Brennan (2003), Grue et al (2009) Hearing aids are clearly associated with impressive improvements in the social, emotional, psychological and physical wellbeing of individuals with hearing impairments.

Hearing aids help to keep older people safe and independent for as long as possible, reducing the increasing need for institutional care.

The lack of knowledge and training on how to use, care and maintain the individual hearing device has often been found to be the main reason behind the non-use as well as the non-proper functioning of the individual hearing device. Proper and an adequate functioning of the individual hearing device benefit both the person with the hearing impairment, the caregiver as well as the environment.

Efficient dissemination of HA information by the audiologist is related to hearing aid user success. The focus of the audiologist has generally been on providing technical information to clients. Ekberg et al (2014)

1.1 Motivation for the Choice of Research Study

The author developed a special interest in hearing aids during a practical training. The author observed during the training that one male client with a hearing aid was not so much interested in the activities and social interactions among the group. He read newspapers most of the time. Whenever they had to talk to him, the caregivers needed to shout on top of their voices. It was later discovered that the batteries in his hearing device had run down some long time ago. The caregivers did not know then exactly what to do. They had to eventually refer to an audiologist advice for such a simple act of changing batteries in a hearing device. The man could fully then participate in all activities after the batteries had been changed.

1.2 Aim of the study and Research Questions

The choice of this study is as a result of an opened option to continue with the project titled 'effective use of hearing devices' lead by Christel Gustafs. The project 'effective use of hearing devices' aims at an easy to use information for staff within elderly services.

The aim of this study therefore is to gather information through a literature review to plan for an easy to use HA care and maintenance booklet. The information will be useful as a reference guide for caregivers within the elderly services for proper functioning and the effective use of clients hearing device.

The following research questions will be answered by collecting and analyzing literature.

1. What are the reasons behind the non-use and non-proper functioning of the individual Hearing Aid (HA)?
2. What information does caregivers within the elderly services need to know about the individual hearing device for effective communication in daily living with clients?

1.3 Concepts

Terms used in this work such as Hearing Loss (Danermark, 2013), prevalence of hearing loss, Age-related hearing loss, hearing loss and quality of life, hearing loss and social participation, hearing devices are discussed in this section.

1.3.1 Prevalence of Hearing Loss

A person that is unable to hear properly as someone with a normal hearing is considered hearing impaired according to WHO 2015. 'Hard of hearing' refers to persons with hearing loss ranging from mild to severe with a hearing threshold of more than 25 dB in both ears according to WHO 2015. Hearing loss can affect one ear or both ears, and leads to difficulty in hearing conversational speech and also loud sounds. A person with hard of hearing usually communicate through spoken language and can benefit from hearing aids. An elderly person with age-related hard of hearing would not usually benefit from sign language used by deaf people who have profound hearing loss (WHO 2015) The WHO (September 2015) states hearing loss as one of the most prevalent chronic conditions affecting the quality of life of the aged. (WHO

(2015), see also e.g. Weinstein, BE (2003), Wong & Cheng (2012) Habanec & Kelly-Campbell (2015)

Around 70 percent of older adults in the United States have some form of hearing impairment, with the occurrence rate doubling with every age decade according to Chen et al (2014). Gispen et al (2014) reported similar results.

1.3.2 Age-related Hearing Loss

The capacity of hearing and balancing organ changes with increasing age. Grue et al (2009). The number of people with age-related losses is expected to rise with the increasing aging population. Brennan (2003). Grue et al (2009). Ishine et al (2007). Wong & Cheng (2012)

Age-related hearing loss may occur in the outer, middle, inner ear, the auditory nerve or the central auditory system. The pinna loses elasticity and the external auditory canal narrows in the outer ear. The eardrum becomes rigid with age. There is degeneration of the middle ear bone, inner ear, hair cells and the organ of corti. Sensitivity to sound is therefore reduced. This affects speech understanding. Other ear disorders such as ear-wax impaction, prolonged exposure to noise-induced hearing impairment may contribute to hearing impairment in old age. Wong & Cheng (2012)

1.3.3 Effects of Hearing Loss

Hearing is important for communication between individuals; connecting as well as maintaining and establishing relations with people. Habanec & Kelly-Campbell (2015)

Gispen et al (2014) concluded that there is a connection between reduced levels of physical activity and moderate to greater levels of hearing impairment. Their study further indicated that physical functioning and bodily movements are negatively affected by hearing impairment. Individuals living with hearing impairment lack awareness of the auditory environment, experiences social isolation. Hearing impairment also affects

an individual's level of cognition. Thus older people with hearing impairment may have lower levels of physical activity.

Hearing loss affects an individual's social, cognitive and emotional state if left untreated. Hearing loss limits an individual's communication, affects psychosocial behavior, affects family and social relations, restricts an individual's enjoyment of daily activities, and affects an individual's physical wellbeing. Hearing loss also limits an individual's level of independence, the accuracy of the older person's medical diagnosis, treatment and management is also greatly affected. Weinstein (2003)

Habanec & Kelly-Campbell (2015) reported that hearing impairments affects communication, individual societal participation as well as interpersonal relations in family. According to Chen et al (2014) hearing impairment is independently associated with disability and limits physical functioning in older adults. Their study made mention of other studies that had stated hearing impairment as having an effect on cognitive load and social isolation resulting in an accelerated cognitive decline and the risk of dementia in older adults.

In their discussion, Chen et al (2014) stated an independent association of hearing impairment with poorer functioning in activities of daily living, instrumental activities of daily living, leisure and social activities, limiting work and walking, and also confusion and memory problems. The resultant effect of hearing impairment on communication may lead to social isolation and loneliness in older people, thereby potentially leading to a reduced physical functioning.

Grue et al (2009) stated that hearing loss is connected to balance problems and falls in elderly people.

1.3.4 Hearing Loss and Caregiver Burden

In their study on "increased caregiver burden associated with hearing impairment but not vision impairment in disabled community-dwelling older people in Japan" Kuzuya, & Hirakawa (2009) demonstrated a strong association between hearing impairment of elderly care recipients and an increased burden on caregivers. The study further stated

that recipient caregiver communication is greatly affected as a result of the hearing disability of the care recipient.

It is estimated that institutionalized elderly individuals have greater rates of sensory impairments as compared to their counterparts living in the community. Brennan (2003), Grue et al (2009)

An enhanced hearing (through effective use of hearing devices) can thus reduce caregiver burden.

1.3.5 Hearing loss and quality of life

In the article entitled “a close association between hearing impairment and activities of daily living, depression, and quality of life in community-dwelling older people in Japan” Ishine et al (2007) reported a close association between hearing impairment and activities of daily living, depression and quality of life of elderly individuals. Their study recorded a higher rate of depression in older people with hearing loss than those without. Relating their findings to other studies, they stated that the strong relation between hearing impairment and activities of daily living, depression and quality of life in older adults is a worldwide occurrence.

Age-related losses have an impact on the quality of life of older individuals. Sensory losses can be stressful to individuals who have lived most of their lives with ‘normal sensory functioning’. It may lead to lower levels of social engagement. Brennan (2003)

Sensory impairments can affect an individual’s daily living, communication, social, functional and mental ability. Hearing loss may lead to falls. Grue et al (2009) Hearing impairment reduces quality of life in older people, especially in the areas of social interaction and psychological functioning. Wong & Cheng (2012)

A decline in cognitive function and reduction in the extent of social interaction may be as a result of hearing loss. Sheft et al (2015) Hearing loss leads to social isolation and intellectual deprivation in old age. Bergman & Rosenthal (2001) Also according to Crews & Campbell (2004) hearing loss in old age may lead to confusion, isolation, disappointment, and frustration. Older individuals with hearing loss are more likely to ex-

perience falls.

1.3.6 Hearing Loss and Healthcare

In their research paper “satisfaction with healthcare among people with hearing impairment: a survey of Medicare beneficiaries” Barnett et al (2014) reported that hearing impairment affects effective healthcare delivery. The study found individuals with hearing impairment reported higher degrees of dissatisfaction in healthcare delivery. This is because there is a significant gap in communication between the individual with hearing impairment and the healthcare provider.

For high quality care delivery there must be an effective communication between the client receiving care and the caregiver. Hearing impairment may contribute significantly to ineffective treatment, as physicians may not get the necessary information for optimal health diagnosis and delivery. Physician to patient medical information may also be misunderstood and this will lead to wrong follow-up of medical recommendation thereby resulting in bad clinical outcomes. Barnett et al (2014)

Individuals with hearing impairment may find it difficult to listen to and follow medication prescriptions and treatment procedures given over the phone. Barnett et al (2014)

1.3.7 Management of Hearing Loss

Hearing Aids

Audiological rehabilitation is recommended for an individual with a documented hearing loss and its associated activity restrictions. This rehabilitation is an interactive and problem-solving activity as defined by the American Speech-language-hearing Association. Weinstein (2003)

Also according to Gordon-Salant (2005) amplification is the principal treatment for age-related hearing loss. A range of assistive hearing devices is available, and the communication need of an individual is assessed before a personalized communication device can be developed. Montano (2003)

McPherson and Wong (2005) reported problems in acoustics or background noise interference with hearing instruments. Ineffective sensory appliances such as a badly adjusted HA may potentially lead to self-reported sensory impairment. Brennan (2003)

Perez and Edmonds (2012) reported lack of uniformity in the assessment of HA usage. The Authors therefore recommends a formal guideline for HA usage data reporting. This will enable a clearer understanding of the correlation between HA usage and its outcomes.

Ear Care

Wax Removal

A lot of research reports that impacted wax or cerumen removal can improve upon hearing and wellbeing of older adults. Smeeth et al (2002) Roland et al (2008)

Regular assessment of older people's ears is very much recommended due to the negative effects wax build up have on their hearing.

Roland et al (2008) recommends the removal of wax before the occurrence of conditions such as vertigo, tinnitus, discharge, pain, blocked ears, hearing loss and otitis externa occur.

1.3.8 ACQUIRING HA IN FINLAND

Finland has a public hearing health care system but private dispensers do also exist. In the public system hearing aids are free of charge for any person who needs a hearing aid. A potential recipient is required to first visit a local health center for medical examination. The threshold for receiving an individual hearing aid is about 30-40 db. (see e.g. Kuuloliitto)

Finland has a system of public hearing health clinics that are usually located at public general hospitals. The person with hearing impairment will be referred to a hearing clinic where the actual fitting of the individual hearing aids is undertaken by a specialized hearing health care professional.

The Federation of Hard of Hearing (Kuuloliitto) (2015) and Svenska hörsselförbundet rf (2015) are organizations that promote the interests of people who are hard of hearing. A great deal of useful information and services can be acquired from these organizations.

1.3.9 Federations of Hard of Hearing, Finland

The Finnish Federation of Hard of Hearing (FFHOH) and Svenska hörsselförbundet rf represents the rights and interest of hard of hearing people in Finland. The organizations also provides services for hard of hearing individuals and their families or significant others.

The organizations has a total membership of 19 200 people. The Finnish Federation has 84 local and two national associations. The Svenska hörsselförbundet rf has 9 local associations.

The national associations are The Finnish Tinnitus Association and The Finnish Acoustic Neurinoma Association. The federations are members of IFHOH (International Federation of Hard of Hearing People), EFHOH (European Federation of Hard of Hearing People)

Kuuloliitto (2015), Svenska hörsselförbundet rf (2015)

1.3.10 Theoretical Framework

Person-centered Approach

The author will attempt to use person-centred approach as framework for this study. This choice results from the use and recommendation of this approach by various literatures relevant to the authors study. (Poost-Foroosh et al 2011; Grenness et al 2014; Laplante-Lévesque et al 2010)

Quality communication results in optimal person-centred care procedure. This level of quality communication is achievable through the use of HAs. Effective caregiver-client

interaction is of significant importance to elderly care. This is because clients are able to give efficient feedback to the caregiving service if there is effective aural communication with the caregiver.

Robinson et al (2008), states person-centred care as a good and desirable measure of quality of care services. Person-centred care has been found to improve communication, promoting client involvement in care, thereby creating a positive client-caregiver relationship, and this leads to effective follow-up of the rehabilitation process. Person-centred care as a result seeks to individualize clients based on their specific needs. Robinson et al (2008)

To the persons with hearing impairment, client-centered care includes the need to take their communication needs into consideration. If a client or an elderly person uses a HA, the care and maintenance of the device must be included in their individual care-plan.

2. METHODOLOGY

The methods used to find answers to this research questions is explained here. The methodology used is literature review. Content analysis of available related literature was carried out in this study.

In literature review, a link is established between existing data and what the current study seeks to examine. The findings in this study must therefore correspond to the findings of other available research in the same or similar study category. (Kumar 2011)

Literature review aims to expand an understanding of existing literature on a study. (Aveyard 2010). The research question in this study will be answered by finding study related literature, assessing the quality of the literature, obtaining study relevant data from the chosen literature and developing new information through the analysis of the chosen data.

The procedure involved in literature review process is made in such a way that other individuals interested in advancing this topic will find it clear and easy to follow. (Griffiths 2009)

The choice of literature review gives the author the chance to put together and analyze existing studies related to the topic under study in order to come out with definite answers to the research questions.

2.1 Data Collection

The author mainly used ARCADA's remote access to Nelli Portal to search for data from home. Electronic search engines containing peer reviewed scientific articles in full text such as EBSCO, Ebrary, Google Scholar was available to the author through the remote access to Nelli portal.

Scientific articles relevant to the chosen study were then obtained and analyzed.

The author had been very focused from the beginning of writing. Database was chosen using the Academic search elite EBSCO. The search terms used were Hearing Loss "all text" AND non-use "all text" AND Hearing Aids "all text". The author had put all the search terms together in EBSCO and retrieved 22 scientific (peer reviewed) journals. 17 out of the 22 articles were in full text. 15 of the articles had been authored within the years 2000 and 2015. 9 articles out of the 15 were relevant to the study. The 9 articles were chosen because they contain information on Hearing aids and their care and maintenance.

2.2 Inclusion Criteria

The study follows ARCADA's guidelines for thesis writing. Peer-reviewed scientific articles in full text written in English and freely accessible in the data base are used in this study. The chosen articles were relevant to the topic under study.

Excluded were articles that did not meet the above criteria.

Table 1: inclusion criteria

Inclusion
<ul style="list-style-type: none"> • Articles written in English language • Articles available in full PDF format with abstract, aim, methods, results • Peer-reviewed scientific journals • Articles relevant to the topic under discussion • Freely accessible scientific articles

2.3 Results of Data Collection

The results of the data collected are summarized and presented in the table below in alphabetical order. Scientific, peer-reviewed articles written between the years 2000 and 2015, and are relevant to this study was chosen in EBSCO. Study methods used in the various articles include cross-sectional study design, observations, interviews, self-assessment inventories, questionnaire, discussions, case study, descriptive analyses and articles.

The scope of the study has a certain level of international dimension as the studies had been done in countries such as the United Kingdom, USA, Scotland, Finland, The Netherlands, and Sweden.

Table 2: summary of results

Nr.	Author and Year	Participants	Method	Results
1	Brooke et al. (2012) “Hearing Aid Instruction Booklets: Employing Usability Testing to Determine Effectiveness”	40 people aged 46-72 years with no experience of Has or audiology services	Cross-sectional study design, observations, individual interviews	Participants experienced problems in completing all tasks while following instructions in the instruction booklet. Highlighted issues included layout, diagrams, and content.

2	Desjardins & Doherty (2009) "Do Experienced Hearing Aid Users Know How to Use Their Hearing Aids Correctly?"	50 experienced hearing aid users	Self assessment inventory, Questionnaire	Experienced hearing aid users range from having an excellent understanding of how to use their hearing aids to a poor understanding.
3	Harkin & Kelleher (2011), "Caring for older adults with hearing loss"	Nurses	Discussion	How nurses can promote good ear care is discussed including the various available options if problems do occur.
4	Holmes (2014) "How to address the communication needs of older patients with hearing loss"	20 staff, 33 patients	Questionnaire, interviews	The toolkit ensures effective communication between staff and older people with hearing loss and thus make care delivery efficient.
5	Jayarajan & Rangan (2000) "Evaluation of hearing-aid provision in adults"	128 adults fitted with postaural hearing aids. (61 male, 67 female), Mean age=73years	Assessment, discussion, interview, observation, evaluation	Problems with hearing aid use were detected in about 60% of the study population. Categories of problems included manipulation difficulties, faulty tubing or earmould, technical difficulties, lack of clarity.
6	Kelly et al. (2013) "Older people's views on what they need to successfully adjust to life with a hearing aid"	240 older people belonging to three different types of HI	Interviews, surveys, follow-up	Participants reported a lack of enough post fitting practical help and support. Hearing aid users needed more information than they received during and after hearing aid fitting.
7	Lupsakko et al. (2005) "The non-use of hearing aids in people aged 75 years and over in the city"	601 people aged 75 years or older, Geriatrician,	Case Study, Questionnaire, interviews, Ger-	The most common subjective reason for non-use of hearing aids were that the use did not help at all, the hearing aid was broken or it was too complicated to use. Also a decline in

	of Kuopio in Finland”	Trained nurse	iatric assessment	cognitive or functional capacity and low income contributes to non-use of hearing aids.
8	Meuwese-Jongejeugd et al. (2007) “Hearing aids: expectations and satisfaction of people with an intellectual disability, a descriptive pilot study”	16 adults with mild or moderate ID and a recent diagnosis of hearing impairment	Specifically designed booklet, semi-structured interviews, descriptive analysis	Most participants were aware of their hearing loss and familiar with reasons for hearing aids. Most participants were partially or totally dependent on carers in use and maintenance of hearing aids.
9	Öberg (2015) “Hearing Care for Older Adults: Beyond the Audiology Clinic”		Article	Older people have low self-confidence in learning to use hearing aids. They thus will benefit from an increased knowledge and support from other health professionals, family caregivers and significant others.

2.3.1 Validity and Reliability

A repeat scientific study that comes to the same conclusions is reliable. A valid research instrument must be able to find solutions to the problems that it was designed for. (Kumar 2011)

Validity of a research arises when there is a clear link between the study objectives and its corresponding research questionnaire. (Kumar 1996)

The author has taking careful consideration in chosen peer-reviewed scientific articles in full text so that the study results will be valid, accurate and reliable.

2.3.2 Ethical Consideration

The author mainly followed ARCADA's guidelines for thesis writing. Issues of ethics are of prime concern in the field of healthcare and its related studies.

Study material is derived from scientifically approved sources. All quotations and citations are properly referenced in accordance with ARCADA's guidelines. Optimal care has been taken to avoid rewriting and plagiarism.

2.4 Study Limitations

The study had been focused on only what caregiving staff can do even though active and physical participation of elderly individuals in care is what is desirable to present day gerontology. The author is critically aware of the difficulty in maintaining a balance between offering too much or too little help to elderly clients. This is because care for elderly individuals must not be done in such a way that the person is made to think or believe that they are 'incapable'.

Providing solutions that work for all range of individual was also noted by the author as very difficult. What is understandable and easy to a person may not be same to another person due to personality differences.

There is too much generalization of old age in written literature.

Finding literature specific to especially washing of ear mold and HA tubing had been quite difficult.

The author initially planned to make a brochure and a video on HA care and maintenance but time could not permit as the study needed to be submitted within time.

3. RESULTS

3.1 What are the reasons behind the non-use and non-proper functioning of the individual HA?

HAs comes in different kinds and specifications and are administered based on an individual's degree of hearing loss. They are known to improve upon and enhance a person's hearing but do not restore hearing back to normal. The ability for a hearing impaired person to hear with the help of hearing aids has been known to improve upon the person's quality of life. Harkin & Kelleher (2011)

3.1.1 Lack of Information and Support

Kelly et al. (2013) wrote that lack of information was the primary need of HA users. General information about the HA and the process of getting Audiological services was expressed by the study participants to be lacking. Individual HA users for instance expressed the need for information on whether to wear the aid at all times and places or at particular times and place.

Jayarajan & Rangan (2000) wrote that the Lack of informed positive benefits of hearing aids; Limitations in hearing disability awareness; Lack of knowledge on how to seek a hearing health check; Longer waiting times for hearing assessment may also have a negative effect on the provision and use of the device.

Lack of support from caregivers was found to be a reason for under use of HAs. Lupsakko et al. (2005) Also according to Brooke et al. (2012) failure of clients' relatives and caregivers to attend audiology appointment sessions may affect the use of the device. Also in a study on "how to address the communication needs of older patients with hearing loss" Emma Holmes (2014) found that caregiver knowledge on the kind of equipment available to help communicate with hearing impaired patient was limited.

Service provision was identified by Meuwese-Jongejeugd et al (2007) as a problem with HA use. The provision of poor-quality information on HAs is one possible reason for

non-use of the device as new users who are unable to use and care for the device will eventually stop using them as a result of frustration and dissatisfaction. Brooke et al. (2012)

3.1.2 Sound Quality and Environmental/Background Noise

Kelly et al. (2013) reported problems in relation to the use of assistive devices, and HA interfering with electronic security devices. The author further stated that device-related problems and difficulties experienced by HA users include sound of blowing wind through the microphone, piercing whistling sound during device insertion.

Desjardins & Doherty (2009) and Meuwese-Jongejeugd et al. (2007) also identified problems with sound quality and acoustics as a barrier to HA use. Similarly according to Lupsakko et al. (2005) non-use of the device among older people may arise as a result of low quality of sound amplification.

Jayarajan & Rangan (2000) reported problems with too noisy aid, hearing not clear enough with the aid, echoing sound in the aid. Limited usefulness of HAs in noisy environments may result in disappointments to some HA users.

In their study Meuwese-Jongejeugd et al. (2007) also reported that some participants had problems with environmental sounds.

3.1.3 Manipulation Difficulties and Ease of Use

The ability of an individual to manipulate the device is an important factor for HA success and satisfaction. Desjardins & Doherty (2009) Ease of use of the device may contribute to the efficient use of HAs. Desjardins & Doherty (2009), Meuwese-Jongejeugd et al. (2007)

Jayarajan & Rangan (2000) reported problems with the inability to use HAs with spectacles.

Technical problems and related difficulties in using and handling the device may also contribute to the rejection of the HA. Lupsakko et al. (2005)

Problems such as pulling the tubing out of the ear mold, incorrect battery insertion, forcing the battery compartment closed and inability to properly reattach the HA to the ear mold were observed by Brooke et al. (2012). Client dissatisfaction with HAs and the services they provide may arise as a result of frustrations of a non-working HA due to a client's inability to perform simple maintenance skills. Difficulties experienced whilst performing basic HA tasks will potentially lead to a follow-up and/or hearing aids repair and maintenance appointments. This eventual follow-up and further repairs and maintenance cost extra money and time. Brooke et al. (2012)

Desjardins & Doherty (2009) also recorded poorer task performances in basic tasks such as using the telephone, cleaning the HA, and the use of the noise program. The authors further stated that experience might not necessarily mean individuals are able to use their HAs without problems.

Jayarajan & Rangan (2000) also detected problems with HA manipulation, faulty tubing or ear-mold, technical difficulties and lack of clarity in their study. Manipulation difficulties were the most conspicuous problem recorded. Rejection and non-use of HAs may arise if an individual finds it difficult to properly insert the ear-mold. This is because improper insertion of the ear-mold will not let the device work efficiently and will have an effect on sound quality.

3.1.4 Individual Expectations, Cosmetic Appeal and Comfort of the Device

According to Kelly et al. (2013) individual expectations of the difference a HA would make to their hearing was disappointing as some thought the use of the device will restore their hearing back to normal. The authors further reported individual disappointments in too conspicuous HAs and not too comfortable earpieces.

In their study Lupsakko et al. (2005) stated difficulty to use or perceived ineffectiveness of the HAs as the most obvious reasons for the non-use of HAs in the study group.

Some individuals did not use hearing aids because they did not feel the need for it and/or the hearing aid was not beneficial to them.

Desjardins & Doherty (2009) stated the cosmetic appearance and comfort of the device as one of the reasons behind the rejection of HAs. Jayarajan & Rangan (2000) stated that under provision and under use of HAs may arise as a result of the cosmetic appeal of the device itself.

Problems identified by Meuwese-Jongejeugd et al. (2007) in relation to HA used also included cosmetic concerns and comfort of use. The study recorded preferences for cosmetic aspects among some participants.

3.1.5 Cost, Degree of Hearing Loss, Intellectual and Functional Capacity

Educational level, degree of hearing loss, memory and information recall capabilities of the individual clients and socioeconomic status influences functional health literacy in old age. Differences in health literacy levels of clients and HA dispensers may be a barrier to understanding the verbal and/or visual information provided to clients by the HA dispenser. Brooke et al. (2012)

Similarly Lupsakko et al. (2005) wrote that some of the main elements that contributes to the use of HAs include functional age, severity of hearing loss, education, word recognition scores, Hearing Handicap Inventory for the Elderly score, the presence of self-reported hearing loss, decline in cognitive and functional capacity, financial costs or low income may cause non-use of the device. Other obvious need for amplification in elderly people depends very much on their living conditions (that is whether they live alone or live in an institution) and also their social activity. Even when provided for free, according to the study, an expensive HA may be left unused because of the cost of batteries.

In a study to determine if experienced HA users know how to use their HAs correctly, Desjardins & Doherty (2009) recorded lower performance scores for older participants compared to the younger ones.

In a study to evaluate hearing aid provision in adults, Jayarajan & Rangan (2000) also reported that elderly subjects in the study group recorded the most higher manipulation difficulties, wax discharge, allergic reactions and lost hearing aids.

Reasons stated for non-use of HAs include the degree of an individual's hearing loss. Desjardins & Doherty (2009). Jayarajan & Rangan (2000) stated that under provision and under use of HAs may be caused by Late referral for HAs by an individuals' general practitioner; Older people perceiving hearing impairment as normal ageing process or not too severe for rehabilitation; Poor self-motivation resulting in elderly individuals placing lower emphasis on communication.

Writing on why older people with hearing impairments fail to acquire HA, Öberg (2015) stated that either some older people never had a health recommendation for further hearing checks, or that the older person perceived the degree of hearing lost as not bad enough for HA, or that hearing impairments had been accepted by the older person as a normal aspect of the ageing process.

Unfortunately Kelly et al. (2013) 294 reported that age-related issues are not usually taking into account during audiology rehabilitation of older individuals.

3.1.6 Limitations of Existing HA Instruction Booklets

It is difficult to develop material that is suited for all range of people due to diversity reasons, especially with regards to individual differences in their ability to read and understand provided information. Brooke et al. (2012)

Testing the usability of two HA booklets Brooke et al. (2012) found difficulties with some parts of the booklets. The difficulties were in relation to finding, understanding and following some provided information. Participants expressed concerns in relation to the diagrams used in the instruction booklets. There was also concern regarding information on the removal of the ear mold from the HA. This information according to a participant is not enough and could have been made much clearer. Some participants were concerned that some headings did not correspond to the information giving and for that matter some information was found in sections where they actually did not expect

to find it. The study further revealed concerns about difficulties to understand the level of language used. Information in the booklets was noted as being confusing or lacking by a large proportion of the participants.

The authors identified problems in performing HA tasks such as cleaning and maintaining the aid, cleaning and maintaining the mold, and changing batteries using the HA instruction booklets.

Accessing and understanding written health related information has been known to be problematic. Poor design and layout, coupled with high readability may prevent a client from getting the most out of their written instructions. Too small font size, missing and irrelevant content and bad layout, jargon, confusing language are known factors that can potentially affect an individual's understanding of written information. Brooke et al. (2012)

Factors that could also affect the usability of the HA instruction booklet includes the wording used by the audiologist as well as the comprehension. Brooke et al. (2012)

3.1.7 Cleaning and Maintenance of the HA

Brooke et al. (2012) observed problems in cleaning the hearing aid after a days use. Some study participants failed to separate or disconnect the ear mold from the HA before cleaning. Whilst some participants cleaned both the HA and the ear mold with the soft cloth, others cleaned only the mold and not the HA itself.

Cleaning the ear mold was the most difficult task for participants in Brooke et al. (2012). There was uncertainties in separating the different components of the HA. The most difficulties was observed in reattaching the ear mold with the HA after cleaning. This was as a result of uncertainty over which way the ear mold should face when being reconnected.

Kelly et al. (2013) also reported problems in relation to reassembling the aid after cleaning. In relation to HA cleaning, individuals problems included how to clean the aid and tubing, deal with condensation, what to do if the device gets wet in rain and changing batteries. Although the audiologist had generally provided such information during fit-

ting appointments, most HA users had forgotten them by the time they got home.

3.1.8 Changing Batteries

Whilst performing this task some study participants experienced some degree of difficulties in their attempt to open the battery compartment. This was attributed to the fact that they found the description of the battery compartment in an HA booklet confusing. Brooke et al. (2012) The authors reported some few individuals as unable to insert the batteries correctly into the HA.

3.2 Information on the HA for caregivers within the elderly care services

3.2.1 Audiologist/Hearing Aid Dispenser

The audiologist/HA dispenser usually explains and demonstrates the use and maintenance of the HA to new users during fitting.

Harkin & Kelleher (2011) wrote that in order to make up for optimal use of the device and to avoid common HA use associated problems, the dispenser basically explains the care and maintenance of the device to the new user during fitting.

According to Desjardins & Doherty (2009) skills typically taught to new HA users include hearing aid insertion, hearing aid removal, opening the battery door, changing the hearing aid battery, cleaning the aid, manipulating the volume control, telephone use, and use of the directional microphone or noise program. These are very basic and essential skills an individual needs for the proper functioning of the hearing aid.

3.2.2 The HA Instruction Booklet

After HA fitting an instruction booklet specific to the provided HA is given as reference guide to the new user of the HA. HA information such as how to change batteries, turn the device on and off, and also how to deal with HA associated common problems are contained in this instruction booklet. The booklet is HA specific and it is developed by the manufacturers of the HA. Brooke et al. (2012)

HA instruction booklets are useful and appropriate for hearing aid users.

Studies have stated that a higher percentage of information given during health service appointments is easily forgotten. Also the amount of information provided to clients during health appointments is usually limited due to time constraints. A hearing impaired person may not easily get to hear the spoken information provided during audiology sessions. Clients therefore have the need to be provided with supplementary information that they can consult when they have problems with their HAs. The booklet serves as a form of support to the hearing loss rehabilitation process. Brooke et al. (2012)

Research recommends all written information for a target audience is evaluated before use to ensure it is readable, easy to follow as well as usable so as to be able to achieve its needed purpose. Available studies support this recommendation. Brooke et al. (2012)

On some reportedly best aspects of the HA booklet containing some useful information, study participants in Brooke et al. (2012) recommended the need for additional information, increased font sizes and suggested for those pages to be located in more prominent pages or easy to find locations of the booklet.

The effectiveness of health-related written information is dependent on its usability. Client satisfaction with HA use can be improved if provided information is easily accessible. This also potentially brings about a reduction in the number of hearing aid repair and maintenance appointments. Brooke et al. (2012)

3.2.3 Background noise

Advances in technology have made it possible to program HAs to work in challenging environments such as background noise. Assistive listening devices such as the loop system are available in public places to help users of hearing aids hear well. This loop system transmits sounds directly to the HA and thus greatly reduce the discomforts of background noise. Harkin & Kelleher (2011)

3.2.4 Staff Knowledge

Emma Holmes (2014) reported that in order to ensure staff had information on what to do, a hearing loss pathway was developed in the form of a flow chart and placed on a wall visible to all staff. This pathway provides support to patients with hearing loss and information on how to refer them for further hearing checks and rehabilitation. Training is provided to staff on understanding hearing loss and basic HA maintenance. The training also provides advice on patient hearing loss screening as well as information on the use of assistive listening devices and specialist referral if required.

3.2.5 Lost HA

In their study Jayarajan & Rangan (2000) reported an incidence of lost HA.

To help keep HA safe, HA storage boxes were introduced on the wards. Emma Holmes (2014). Staff found the HA storage boxes useful. Hearing aids were kept safe, batteries stored efficiently and it help easy identification and recognition of hearing impaired patients eliminating the need to put a hearing loss sign on top of patient beds. It also brought about a reduction in the number of lost HA on the wards.

3.2.6 Pre and Post-fitting counseling and rehabilitation

Hearing aid users need psychological, practical and problem-solving support. This include follow-up support, help with adjusting to HA use, help with managing HA related problems, cosmetic related problems, acceptance of the hearing impairment and the importance and benefits of HA usage. Kelly et al. (2013)

In their study on 'Evaluation of hearing-aid provision in adults' Jayarajan & Rangan (2000), showed that Post-fitting counseling and rehabilitation is an effective tool for improving the continued use of the HA.

Of particular information concern in Kelly et al. (2013), was the differences between various HA dispensers, differences between digital and analogue HA and also the need to clearly understand what causes hearing impairments.

In order to be able to maintain and get the most out of the device after fitting, HA users will benefit from both informational and support needs. This will limit the amount of difficulties experienced by HA users as well as provide the much-needed basic information on the device. Kelly et al. (2013)

Study participants in Kelly et al. (2013) expressed the need for post fitting information on environmental aids, on the care and maintenance of the device, on how to cope with new sounds, managing the controls of the device, communication tips, when to and when not to wear the device as well as other sources of HA information and support. This source of information and support will help HA users to adjust to wearing the device. HA users expressed the need for more information on availability of environmental aids and assistive devices such as loop systems, telephones, doorbells, safety devices, alarm clocks and televisions and how to access them.

3.2.7 Individual Perception

The perceived non-beneficial effects of the device may possibly be because the HA is either being prescribed too early or rather too late to the hearing impaired individual.

Timing is important in HA provision. Long wait times for HA provision may potentially not motivate an older person to seek hearing care. Lupsakko et al. (2005)

Öberg (2015) recommends increased advocacy on the benefits of audiological rehabilitation. Individual beliefs and decisions to have their hearing checked is mostly influenced by the kind of information they receive from friends, family and the media.

3.2.8 Caring for the HA

Disconnect or separate the HA from the ear mold. Then wipe the HA with a soft cloth. Brooke et al. (2012)

According to Harkin & Kelleher (2011);

- Wipe the HA with dry cloth to keep it clean
- Allow products such as hairspray and aftershave to dry before inserting the hearing device. These products are known to have an effect on the hearing device.
- Avoid contact with heat sources and water
- Hearing aids must be removed before sleeping
- In order to save battery power, switch off hearing aid when not in use
- Some hearing aids come with a wax removal tool and a small blower. These can also be bought from a hearing aid provider if needed. Use these to remove wax or moisture if the sound outlet of the hearing aid is blocked by one of these.

3.2.9 Cleaning the ear mold

Disconnect or separate the HA from the ear mold. Dip the ear mold into lukewarm water. Check tubing for wax. Allow water to run through the tubing. Dry the ear mold effectively by blowing air through the tubing. Wipe with soft cloth and reattach it to the HA. Brooke et al. (2012)

Cerumen build up, bodily oils and other debris may block the microphone port and/or the receiver resulting in HA users not able to hear clearly enough with their device. This

potentially avoidable problem has been known to result in HA being sent for repairs and or replacement. Desjardins & Doherty (2009)

There are also reported problems with ear discharge and ear infections. Jayarajan & Rangan (2000), Kelly et al. (2013)

Harkin & Kelleher (2011) recommends for the tubing to be changed after every fourth month or immediately the tube is blocked, has moisture inside or has become hardened. Replacement of the ear mold may depend on the style and material of it. The ear mold should however be replaced as soon as it is leaking, hurting or broken. WHO (2004)

To effectively clean the ear mold according to Harkin & Kelleher (2011);

- The ear mold together with the tubing must first be disconnected from the hearing device
- Regularly wash the ear mold in a warm soapy water and also immediately you see the tubing being blocked
- To prevent moisture damage to the hearing aid, allow the mold and tubing to dry out very well before fixing it back to the hearing aid
- The HA must never be washed, as contact with water can cause permanent damages to it.

Care must be taken when inserting the ear mold and tubing to the HA. This according to Harkin & Kelleher (2011) is because a not properly inserted ear mold, an ear mold that is no longer a good fit, ear canal blocked with too much wax, infection and/or discharge from the ears, and a faulty hearing aid may cause **whistling sounds in the hearing device**.

The best the caregiver can do for maintenance and care of the HA is to change the batteries and constantly or regularly clean the device.

For more detailed information about the HA and information what caregivers can do please see recommendations from the interview of HA provider Kari Silvasti (2013) and WHO (2004) in Appendix 1.

4. DISCUSSION

Daily routine care and maintenance of the individual HA is highly significant for the optimal use of the device. The reviewed articles support this statement. Daily checks will ensure that common device problems can be readily avoided.

Persons with HA should be given the information to use the HA as much as possible despite the consuming of more battery life (as batteries should be made affordable). They should also have the option to get an individual hearing aid in both ears.

Technological interventions or devices for the elderly must be easy to use and cared for. Design must be convenient and user-friendly for elderly people. The allocated time for first time HA user training is relatively short and as such absorbing all the HA information becomes quite problematic. This is especially true with hard of hearing individuals who may also have some form of memory deficiency. Individual dissatisfaction with hearing aids may arise if important HA information is insufficient and/or forgotten and this could lead to non-use of the device. Desjardins & Doherty (2009)

Family and caregiver involvement in audiological sessions could provide the much needed help with remembering and understanding the HA information provided by the audiologist. Kelly et al. (2013). An older person might have low confidence in their ability to learn and handle new things. They may thus require assistance from family and caregivers. Öberg (2015). The acquisition of knowledge on the care and maintenance of the individual HA by the caregiver or significant other is very necessary. This is because hard of hearing individuals with functional and/or cognitive decline may be dependent on relatives and caregivers in handling their HAs. Caregiver knowledge of HA handling will be a good indicator of the quality of nursing care. The knowledge learned by carers, family or significant others will minimize the time and resources spent by both the individual and the audiologist to fix broken HAs.

Due to the importance of communication to elderly people, the author recommends that caregiver spend some time to check the HA daily to ensure it is clean, wax-free and that batteries are in good condition.

Post Support services must be provided and easily accessible (Meuwese-Jongejeugd et

al. 2007) to HA users. One of the critical findings in the study of Kelly et al. (2013) is that informational needs of older people were not being met and that older people could benefit from more practical informational support both before and after HA fitting. There is a perception among HA users that pre and post-fitting information and post-fitting support are generally lacking. It is therefore highly recommended for rehabilitation to be enhanced and go beyond HA fitting alone. Providing more information and support will enable older people to use and make the best out of their HAs.

Hearing aid instruction booklet must be easy to use, non-technical and practical. Written care and maintenance information for HAs must be clear and simple to understand and follow procedure for both long term and first time users.

Provision of HA batteries is very necessary as HAs are useless without batteries. The author is tempted to disagree with Lupsakko et al. (2005) on HA rejection as a result of battery cost. According to WHO (2004, 16) at least twenty zinc air HA batteries will be required to power a HA for a year of daily usage. Also the HA technician says the battery life is about two weeks. The authors' check at shops reveals the average price of HA batteries in Finland is about one euro. At this price the author believes HA batteries can be afforded, and therefore this information on the price of HA batteries is very important for the elderly service. Effective care taken to switch device off when not in use and the use of rechargeable batteries are other options to prolong battery life and reduce cost according to WHO 2004.

HA performance is known to reduce with incidence of wax build up in the ear. Routine ear checks for early wax detection and removal is very necessary. Desjardins & Doherty (2009) and Harkin & Kelleher (2011) States a high rate of damage to HAs as a result of device coming into contact with earwax. Therefore it will of great significance for caregiver to receive additional training in ear care. Use of the device potentially becomes expensive if it has to be regularly taken to HA technician for repairs or replacement as a result of a lack of effective routine care and maintenance. Communication between carers and hearing impaired clients is affected during this period of time a device is sent for technical repairs. This mostly avoidable technical repair and/or replacement constitute an added cost to the device user.

HA user information must focus more on using the telephone, cleaning the HA, and the use of the noise program as most problems had been observed in performing these tasks. An improvement in the use of hearing device with the telephone can have a good impact in maximizing the benefits of hearing device use. A required skill that is needed in order to use the device with the telephone correctly is the ability to properly position the telephone in relation to the hearing device. Difficulties in using telephone with an HA has been observed to be one of the major reasons for HA rejection and non-use. Desjardins & Doherty (2009)

HAs are designed, improved and equipped with noise program or directional microphone to help individuals understand speech in noise. Some HA users are unfortunately either not aware of this function on their device or are aware but do not know how to properly use it. Recent manufactured hearing aids are able to automatically tune in and adapt to different acoustic conditions, however a large number of hearing impaired individuals still use other forms of HAs which has not got this feature. Until these automatic hearing aid features become more common, HA training and manuals must focus and place a lot of emphasis on the noise program. Desjardins & Doherty (2009)

Staff in Emma Holmes (2014) found the hearing loss pathway and training useful and relevant as it increased their awareness of possible hearing loss. The simple, quick and effective hearing loss screening training proves that an easy to use procedure provides efficient results. Client emotions and social wellbeing can improve through caregiver knowledge in the use of assistive listeners. In relation to Emma Holmes (2014) Efficient communication will ensure hearing-impaired clients give feedback to care giving concerns.

HA ownership as indicated is high among elderly people. Hearing impairment is known to be common in men than in women but female ownership of HAs is more than that of males in Lupsakko et al. (2005). Meuwese-Jongejeugd et al. (2007) agrees HA users (especially individuals with intellectual disability) may possibly depend on caregiver knowledge in getting their HAs maintained.

Consistent use of HAs had been reported in nursing homes. Lupsakko et al. (2005) As such older HA users will benefit from an increased cooperation between audiologist and caregivers or their significant others. Unused HAs represents a huge waste of health resources.

Dissemination of information related to hearing and audiology rehabilitation could in the form of training of nursing home staff, increasing awareness and provision of information to members in senior associations as well as increased lectures on the ear to nursing and caregiving students. Individual needs can be met through establishing and maintaining contact with their carers. Öberg (2015)

5. CONCLUSION

The need to communicate and understand speech is an integral part of an individual wellbeing. Communication with hearing-impaired elderly clients can be greatly improved with the use of the individual HA.

Lupsakko et al. (2005) recommends timely prescription of HAs, patient motivation, counseling, follow-up and training of local healthcare personnel.

The audiologist and HA technician/consultant have all the knowledge on HAs. The caregiver in elderly care services may not have this kind of knowledge. The question that arises here is whether the audiologist and HA technicians/consultant have the requisite knowledge and expertise on what goes into elderly care services. As such collaboration between clinician, audiologist, HA technician/consultant, geronomes and all categories of caregivers within the elderly care service sector is needed to produce an understandable, practical and easy to use HA brochure and video material. This material must be made available and easy to assess by caregivers in elderly homes as well as family/relations of an elderly individual with hearing impairment. This easy to use material

is very important because HAs can only be used efficiently if it can be properly cared for and maintained.

More hearing loss education and training is needed and desirable for all stakeholders in the field of elderly care. Promoting ear healthcare will significantly reduce the probability of hearing problems occurring.

Future technological interventions must address individual specific needs due to the large differences among elderly people to a given degree of hearing loss. It is very important for devices to be easy to use and cared for. The design of convenient, easy to use HAs must be a top priority to manufacturers.

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APPENDIX 1.

What caregivers can do according to HA provider and WHO 2004

This information is based on recommendations of HA provider and WHO 2004.

In the interview of HA provider Kari Silvasti 26.4.2013 he recommends mercury-free zinc air batteries. The life span of the battery is about two weeks. Look out for expiry dates when purchasing the batteries.

In order not to mix old and new batteries together, change and replace the batteries before you take away the sticker from the newly inserted batteries. Always open the battery compartment when the device is not in use but do not take out the batteries.

The cost and longevity of the batteries depend on:

1. The Environment: Battery life shortens under rainy and humid conditions.
2. HA usage hours per day
3. Age of the HA: Older devices use more power and reduces battery life
4. The Individual: Heavy hard of hearing individuals consumes more battery life.
5. HA battery cost can be reduced significantly when it is purchased in bulk by countries, regions, districts or NGOs.
6. It is also desirable for the HA batteries to be classified as medical supplies instead of electronic consumables. This will potentially reduce import taxes.
7. The batteries must be easily available through an effective distribution network.
8. Prices must be affordable in retail shops and priced within the limits of the average HA user.

9. Battery life depends on length of use, power of the device, switching off or removing batteries from aid when not in use.
10. It is estimated that at least twenty zinc air HA batteries will be enough for one year of daily HA usage.
11. The use of HAs and batteries can be monitored effectively if new batteries are provided in exchange for old and use ones. This will also ensure safe battery disposal.
12. Storing batteries in cool, dry conditions extend battery life and prevent battery corrosion.
13. Look out for expiry date when purchasing batteries. Buy batteries well within its shelf life.
14. The HA dispenser must provide information on the original type and/or alternative type of batteries for the HA and where an individual can get one to buy.
15. It is highly recommended for HA users to use the appropriate type of batteries recommended for a particular HA.

(WHO (2004), HA provider (Spring 2013))

Changing the batteries

HA batteries need replacement when they are exhausted. For continued and effective use of HAs, there must be a reliable supply of batteries. Rechargeable batteries last longer and are appropriate where there is efficient and reliable supply of electricity. The cost of electricity for charging together with the cost of the rechargeable batteries must be affordable as compared to the cost of disposable batteries. WHO (2004)

The HA provider recommends two HAs instead of one. The personal HA is very volume/sound person specific. Therefore the adjusted volume of the device depends on the level or degree of a person's hearing loss.

The best the caregiver can do according to the provider is to change the batteries and constantly or regularly clean the device.

When the HA is not working properly:

1. Change the batteries
2. Cover the device completely with both hands

3. Hearing whistling sound implies the HA is in working condition
Take device to HA provider for technical diagnosis if it's still not working

Accidents happen

When the HA soaks up water;

- Open the battery compartment immediately
- Take out the batteries and throw them away
- Wait for the device to dry out completely
- When the device is dry, put in new batteries
- Completely cover the device with both hands and listen for the whistling sound

If there is no whistling sound, call to the HA center or provider and tell exactly what has happened.

Always remember to use new batteries.

Also remember to ask care home if they have contacts or telephone numbers of the HA center.

(WHO (2004), HA provider Kari Silvasti (2013))

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