

EFFECTIVE USE OF HEARING DEVICES:

A GUIDE FOR GERONOMS AND CARE GIVERS IN
SUPPORTING ELDERLY WITH DEMENTIA IN AN
INSTITUTIONAL SETTING.

A Literature Review

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<p>Abstract: Hearing loss is one of the most prevalent chronic conditions affecting the elderly. Age related sensory changes like hearing and vision can be a greater challenge for individuals suffering from dementia because it hinders communication with the people around them. Early diagnosis and proper care can reduce progressive cognitive decline. Hearing aids and other listening devices remain the only solution to alleviate for this problem. Aim: The aim for this study to map out the problems experienced by hearing aid users with dementia in an institutional setting and finding solutions on how caregivers can support clients with sensory loss and dementia. Two research questions are used to find the answers.</p> <ol style="list-style-type: none"> 1. What are the main challenges or reasons contributing to inappropriate or non-use of hearing devices by the elderly with cognitive impairments? 2. How can institutions, nursing homes, nurses and other professionals support clients with hearing loss? <p>Method: Literature review with deductive content analysis. The search engines used was EBSCO, CINAHL, SAGE and Google Scholar. The results are grouped in categories and sub categories with the main themes being: “barriers to hearing aid use” and “support for clients with hearing loss”. The theoretical framework used for the Health Belief Model (HBM). Limitations for this study was useful articles were not available in full text or were in not in English.</p> <p>Results: Hearing loss is one of the most undetected conditions and there is underuse of hearing devices in nursing homes compared to the general population. Conclusion: There is an unmet need for improvement of service delivery for this population. Further studies need to explore what impact individuals with dementia and hearing loss would have by being involved in their own uptake of hearing aids and rehabilitation especially counseling</p>	
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<p>Kuulon huononeminen on yksi hallitsevimista kroonisista terveyden alenemiseen vaikuttavista seikoista vanhuksilla. Ikään liittyvä aistien heikkeneminen, kuten kuulon ja näön heikkeneminen voi olla suurempi haaste yhdessä dementian kanssa, koska se hankaloittaa kommunikaatiota muiden ihmisten kanssa. Aikainen diagnoosi ja hyvä terveydenhuoltojärjestelmä hidastaa taudin kognitiivisia vaikutuksia. Kuulolaite ja muut kuulemiseen liittyvät apuvälineet ovat ainoa ratkaisu helpottaa ongelmaa.</p> <p>Tavoite: Tavoite tässä tehtävässä on analysoida miten ongelmat ilmenevät kuulolaitteita käytävillä dementikoilla, jotka asuvat palvelutaloissa ja löytää ratkaisuja kuinka auttajat voivat tukea asiakkaita aistien huonontuessa ja dementian pahentuessa. Vastauksia etsiessä haastattelukysymyksiä käytettiin:</p> <ol style="list-style-type: none"> 1. Mitkä ovat pääongelmat tai -syyt kuulolaitteiden väärinkäytölle tai käyttämättä jättämiselle vanhuksilla, joilla on huono kuulo ja dementia. 2. Kuinka instituutiot, hoitokodit, hoitajat ja muut ammattilaiset voivat tukea asiakkaita, joilla on huono kuulo ja dementia. <p>Menetelmät: Kirjallisuuden sisällön deduktiivinen analyysi. Käytetyt hakukoneet olivat EBSCO, CINAHL, SAGE ja Google Scholar. Tulokset lajiteltiin kategorioihin ja edelleen pienempiin ryhmiin. Pääotsikot olivat: ”ongelma kuulolaitteen käytössä” ja ”asiakkaiden tukeminen huonon kuulon ja dementian kanssa”. Teoreettisena viitekehyksenä käytettiin Health Belief Model:ia (HBM). Haasteet tässä kategorioihin ja edelleen pienempiin ryhmiin olivat, kun hyödylliset artikkelit eivät olleet kokonaan käytettävissä tai ne eivät olleet englanniksi.</p> <p>Tulokset: Asiakkaat, joilla on dementia ja asuvat palvelutaloissa käyttävät vähemmän kuulolaitteita kuin kotona asuvat vanhukset. Tämä johtuu siitä, että persoonalliset tekijät, ympäristötekijät, kuulolaitteen käyttöön liittyvät tekijät sekä sosiaaliset- ja institutionaaliset tekijät luovat rajoja kuulolaitteiden käytölle.</p> <p>Johtopäätökset: Terveystuotojärjestelmässä olisi kehitettävä palveluiden tarjoamista heille, joilla on kuulon huononemista ja dementiaa. Täytyisi tehdä lisäselvitystä, mikä vaikutus yksittäisellä ihmisellä on dementian ja kuulon huononemisen kanssa ja mitä voitaisiin kehittää heidän kuulolaitteiden käytössä kuntouttaessa heitä ja erityisesti heitä neuvottaessa.</p>	
Avainsanat:	kuulon heikkeneminen, kuulolaite, neuvonta, kuntoutus, instituutiot, palvelutalot,
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FOREWORD

I first and foremost thank the Almighty God for bringing me this far and for renewing my strength everyday as I embarked on this journey of writing my thesis.

I would like to express my deepest gratitude to Arcada University of Applied Sciences for giving me a chance to study in this great establishment. It has been a pleasure and a great honour to be taught by great lecturers who imparted their knowledge on me which I will apply in my career. Indeed I am indebted to the whole staffs of Arcada have been very supportive. I would like to single out the student's affairs office, the library staff that never tired in providing me with information no matter how many times I went to them and the IT desk for their technical support. Special appreciation goes to the program leaders Elizabeth Kajander and Birgitta Dahl for being there to listen to us and to guide us. I had the pleasure of meeting amazing students in my class who made learning a new and enjoyable experience. I thank my entire classmates for making everyday a unique experience.

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1 INTRODUCTION

The elderly population in the developed countries is steadily increasing and expected to increase in the coming years. This is attributed to the increase in life expectancy. Therefore, age related changes are going to be more pronounced in this population.

Hearing loss is the one of the most chronic sensory deficit affecting the elderly population. The most common condition that causes hearing loss in elderly people is presbycusis (age-related hearing loss). Hearing loss is a normal process of ageing and is not treatable. Hearing aids and other listening devices remain the only solution to alleviate this problem.

Hearing problems hinder communication between elderly persons and people around them. Age related changes to the senses like hearing and vision can be even a greater challenge when an individual is suffering from dementia. Loss of hearing and dementia usually display similar symptoms like depression, loss of functional abilities, social isolation, disorientation, stress and depression.

Early diagnosis of hearing loss and proper care can reduce progressive cognitive decline. Elderly people with dementia and sensory loss require a lot of support from their families and caregivers. Unable to cope on their own at home, they are placed in nursing homes or institutions. Without proper support with their hearing aids, they either stop using them or use them inappropriately. Care givers in nursing homes should be trained on maintenance of hearing aids and on how to provide an enabling environment for their clients. By listening to their clients, they can work on improving services and motivating their clients. Continuous evaluation and implementing a client centred rehabilitation approach can ensure that the client is using and is satisfied with the hearing aids provided.

This research focuses on individual hearing aid uptake, use and non-use by elderly individuals coping with hearing loss and dementia. The study will look into how the caregivers can use the clients experience to improve on the services and rehabilitation pro-

grams. In this paper, the role of self-efficacy or self-report by the elderly plays a significant role in finding viable solutions to providing optimal support.

Health Belief Model will be used as the theoretical framework for this study. The model attempts to explain and predict behaviour by focusing on the attitude and the beliefs of the individual. Therefore, it enables health care professionals to focus attention on modifiable factors influencing behaviour. A literature review will be done in this study and will attempt to demonstrate and support this hypothesis.

1.1 Motivation for choice of research study

During the course studies on practical training, the author was able to observe how hearing loss affects the lives of the clients either living at home and in institutions. There is general lack of knowledge on why clients did not use hearing aids and on how to provide support for them.

During the last practical training, the author was privileged to work with Svenska Hörsjälförbundet Rf (Finnish Federation of Swedish Speaking Hard of Hearing). The invaluable work they do to support individuals with hearing impairment was a very big motivator for doing this study. The federation provides a platform for the members and plays an important role in voicing their needs. They train the spouse, caregivers and family members on how to use and maintain individual hearing aids. The lack of knowledge on how to maintain the hearing aids was attributed as the contributing factor to non-use of the devices.

1.2 Aim of the study and research questions

The aim of this study is mapping out existing problems that are experienced by hearing aid users with dementia in an institutional setting and finding solutions of how care givers can support clients with sensory loss and dementia. These questions will help to find the answers:

1. What are the main challenges or reasons contributing to inappropriate or non-use of hearing devices by elderly clients with cognitive impairments?
2. How can the institutions, geronomos, nurses and other professionals support clients with hearing loss?

1.3 Concepts

This section describes some of the terms used in this work regarding hearing loss, individual hearing aids and hearing devices

1.3.1 Aural rehabilitation

Boothroyd (2007:63) describes adult aural rehabilitation as:

“The reduction of hearing-loss-induced deficits of function, activity, participation, and quality of life through a combination of sensory management, instruction, perpetual training and counselling”

1.3.2 Hearing loss

Hearing loss is the decrease in the ability to hear either on one ear or both. World Health Organization report by Mathers, Smith & Concha (2000), shows categories of hearing impairments range from no impairment to profound impairment depending on the pure tone average on the better ear as shown on table 1.

Hearing loss can either be conductive or sensorineural. Burkey (2003:11f.), defines conductive hearing loss as hearing loss that affects the structures that conduct sound to the inner ear. Ear wax, infection and fluid can block transmission of sound. Damage to the eardrum and middle ear bone can also cause conductive hearing loss. Sensorineural hearing loss affects the sensory cells in the inner ear due to nerve damage which affects the loudness and clarity of hearing.

Table 1: Mathers, Smith & Concha (2000). Global burden of hearing loss.

World Health Organization. Grades for hearing impairment

grade of impairment	Audiometric ISO value (average of 500, 1000, 2000, 4000 Hz)	Impairment description
0 (no impairment)	25 dB HL or less (better ear)	No or very slight hearing problems. Able to hear whispers
1 (slight impairment)	26-40 dB HL (better ear)	Able to hear and repeat words spoken in normal voice at 1 metre
2 (moderate impairment)	41-60 dB HL (better ear)	Able to hear and repeat words using raised voice at 1 metre
3 (severe impairment)	61-80 dB HL (better ear)	Able to hear some words when shouted into better ear
4 (profound impairment including deafness)	81 dB HL or greater (better ear)	Unable to hear and understand even a shouted voice

Pure-tone average

It is a calculation used by audiologists and occupational health specialists to calculate the degree of hearing loss in decibels (dB)

1.3.3 The ear

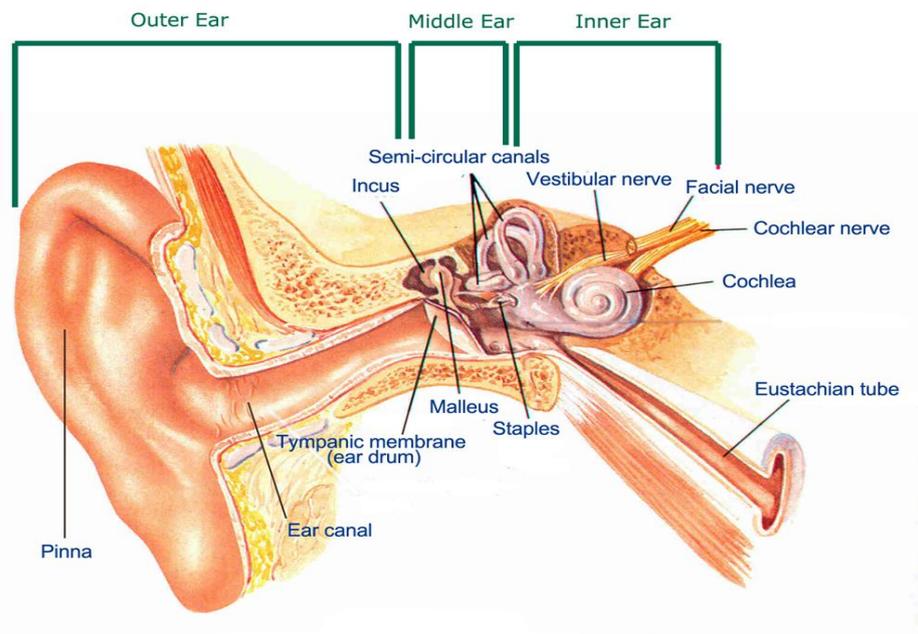


Figure 1: Anatomy of the ear by Spinach Effect Pty Ltd (2010)

<http://www.digitalhearing.com.au/upload/EarImage.jpg>

Outer ear

The visible part of the ear the external ear (pinna) collects the vibration and directs them to the ear canal. These two components make up the external ear. Air in the ear canal carries vibrations to the thin flexible membrane covering the inner end eardrum (tympanic membrane) because it resembles the membrane of a drum. The air vibrations cause the eardrum to vibrate

The lining of the outer two-thirds of the ear canal contains modified apocrine sweat glands called *ceruminous glands*. These glands secrete a semisolid waxy material called *earwax* (cerumen). The earwax traps insects and small particle matter from entering the ear. (Digiovanna 2000:165)

Age changes

The pinna (outer ear) becomes thicker, longer, broader and stiffer. Hairs on the pinna become more visible because they thicken and lengthen. The ceruminous gland produc-

es wax at the same rate regardless of age. However, the rate of production decreases because the ceruminous gland slowly decreases. The wax may become thicker. Therefore, it takes longer to move to the end of the ear canal and becomes even firmer. Age-related changes in skin elasticity can cause the ear canal to sag. Therefore, earwax tends to accumulate within the ear canal. The problem is increased when attempts to remove the wax with cotton swabs or other objects push it deeper into the canal. The build-up of wax in the canal inhibits the passage of vibrations to the eardrum and therefore diminishes a person's ability to hear. Removal of accumulated wax should be done by trained individuals. (Digiovanna 2000:165)

Middle ear

Sound vibrations causing the ear to vibrate are passed to the small bone attached to the inner surface of the eardrum, the hammer (malleus). The vibration then passes to two other bones anvil (incus) and stirrup (stapes). The stirrup passes the vibrations to the thin flexible membrane the oval window which marks the end of the middle ear. The bones in the middle ear provide a system of levers that amplify the sound vibrations passing through them.

The space surrounding the three bones is filled with air so that the bones can vibrate easily. (Digiovanna 2000:166)

Age changes

The eardrum becomes slightly stiffer and the joints between the hammer and anvil and the stirrup become calcified and deteriorated. However, these changes do not have a significant effect on hearing. Digiovanna (2000:166)

Inner ear

The inner ear is composed of two sets of channels in the temporal bone that are connected to the vestibule and there upper channels (the semi-circular) which are concerned with balance. The lower channel coiled like a snail is called the cochlea which is concerned with the hearing, specifically the changing of vibrations to nerve impulses. Christiansen & Grsybowlki (1999:299)

Vibrations in the perilymph pass through a flexible membrane (vestibular membrane) within the cochlea and enter another fluid called *endolymph*. The vibrating endolymph causes the vibrations of another flexible membrane, the basilar membrane. The basilar membrane bristles with rows of neurons called hair cells which are sensitive to vibrations. The rows of neurons make up the organ of corti. The vibrations agitate the hair cells causing them to initiate impulses. The impulses from the hair cells are passed to other neurons in the ear that carry them to the brain. Auditory centres in the brain process and interpret the impulses and the result is hearing. (Digiovanna 2000:167)

Age changes

There are several changes that occur in the ear. However, a variety of other factors are also involved in producing these changes. They include the amount of fat and cholesterol in the diet, genetic factors, noise and atherosclerosis.

As age increases, there is shrinkage of blood vessels servicing the cochlea and producing endolymph. The decline may be partly responsible for changes in the organ of corti. The reduction in endolymph production diminishes the passing of vibrations through the cochlea resulting to decreased ability to hear all frequencies of sound.

There are decreases in hair cells in the organ of corti, the cells that support the organ and the neurons that carry impulses to the brain. The organ of corti becomes more flattened and distorted. The net result is decline in the ability to hear. Hearing loss of high-frequency sound is usually greatest. (Diogiovanna 2000:167)

1.3.4 Hearing aids

A hearing aid is a battery-powered, electronic powered, electronic device that amplifies sound and makes listening easier for individuals with hearing loss. A hearing aid consists of a microphone, an amplifier and a receiver. Hearing aids are either analog or digital.

Analog hearing aids

Analog hearing aids make continuous sound waves louder amplifying all sounds in the same way. Some analog hearing aids are programmable. They have a microchip settings programmed for different listening environment such as in a quiet or a noisy place. Hearing aid settings can be changed by pushing a button depending on the sound environment.

Digital hearing aids

Digital hearing aids have all features of analog aids but in addition convert sound waves into digital signals and produce an exact duplication of sound. Digital hearing aids have computer chips that analyse speech and other sounds in the environment. The digital sound processing improve the performance of the hearing aid in certain situations such as managing background noise and whistle reduction.

Types of individual hearing aids



Figure 2: Types of hearing aids

Sinus Institute of Northern Virginia, Associates in Otolaryngology (2009)

<http://entdr.com/images/audiology/hearingaids.jpg>

Behind-the-ear – They have a small plastic case that fits behind the ear and conducts sound to the ear canal through the ear mould that is custom made for the user. Behind-the-ear hearing aid can be used for mild to profound hearing loss.

In the ear- They fit in the outer ear and are sometimes visible when standing face to face with the wearer. The hearing aid is custom made to fit each individual ear. They can be used for mild to some severe hearing loss.

In the canal- They are smaller and fill the bottom half of the external ear. It is usually not visible when standing face to face with the individual wearing the hearing aid. They include features that are not available on the completely- in- the-canal aids. However, the small features can make it difficult to adjust.

Completely in the canal- They are the smallest and are often not visible unless you look directly into the wearer's ear. These aids can be used for mild to moderately severe losses. They do not contain extra features such as volume control and directional microphones. The models use very small batteries therefore, good manual dexterity is required.

See table 6 for instructions on hearing aid maintenance.

1.3.5 Assistive listening devices

These are hearing devices other than hearing aids which amplify sound. They can be used with or instead of hearing aids. They include telephone amplifiers, induction loops, communicators and pocket talkers.

2 BACKGROUND

Communication plays a vital role in everyday life. Difficulties in communication with others can result in frustration, loneliness, low self-esteem, depression and withdrawal from social engagements. According to Cruikshanks et al. (1998), hearing loss is most self-reported condition in older adults. It is the third most common chronic condition affecting the elderly population following hypertension and arthritis.

The World Health organization (2011) estimates that there are 62 million persons over the age of 60 experiencing a degree of hearing loss. According to Roth, Hanebuth & Probst (2011:1101), they estimated that about 30% of men and 20 % of women in Europe had some degree of hearing loss of 30dB or more by the age of 70 and 55% of men and 45% by the age of 80.

In Finland, statistics show over one million people are aged 65 and over. (Official Statistics Finland, 2012). This is attributed to increase of life expectancy age. This factor is expected to raise the number of elderly people at risk of experiencing a certain degree of hearing loss.

The most common type of hearing loss affecting the elderly is presbycusis. Presbycusis is a general term that refers to hearing loss in the elderly as a result of degenerative changes in ageing. Older people with hearing loss will likely experience increased hearing impairment over time. (Cruikshanks et al. 2003). Therefore, there is need for appropriate referral for auditory rehabilitation.

A review conducted by Arlinger (2003), reported that elderly individuals with uncorrected hearing loss are often at risk of withdrawing from social activities. Hearing impairment can lead to depression and functional problems greatly affecting the quality of life and have a negative impact on independence.

Hearing loss is a progressive condition and not reversible but it can however be managed with the use of listening devices. A study conducted on the 5 year incidence and

progression of hearing loss showed that individuals who had hearing loss at the baseline experienced a decrease in hearing of 21% (Cruickshanks et al, 2003). Hearing aids remain the main treatment of hearing loss. They cannot restore normal hearing but can help to amplify sound. In some developed countries in the world, rehabilitation resources are allocated to hearing aids. In Finland, hearing aids are provided free of charge. The individual with hearing loss is given a referral from their local health centres for examination by an audiologist. The university hospitals provide the hearing aids. Despite the fact that hearing aids are provided for free and reduce the negative effect of hearing loss, most elderly people who could benefit from the hearing aid do not use them. (Cruickshanks et al, 1998).

Hearing loss and incident dementia was found to be independently associated in the Baltimore longitudinal study carried by Lin et al. (2011). The results show that the risk of incident dementia became more evident for hearing loss greater than 25dB and therefore the risk increased with hearing loss severity.

World Health Organization (2012), worldwide estimates of people living with dementia is nearly 35.4 million. The number of dementia cases are set to double by 2030 (65.7million) and more than triple by 2050 (115.4 million). WHO recommends that there should be programs in place to enable early detection of dementia and proper measures to be taken to raise awareness of the disease and reducing stigma. The report points to lack of information and understanding about dementia and recommends providing better care to dementia clients and support to caregivers.

Dementia and Alzheimer's diseases were the third leading cause of death (12%) in Finland after diseases of circulatory system (40%) and neoplasms (22%) (Official Statistics Finland, 2010). A multivariate study on the effects of sensory aid on mortality of elderly by Appollonio et al. (1996) associated uncorrected sensory deprivation and a low quality of life. The same was not found with subjects who used hearing aids. The study showed a significant increase in mortality due to sensory deprivation for men. Cruickshanks et al (2003) showed the same results. The findings showed mortality rate was higher for those individuals with hearing loss than those at risk of incident hearing loss.

Research into hearing loss and has been done extensively over the years. However, individuals with dementia and other cognitive impairments are sometimes excluded from the studies. Findings of Cahill et al (2004) demonstrated that individuals with dementia can participate in quality of life research. People with dementia rated their lives more positively compared to their family and caregivers. Therefore, caregivers should make an effort to listen to the individual with dementia and hearing loss. Understanding client compliance and non-compliance to use hearing aid can be used to model behaviour.

2.1 Case scenario

Problem behaviour associated with dementia like agitation may arise from missing glasses or dysfunctional hearing aids.

The case scenario below is of a woman living in a long-term care setting was evaluated by Haque, Abdelrehman & Alavi (2012). The case highlights how basic knowledge of hearing aids, how they function and developing strategies for troubleshooting in case they fail to function can prove to be particularly important when dealing with a person with cognitive impairment.

A 91 year old woman residing in a nursing home had a history of osteoarthritis, Alzheimer's disease, glaucoma, haemorrhoids, degenerative arthritis of the spine, legal blindness, prolapsed bladder, recurrent urinary tract infections and severe hearing loss. She wore a hearing aid in her left ear as hearing from her right ear was completely lost years earlier.

Staff members reported that she had intermittent bouts of confusion and complained of being raped, particularly at night. Investigations were carried out and the patient's family confirmed that the claim could be likely due to her probable history of being a rape victim. The staff reported that she did not listen to them during these events and that her behaviour was not manageable, but she was eventually consoled after being brought to the nursing desk in her wheelchair. The interview was inconclusive as she was not able to recall the incident. She was unable to answer questions until spoken to in a well-lit area with the speaker's face very close to her eyes, enabling her to read lips. When spo-

ken in this manner, she was able to follow simple commands and she could verbalize her concerns.

A recent Mini-Mental State Examination (MMSE) scored 12 out of 30. To test if her hearing aid was working properly, a tuning fork was struck against the palm of the hand and held from 1 inch up to 12 inches away from her left ear. She was only able to hear the vibration from the tuning fork at the onset of vibrations when held at a distance of 3 inches. During removal, no whistling or beeping was heard indicating a depleted battery. An examination of her ears canal and eardrum showed no abnormalities. The tuning fork was used again to assess her hearing without the hearing aid in place. Her hearing remain unchanged, and this confirmed that the hearing aid was not working.

After the battery was replaced, she could hear vibrations from the tuning fork as a distance approximately 12 inches from the left ear and her bouts of agitation and confusion resolved. The patient care plan was reviewed with her family and new measures implemented. She was kept in a well-lit room at night, her family replaced her hearing aid batteries on a regular basis and to make an appointment with a urologist to have her indwelling catheter replaced with a suprapubic catheter to reduce her discomfort and risk of infection.

Eight weeks later, the patient started experiencing visual hallucinations at night. The staff reported that during these episodes she yelled, "There is monster or man under my bed". A clinical assessment was carried out. Poor vision and hearing were noted. When the hearing aid was removed there was no whistling indicating a problem with the battery. Her family reported changing the battery 3 weeks earlier. After the batteries were replaced, she was able to hear.

Change of battery was not carried out as scheduled and in addition, an inspection to her room revealed that the light in her bathroom was being kept on at night and therefore casting shadows capable of causing illusionary perception particularly with persons with sensory impairments. The care plan was reviewed that light in her room was adjusted to improve sensory perception while avoiding shadows being cast at night, her hearing aid battery was to be changed every third week and a regular follow up by the care team was scheduled to ensure compliance with the care plan.

3 THEORETICAL FRAMEWORK

A theoretical framework is a group of statements composed of concepts related in some way to form an overall view of a phenomenon. (Fitzpatrick & Wallace 2006:594).

A theoretical framework is developed by examining the relevant materials or literature and by discovering themes, the author is able to explore and narrow down theories that are appropriate to address different perspectives.

The health belief model is going to be used in this research. The model has been used to explain change and maintenance of health related behaviours as a guiding framework for health behaviour interventions and evaluation programs. This model will enable the author to establish the barriers to effective use of hearing aid and come up with viable solutions.

3.1 Health Belief Model

The health belief model is a framework for motivating people to take positive health actions that uses the desire to avoid health negative event as the main motivator. The health belief model was first developed by Godfrey Martin Hochbaum (1958) and was later developed by Irwin Rosenstock (1988). The model was developed to explain why people who were more prevalent to tuberculosis rejected the opportunity to get free x-rays. On the other hand tried to find out why those who consented to screening at the risk of being labelled as having tuberculosis participated. The findings show that an individual must be psychologically ready to act and conditions must be appropriate before any action is taken. Health beliefs were correlated with behaviours.

The original model by Hochbaum posits that health-related action depends on the occurrence of the following factors: Perceived susceptibility, perceived seriousness, perceived benefit, Perceived barriers and cost.

Perceived susceptibility

This is the belief that one is vulnerable to a serious health condition. This belief posits that the greater the perceived risk, the greater the likelihood of engaging in behaviours that decrease the risk. The belief that a person is at risk for a disease or a health condition, will more likely prompt the individual to do something to prevent it.

Perceived seriousness

This is the belief that the event poses a serious health problem or condition. Perception of seriousness is mostly based on medical information or knowledge. It may also come from the beliefs a person has about the difficulties a health condition would create or the effects it would have on their life in general.

Perceived benefit

The belief that the preventive measure taken will be effective in reducing the threat of the negative event. People tend to adopt healthier behaviours when they believe that the new behaviour will reduce their risk of developing a serious health condition.

Perceived benefit plays an important role in adopting preventive behaviours such as screening, consulting and follow-up.

Perceived cost and barrier

This is the belief that the recommended health intervention will not entail too much cost. This also includes minimizing the perceived barriers to overcome in order to follow the recommended health action.

According to Janz and Becker (1984:21), perceived barriers are the most significant in determining behaviour. In order to adopt new behaviour, a person needs to believe the benefits of the new behaviour outweigh the consequence of old behaviour. This enables barriers to be overcome and new behaviours to be adopted.

Cues to action/health motivation

This dimension was introduced by Rosentock in 1974, theorizing that there was a need for some stimuli to be present to trigger decision making. (See Janz and Becker 1984:2). Behaviour is also modified by these stimuli or cues to action. Cues to action are external events, people or things that prompt an individual to change their behav-

ious. The cues to action may be internal for example symptoms or external for interpersonal interactions, mass media communications or reminders from health care providers. Knowing a person or a family member with an undesired health event is a significant cue to action.

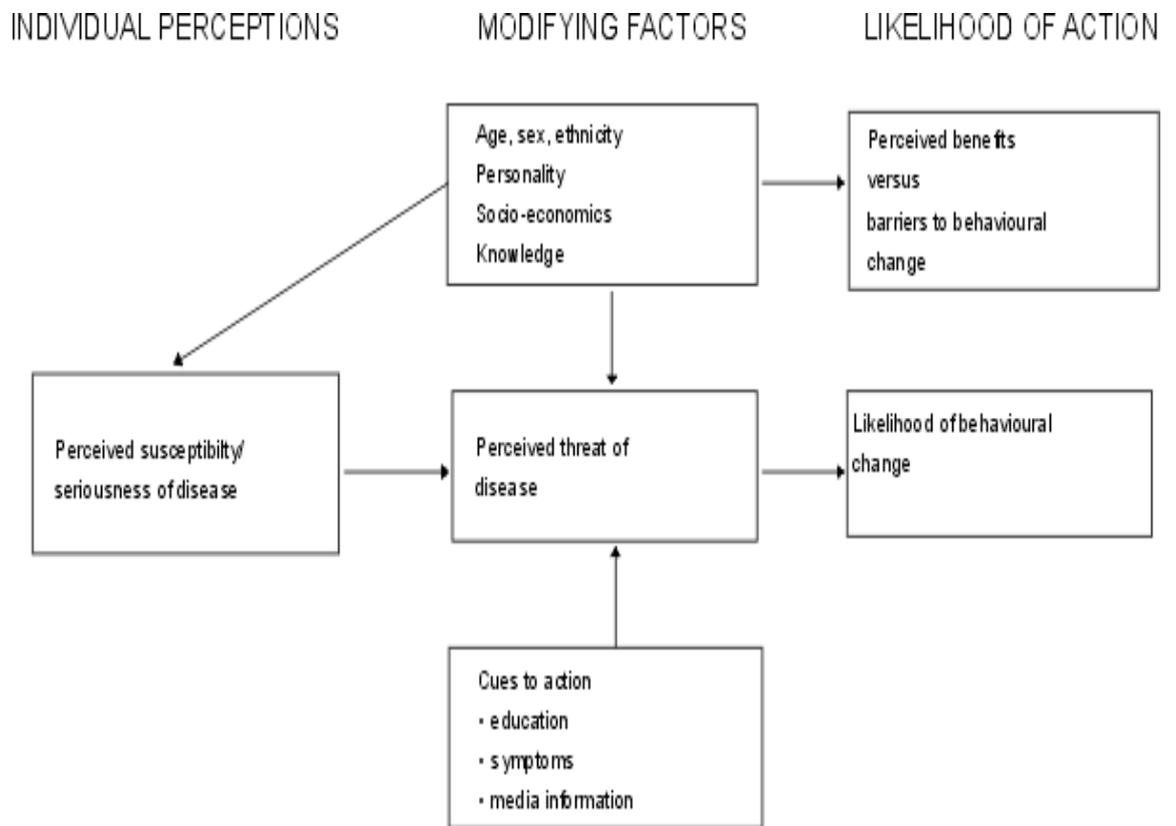
Self-efficacy

Self-efficacy refers to the extent of an individual's belief in their abilities based on feelings of self-confidence and control. It is a good predictor of behaviour and motivation. Following criticism of the Health belief model in that it failed to address emotions such as fear and denial, Rosenstock, Stretcher & Becker (1988) introduced self-efficacy to the Health Belief Model and believed that self-efficacy would provide a more powerful approach in predicting and understanding health related behaviour. A comparison was made with the social cognitive theory by Bandura. Self-efficacy is proposed as a separate independent variable. According to Rosenstock et al. (1988:179), incorporating self-efficacy in the Health Belief model has two values. That is, it delimits the barriers dimension and suggests new and more productive lines of research and practice.

Modifying variables

The four major concepts of perception (perceived susceptibility, seriousness, benefit and cost/barrier), are modified by other variables such as culture, education level, age, sex, skills, motivation and past experiences. These individual characteristics influence personal perception.

Figure 3: Health Belief Model. Source: Glanz et al, 2002 p.52



4 RESEARCH METHODOLOGY

The methodology used in this research is systematic literature review with the objective of finding viable answers as to how hearing aids can be used effectively in an institutional setting. Content analysis in a deductive approach is used to analyse data in relation to the research questions because the study is analysed according to earlier studies. Main categories and subcategories are derived in order to go deeper into understanding the research questions.

4.1 Literature review

Aveyard (2007:5) defines literature review as the comprehensive study and interpretation of literature that relates to a particular topic.

A systematic literature review is defined as “...a review prepared with a systematic approach to minimising bias and random errors, and including components on materials and methods.” (Bowling, 2001:437).

According to Kumar (2011:32), review of literature provides a greater insight into the research questions and provides clarity and focus which are central to a relevant and valid study. Kumar goes further to explain that literature review provides a theoretical background for the study and it helps establish the links between what the researcher is examining and what has already been studied. The researcher is able to show how the findings of the study have contributed to the existing knowledge in the field of study.

Literature review should be comprehensive detailing the methods and result of the study and should be presented in a critical manner (Bowling, 2001:136). Details of the methods used to collect data should be included.

4.2 Data collection

Information gathered for this study is mainly from secondary sources. Research articles and books are used for gathering information. The journals and books are published material with public access from Arcada library, Helsinki University library and the internet.

The author selected materials according to relevance to the topic with no bias. Articles selected are scientific written articles based on the relevance to the topic. Internet search was used to find journals that were not in full text at the Arcada library.

4.2.1 Data base search

A literature search was conducted in Arcada library by computer using the following databases: EBSCO host CINHALL, SAGE and Google scholar. A variety of key words into the various data bases using the key words: hearing impairment or loss, hearing aid or devices, hearing loss and dementia, barriers to hearing aid use AND rehabilitation, effectiveness of hearing aids, hearing loss in institutions/nursing homes. The articles retrieved were from the year ranging 2000-2012. However, two articles from 1997-1998 were deemed to be important by the author and were therefore included in the study. Articles that were found in the Arcada library but not in full text were later retrieved from the internet. Below is a table showing key words used and the number of articles used.

Table 2: Data base search

Data base	Key words	Total no. of hits	Articles retrieved	Article used
EBSCO HOST,CINAHL	Hearing aid use AND elderly	65	14	2
EBSCO HOST,CINAHL	hearing loss, AND nursing home	16	5	2
EBSCO HOST,CINAHL	Hearing aids AND dementia OR elderly	36	5	1
EBSCO HOST,CINAHL	Hearing loss AND Q of Life OR elderly	48	8	1
GOOGLE SCHOLAR	Barriers to hearing aid use, elderly AND rehabilitation,	33,700 Refined search hearing aids and barriers		4
GOOGLE SCHOLAR	Hearing loss, hearing aids AND nursing homes, residential care	20,000 Refined search hearing aids and nursing homes		3
GOOGLE SCHOLAR	Hearing aid use, elderly, adults AND cognitive function	31,400 Refined search hearing aid and dementia		2

4.2.2 Inclusion and exclusion criteria

The articles selected were retrieved from the search engines on the computer. All the article are scientific and peer reviewed. The selection criteria included full text articles published between the years 2000-2012. The table below shows the selection criteria. Two articles published in 1997 and 1998 were later used as they were deemed to have useful information.

Table 3: Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
<ul style="list-style-type: none"> ✓ Articles in full PDF format ✓ Written in English ✓ Peer reviewed articles ✓ Articles with an abstract ✓ Articles published in 2000-20012 with the exception of two(1997-1998) which were deemed important ✓ Articles with an abstract and results ✓ Articles that were free to access ✓ Articles with relevance to the topic 	<ul style="list-style-type: none"> ✓ Articles not in full text ✓ Articles written in other language than English ✓ Articles not scientifically written ✓ Articles lacking enough evidence ✓ Article dating more than 12 years

4.3 Content analysis

The method used in this thesis for analysing data is content analysis in a deductive approach to the themes. Content analysis is the process of analysing data or observational field notes in order to identify the main themes that are observed (Kumar 2011:381).

The author has chosen this method of analysing data because major themes and categories are able to be identified. The data is collected and coded by theme or category grouped in content that share similarities. These are later analysed and presented.

The results will be analysed bearing in mind the main concepts of the Health Belief Model.

4.4 Validity and reliability

“Validity is defined as the degree to which the researcher has measured what he has set out to measure” (See Kumar 2011:178). Kumar reiterates the importance of applying the concept of validity in the research process given that inaccuracies can be introduced at or into any stage of the study.

Reliability on the other hand refers to consistency in the findings of the study when the research instrument is used repeatedly. (Kumar 2011:184). Kumar further goes on to explain the four factors in a qualitative study which determine “trustworthiness” and “authenticity”. (See Kumar 2011:185) These factors are:

Credibility- involves establishing that the results of the research are credible or believable from the perspective of the participant in the research.

Transferability- refers to the degree to which the results of the research can be generalized or transferred to other context or settings.

Dependability- determines whether the same results would be obtained if it could be observed again.

Confirmability- refers to the degree to which the results could be confirmed or corroborated by others.

This thesis investigates the existing challenges of using hearing aids experienced by elderly people suffering from dementia in an institution setting. The author believes that the research questions used are in line with the objective of the study to find appropriate solutions. In addition, the author uses a theoretical framework which is proven for establishing the appropriateness, quality and accuracy of the solutions to the research questions.

4.5 Ethical consideration

Before beginning the study, a short plan for thesis was written by the author and signed by the supervisor. The supervisor forwarded the plan to the Arcada ethical committee for approval. Upon approval by the ethics committee, the plan is presented to Svenska Hörsselförbundet Rf (Finnish Federation of Swedish Speaking Hard of Hearing) to be commissioned.

The author has read the good scientific practice guideline provided by Arcada University of Applied Sciences before and during the process of conducting this research.

5 RESULTS

The findings of this thesis will be analysed using content analysis. This chapter will discuss the findings that were analysed from the research articles. The presentation of the findings will be presented in main themes, categories and sub categories. The summary will be on table 4

5.1 Barriers to effective use of hearing devices (Question 1)

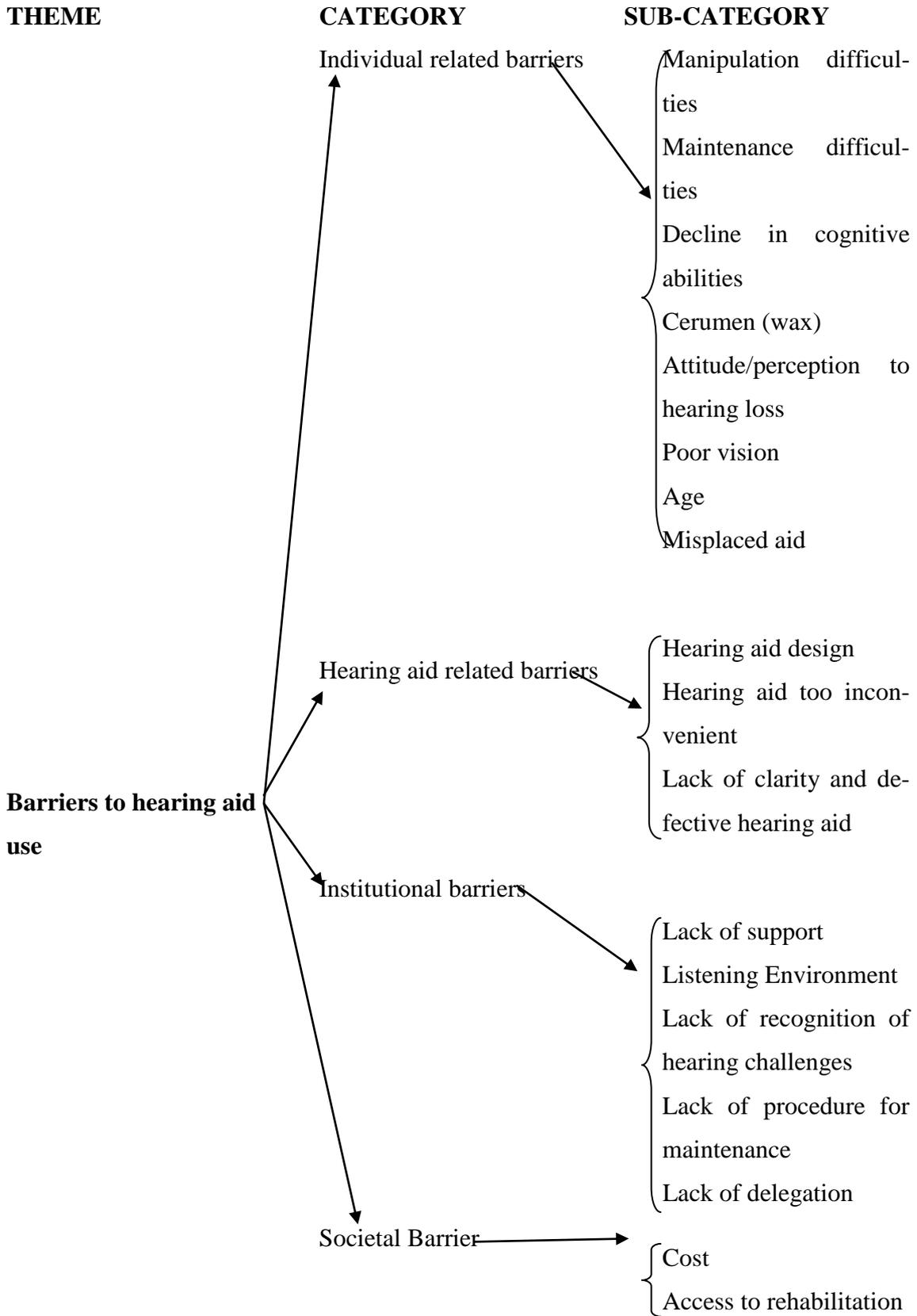
The results for the first research questions are discussed in this chapter. The main focus will be to address the barriers that hearing aid user's experience which in turn affect the uptake of hearing aid.

Hearing impairment is estimated to be between 30-60% in community dwelling elderly population and 97% for residents in institutions (See Allen et al 2003:189). Another report (See Cohen-Mansfield 2004b:289) reported a lower percentage (70%-90%). These figures take into account all degrees of hearing impairment. This could explain why the percentages are so high.

According to Cohen-Mansfield & Taylor (2004b:290) hearing aid use for individual suffering from dementia was lower than in the general population given that evidence suggest they could benefit from using hearing aids. They reported in their finding that 70% (23 out of 33) of residents of hearing aid users had one or more problems with their hearing aid.

Hearing aid use barriers are complex and multi-factorial and are analysed below in categories and sub categories.

Figure 4: Category and sub category (question 1)



5.1.1 Individual related factors

There are predisposed factors associated with the individual which may affect hearing aid uptake. These factors are attributed to personal attributes, physiological and psychological aspects of ageing. The ability or inability to perform certain function may contribute to a person being able to use hearing aid.

Manipulation difficulties

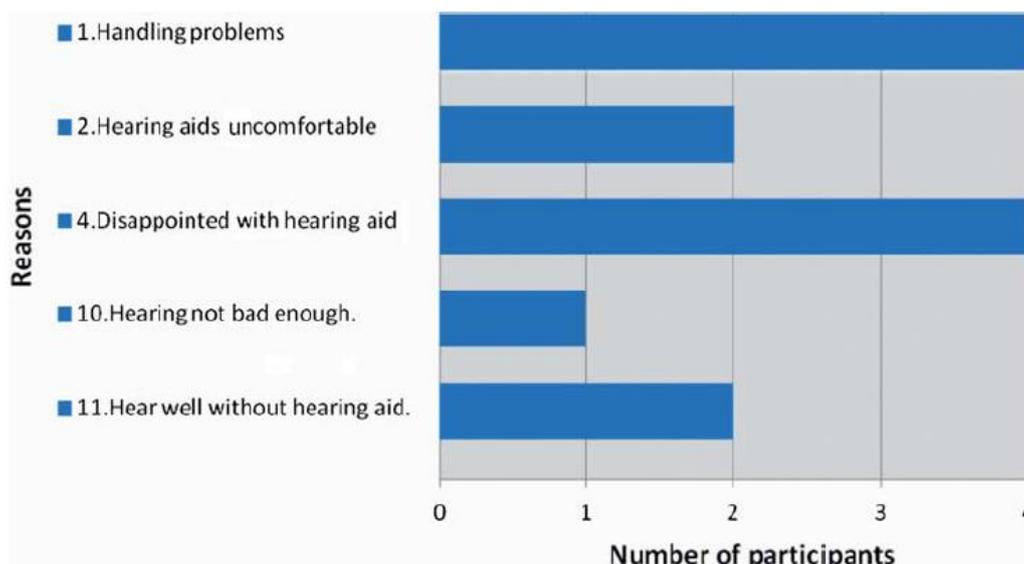
Decline in functional abilities is one of the factors contributing to non-use of hearing aids. This is attributed to the fact that a person needs manual dexterity when handling a hearing aid. Lupsakko et al. (2005:168). This is echoed by a study carried out in a hospital in Surrey, United Kingdom involving 128 (35-90 years) subjects showed that manipulation difficulties as a major factor experienced by hearing aid users affecting 33% of the patients. The problems were particularly frequent in the over 81 group which accounted to 58%. Jayarajan & Rangan (2000:31). Flynn et al (2002:143) also reported that residents had did not use their hearing aids because they reported having problems with insertion and adjusting the controls.

Desjardins & Doherty (2009) investigating on users' ability to use their hearing aids, found that hearing aid manipulation to be a very important factor in hearing aid success. The study showed that given that the participants had at least one year experience of using hearing aids, they were able to satisfactorily insert their hearing aids and open battery doors. However, they demonstrated that several tasks on the PHAST (Practical Hearing Aid Skill Test) test proved to be a challenge for the users. For example, more than three quarters of the participants were unable to use the telephone with their hearing aids. Participants who did not have a t-coil or a telephone program had difficulty in positioning the telephone to prevent feedback. This was particularly affecting users with the behind-the-ear hearing aids because they found difficulty in positioning the telephone in the direction of the microphone reporting that the hearing aid not work with the telephone.

If the user does not understand how to use hearing aid, they may not benefit from it. Participants were unaware of using the noise program or directional microphone though some knew about it but were unable satisfactorily uses it. Participants in this study had analog hearing aids.

Öberg et al (2012:112) reported that the number of non-users was 12% of the 85 year olds which was comparatively lower than 25% reported by Lupsakko et al. (2005:167). This was credited to the fact that the elderly in the Öberg et al study had the opportunity to visit the clinic three or more times after hearing aid fitting. However, the decrease in number of non-use was attributed to handling problems. See figure below shows the summary of reasons for non-use.

Figure 5: Participants main reasons for not using hearing aids



Hearing difficulties, uptake and outcome of hearing aids in people 85 years of age. Öberg et al (2011:113)

Maintenance difficulties

Proper maintenance and cleaning of hearing aid ensures optimal performance of the hearing aid. According to Desjardins & Doherty (2009:74) 90% of the participants scored below satisfactory on ability to clean their hearing aids. The majority of the par-

ticipants in the study had more than 5 year experience of hearing aid use. However, only 18% of the participants scored excellent on the PHAST test. Overall performance of the test was affected owing to the fact that the participants performed poorly on the hearing aid cleaning. Lack of proper performance of the hearing aid may lead to a user discarding the hearing aid and rejecting amplification. This is consistent with the work of Flynn et al (2002: 143) which showed that many participants who owned hearing aids were unaware of how to perform routine maintenance of their hearing aids. 22% experienced difficulty in changing batteries and 34.1 % did not know how to remove wax form the tubing and casing of the hearing aid.

Cohen-Mansfield & Taylor (2004b:291) found that nurses reported 86.5% of the residents had a problem with maintaining their hearing aids by themselves. Changing the batteries was particularly a major challenge. 62% needed help in putting in hearing aids and 54% required help to take them off.

Decline in cognitive abilities

The population study carried out in the city of Kuopio Finland investigating non-use of hearing aids in people aged 75years and over, reported that cognitive decline and low income was closely associated with failure to use hearing aids. Lupsakko et al (2004:168). Their finding showed the importance of providing special attention to the individuals suffering from dementia and experiencing hearing loss as these two factors were are associated with age. They further report that elderly persons who need hearing aids and have declined cognitive function are at a risk of becoming non-users of hearing aids. The study population consisting of 700 persons showed that 17% of the population had been provided with hearing aids. However, 25% of them never utilized their hearing aid.

Cerumen (wax)

Age related changes in the production of wax as discussed in the introduction section may prove to be a hindrance in hearing aid use. Curemen build-up may block the transmission of sound. For individual using hearing aids, this may be construed that the hearing aid is not functioning. Findings of Flynn et al (2002) which was assessing the level of hearing impairment in residential care facility showed that this was a major challenge

facing residents. Otoscopic examinations of 356 ear canals showed that 42.1% of the participants had at least one ear that needed to be cleared of excessive build-up of wax. The wax build-up in the ear canal of the residents was 15.7% in one ear (unilateral) and 26.4% in both ears (bilateral). Wax could also build up in the hearing aid tubing and with lack of proper maintenance. With time this may lead to the hearing aid malfunctioning.

Cohen-Mansfield & Taylor (2004b:292) reported that neither the residents (with the exception of 1) nor the nursing home had an otoscope to check in the ear. The nurses reported that they relied on the doctors to bring their own to the units.

The figure below shows wax removed from the ear.



Figure 6: Wax removed using a ProScoop.

Harkin & Kelleher (2011:24). Caring for older adults with hearing loss

Attitude/perception to hearing loss

Reports show that it is common for elderly people with hearing loss have a negative attitude towards hearing loss. The reason was attributed to denial of hearing loss, lack of knowledge about hearing loss and lack of support from the health care professionals. (See Karlsson & Rosenhall 1998:159)

Leplante-Levesque et al. (2012) showed how self-assessment of hearing loss is an important determinant towards help-seeking and decision making in individuals with hearing loss. This sentiment was also shared by Gopinath et al. (2011:502) who explained that self-reporting of one's hearing loss was one of the key predictors of hearing aid us-

age and ownership. One of the key reasons given for non-use of hearing aids was that the participants felt that the hearing aid did not help to improve their hearing.

According to Dalton et al. (2003:665f), stated that there is a tendency for the hearing impaired to underreport hearing difficulties. In their analysis, only 22% of people with mild hearing loss reported a handicap on the Hearing Handicap Inventory for the Elderly- Screening version (HHIE-S) while 56% for those with moderate to severe hearing loss. Similarly, Karlsson & Rosenhall (1998:159) reported that half of the group of 75 year old with pronounced hearing problems did not use hearing aids.

Öberg et al (2012:114), stated that elderly people with self reported hearing difficulties do not have hearing aid mainly because they do to perceive their hearing as bad enough to warrant hearing aid use.

According to Lupsakko et al. (2005:168) non-use of hearing aid in age group over 75 in Kuopio, Finland, was attributed to the individual's perception that the hearing aid hearing aid did not benefit them. In most cases the hearing aid was provided too late and it was of no help anymore. On the other hand, early uptake of hearing aid had similar results. Therefore, correct timing of acquiring hearing aid is important. The waiting time for acquiring a hearing aid in Finland is 6-18 months. Gopinath et al (2011:503) had similar findings that elderly could feel that they do not need for hearing aids owing to lack of education about the benefits of hearing aids. Another factor was associated to denial or underestimation of their hearing loss.

Negative attitude to aural rehabilitation was attributed to lack of knowledge about hearing loss, denial and insufficient support from healthcare professionals. (See Karlsson & Rosenhall, 1998:159)

Poor vision

Combined vision and hearing impairment may hinder the use of hearing aids. Flynn et al. (2002:143) carried out functional vision assessments of 139 participants living in residential care facilities. The findings showed that vision is vital in enabling the individual to assess facial cues important for interpreting lip reading. According to Flynn et al.

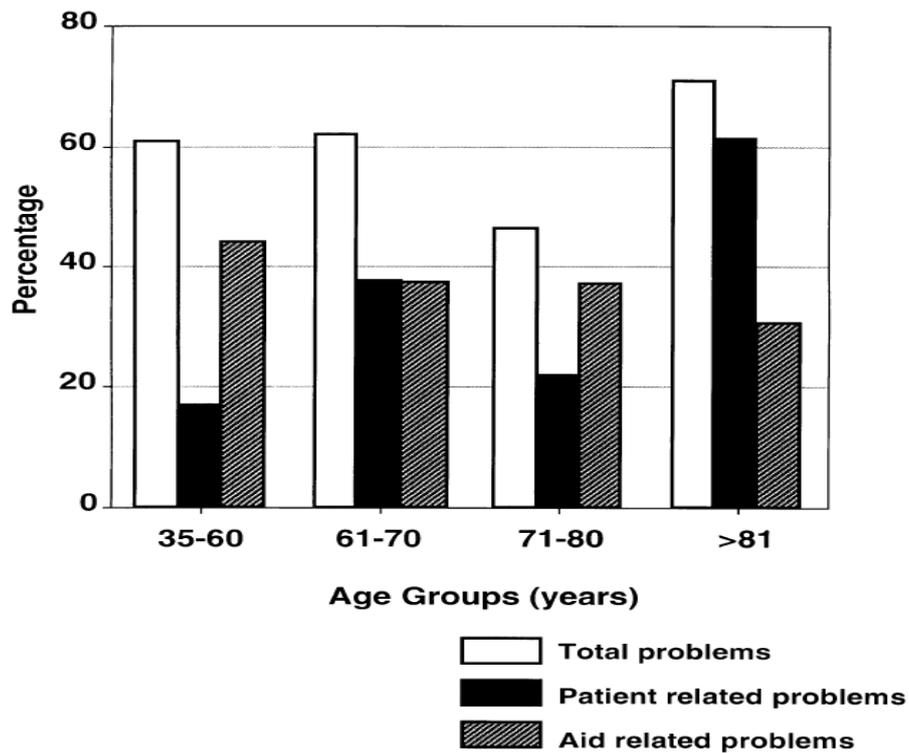
(2002:143) speech perception skills were improved for the participants who were able to lip-read.

Another challenge of having poor vision was attributed to the participants' inability to perform tasks like changing the batteries and removing wax from the hearing aid tubing and casing. Flynn et al. (2002:143)

Age

Old age is a significant factor that may affect an individual's ability to use hearing aids. Gopinath et al (2011:504) attributed age as a significant predictor of hearing aid use and ownership. In a population study involving a total number of 128 adults ranging from 35-90years showed that the total number of problems related to use or uptake of hearing aids were significantly higher in age group 81 years and over accounting or 72% compared to the younger group of 35-80 years which was 55%. Jayarajan & Rangan (2000:28) stated that though there were similar problems in each age group, the 81 and over experienced the more challenges in terms of 'patient related' (61%) and 'aid related' problem (38%). In the 35-80 years age group, there was no significant difference in aid related problems (30.5%).

Desjardins & Doherty (2009:74) had similar findings on the older participants' poor performance on the PHAST test and manipulation problems compared to the younger hearing aid users. The poor performance was attributed to poor memory and may not be able to process information on how to operate the hearing aid. See figure 8



*Figure 7: Distribution of “total problems” and two main sub-groups.
(Journal of Audiological Medicine. Jayarajan & Rongan, 2000:29)*

Misplaced aid

The size of the hearing aid makes it easier to lose or misplace. Juniper & Spivey (1997:207) reported that residents lose their hearing aid in rolled up tissue and there was a risk of fitting the hearing aid in the wrong ear for binaural hearing aid users. Jayarajan & Rangan (2000:29) showed that a client had lost a hearing aid.

According to the study made by Cohen-Mansfield & Taylor (2004b:291) in nursing homes, loss or fear of losing of hearing aid was the most common reported problems according to the nurses. This accounted for 12% that accounted for hearing aid non-use. (appendix 2)

5.1.2 Hearing aid related barrier

These are barriers which are associated with the general attributes of the hearing aid and its functioning.

Hearing aid design

Technical problems and difficulty to use a hearing aid is one of the factors highlighted as one of the reasons contributing to non-use. Lupsakko et al. (2004:169), highlights the need of manufacturers to design hearing aids that are convenient and user friendly for the elderly. However, Gopinath et al (2011:504) demonstrated that continual improvements in hearing aid technology did not have a significant impact on increasing hearing aid ownership and use.

Cohen-Mansfield & Taylor (2004b:292), recommends improvement of design that allows for longer lasting batteries, more comfortable to fit and easily adjustable especially considering persons with cognitive impairments. They noted that the needs could be slightly different compared to the community dwelling elderly who may be concerned with cosmetic design and social impact.

Hearing aid too inconvenient

Gonipath et al (2011:502f) in the 5 year Blue Mountain Hearing Study (2,015 participants) investigating incidence and predictors of hearing aid use among older adults established that one of the reasons they failed to use hearing aids was that they found the hearing aids were too uncomfortable and had a problem of putting them on(1.4%)

According to the findings of Cohen-Mansfield 2004b:291) 42% of hearing aid users reported to having discomfort using the hearing aid. They reported the hearing aids did not fit well, not tolerated and they hurt.

Lack of clarity and defective hearing aid

Lack of proper cleaning and maintenance reduces the performance of a hearing aid. According Desjardins & Doherty (2009:74) the most common hearing aid repairs are done because of cerumen or wax build up in the receiver.

Jayarajan & Ragan (200:31) found that 9 patients (10%) of the total problems were attributed to lack of clarity. However, upon examining these hearing aids, no faults were found. Noisy surroundings reduced the ability to hear speech.

5.1.3 Institutional barriers

These barriers are associated with the general policies that are in place in a particular institution or nursing home that affect or influence the use of hearing aid or hearing rehabilitation.

Lack of support

According to the study done in two residential care homes (Pryce & Goberman-Hill 2010:42), the results showed that the residents relied on staff and family members to access hearing aid services. Both residential homes did not have specific services for hearing aid maintenance and no other additional access to environmental equipment to facilitate better hearing for example television and telephone aids. Pryce & Goberman-Hill go further to explain that the staff lacked specific training on hearing aid services.

Residents with some form of dementia described feelings of being unwanted and felt that others were not concerned for their wellbeing. There was a risk of communication breakdown as cognitive impairment combined with mis-hearing made it more difficult to hold a conversation. (Pryce & Goberman-Hill, 2011:42).

Communication with the staff members tended to be task focussed for example, giving choices to the residents or the residents describing their needs. This however became a problem when communication was done in group activities. Pryce & Goberman-Hill gave a scenario where a staff member gives a quiz while the television is still on. The client tries cannot hear and the staff member is oblivious of this and after a while the client nods off to sleep.

Listening environment

Residents in the study conducted in three separate nursing homes indicated that many residents who use hearing aids reported having difficulty hearing television in public areas and in their own rooms. Difficulty was also experienced in dining areas, large groups lecture rooms and during other group activities. (Jupiter & Spivey 1997:204).

Similar findings by Flynn et al (2002:143) showed that participants had difficulty communicating in everyday life particularly in the presence of background noise. 44.4% of the residents pointed out that carrying out conversation at the dinner table a challenge. Flynn et al argued that this was of great concern given that the dining table is supposed to promote social contact by conversing with other residents.

Pryce & Gooberman-Hill (2011:42ff) reported the same findings showing little interactions at mealtime owing to background noise. The interactions were only with the staff members which were needs focussed. It was observed that music and television was played at meal time and the researchers noted that it was only one time that the staff asked the residents whether they preferred to have the music playing. Interestingly, the residents discussed the issue of background noise with the researchers. However, they had not raised the issue with the staff.

Pryce & Gooberman-Hill (2011:44) stated that, “*Residents make choices based on the need to preserve equilibrium within their social setting.*”

Lack of recognition of hearing challenges

Cohen-Mansfield & Taylor (2004b:291ff) findings showed that there was a disparity in what the nurses and the residents awareness to the barriers to hearing aid use. Residents estimated their ability to be higher than what the staff estimated.

They also stated that nurses underestimated the hearing of the residents and inconsistent reporting of hearing impairment and hearing aid use.

Lack of procedure for maintenance

According to Desjardins & Doherty (2009:75), it would be misleading to simply ask a user whether they understand the basic skills of maintaining a hearing aid as there is a mismatch between hearing aid user' perceived ability and their actual performance of the task.

According to Cohen-Mansfield & Taylor (2004b:291), nurses reported to lack of knowledge on hearing aid maintenance (45.8%). They reported that they had never received any training and recognised they would need training. 31.3% reported to not knowing at least one aspect of maintenance and use of hearing aid. However, 93.7% knew how to turn them on, 87.5% had the knowledge on changing the batteries and to check on whether they worked. Only 68.7% reported on knowing how to clean the hearing aids.

Lack of delegation

There was no clear procedure and allocation of responsibility regarding the handling of hearing aids. In most cases, multiple people were responsible for example nursing assistants, charge nurse and the family members. Cohen-Mansfield & Taylor 2004b:291f). Because of lack of accountability and delegation, there is a risk of mismanagement in maintenance of hearing aid. This was reported in 10 out of 36 cases while 5 residents depended on their family for help. However, there was considerable disparity on the reports between the nurses and the residents regarding the identity and needs of help with hearing aids.

Cohen-Mansfield & Taylor 2004b:292) reported that out of the 12 units observed only 2 of them had a designated aide who was specifically responsible putting on and taking off of hearing aids and storage at the end of the day. In the other units, the caregivers mostly the nurses performed this duty and the hearing aids were stored in the residents beside cabinet.

5.1.4 Societal level barriers

Cost

According to Lupsakko et al (2004:168), low income was one of the contributory factors for hearing aid use non-compliance. In Finland, hearing aids are provided free of charge. However, patients have to purchase the batteries. Some patients complain of high cost of batteries and may end up not using the expensive hearing aids provided. Lupsakko et al (2005:168). Similarly, Gopinath et al (2011:503) found high cost of batteries and hearing aids for the self-funded users in Australia will most likely increase over time. Unlike Finland, Australia health care welfare only provide free hearing aids to individuals aged 60 years or older who have Pensioners Concession Card (see Gopinath et al 2011:503). Cost however varies depending on the country.

According to Cohen-Mansfield & Taylor (2004b:292) cost of replacing broken or lost hearing aids was one of primary reasons for non-use in eight of the residents.

Access to rehabilitation

According to Laplante-Levesque et al. (2012:101f), the participants seeking rehabilitation were not aware of the rehabilitation process. They viewed interactions with clinicians, help-seeking and rehabilitation as isolated events rather than a progressive process spanning over time and relating to a common goal. This is attributed to the lack of continuity especially where different professionals are involved in the provision of hearing services.

The participants, who reported to be aware of their gradual hearing difficulties and self-adoption of hearing aids, sometimes felt that their clinicians were not aware of such a process. For example, they felt their clinicians did not recognize the importance of ongoing appointments with the hearing aid practitioner and vice versa sometimes the individual failed to see the need of the appointments. The implications are that, there was a likelihood of either the client or the clinician viewing hearing rehabilitation as a 'quick fix' and the other party rehabilitation as a gradual process, a timeline or a series of event spanning over time working towards a common goal. (Laplante-Levesque et al

2012:102). Therefore, the clients' point of view should be considered in the rehabilitation process.

5.2 Providing support for hearing aid users (Question 2)

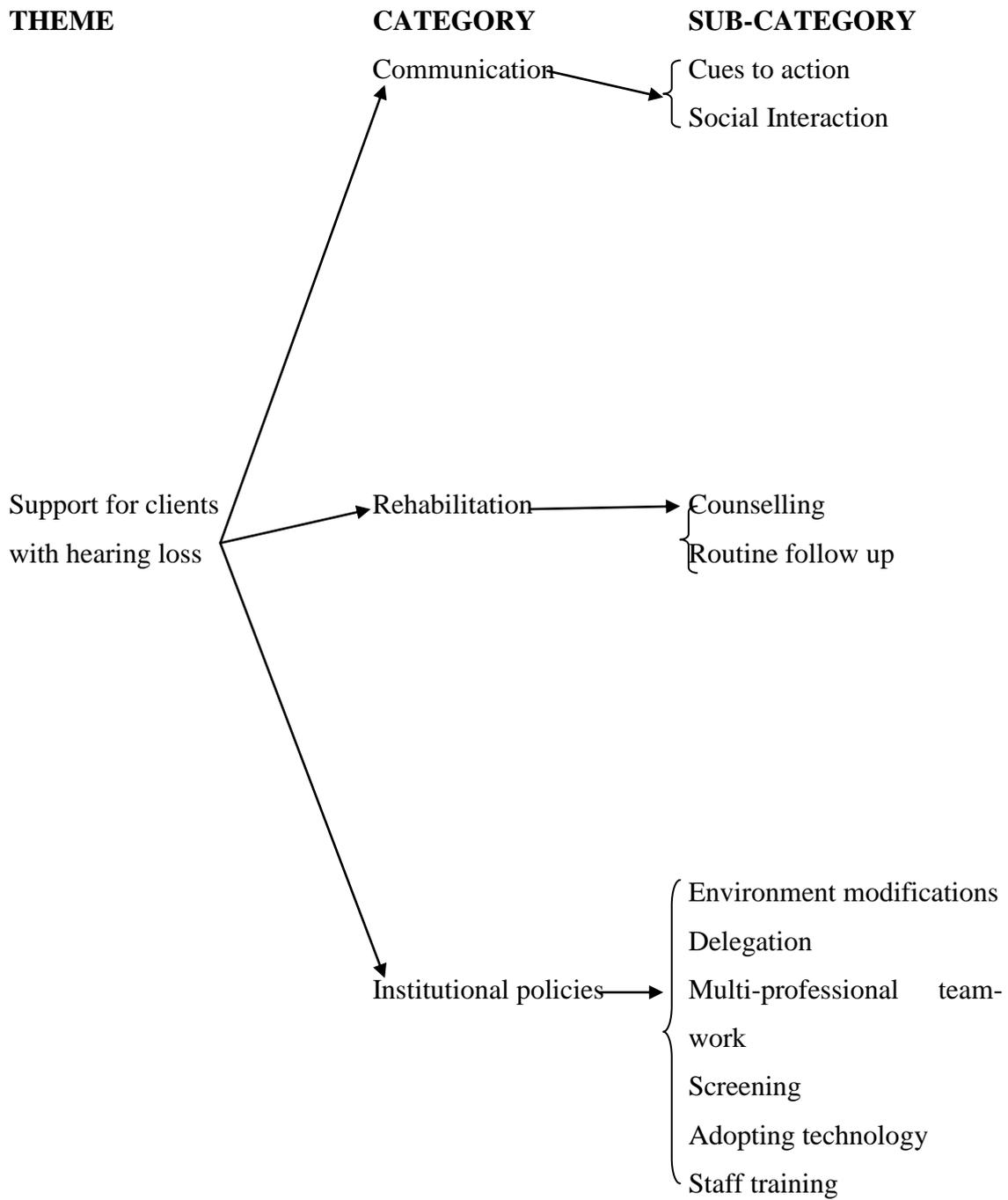
This chapter will look into how barriers discussed in research question 1 can be addressed by the healthcare professionals. The author has consolidated solutions from different researches to find viable answers. Hearing aid users living in institutions especially the ones suffering from dementia are in great need of support from the staff and hearing consultants. Since the staff work closely with the clients, they are better placed to assess the client's situation, make evaluation and provide better support for the elderly with hearing loss.

The problem of under-detection of hearing impairment is far much greater for the residents living in nursing homes as compared to the general population. This is as a result of lack of patients self-reporting of hearing problem or denial and lack of provision of support by the caregivers.

Hearing impairment is associated with functional decline (Cohen-Mansfield & Taylor, 2004a:284). Findings by Allen et al. (2003:191f) showed that 42% of the residents suffering from dementia and supplied with hearing aids had an improvement on an independent measure of change (Clinical Global Impression-CGI). Though the results did not show improvement in cognitive functions, there was an overall reduction of hearing disability and the care burden did not increase.

Allen et al. (2003:192) stated that improvement in hearing for adults with dementia can be measured with assessments previously validated for people with no cognitive conditions. This is important because participants in this study established hearing impairment and dementia benefit from the provision of hearing aid.

Figure 8: Categories and sub-categories(question 2)



5.2.1 Communication

Hearing loss affects how clients interact with both the other clients and staff members. Communication barriers may lead to the individual withdrawing from having conversations with the persons around them. Nurses and other health care professionals work closely with the clients. Therefore, this enables them to be more observant of the clients hearing handicap as far as communication skills are concerned.

Self-reported difficulties with communication were common with participants (59%) with moderate to severe hearing loss Dalton et al (2003:666). Hearing loss has an impact on both the individual and the people around them.

Cues to actions

Allen et al. (2003:192) findings showed that residents suffering from mild to moderate form of dementia found it more acceptable to use hearing aids with regular supervision from the nurses.

Juniper & Spivey (1997:207) reported that one of the problem encountered by residents using hearing aids is that they forgot to switch on their hearing aids. Nurses should be at hand to prompt or remind them to turn them on.

Social interactions

Health care workers need to be aware of communication limitations experienced by residents who have hearing difficulties. Hearing loss affects how an individual interacts with other residents and workers.

One area that residents have a chance of socializing is in the dining hall. However, Flynn et al (2002:143) reported that increased distance between the residents presented a poor setting for conversation at the dining table. This is due to failure to see facial cues and expressions.

In anticipation of difficult communication situation, the individual having hearing impairment may withdraw from social contact as a coping strategy to avoid demands for

oral communication. (Karlsson & Rosenhall 1998:159). The same was reported that residents chose their communication opportunities in social group meetings and while sharing a meal in a communal area. (Pryce & Gooberman 2011:43)

Nurses and care workers spend a lot of time with the residents and therefore, they are better placed in understanding communication disorders of both severity and impact. When communicating with the residents, nurses need to be alert to discrepancies between questions and to remarks such as “What did you say?” and “Stop mumbling”. Juniper & Spivey (1997:207). Instead, nurses should evaluate the situation and establish whether the difficulty is due to improper hearing aid use or if the hearing aid has malfunctioned. See tips on how to care for hearing aid (Table 6)

5.2.2 Rehabilitation

Hearing aid up-take may be influenced by adopting favourable interventions. Involving the individuals with hearing impairment in the rehabilitation process may influence them to use hearing aid. Screening and follow-up after hearing aid up-take could solve some of the problems that hearing aid users experience. The overall success of hearing aid uptake and use depends on multi-professional contributions and teamwork.

Dalton et al. (2003:667) highlighted the need of provision of auditory rehabilitation, improvement of services and teaching coping strategies in order to improve the quality of life for the hearing impaired. Similarly, Öberg et al. (2011:114) stressed the importance of providing high quality rehabilitation programs to ensure that the elderly continue to use their hearing aids.

Counselling

Saunders & Forsline (2012:757) compared the effectiveness of two forms of counselling for duration of 30 minutes which are Informational counselling (IC) and Performance Perceptual Counselling (PPC). In the IC form of counselling the participants were encouraged to share their experiences regarding hearing loss and hearing aids and their thoughts on the information they had received. Depending on their response, the audiol-

ogist recommended various communication strategies to address patient-specific difficulties and ways in which they could use their hearing aid effectively.

On the other hand, in the PPC form of counselling, the concept of underestimation, overestimation or accuracy of hearing ability of the participants was assessed. For those who underestimated their hearing ability, the audiologist gave an explanation of the possibility of the individuals placing high expectations of their hearing, loss of confidence and reluctance to take risks. Therefore, there was a risk of them becoming dependent on others for communication or withdrawing from social engagement altogether. For the over-estimators, possible explanations given were that they were reluctant to acknowledge the extent of their hearing loss or that the onset of hearing loss was so gradual for them to notice. The implications of overestimating the ability to hear were explained by the audiologist that the individuals might assume to hear things correctly to the contrary. This may lead to frustration of others and the individuals may find themselves in situations of misunderstanding.

The audiologist gave example of coping strategies for the under-estimator and over-estimators. The under-estimators were encouraged to try guessing what they had heard or to assume that they had heard until told otherwise. By so doing, their confidence would be boosted. The over-estimators were encouraged to see clarification more often and to think more carefully on whether they understood correctly what had been said. Sanders & Forsline (2012:758 & 760) goes further to explain that though there was no significant difference in the two groups, over 50% of participants reported that their perceptions about their hearing ability had changed. Findings also showed that 30% of individuals in the IC group and 41% in the PPC group reported that they could hear better with hearing aids. 70% of IC participants and 60% of the PPC reported a change of attitude about their hearing aids. The explanation given for this was that, 55% of the participants were more willing to use their hearing aids or because 24% of the participants realised their hearing aids were more helpful. There was an increase of hearing aid use prior to counselling in over half IC participants and 40% of the PPC participants. 29% of the participants attributed better understanding of how to use hearing aids to counselling. 29% also said that counselling had prompted them to give their hearing aid another chance and 13% had more social interactions.

Sanders & Forsline (2012:62) reported that participants appreciated learning various communication strategies. However, despite this, 35% of the participants admitted that they could not recall any of the suggestions. Therefore, Sanders & Forsline suggest that audiologists should encourage individuals using hearing aids to attend at least two counselling or information sessions.

Similarly, Öberg et al (2012:112) stated the importance of communication program interventions. On the other hand, they suggested that elderly people with hearing difficulties seeking rehabilitation should be encouraged to interact with the same age persons who can share their positive experiences with rehabilitation citing this could be more effective than information from clinicians.

According to Desjardins & Doherty (2009:74), there is a need for to use the PHAST test for the elderly with age related memory deficits who self-report a greater need of ease with manipulation. They stressed the importance of the PHAST test in that it may be used in evaluation and could establish specific areas the individual needs on further counselling. Participants who used the hearing aids more hours per day performed better on the PHAST test compared to participants who used for few hours.

Gopinath et al. (2011:504) pointed out that some of the problems associated with non-use could be easily solved by ensuring that users have continuous support through counselling from the hearing aid dispensers. Lupsakko et al (2004:169) gave similar results and stressed on the need for continuous counselling and follow up to train and motivate elderly persons using hearing aids.

Jayarajan & Rangan (2000:32) found that multiple problems with hearing aid usage were particularly more prevalent with the elderly. Therefore, this warrants the need for early referral and routine follow-up after hearing aid provision.

Lupsakko et al. (2004:168) highlight the urgent need for provision of hearing aids and special attention particularly for individuals suffering from dementia in counselling to guarantee the efficient use of hearing aid.

Findings of Öberg et al (2012:113), showed that on account of successful rehabilitation, hearing aid users enjoyed better health scores compared to those who did not use hearing aid. The figure below shows the comparison between three groups:

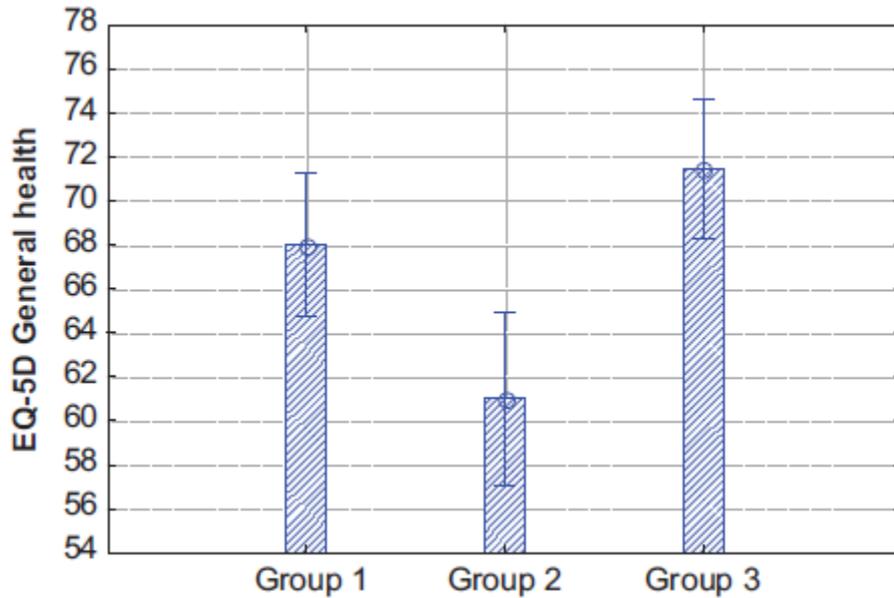


Figure 9: Hearing difficulties, uptake of hearing aids

Mean scores and 95% confidence interval for EuroQol-5D(EQ-5D) VAS

for Group 1:hearing difficulties and hearing aid; Group 2: hearing difficulties without hearing aid; Group 3: normal hearing. Higher scores indicate better health (Öberg et al 2012:111)

Routine follow up

According to Juniper & Spivey (1997:207), residents with hearing aids still reported feeling handicapped despite using hearing aids. Therefore, there is a need to do a continuous assessment to establish the factors that give the clients these feelings of helplessness and come up with viable solutions.

There is need for follow-up to ensure that the hearing aid properly fit and that the individual is familiar on how to use the hearing aid. Dissatisfaction with the hearing aid

may lead to the user discarding the hearing aid. (Cohen-Mansfield & Taylor, 2004b:209ff). They go further to explain that owing to the limitations experienced by the residents with cognitive decline, the responsibility to ensure hearing aids are used properly shifts to the staff.

Flynn et al (2002:142) showed that majority of the individuals they assessed (87.1%) of 178 had hearing impairment. Of these, only 43.3% had been furnished with hearing aids. Flynn et al (2002:144) stressed the importance of increased detection and management of hearing impairment in residential care facilities. Service providers should provide resources to facilitate screening programs to be used as a guide for the in-service staff in order to ensure effective assessment and rehabilitation.

Gopinath et al (2011:501) established that using The Hearing Handicap Inventory for the Elderly- Shortened version (HHIE-S) could be used as a measure for predictive use and ownership of hearing aids. A positive response to particular questions was viewed as a significant predictor of hearing aid use and ownership. For example, the question of hearing when someone speaks by whispering predicted a 3-fold increased risk of incident hearing aid use and ownership as demonstrated in the figure below:

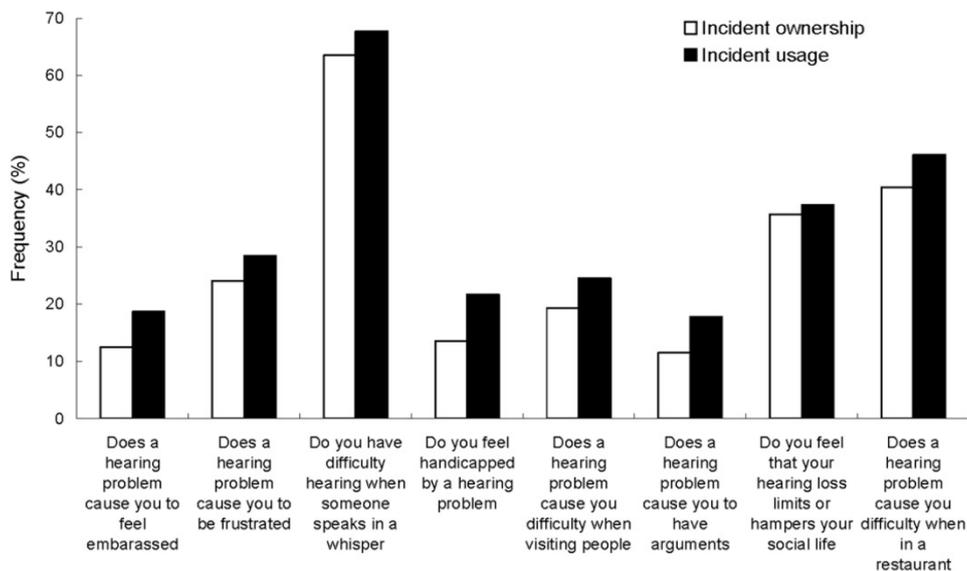


Figure 10: selected questions from the Hearing Handicap Inventory (HHIE).

Incidence of hearing aid use in older adults. Gonipath et al 2011 p. 503

Self-reported assessment of hearing loss at follow-up was associated with a 4-fold increased likelihood of being a new hearing aid user. Gopinath et al (2011:504). They go further to explain that self-perceived hearing difficulties correlate positively with seeking help, uptake and satisfaction with the hearing aid.

5.2.3 Institutional policies

Comprehensive institutional policies put in place incorporating all the key role players in the work place are needed. These policies ensure that all avenues are explored to provide a conducive environment to enable individuals with hearing loss use their hearing aids effectively. Gopinath et al. (2011:505) suggested that having a well-coordinated health policy could improve help seeking behaviours for individuals living with hearing loss.

Multi-professional teamwork

Cooperation between audiology and geriatric departments is valuable to elderly persons (see Lupsakko et al. 2004:168). (Gonipath et al. 2011:504) echoes this sentiment that owing that elderly people experience problems handling aids because of dexterity problems, there is a need for audiologist, providers and other support networks and services to work together in optimizing the rehabilitation of persons with hearing impairments.

Cohen-Mansfield (2004:295) stated that medical directors can play an important role in tackling many of the problems regarding hearing aid use by working with the nurses. Addressing these issues in multi-professional teams may bring about change in policies, care procedures and training of staff.

According to Öberg et al. (2012:112), the health care professionals should focus on increasing elderly peoples' awareness of hearing loss and highlight to them the benefits of hearing rehabilitation. They suggested that one way of doing this was to encourage elderly people with hearing loss should be encouraged to meet with other successful hearing aid users to share experiences. Seeing the impact of hearing aid on improvement of quality of life may be more effective than information gotten from clinicians.

Environment modification

Background noise can distort the sound making it very difficult for a hearing aid user to hear properly. According to Jupiter and Spivey (1197:204), modification of the environment can go a long way in improving the quality of life for individuals using hearing aids. These modifications include sound-absorptive windows, walls or acoustic panels (Figure 12) and ceiling. Rugs and curtains minimize noise and acoustic feedback. Similar findings by Flynn et al. (2002:143) showed that the dining hall for the residential facility did not provide a good environment to promote communication for the residents. High level of background noise and poor acoustic conditions for listening are attributed to hard linoleum floors and hard surfaces.

The findings of Pryce & Goberman (2011:44) reveal that the home care environment was of a greater influence on choices in communication rather than the hearing loss as impairment. They suggested that carers in the residential homes could play a vital role in the audiological care by promoting and providing a modified environment that reduces background noise.



Figure 11: Acoustical panels made from polyester fibre

By Interior Exterior Solution (2012)

<http://www.interiorexteriorsolution.com/wp-content/uploads/2012/08/acoustic-panels-home-theater-products-150x150.jpg>

Delegation

There is need to for improving on accountability of hearing aid management in the care facilities especially for the clients who are cognitively impaired. This ensures that hearing aids are properly and closely monitored. Cohen-Mansfield & Taylor(2004b:293) gave an example of a nursing home which had designated persons who were responsible for fitting and storage of the hearing aids in the evening.

Juniper & Spivey (1997) recommended that the residents home should ensure that the hearing aids have an accountability record that would be monitored by nurses and the name list of the of all residents who use hearing aid to be posted on each floor.

Screening

Hearing loss is one of the most undetected conditions in nursing homes. Patients suffering from cognitive impairment like Alzheimer's display behaviours such as disorientation, confusion and withdrawal. (Cohen-Mansfield & Taylor 2004a:284). The same is noted that symptoms of hearing loss are which include inappropriate responses, irritability and inattention are often misdiagnosed as dementia. The under detection is attributed to among other factors insufficient screening and provision of appropriate referrals by physicians. (See Cohen-Mansfield & Taylor 2004a:284).

Screening helps to determine the cause of hearing problem. For example it can help determine whether removing wax from the ear canal can improve hearing as shown by Allen et al (2003:192). 10% of the participants had improved hearing after removal of wax.

Adopting technology

By understanding the communication deficits experienced by the client in residential homes, the staff may adopt and promote use of various technologies or assistive devices by the residents. Residents who were interviewed and tested using a personal listening device achieved better scores and improved on cognition. This was particularly noted on individuals diagnosed with dementia. Juniper and Spivey (1997:206)

Phone amplifiers (Figure13) increase loudness of the telephone. (Jupiter and Spivey, 1997:205). The amplifier can be portable or in-build in the telephone receiver. For indi-

viduals having difficulty using the telephone while having a hearing aid may also use a pocket talker (Figure 14).



Figure 12: Phone amplifier

<http://www.floridahearingloopsystems.com/uploads/7/8/7/6/7876116/190623.jpg>



Figure 13: Pocket talker

[http://i.ebayimg.com/i/POCKET-TALKER-ULTRA-SOUND-AMPLIFIER-W-DELUXE-FOLDING-HEADPHONES-121-dB-SPL-AMP-/00/\\$\(KGrHqR.!hgEI8cVfoPBNdO4tMnv!~~ 35.JPG](http://i.ebayimg.com/i/POCKET-TALKER-ULTRA-SOUND-AMPLIFIER-W-DELUXE-FOLDING-HEADPHONES-121-dB-SPL-AMP-/00/$(KGrHqR.!hgEI8cVfoPBNdO4tMnv!~~ 35.JPG)

Induction loop system may be used in larger room areas to help hearing aid users to hear high quality sound and remove unwanted background noise. Induction loop system can be used by both hearing aid users and non-hearing aid users. Juniper and Spivey (1997:205). The induction loop (Figure15) consists of a microphone, an amplifier and a wire that surrounds a designated area for example a lecture hall, meeting hall, dining hall and rehabilitation centres. The residents are able to interact and participate in group activities or watch television in the lounge area. (Juniper and Spivey 1997:205). An in-

ternational standardized symbol is used to identify places where individuals can use the induction use facility. (Figure 16 & 17)



Figure 14: Induction loop system

<http://simenibiz.com/image/cache/data/earpiece/71-01-500x500.jpg>



Figure 15: Induction loop symbol

https://encrypted-tbn1.gstatic.com/images?q=tbn:ANd9GcSI5IPKsKHdpvF9vOh11slHzegkJsm8_7UD5WHwCS1fkOck6R0gQ



Figure 16: Induction loop symbol (Commonly used in Finland)

http://www.turkukaikille.info/images/listen_n.gif

Cohen-Mansfield & Taylor (2004b:293) stated that out of the 16 unit managers in the nursing homes only one reported to have an otoscope and none possessed assistive devices to help those with hearing loss. This shows there was an unmet need for hearing rehabilitation in this population.

Staff training

Continuous orientation about hearing loss and hearing aid management is of utmost importance to for the staff working with individuals affected by hearing loss particularly the ones suffering from dementia. The staff members need to be equipped with knowledge in order to provide adequate support for the clients. Facilitating, promoting and enhancing conducive environment for communicating should be a priority. (See tips on table 7)

Cohen-Mansfield & Taylor(2004b:291) reported that 46% of the nursing staff lacked training on the use and maintenance of hearing aids and 31% did not have the knowledge of how to remove wax from the hearing aids. See tips on hearing aid maintenance (Table 6)

Juniper & Spivey (1997:207) recommend that staff members should have on-going in house training to ensure that they acquire the knowledge and skills on how to manage

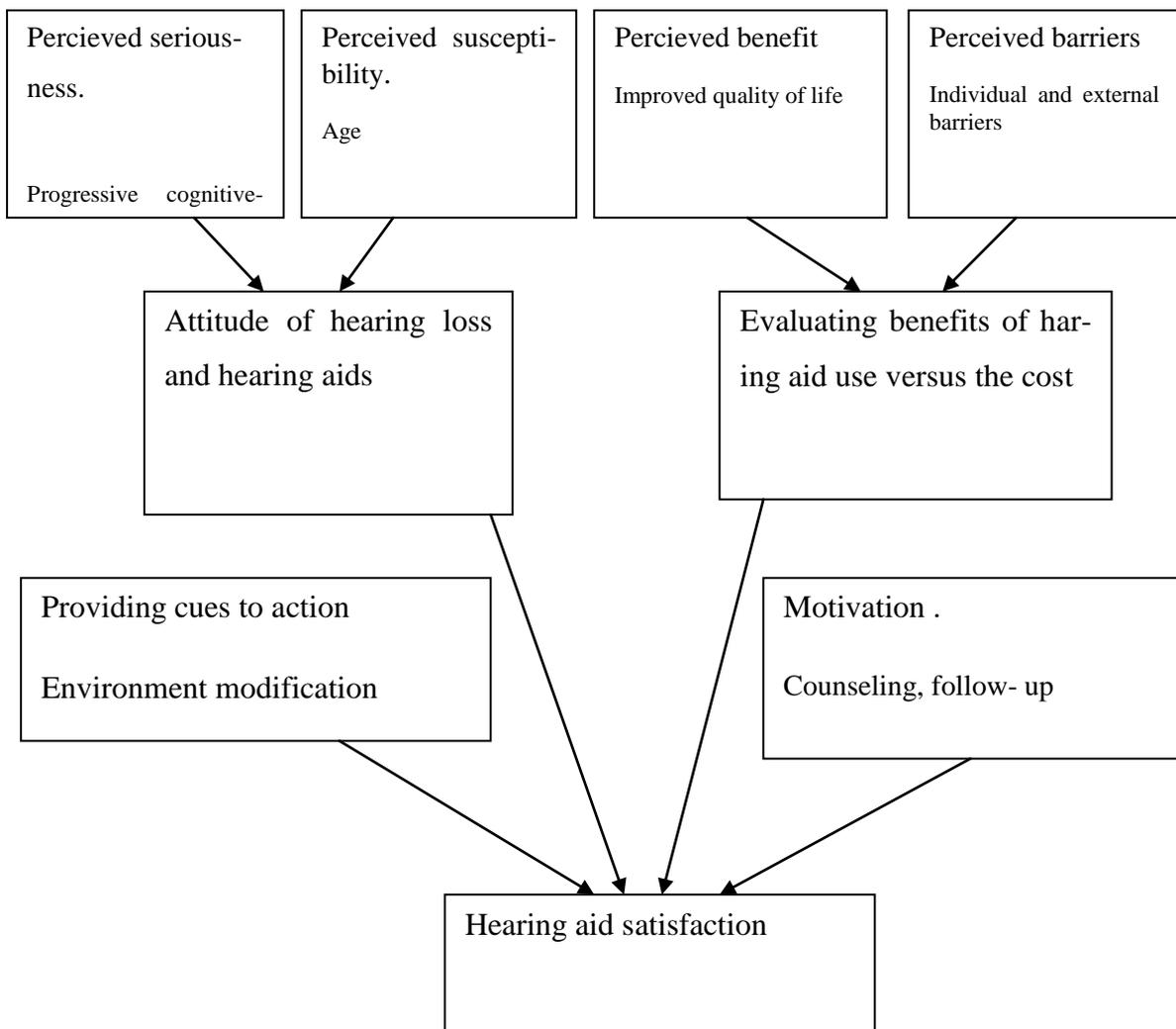
hearing loss. According to Allen et al. (2003:192), removal of earwax significantly improved hearing in 10% of patients with hearing loss

5.3 Applying theory to practice

The theoretical framework used for this study is the Health Belief Model which posits that health related actions depend on the occurrence of several factors which may influence an individual's decision. These factors are discussed in chapter three.

The findings of this study show that hearing aid use or uptake is affected by multiple factors. The Health Belief model can be used to examine hearing aid use because it is a multifactorial model. The following figure describes how the factors can be evaluated to facilitate hearing aid satisfaction

Figure 17: Application of theory to practice



6 DISCUSSION

The rising population of elderly population in the developing countries such as Finland is presenting a unique challenge in the care for the elderly because age pronounced changes are more pronounced in this population. Age related changes such as hearing loss and vision are common conditions for the elderly. Hearing loss is the third most chronic condition reported by the elderly. Hearing loss coupled with cognitive decline conditions such as dementia can prove to be a great challenge for the individual. In Finland, dementia was the third leading cause of death in 2010 (12%).

The objective of this literature review was to map out the existing challenges that the elderly people with dementia encounter while living in then institutional setting. The other one was to find solutions of how the care givers would provide support for this population.

The research questions that were used to guide or help find the answers were: What are the main challenges or reasons contributing to inappropriate or non-use of hearing aids? And how can the institutions, geronomos, nurses and other professionals support clients with hearing loss?

The theoretical framework used for this study is the health belief model developed by Irwin Rosenstock in 1988. The model was developed to try and find out why people who were more prevalent to tuberculosis rejected the opportunity for free screening and to find out why the other group consented to screening at the risk of being labelled as suffering from tuberculosis. Health related actions depended on several factors: perceived benefit, cost, susceptibility, seriousness, health motivation, self-efficacy and other motivational factors.

The results of this current study have shown that hearing loss is prevalent in the elderly but particularly more prevalent in nursing homes. Hearing impairment is estimated to be between 30-60% in community dwelling population and up to 97% for residents living in institutions and nursing homes. Hearing uptake for individuals suffering from demen-

tia is considerably lower than that of the general population. The factors affecting hearing aid use are multifactorial. The results are analysed in categories and sub categories.

Psychological and physical related changes in ageing affect hearing aid use. Decline in cognitive abilities brought about by dementia coupled with hearing loss presents a challenge for both the individual and the caregivers. Changes in physical dexterity make it difficult for an elderly to operate a hearing aid. This was particularly noted in the age group of over 81 years. The participants reported having problems with insertion and adjusting the controls. Hearing aid users with the t-coil or telephone program had a problem using the telephone particularly those who use behind the ear hearing aid. Poor vision combined with hearing loss may hinder hearing aid use. Tasks like lip reading, cleaning the aid and changing battery becomes a challenge.

Wax build up in the ear canal can block the transmission of sound and could lead to an individual discarding the hearing aid presuming that the hearing aid is broken. The wax could block the tubing of the hearing aid therefore interfering with the transmission of sound.

The study reports problems with the maintenance which were experienced by both the elderly and the caregivers. They lacked the knowledge on how to clean and to change batteries. Failure to clean the hearing aid regularly affected the performance of the hearing aid and there was a risk of discarding the hearing aid.

It is common for the elderly with hearing loss to have a negative attitude towards hearing loss. Perception of hearing is an important determinant towards help-seeking and decision making for individuals with hearing loss. Self-reporting of hearing loss is a key predictor of hearing ownership and use.

Some residents reported that the hearing aids were too uncomfortable or did not fit well and had a problem putting them on.

Loss or fear of losing a hearing aid was the most common reported problems to the nurses.

Age was considered to be a significant factor in using hearing aids. The elderly performed poorer in the PHAST test than the younger group with patient related problems being more pronounced than the hearing aid related problems.

Recommendations were made for the improvement of hearing aid design to make it more comfortable and user friendly for the elderly. It was noted that the need for the participants with dementia was slightly different compared to the community dwelling elderly who may be concerned with cosmetic design.

Participants reported to that they lacked support from the caregivers. Residents with dementia expressed feelings of being unwanted and felt that others were not concerned for their well-being. This could be because communication with the carers tended to be task focussed. There was a disparity in what the nurses and the residents awareness to the barriers of hearing aid use. Residents estimated their ability to be higher than what the staff estimated.

Noisy environment in the dining hall and other common areas can be a hindrance to communication. Staff members should play a role in improving the listening environment. The staff members require continuous training on care and maintenance of hearing aids. The findings show that there is a need for improved service deliver for this population who mostly rely on the staff and family members.

7 CRITICAL ANALYSIS

While compiling articles for this study the author did not realise how difficult it would be to find particular articles that were going to provide answers for the research questions. The aim of the study was to look for ways in which elderly living in institutions and suffering from dementia could be supported. The two research questions were: what are the barriers to effective use of hearing aid and how can the geronomes, nurses and other staff members support those with hearing loss?

One of the challenges in this study was difficulty in getting full text articles which were specifically addressing the problem. In the course of research, the author realised that extensive research has been carried out in the general population compared to the population with elderly with cognitive decline. Therefore, the author had to search and read deeper to find some articles. There were few articles addressing dementia and hearing loss. However, some were not scientifically written therefore were not used since that was a prerequisite for inclusion in the study. Others that were found could not be accessed in full text and could not be retrieved without cost. On the other hand some of the articles that were retrieved were of high quality and value. Though some of them addressed cognitive conditions like dementia as part of their research, the results were substantial to analyse. The author would have liked to analyse more articles from Finland. However, some of them could not be retrieved while others were in Finnish language.

The strength of the study is the general result is reliable. The results analysed from different articles were arranged in categories and sub-categories.. For example challenges with manipulation difficulties, maintenance problems, the sound environment and hearing loss perception were highlighted.

The weakness of this study is that that the author felt that there were deemed important regarding elderly people and hearing loss that were not feature or factored in the finding. Lighting in nursing homes especially for the cognitive impaired is very important. This factor featured in the introduction part with the case study about the lady who has

dementia and hearing loss. The other factor is stigma which is associated with hearing loss and use of hearing aids.

The theoretical framework selected for this research is in line with the research questions and it has helped in generating answers. The health belief model tries to explain why individuals do not take up health behaviour and posits that this is influenced by a number of factors. The themes developed in this study can be used to apply the health belief model in improving and promoting use of hearing aid among elderly in institutions who are cognitively impaired.

8 CONCLUSIONS AND NEED FOR FURTHER RESEARCH

Hearing loss is one of the most common conditions associated with age. This study has confirmed that this problem is more prevalent in nursing homes compared to the general population. There is reported underutilization of hearing aids in nursing homes. There is need for change in institutional policies regarding staff training and rehabilitation programs. Since the factors associated with help-seeking behaviours are complex, a multifactorial model such as the Health Belief Model should be used to examine these behaviours.

This study has shown that assessments which were previously validated for individuals with no cognitive decline could be used to measure or to assess those with dementia. Therefore, there is need for further studies on the impact of individuals with dementia and hearing loss involvement in their own uptake of hearing aids and rehabilitation especially in counselling.

LIST OF REFERENCES

Allen, N.H & Burns, A & Newton, V & Hickson, F & Ramden, R. & Rogers, J. & Butler, S. & Thistlewaite, G. & Morris, J. 2003, The effects of improving hearing in dementia *Age and Ageing*. Vol. 32(2) pp189-193. ISSN:0002-0729

Adelaide digital solutions. 2010. Anatomy of the ear by Spinach Effect Pty Ltd .

(Referred 07.03.2013) Access method:

<http://www.digitalhearing.com.au/upload/EarImage.jpg>

Appollonio, I, Carabellesse, C, Frattola L & Trabucchi M. 1996, Effects of sensory aids on the quality of life and mortality of elderly people: A multivariate analysis. *Age and Ageing*. Vol. 25(2) pp 89-96. ISSN: 0002-0729

Arlinger, S. 2003, *Negative Consequences of Uncorrected Hearing Loss- A Review*. Lidingö, Sweden. *International Journal of Audiology* 42:2 S17–2 S20

Aveyard H. 2007. *Doing a Literature Review in Health and Social Care: A Practical Guide*. Published by Open University Press, Berkshire, England. 170pp

Bowling Ann. 2002, *Research Methods in Health. Investigating Health and Health Services*. Open University Press, Berkshire U.K. 486pp ISBN: 0-335-20643-3

Boothroyd, A. 2007, Adult aural rehabilitation: What is it and does it work. *Trends in Amplification*. Vol. 11(2) pp 63-71 San Diego. ISSN:1084-7138

Burkey, JM. 2003. *Overcoming Hearing Aid Fears: The Road to Better Hearing*. Rutgers University Press, New Brunswick, USA. October 2003 189pp ISBN: 9780813534879

Cahill, S. Begley, E. Topo, P. Saarikalle, K. Macijauskiene, J. Budrantiene A. Hagen, I. Holthe, T and Jones, k. 2004. *'I Know Where This Is Going and I Know It Won't Go Back': Hearing the individual's voice in dementia quality of life assessments*. SAGE Publications. *Dementia*, 3:3013

Christiansen J.L & Grzybowski J.N. 1999. *Biology of Aging: An Introduction to Biomedical Aspects of Aging*. McGraw-Hill Companies, Inc. Primis Custom Publishing. USA.344pp. ISBN: 0-07-235187-X

Cohen-Mansfield, J & Taylor, J. 2004a, Hearing aid use in nursing homes, Part1: Prevalence rates of hearing impairment and hearing aid use. *American Medical Directors Association*. Vol. 5:5 pp 238-288. ISSN: 1528-8610

Cohen-Mansfield, J & Taylor, J.W. 2004b, Hearing aid use in nursing homes, Part 2: Barriers to effective utilization of hearing aids. *American Medical Directors Association*. Vol. 5:5 pp289-296. ISSN:1525-8610

Conner, M & Norman P. 2005, *Predicting Health Behaviour*, Berkshire, UK: McGraw-Hill Education. 402pp

Cruickshanks, K.J. Tweed, T.L. Wiley TL. Klein, E.K. Klein, R.Chappel, R. Nondahl, D.M. and Dalton, D.S. *The 5-year Incidence and Progression of Hearing Loss*. Arch Otolaryngol Head Neck Surg. University of Wisconsin 2003; 129:1041-1046

Cruickshanks, K.J. Wiley TL. Tweed, T.L. Klein, E.K. Klein, R. Mares-Pearlman, J.A. Nondahl, D.M. 1998, *Prevalence of Hearing Loss in Older Adults in Beaver Dam, Wisconsin*. The Epidemiology of Hearing Loss Study. U.S.A. American Journal of Epidemiology. 148 (9): 879-886

Dalton, D.S & Cruickshanks, K. J & Klein, B.E.K. & Klein, R & Wiley, T. L & Nondahl, D.M. 2003, The impact of hearing loss on quality of life in older adults. *Gerontologist*. Vol. 43:5 pp 661-668. ISSN: 0016-9013

Desjardins, J.L & Doherty, K.A. 2009, Do experienced hearing aid users know how to use their hearing aids correctly? *American Journal of Audiology*. Vol 18:1 pp 69-76. ISSN: 1059-0889

- Digiovanna A.G. 2000. *Human Aging: Biological Perspectives, 2nd Edition*. McGraw-Hill Companies, Inc. USA. 389pp. ISBN: 0-07-292691-0
- Fitzgerald J.J. and Wallace, M. 2006, *Encyclopaedia of Nursing Research. Second edition*. Springer Publishing Company, Inc. 751pp
- Flynn, M.C & Kennedy, E.J & Johns, J. & Sanbridge, R. 2002, Hearing and Vision loss within residential care facilities- The need for improved service delivery. *Australian Journal on Aging*. Vol. 21:3 pp141-144 ISSN: 1440-6381
- Glanz, K., Rimer, B.K & Lewis, F. M. 2002. *Health Behavior and Health Education. Theory, Research and Practice*. Jossey-Bass, San Fransisco, CA 583pp
- Gopinath, B & Schneider, J & Hartley, D & Teber, E & McMahon, C.M & Leeder, S.R & Mitchel, P. 2011, Incidence and predictors of hearing aid use and ownership among older adults with hearing loss. *Annals of Epidemiology*. Vol. 21:7 pp 497-506. ISSN: 1047-2792
- Haque.R, Adelrehman. N and Alavi Z.2012. “*There`s a Monster Under My Bed`*”: Hearing Aids And Dementia In Long-Term Care Settings. *Annals of Long-Term Care: Clinical Care and Aging*. 20(8):28-33PP
- Harkin, H & Kelleher, C. 2011, Caring for older adults with hearing loss. *Nursing Older People*. Vol. 23:9 pp22-28. ISSN: 1472-0795
- Hochbaum, G.M. 1958 *Public Participation in Medical Screening Programs: A Sociopsychological Study*, PHS publication no, 572. US Government Printing office, Washington, DC. [Referred 09.11.2012] Access method:
<http://128.121.13.244:8080/awweb/main.jsp?flag=browse&smd=1&awdid=1>
- Janz. N.K and Becker. M, H. 1984. *The health Belief Model: A Decade Later*. *Health Education Quarterly*. SOPHE. Published by John Wiley & Sons Inc. , Vol.11(1) 1-47pp

- Jayarajan, V & Rangan, S. 2000, Evaluation of hearing-aid provision in adults. *Journal of Audiological Medicine*. Vol. 9:1 pp25-34 ISSN: 0963-7133
- Juniper, T & Spivey V. 1997, Perception of Hearing loss and Hearing Handicap on Hearing Aid Use by Nursing Home Residents. *Geriatric Nursing*. Vol. 18 No. 5, pp201-208. ISSN: 0197-4572
- Karlson, A.K& Rosenhall, U 1998, Aural rehabilitation in the elderly. Supply of hearing aids related to measured need and self-assessed hearing problems. *Scandinavian Audiology*. Vol. 27:3 pp 153-160. ISSN: 0105-0397
- Kumar Ranjit. 2011, Research Methodology 3rd edition. *A Step-by-Step Guide For Beginners*. SAGE Publications London U.K. 415pp ISBN: 978-1-84920-301-2
- Laplante-Levesque, A & Knudsen L.V, & Preminger, J.E & Jones, L & Nielsen, C & Öberg, M & Lunner, T & Hickson, L & Naylor, G & Kramer S.E. 2012, Hearing help-seeking and rehabilitation: Perspectives of adults with hearing impairment. *International Journal of Audiology*. Vol. 51:2 pp93-102. 1499-2027
- Lin, FR. Metter, EJ. Rensick, SM. ZondermanAB & Ferrucci L. 2011, Hearing loss and incident dementia. *Archives of Neurology*. The John Hopkins School of Medicine.USA. Vol. 68(2) pp 214-220
- Lupsakko, T.A. & Kautiainen H.J. & Sulkava R. 2005, The non-use of hearing aids in people aged 75 years in the city of Kuopio in Finland. *Europeans Archives of Oto-rhino-laryngol of head and neck*. Vol. 262:3 pp165-169. ISSN: 0937-4477
- Mathers, C. Smith, A. & Concha, M. 2000, Global burden of hearing loss in the year 2000. Global burden of disease. *World Health Organization*. 30pp
- Öberg, M & Marcusson, J & Nägga, K. & Wressle, E. 2011, Hearing difficulties, uptake and outcomes of hearing aids in people of 85 years of age. *International Journal of Audiology*. Vol. 51:2 pp108-115. ISSN: 1499-2027

Official Statistics of Finland (OSF): Causes of Death 2010, Helsinki. Accessed 28.10.2012. Published 16.12.2011

http://tilastokeskus.fi/til/ksyyt/2010/ksyyt_2010_2011-12-16_en.pdf

Official Statistics of Finland (OSF): Preliminary population statistics [e-publication].ISSN=2243-3627. July 2012, Helsinki: Statistics Finland [referred: 28.10.2012].Access meth-

odhttp://tilastokeskus.fi/til/vamuu/2012/07/vamuu_2012_07_2012-08-16_tie_001_en.html.

Pryce, H. & Gooberman-Hill. 2012, “There is a hell of a noise”: Living with a hearing loss in residential care. *Age and Ageing*. Vol. 41:1 pp 40-46. ISSN: 0002-0729

Rosenstock I.M, Stretcher. V.J, Becker. M. H.1988. *Social Learning Theory and the Health Belief Model. Health Education Quarterly*. SOPHE. Published by John Wiley & Sons, Inc. Vol. 15(2): 175-183pp

Roth, T. Hanebuth, D & Probst, R. 2011, Prevalence of age-related hearing loss in Europe : A review. *European Archives of Oto-Rhino-Laryngology*. Vol. 268(8) pp. 1101-1107. ISSN: 09374477

Saunders, G.H.& Frosline, A. 2012, Hearing-aid counseling: Comparison of single-session informal counseling with single session performance –perceptual counseling. *International Journal of Audiology*. Vol. 51:10 pp 754-764. ISSN:1499-2027

Sinus Institute of Northern Virginia, Associates in Otolaryngology. (2009)

http://entdr.com/hearing_aids.html

Tones, K & Green, J. 2004, and Heath Promotion: *Planning strategies*. London: SAGE 376pp

World Health Organization: World report on disability, 2011, Hearing Aids Services: *Needs and Technology Assessment for Developing Countries: report of a WHO/CBM workshop*

World Health Organization: World report, 2012, *Dementia: A public health priority*. [Referred: 28.10.2012]. Access method: http://www.who.int/mediacentre/news/releases/2012/dementia_20120411/en/index.html

APPENDIX

Table 4: List of articles used in the review

Author(s), place and year of publication	Title of article	Study sample and method or design	Aim/objective	Results
Laplante-Levesque et al (2012) Australia, Denmark, UK and USA	Hearing help-seeking and rehabilitation: Perspectives of adults with hearing impairment	34 adults with hearing impairment. Individual semi-structured interviews	Investigate the perspectives of adults with hearing impairment on hearing help-seeking and rehabilitation	Adults described help-seeking and rehabilitation in the context of their daily lives. They rarely described clinical encounters towards hearing help-seeking and rehabilitations as a connected process. They portrayed interactions with clinicians as isolated events rather than chronologically-ordered steps related to a common goal.
Saunders & Forsline(2012) USA	Hearing-aid counselling: Comparison of single-session performance-perceptual counselling	Two forms of counselling were compared: informational counselling(IC) and performance perceptual counselling (PPC)	To examine the effectiveness of single-session informational counselling with single-session informational counselling with single-session performance-perceptual counselling	A single session of hearing-aid counselling can improve hearing-aid use and satisfaction. Open ended interview and/or quality of life measures are more sensitive to these benefits than hearing questionnaires.
Gopinath et al (2011) USA.	Incidence and predictors of hearing aid use ownership among older adults with	Blue Mountain Hearing Study. Hearing levels were measured with pure-tone audiometry.	To describe the incidence and predictors of hearing aid ownership and use among older	Incident hearing aid ownership and usage was relatively low among hearing impaired adults. Age, question-defined hearing handicap and measured hearing loss were sig-

	hearing loss	Participants aged ≥ 55 years. Between 1997 and 1999 and 2002 and 2004	adults.	nificant predictors of incident hearing aid use/ownership
Pryce & Goberman-Hill	“There is a hell of a noise”: Living with a hearing loss in residential care	Ethnographic study in 2 residential care homes. In-depth interview with 18 residents.	To explore the factors affecting communicating with a hearing loss in residential care.	Environmental and social factors are key to maximizing communication opportunities. Improvements to communication in residential care settings could be based on changes in these with input from residents and staff. Further work is needed to develop effective communication strategies in residential care.
Öberg et al(2012) Sweden	Hearing difficulties, uptake, and outcomes of hearing aids in people 85 years of age	346 elderly adults. Questionnaire	To investigate self-reported hearing difficulties, uptake and hearing aid outcomes and their relationships to demographic, cognitive, psychosocial and health variables in 85 year olds.	Many older people with self-reported hearing difficulties do not acquire hearing aids despite this study’s findings that older people are likely to have success with hearing rehabilitation. It is important to make efforts to try and increase elderly adults’ awareness of hearing loss and the benefits of hearing rehabilitation
Desjardins et al(2009) USA	Do experienced hearing aid users know how to use their hearing aids correctly?	Practical Hearing Aid Skill Test(PHAST) 50 adults aged between 46-89 years	To assess experienced hearing aid users’ ability to use hearing aids correctly	Experienced hearing aid users have an excellent understanding of how to use hearing aids to poor understanding. The variability calls for the need to assess a client’s ability to use his or her hearing aid.
Cohen-Mansfield &	Hearing aid use in nursing	Cross-sectional survey, inter-	To investigate rates of hearing	There is a need for regular hearing assessments in the

Taylor(2004) USA	homes, Part 1: Prevalence rates of hearing impairment and hearing aid use	views. 279 resident caregivers dyads as well as from Minimum Data Set (MDS).	impairment and hearing aid use among residents in large mid-Atlantic nursing home	nursing home population and need for evaluation of institutional-level policies regarding screening and hearing aid management.
Cohen-Mansfield & Taylor(2004) USA	Hearing aid use in nursing homes, Part 2: Barriers to effective utilization of hearing aids	Interviews of 279 residents and 51 nursing home staff	To examine the barriers to hearing aid use among persons who were reported to have hearing difficulties	Barriers to hearing aid use are complex and multifactorial, involving lack of system commitment, lack of knowledge by staff members, inappropriate delegation and care procedures, hearing aid design. This calls for change regarding care procedures and follow up.
Lupsakko et al(2005) Finland	The non-use of hearing aids in people aged 75 years and over in the city of Kuopio in Finland	A questionnaire 601 adults aged 75 years or older	To investigate the participants' socioeconomic characteristics and the use of hearing aids	Elderly people provided with hearing aid but have cognitive or functional decline are at risk of being non-users of hearing aid. There is need for special attention in counseling.
Dalton et al(2003)	The impact of hearing loss on quality of life in older adults	Longitudinal study. 5-year follow-up Epidemiology of hearing loss. Hearing Handicap for the Elderly-Screening version (HHIE-S) 5,924 subjects between the ages of 43-84 years	To investigate the impact of hearing loss on the quality of life of older people	Severity of hearing loss is associated with reduced quality of life
Allen et al(2003)	The need for improving hearing in	Screening for hearing impairment	To assess the effect of increasing audito-	The presence of dementia should not preclude assessment for a hearing aid as

	dementia		ry acuity by providing hearing aids to subjects with dementia who have mild hearing loss.	they are well tolerated and reduce disability caused by hearing impairment. Hearing aids do not improve cognitive function or reduce behavioural or psychiatric symptoms. There is evidence that the patients improved on a global level.
Flynn et al (2002) Australia	Hearing and vision loss within residential care facilities- the need for improved service delivery	178 adults resident. Pure-tone screening, case history, otoscopic examination and vision screening	To assess the level of hearing impairment within the residential care facilities to determine the efficacy of providing rehabilitation within the facility	High prevalence of hearing impairment amongst the elderly and calls for the need of increased rehabilitation services for the elderly in the areas of hearing aid maintenance, cerumen removal and delivery of communication skills training of residential care workers.
Jayarajan & Rangan (2000) UK	Evaluation of hearing-aid provision in adults	128 adults (35-90 years) Pre and Post fitting assessments	Assess outcomes following the provision of hearing aids	Majority had a problem relating to use of the hearing aid. This was particularly more apparent in the elderly (over 81). Early referral for hearing aids was essential for successful rehabilitation. Follow up after fitting of these devices was also shown as important.
Karlsson & Rosenhall (1998) Sweden	Aural rehabilitation for the elderly: supply of hearing aids related to measured need and self-assessed hear-	615 participants. 3 age cohorts (70,75 and 88 years) Measured and self-assessed hearing	To perform an analysis of the supply of and need for aural rehabilitation in old age	Very few participants with no documented hearing problems for aural rehabilitation had been equipped with hearing aids

	ing problems			
Juniper & Spivey (1997)	Perception of hearing loss and hearing handicap on hearing aid use by nursing home residents	60 adults 65 years or older. Nursing Home Hearing Handicap Index(NHHI)	To examine the perception of hearing loss and self-assessed hearing handicap on hearing aid use by nursing home residents.	Moderate correlations among three variables. It was determined that nursing home residents use their hearing aids. However, amplification does not address all communication needs of the nursing home resident. Assistive listening devices and environmental modification would improve communication ability and the quality of life of the nursing home resident.

Table 5: Tips on care of hearing aids

BOX 1. CARE OF HEARING AID DOS AND DON'TS
Do
Handle with care
Open battery compartment and remove battery when aid is not in use
Test battery with battery tester every few days
Make sure that patient has spare batteries
Check that battery is inserted into compartment correctly
Once a week separate the earmold from behind-the-ear hearing aid and wash the earmold in soap and water.
Let dry overnight
Wipe the plastic shell casing of an in-the-ear hearing aid with a tissue
Remove wax with wax remover from earmold or opening of hearing aid
Check for cracks in tubing or earmold
Check to see that patient has inserted earmold & hearing aid in the correct ear
Check that earmold or hearing aid is properly inserted
Check that hearing aid is turned on
Check that volume control wheel is turned up to appropriate settings
If "whistling" occurs check earmold/hearing aid fit
Don't
Store hearing aid in safe
Put hearing aid on heated surface
Wash hearing aid
Drop hearing aid
Let patient wear hearing aid in bath or shower
Let patient wear hearing aid overnight
Ignore a hearing aid that is "whistling"
Let patient use in contact with cream, oil, or hair spray when hearing aid is on

Table 6: Tips on care for the hearing impaired

BOX 2. CARE OF THE HEARING IMPAIRED—DOS AND DON'TS	
Do	
Develop a routine of care	
Gain attention first	
If the patient is turned away from you, alert the patient by touching gently	
Use the patient's name first, then continue the sentence	
Decrease background noise	
Turn off the television or radio or wait until the room is less noisy	
Communicate in a quiet surrounding	
Give clues	
Use gestures if you need to clarify a statement or question	
Keep your mouth clear	
Women should use lipstick to help with visible clues	
Don't eat, chew gum, or cover your mouth when speaking	
Don't hold anything in your teeth	
Don't exaggerate your lip movements	
Keep it simple	
If a lengthy explanation is needed, use an interpreter	
If the listener does not respond, rephrase the idea in short, simple sentences	
Evaluate the patient's response to what you say or write before continuing	
Put terms in simple, plain English	
Check for visual impairment	
If the patient wears glasses, they are extremely important. Be sure glasses are clean and accessible	
Establish eye contact	
Establish eye contact and facial expressions	
Don't turn away in the middle of a sentence	
Never speak directly into the person's ear. This prevents the listener from using visual cues	
Directly face the patient with light on your face	
One person at a time should talk to the patient	
Allow extra time for the listener to understand and respond.	
Distinguish between noncompliance and comprehension problems	
Do follow-up	
Provide cerumen management with ENT every 2 months	
Check to ensure that patients undergoes audiologic evaluation and hearing aid evaluation annually	
Don't	
Speak louder than normal if the patient has the ability to hear; shouting may be painful, and speech may become unclear	
Speed up or over articulate your normal speech. These also distort the sounds and make visual clues more difficult	
Communicate from a distance greater than 3 feet	

Table 7: Reported problems with hearing aid use

	Users Self-report (N = 33)	Users Staff Report (N = 42)	Nonusers Self-report (N = 28)	Nonusers Staff Report (N = 31)
Any problem	70%	29%	46%	84%
No need/no problem	31%	71%	54%	16%
Service needed (cleaning, batteries)	6%	—	—	—
Not functioning well/broken	36%	7%	4%	3%
Not fitting well, hurts, not tolerated	21%	5%	7%	10%
Hard to use/inconvenient	42%	—	7%	—
Too expensive	3%	—	11%	—
Lost, afraid of losing	—	12%	4%	—
No evaluation	—	—	14%	10%
Do not know	—	5%	—	55%
Physician did not recommend/will not help	—	—	7%	3%
Refuse anything	—	—	—	3%
Resident needs help putting devices on (n = 30 resident, 40 staff)	43%	62.5%	—	—
Resident needs help taking devices off (n = 30 resident, 37 staff)	13%	54%	—	—
Resident needs help changing batteries (n = 29 resident, 37 staff)	62%	86.5%	—	—

Source: Cohen-Mansfield & Taylor. 2004 p. 291. *Hearing aid use in nursing homes, part 2: Barriers to effective utilization of hearing aids*