

The maintenance and utilisation of government fitted hearing aids

Research Article

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Abstract: This study is aimed to examine the maintenance and utilisation of hearing aids given to clients attending government hospitals in Tshwane and to probe factors that impacted on the hearing aid fitting process, in order to contribute to the formation of service delivery guidelines. As most participants were embarrassed to wear their devices, results showed that there was a general consensus about the self-image and wearing of hearing aids. Furthermore, it was found that most government fitted hearing aids and accessories were poorly cared for and maintained. One of the factors which negatively influenced the utilisation and maintenance of hearing aids was finance. Participants could not afford to properly maintain and service their hearing instruments. Multilingualism also presented an obstacle in terms of utilising hearing aids correctly and to their full benefit, as most participants were not instructed on hearing aid care and use in their first language. Furthermore, distance to and from the provincial hospitals also posed a problem for clients living in rural and outlying areas.

Keywords: Adults • Government hospitals • Hearing aids • Hearing loss • Service delivery guidelines • South Africa

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1. Introduction

“A hearing aid should be regarded as only one component of a hearing health system that includes the ear mould, batteries, maintenance, repair, instruction, and rehabilitation” [1].

Hearing loss affects a person's quality of life and ability to function in society, as it hinders the most fundamental of all human attributes – social contact and communication [2]. The effects of a hearing loss has far reaching consequences in that it influences all of those who come into contact with an individual with hearing loss. Only a small number of individuals can be treated for hearing loss through medication or surgical procedures. Therefore, the majority of people with hearing loss seek to compensate for their difficulty with an assistive listening device [3]. A hearing aid is an example of an assistive listening device. It is an effective, restorative mechanism that amplifies sound to compensate for hearing loss [4].

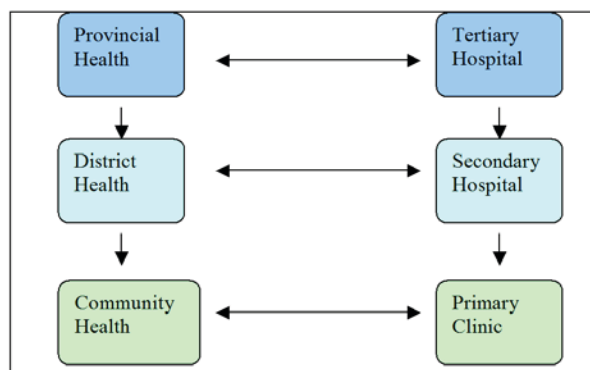
To realise a hearing aid's value and exceed what it can offer, the client must acquaint him/herself with how the instrument operates, how to handle it, how to care

for it, and, most importantly, how to use it [4].

A large percentage of the South African population utilise the public sector for health care rather than the private sector [5]. This is due to the fact that an estimated 17% of the adult population of South Africa has access to some form of medical or benefit scheme [5]. This statistic can be attributed to the prior health care system in South Africa.

Before the Government of National Unity took office in 1994, there was substantial fragmentation and gross inequalities in the health status, health infrastructure, and health services. Since then, there has been an intensive program of legislative and policy development to reform the service delivery of health care. Priority programs were outlined in the White Paper for the Transformation of the Health System in South Africa. Rehabilitation services were addressed and stated that it should occur at primary level within the District Health System [5]. South Africa has a population of approximately forty million. Just over half of this population (53%), live in rural areas and 75% of those who live in rural areas live in poverty [5].

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Figure 1. Levels of healthcare in South Africa.

According to the levels of health care in South Africa (Refer to Figure 1), the highest level of health care is provincial health care which occurs at tertiary institutions. Following this is district health care which occurs at secondary institutions and the lowest level is community health care which can occur at primary institutions, *i.e.* clinics.

The above figure indicates where the various levels of the public health care system can occur. Provincial health care occurs at tertiary hospitals which are large hospitals, well equipped and well staffed and usually situated in a central location, *i.e.*, the city centre. The next type of health care is district health care which occurs at secondary hospitals. These hospitals are not as large as tertiary institutions, do not have as much diagnostic equipment and are situated close to specific districts of a province. The last level of health care in the public health system is community health care which occurs at primary clinics. These clinics are much smaller than tertiary and secondary hospitals, with minimal equipment, and staff, and are situated in communities within a particular district [5,6].

The levels of health care and location of hospitals and clinics are important to consider, especially for the

dispensation of hearing aids, as half of the South African population live in rural areas, *i.e.*, community settings [5]. However, current hearing services including the dispensation of hearing aids occur mainly at tertiary and secondary hospitals (Figure 1).

In South Africa, funding of government hearing aids occurs via the Government State Tender Board. The majority of individuals who do not have medical aid coverage will not pay more than 25% of the total cost of the hearing aid on tender. The hospital will contribute to the rest of the cost from their annual budget [6]. The dispensation of hearing aids in the public sector of South Africa although aided by government monies, is burdened with problems such as lack of provision of batteries for hearing aids, poor repair services and inadequate follow-ups.

It is hypothesized that the problem faced by many adult clients who are fitted with government hearing aids is that they cannot adequately utilise and maintain their devices. This is due to the large number of clients who do not return for servicing of hearing aids, batteries and those who return with damaged hearing aids [6]. The problem impacts largely on the financial resources (*i.e.* provincial and district budgets) that is spent on the purchase of hearing aids. If devices are not utilised and maintained properly, a substantial percentage of this money spent is therefore wasted. In South Africa, delivery of quality care is a requirement for accountable services for the professions of speech therapy and audiology. There is a need to constantly assess quality of standards of health care, optimisation of services and to extent to which services are clinically effective and cost effective. According to WHO Guidelines for hearing aids and services for developing countries [1], service delivery systems must be continuously monitored and regularly evaluated in order to assess the outcomes of a successful hearing aid fitting.

Table 1. Outcomes of Successful Hearing Aid Fitting.

Level of Impairment, Handicap and Disability caused by Hearing loss	Potential effects of a successful hearing aid fitting
Impairment Level	Improved recognition / discrimination and perception of environmental sounds and speech [7].
Activity Level	The person has improved ability to have a conversation in various listening situations including a noisy environment [8].
Participation Level	The person has improved ability to find employment where spoken communication is a requirement (participate economically in society) [8].
Satisfaction Level	Possible increased confidence of the person <i>i.e.</i> ability of the person to participate in social and cultural activities [4].
Quality of life	Possible decreased loneliness, depression and isolation due to hearing loss [4].
Cost Benefit	Purchase of hearing aid, batteries and servicing is justified because the individual has economic benefit indirectly derived from wearing the hearing aid <i>e.g.</i> the person is now able to earn a salary to pay for hearing aid expenses [4].

Table 2. Summary of WHO Guidelines.

Area of Hearing Aid Provision	Minimum Performance Specification in Developing Countries
- Manufacturing of hearing aids:	Should be in a form that allows for ease of servicing and components must be readily available and costs should be kept to a minimum. Hearing aids must be manufactured or at least assembled locally as this will ensure ease of access to parts and costs will be reduced [1].
- Ear moulds:	Facilities for the production of ear moulds should be set-up at district level and replacement of ear moulds conducted by a trained Primary Health Care (PHC) worker [1].
- Batteries:	Must have a good distributive network i.e. through PHC / Community Based Rehabilitation (CBR) networks and be available at affordable prices [1].
- Instructions to the user of the hearing aids:	Hearing aid follow-up sessions must be in a format that is easily understood. Use of a combination of verbal instructions (in the local language) and booklets / written instruction with pictorial representations. Follow-ups must be done in the community i.e. at primary level in the form of outreach for as long the client requires support [1].
Quality of life	Possible decreased loneliness, depression and isolation due to hearing loss [4].
Cost Benefit	Purchase of hearing aid, batteries and servicing is justified because the individual has economic benefit indirectly derived from wearing the hearing aid e.g. the person is now able to earn a salary to pay for hearing aid expenses [4].

The above table illustrates the various levels of impairment, handicap and disability in relation to potential effects of wearing a hearing aid. This is an important consideration as a successful hearing aid fitting will ensure maximum benefit and utilisation of the hearing aid by an individual. Hearing aid fittings serve to enhance an individual's communication in all environments, *i.e.* social, home and work [4].

The WHO guidelines were developed by an expert working group to address the need for affordable and appropriate hearing aid services, taking into account the scarcity of skills, training, finance and services in developing countries. They represent the minimum requirements for the provision of hearing aids in countries such as South Africa.

These guidelines are particularly targeted for manufacturers of hearing aids, distributors, policy makers and service providers at all levels [1].

Although the WHO document and guidelines were developed recently, *i.e.* 2004, there has yet to be any implementation of aspects provided in the guidelines thus far in South Africa as all the hearing aids available on the Gauteng Tender are from international companies and therefore not manufactured for the specific needs of the South African context [5]. Although ear mould impressions are taken at tertiary and district hospitals - repairs, replacements and re-tubing of ear moulds (maintenance) is still conducted at hearing aid companies, due to lack of proper equipment such as drills, at government institutions.

This can be attributed to the fact that healthcare in developing worlds has been traditionally pre-occupied with mortality indices and life threatening diseases [9]. As a consequence, hearing loss is a low priority for

health systems in the developing world, as technology is too expensive and services are restricted [10]. It is also one of the world's most neglected sensory disorders and this disregard appears to be more overwhelming in developing countries [11]. However, recently as the mortality rate decreases there is an increased awareness of quality of life issues [9].

An estimated 250 million people worldwide have hearing loss, *i.e.* 4% of the world's population [11]. Two thirds of this population, *i.e.* 165 million, live in developing countries and cannot afford the basic price of a hearing aid which is approximately \$300 and equivalent to approximately R1800 [11]. It was also estimated by [11] that developing countries need more than 32 million hearing aids per year. It was also projected that only one out of every eight hearing aids produced worldwide ends up in a developing country [9].

The fitting of hearing aids in South Africa is complicated by several issues such as multilingualism, lack of interpreting services, literacy levels of clients and cultural differences between clients and audiologists. South Africa in many aspects is considered to be developed, however large gaps in the economy and having a dual economy (*i.e.* significant differences between wealthy and poor) maintains that it is a developing country [12]. According to [1], certain aspects such as local supply, cheaper pricing, adequate stock, local distribution and spare parts should be adhered to.

To date, there have been no initial or follow-up studies regarding the utilisation and cost effectiveness of hearing aid service delivery in South Africa. This study therefore is aimed to examine the maintenance and utilisation of hearing aids given to clients attending government hospitals in Tshwane and to probe factors

that impacted on the hearing aid fitting process. The information derived from this study not only provided the first data regarding the dispensation of hearing aids in South Africa, but also contributed to the formation of service delivery guidelines for the country.

2. Material and Methods

The main aim of the study was to determine the maintenance and utilization of government fitted hearing aids. Results were used to propose hearing aid service delivery guidelines.

Sub Aims

To establish the maintenance of government fitted hearing aids.

To establish the utilisation of government fitted hearing aids.

To establish the condition of government fitted hearing aids after the dispensation.

2.1. Research Design

Both a qualitative and quantitative research approach was utilised. The type of research was cross-sectional and analytical. A method of non-probability purposive sampling was employed. A structured interview was adopted using an English interview schedule that was developed by the researcher. An interpreter was available for the all of the interviews.

2.2. Participants

Fifty seven of the targeted 64 participants responded. They were all second language English speaking hearing aid users from Tshwane. Of the 57 participants, 39 were male and 18 were female.

2.3. Data Collection

The researcher made use of the above-mentioned interview schedule, as well as an evaluation checklist which was also designed by the researcher for the evaluation of the condition of the participant's hearing aid. Over 75% of the questions in the interview schedule were closed or scaled; this aided the completion of the interview schedule. A number of open-ended questions were also formulated to allow for an opportunity for the participants to make recommendations regarding the service delivery and to comment on the impact of the hearing aid on their lives. The evaluation checklist was designed for the evaluation of the condition of the hearing aid, and consisted of a list of all major components of hearing aids including ear moulds. This evaluation was

conducted after the interview. Photographs were of the condition of all the hearing aids in the study. A pilot study was conducted prior to the main study in order to evaluate the interview schedule and the interpreter [13].

2.4. Data Analysis

The quantitative data was coded to organise the responses into an appropriate format for data capturing and analysis. The coded responses were entered into a computer using the Microsoft Excel program to conduct statistical analysis of the data. A combination of qualitative and quantitative methods was employed to analyse the data from the study, *i.e.* data gathered in narrative form, and numeric form.

In terms of analysing quantitative data, the researcher made use of descriptive statistics. Qualitative data, *i.e.* responses to open-ended questions, were categorised into main themes and ideas. Once the data was analysed, common themes, and recommendations were then identified.

3. Results

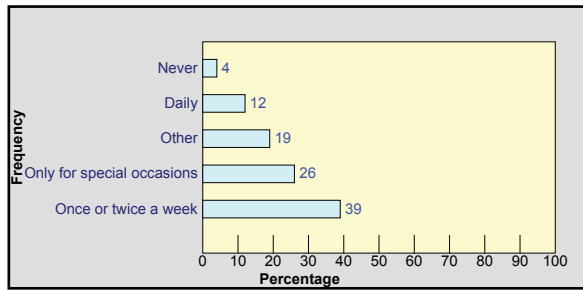
The findings are presented according to the sub-aims posed.

3.1. The maintenance of government fitted hearing aids

Participant's whose hearing aids were in need of repairs and servicing (24%) reported that they did not return to the hospital due to travel / distance and lack of funds (18%) as the main reasons. The responses of participants indicate an urgent need for a more accessible means of repair and support for hearing aids, *i.e.* community clinics or free designated transport to and from hospitals.

Twenty-six percent of participants reported to never having cleaned their hearing aids, while 15% of participants clean their aids monthly. This is not following what is usually recommended to clients internationally and nationally, which is to wipe the hearing aid daily and to keep it in a Dry Aid kit every night, especially in hot and humid climates such as Gauteng [4]. If the hearing aid is not wiped clean daily and kept in a special drying kit, the microphone or the tone hook of the hearing aid may become clogged with debris which in turn affects sound quality and overall benefit derived from the hearing aid [4]. Over half of the participants (59%) reported that they do not use a specific time frame for cleaning but rather clean the instrument only when its very dirty (38%)

Figure 2. Frequency of use of hearing aids (n=57).



and if they have the time (21%). Seventy-two percent of participants reported wiping the hearing aid with a soft cloth to clean it, while a shocking 2% reported to washing the instrument. Washing the instrument will lead to permanent damage of the inner circuitry of the device [4] and this will in turn lead to replacement of the instrument, which will be at the expense of the government. Furthermore, during this time the client will be left without a device and this will affect their work, family and social lives.

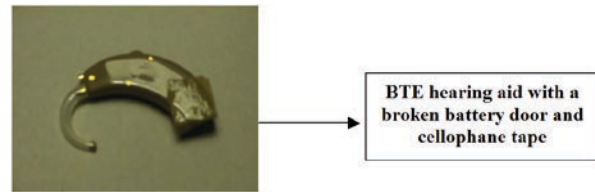
Cost of batteries at state hospitals was reported to be less than R50 for a pack of six batteries whereas at pharmacies and supermarkets cost was estimated at more than R50. This is very expensive as according to [14], the average cost of a six pack of zinc air batteries is approximately \$4.50 which is approximately R30. The additional R20 that is charged could be due to importation costs. A possible solution would be for government to subsidise the cost of batteries or the development and sale of a solar powered hearing aid similar to the one currently in production in Botswana [14].

3.2. The utilisation of government fitted hearing aids

The language utilised by therapists during the hearing aid fitting indicates that multilingualism presents an obstacle in utilising hearing aids correctly and to their full benefit. This suggests the necessity for more qualified and trained interpreters to be employed in the public sector, as well as the need for more Black African speech-language therapists and audiologists. Figure 2 represents that frequency of use of hearing aids by participants.

A large percentage of participants (39%) indicated that they wear their hearing instruments once or twice a week, however, only 12% reported to using it daily. This indicates that most participants are at risk for auditory deprivation as they do not wear the device on a daily basis and may take even longer to adapt to amplification [4]. Four percent of the participants no longer utilise their hearing aids at all. Of the 19% of participants who chose

Figure 3. Behind-the-ear (BTE) hearing aid.



the option "Other" specified that they only wear the hearing aid at home (10%) and only if they need it, i.e. if they feel they cannot cope (9%). These results are not correlating with the findings from research conducted in similar contexts, i.e., in other developing country. Results from a study conducted in Ghana showed that 45% of adults used their hearing aids all the time every day and almost 26% of adults who were fitted used their hearing aids daily, but not all the time [9]. The lower utilisation percentages for South African can be largely attributed to a combination of several factors including language barriers, financial issues, transportation and cosmetic concerns.

3.3. The condition of government fitted hearing aids after dispensation

Only 25 out of the 57 participants brought along their hearing aids, ear moulds, or parts of hearing aids to the interview. Evaluation of the condition of hearing aids and accessories showed numerous broken instruments and the need for repairs or replacements. Figure 3 represents one type of hearing aid that was brought in by a participant.

The above figure represents a BTE hearing aid of which the battery door has been broken and is stuck back together with cellophane tape. This indicates the need for hearing aid repairs.

4. Discussion

It is evident from the results of this study that in general government fitted hearing aids are inadequately cared for i.e. cleaned and serviced; and under utilised as only a small percentage utilised their hearing aids on a daily basis. This was found to be attributed to a number of factors. One of the main factors to influence utilisation and maintenance of government fitted hearing aids is finance. The cost of traveling to and from tertiary hospitals, as well as, paying for repairs and batteries significantly contributed to under utilisation and poor maintenance. Furthermore, the issue of language also presented a complication in terms of participants not being able to fully understand all aspects covered

during the hearing aid fitting and orientation. The above findings indicate a need for improvement in the service delivery of hearing aids in the public sector and the development of service delivery guidelines to address the above issues

In the last decade more emphasis has been placed on the importance of accountability. Health care professionals began to appreciate the complexity of quality assurance necessary for effective service provision, as this adds the value of beneficence, autonomy and justice for all clients. The South African population is one of diversity and constant change therefore research must fulfil the requirements of the population. This research aimed to fulfil those goals by highlighting the needs of clients with government fitted hearing aids. The research has practical implications for audiologists in government hospitals as well as for hearing aid users in the South African context.

The development of service delivery guidelines even in a working format has benefits and provides useful information in addressing the needs of the South African population.

5. Recommendations

Service delivery guidelines must be systematically developed statements which will assist in the decision making about appropriate health care for specific clinical conditions. Firstly, one must consider the role of service delivery guidelines, *i.e.*, to promote effective health care by reinforcing good clinical practice and to promote change in professional practice where this does not comply with current evidence of best practice. Secondly, one has to consider the role of all stakeholders involved in the delivery of the specific area [15].

The concept of primary health care is to match client needs to the health care resources available. Primary level care is the most financially and geographically accessible arm of the health care system. In order to achieve a good health status for all, society must be able to distribute health care across its entire population with equity and efficiency. The problem occurs when idealised versions of primary health care becomes difficult to reliably execute into reality. Therefore, before conceptualising service delivery guidelines, one has to consider three questions [15]:

1. How should people be linked to primary care practices to promote the systems functions to primary care?
2. How should primary care be linked to other services within the health care system (*i.e.* tertiary levels) to optimise the functioning of the overall system?

3. How should primary care be linked to communities to best integrate community members?

The proposed guidelines for the service delivery of hearing aids in the public sector is based on literature for developing service delivery guidelines and models as well as the findings and responses from participants'. Figures 2, 3 and 4 provide a description of three options / guidelines to consider for the service delivery of hearing aids in the South African context. An evaluation of each option is also provided. All options were developed according to the principles of community care [16], which are the following:

Continuity/ Sustainability:

This refers to the ability of relevant services to continue regardless of change of personnel.

Accessibility:

Service characteristic experienced by clients and their caregivers, enables them to receive services where and when they require it.

Comprehensiveness:

Services extend across the entire range of assessment, diagnosis, treatment and rehabilitation.

Equity:

This ensure a fair distribution of resources *i.e.* services available are similar on par with that of tertiary level care.

Efficiency:

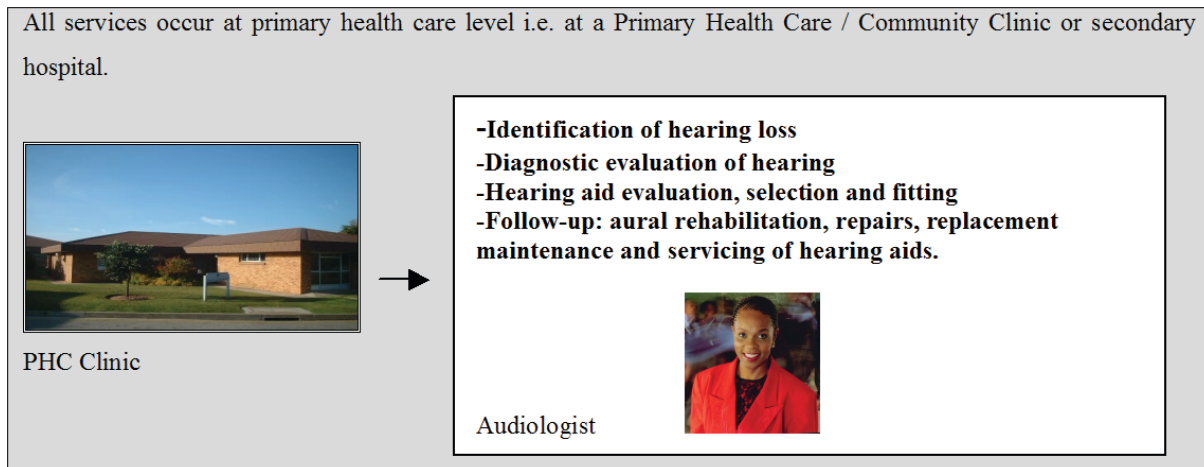
Services rendered are carried out with efficiency and adequacy.

The following figures represent three possible options for hearing aid service delivery in a developing country. The visual representations of options will be followed with a discussion of each.

In Figure 4, all hearing services including hearing aids and follow-up is conducted at a primary health care level, *i.e.*, primary clinic or a district level (secondary) hospital. The advantages of this option is that services will be easily accessible to all clients since primary clinics and district hospitals are situated in rural areas close to where the majority of clients reside. This would also be a more financially viable option to clients as they would not have to pay for transport to tertiary hospitals. Not to mention, clients' would not have to miss a day's work due to the service being available close to where they live and most likely work. Furthermore, waiting times for repairs and servicing would be improved as well as the purchase of batteries.

However, in order for the option to work effectively the following aspects must be available:

Figure 4. Option one of hearing aid service delivery guidelines.



- Placement of speech-language pathologists and audiologists at primary clinics and district level hospitals. This will require the creation of positions and the willingness of professionals to work in such areas.
- Placement of trained interpreters at primary clinics and district hospitals. This will also require the creation of positions and the willingness of professionals to work in such areas.
- Infrastructure, i.e., budget for hearing aids, salaries and equipment. This will require government health official's approval of a budget.

If option one is to be implemented it will meet the principles of community care and will be a form of assertive outreach [16]. Assertive outreach is an active form of services taken to clients rather than expecting clients to attend services at tertiary level and services are offered in community settings at times suited to clients [16].

There are also several challenges with regard to option one. For example it requires interpreters. However, there is a lack of trained interpreters as well as a lack of Black audiologists and speech-language pathologists. Even though services will be more accessible and affordable, a language barrier may still exist and this could still impact negatively on the utilisation and maintenance of government hearing aids.

Option two is represented in Figure 5. In this option some hearing services occur at tertiary level and some at primary level.

Currently, identification of hearing loss, diagnostic evaluation as well as selection and fitting of hearing aids can occur at tertiary level. This can remain as is. However follow-ups, i.e. rehabilitation, repairs, servicing, replacements and distribution of batteries can be done monthly at a primary health care clinic. The audiologist

or speech-language pathologist can visit various clinics monthly via mobile van. Other professionals such as optometrists, occupational therapists, etc. can also be included to facilitate coordinated service delivery by a team of health care professionals.

The advantages of this option are similar to option one in that services will be more accessible and economical for clients. However, since the audiologist would only go in monthly, waiting times for repairs, replacements and batteries would not be as immediate as option one.

Rehabilitation can occur via group therapy or support groups during the monthly visits and checklists can be kept by the audiologist to monitor areas that require assistance and additional support.

As with option one, this option has numerous challenges as well. Clients will still have to visit tertiary institutions for diagnostic testing and the hearing aid fitting, which brings about financial and travelling issues. Furthermore, a monthly clinic may not be sufficient for repairs and rehabilitation. In addition, there will still be the issue of multilingualism as the audiologist will require an interpreter during the monthly visits. Clients may also not prefer aural rehabilitation to be conducted via group therapy. All of the above challenges will have to be addressed if the utilization and maintenance of hearing aids is to improve.

The figure 6 represents option three, which encompasses much of option two, in that some hearing services will be conducted at tertiary level. However, the major difference is that instead of the audiologist or speech-language pathologist conducting the repairs and follow ups, this will now be done at community level by community based rehabilitation (CBR) workers and people from the community with disabilities. Furthermore, hearing aid training programs can be translated into all official languages and video tapes can be utilised as

Figure 5. Option two of hearing aid service delivery guidelines.

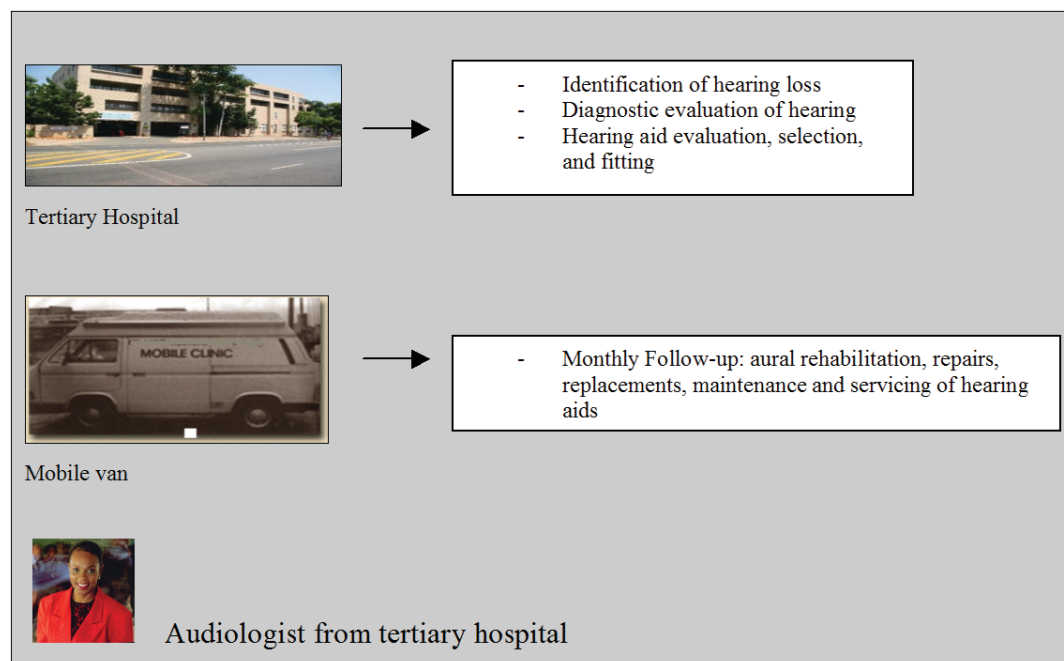
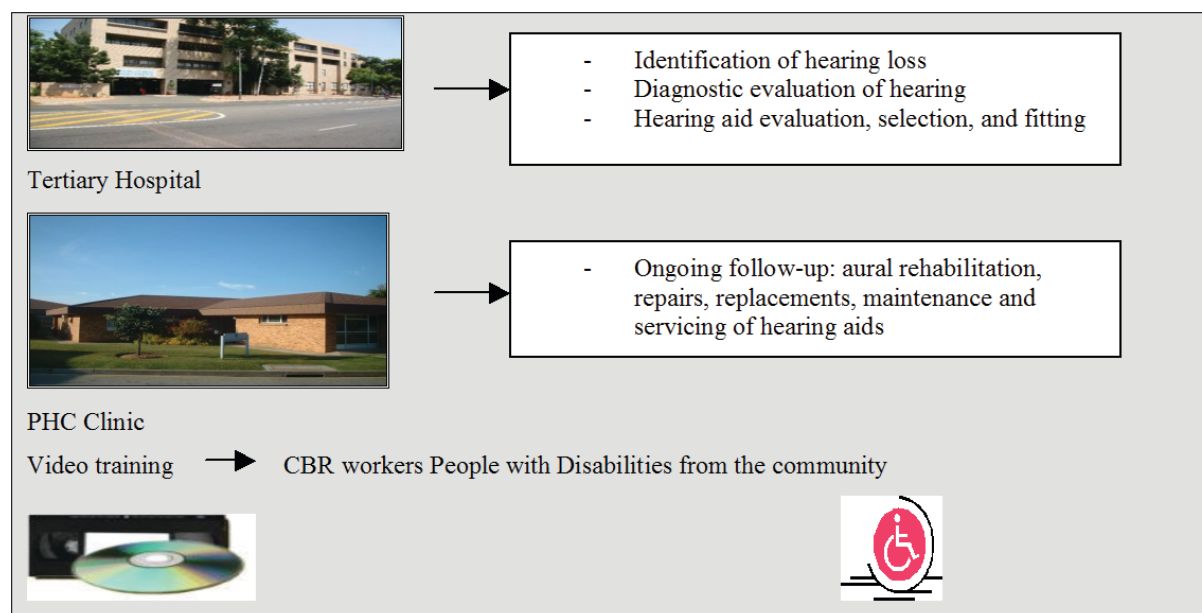


Figure 6. Option three of hearing aid service delivery guidelines.



tools for rehabilitation at primary health care clinics.

However, in order for this option to be successful it will require the following:

- Collaboration with the community and its members
- Collaboration with hearing aid companies and audiologists, as training of the community members and rehabilitation workers will be required
- Collaboration with local government structures with regard to infra structure

The advantages of this option is that costs and waiting times for rehabilitation, repairs, and servicing of hearing aids would be reduced for clients, as services would be provided at community level. In addition, this option would promote job creation and skill development for members from the community and initiate an overall sustainable mechanism for hearing aid service delivery. Moreover, this option would alleviate the need for trained interpreters, as people from the community who can

speak the predominant languages will now be providing services.

The challenges associated with option three include persuading members of the community to be involved, as well as collaboration with the hearing aid companies in order to provide the training needed. Hearing aid companies may view this as threat to their income if they are no longer solely responsible for the repairs and servicing of hearing aids. Furthermore, as with option two, clients will still have visit tertiary hospitals for diagnostic hearing evaluations and hearing aid.

In conclusion, the requirements of the South African adult population with hearing loss is immense and there is an urgent need to address issues that impact negatively on utilisation and maintenance of government fitted hearing aids. Furthermore, the multilingual needs of the South African population must be catered to, especially in the public health sector. This necessitates the training

of more interpreters and the introduction of more Black audiologists and speech-language pathologists into the profession.

Speech-language pathologists, audiologists, interpreters, community based rehabilitation workers, community members, and government officials must collaborate in order to provide optimal hearing aid services for the South African population.

"Long-term care leaders have a tremendous opportunity to make a difference in their facilities by loosening boundaries and creating flexible environments. In doing so, they encourage and support teamwork. We know that any real change in health care depends on improving the ways in which we work together within and among organizations. Collective work and collaboration is the engine of transformation" [17].

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