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Hearing Aid Dispensation in the Cameroon Baptist Convention Health Services: An analysis of the Model, Client Satisfaction and impact on quality of life

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ABSTRACT: Informed by the paucity of literature regarding ear and hearing care technology in Cameroon and the growing prevalence of ear and hearing pathologies justified by an increase in the number of clients that show up for ear and hearing care at facility level, the Cameroon Baptist Convention Health Services (CBCHS) in partnership with Sound World Solutions (SWS) and Christophel Blind Mission (CBM) commissioned this study to conduct a field testing of SWS Hearing Aids with the aim of investigating user satisfaction vis a vis the quality and model of delivery of SWS Hearing Aids (HD75 and HD100) and to measure improvements in the quality of life of persons with hearing impairment using SWS hearing aids. Within 6months, 30 participants selected through a combination of self-reported inquiry and a Pure Tone Audiometry Test (PTA) took part in the study that was nested in the Ear Nose and Throat (ENT) departments of the Mbingo Baptist Hospital (MBH). Three tools including the Hearing Aid Satisfaction Survey (HASS), Hearing Handicap Inventory for Adults (HHIA) and the Washington Group set of Questions (WGQ) were used for Data collection at facility level at onset (upon consultation) and three to six months after using the Hearing Aids. The data collected was analyzed using a mixed method design. The findings show reported improvements in quality of life that were drastically adverse at onset of hearing impairment. There was an overall 80% satisfaction with the technical quality of the hearing aids, the accompanying services provided, affordability and ease of use. The Study recommends a review of current protocols related to hearing aid dispensation in the region.

KEYWORDS: Hearing Loss, Hearing Aids, Ear and Hearing Care, ENT.

INTRODUCTION AND BACKGROUND

Disability is an evolving concept resulting from the interaction between persons with impairments including those with hearing impairments and attitudinal and environmental barriers that hinder their full and effective participation in society on equal basis with others Invalid source specified. In developing countries, meeting the needs of Persons with Disabilities has been a welfare issue and has not been given significant priority in planning Invalid source specified. Persons with Disabilities still face more socioeconomic challenges and poverty because of the several barriers to healthcare, rehabilitation, education, employment opportunities and because of exclusion from everyday life activities Invalid source specified.

The UN statistics on hearing impairment show that there are 466 million people estimated to be living with disabling hearing impairments, many of them living in sub-Saharan Africa (WHO, 2019). This number is expected to double by 2050 due to ageing populations and new cases of hearing loss caused by untreated ear infections, ototoxicity, and noise exposure. The impact of hearing impairment is enormous and can negatively impact oral communication, may lead to discrimination (Cioba et al 2012) as well as stigma. For children of school going age and above, hearing impairment will very likely lead to dropout from school and potentially retard progress unlike their peers without impairment (Mbibeh et al 2020) while adults are more likely to be unemployed or working in a low-grade occupation, especially in low- and middle-income countries (Ferrite et al 2017). The prevalence of hearing impairment (HI) in Cameroon ranges from 0.9% to 3.6% in population-based studies and increases with

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age. Environmental factors contribute to 52.6% to 62.2% of HI cases. Infectious diseases that are preventable by vaccination (meningitis, measles, rubella and mumps) represent 41.3% of cases (Wonkam et al., 2014)

Hearing loss is preventable and can be managed, and people with hearing loss can be supported to have good quality lives when health and hearing care services are provided. (Mbibeh et al 2020). According to Wonkam et al (2014) thousands of people in Cameroon live with hearing loss, which is not well documented or supported. The WHO defines ear and hearing care as "comprehensive, evidence-based interventions to prevent, identify, and treat ear diseases and hearing loss, and to rehabilitate and support persons with hearing loss" (WHO, 2015: 6). The provision of such services takes commitment from governments, non-governmental organizations, and related stakeholders. This includes providing technology like hearing Aids to improve the quality of life of persons with hearing impairment. According to Ferrite et al (2017), public health measures can effectively reduce hearing loss or minimize its impact through prevention (e.g. rubella vaccination), treatment (e.g. medical intervention for otitis media) or early diagnosis followed by appropriate interventions such as the use of Hearing Aids.

PREVALENCE OF DISABILITY AND HEARING LOSS

As mentioned earlier, 360 million people are estimated to be living with hearing impairment worldwide, with an average hearing level greater than 40 dB in adults or 30 dB in children in the better ear, of whom the majority live in low and middle-income countries (WHO 2019).In 2014, Mactaggart et al reported a disability prevalence of 10.5% for the Northwest region with prevalence for visual impairment at 2.3%, hearing impairment at 3.6%, and physical impairment at 3.4% in the wider population. According to WHO, the sub-Saharan region constitutes the region with the highest prevalence of avoidable hearing loss. However, these estimates are based on few data but a recent review found only three population-based studies that measured hearing and 14 school screening surveys for the region (Ferrite et al 2017). In their study, Ferrite et al (Ibid) recognized the paucity of studies on the prevalence of hearing impairment in the country and focused their study on one district. According to this study, the overall prevalence of hearing impairment was 3.6%. The prevalence was low in people aged 0–17 and then rose sharply in people aged 50+ with a total of 74% of cases of hearing impairment in people aged 50+.

This picture that dates as far back as 2014 to 2017 has implications on planning for ear and hearing care services. From 2017 onwards, there has been an escalation of armed conflict and violence in the Northwest and Southwest regions (International Crisis Group, 2017; CHRDA and Wallenberg Centre, 2019), with obvious implications for health care in general and hearing impairment in particular. It is obvious and as has been proven by statistics from the ENT service of the CBCHS, many more people have continued to present themselves with hearing loss and will need more medicalised interventions. The incidence of war on health especially hearing impairment cannot be overemphasized implying the need for more reliable health care interventions. At facility level, that has been a geometric rise in clients that present with ear pathologies in the CBCHS facilities from 500 clients in 2010 to 232,000 clients in 2023.

STATEMENT OF THE PROBLEM

The Cameroon Baptist Convention Health Services (CBCHS) through its Ear Nose and Throat (ENT) Department has been providing ear and hearing cares services to over 232,000 clients since 2010[1] when the department was created in the Mbingo Baptist Hospital. The key services provided include; health promotion and prevention campaigns, screenings, hospital and community-based diagnosis, consultations, and treatment of a wide range of ear, nose and throat conditions, head and neck surgery cancer treatment, and audiology.

Informed by the growing prevalence of hearing impairment, in 2014, the CBCHS introduced an audiology service in Mbingo Baptist Hospital through which over 3000 refurbished hearing aids have been provided to clients at a subsidized rate in partnership with Sound Seekers International and Christopher Blind Mission (CBM) Australia, (SEEPD Program, 2020). This process is however constrained by clinical procedures such as the heavy reliance on an audiology technician to test for hearing loss, set and fit the hearing aid, and replacement of the battery can only be done at the ENT Clinic. Hence, the need for a system that counteracts this huge challenge with inherent cumbersome clinical procedural challenges.

It is based on the difficulty to access ear and hearing care technology by clients that the CBCHS in partnership with CBM and Sound seekers conducted a field-testing of Sound World Solution's (SWS) Hearing Aids. Within the framework of this

[1] Statistics from the ENT Department as of September 2023

partnership, CBCHS engaged in a research project to assess client satisfaction and impact on quality of life of self-fitting SWS Hearing Aids (HD75 and HD100) dispensed in the CBCHS ENT department in the Mbingo Baptist Hospital. The findings from this study will inform decisions with regards to the provision of SWS Hearing Aids in CBCHS facilities and beyond.

As discussed in the background, the challenges of having access to ear and hearing care technology are enormous in low- and middle-income countries such as Cameroon. This is due specially to challenges related to accessing and managing hearing aids. Added to this, there is very limited research related to ear and hearing care in Cameroon and in the Northwest Region in particular. In effect, no research as of now has paid special attention to ear and hearing care technology and the dispensing process. This has resulted in the paucity of literature regarding ear and hearing care in general (Mbibeh et al 2020) and hearing care technology in the region.

The growing incidence of hearing impairment due to neglected treatment of ear conditions and poor access to services (Mactaggard et al 2014) and to technology has compounded the situation for persons with disability in general and those living with hearing impairment in particular. This research project therefore set out to evaluate the satisfaction of clients involved in the field testing of brand new self-fitting hearing aids (HD75 and HD100) and the impact it has on their quality of life. Findings thereof will inform key decisions related to hearing care and hearing care technology. Finally, the international community strongly recommends the collection of relevant information for supporting research on disability in general and hearing impairment in particular (WHO Global Disability Action Plan, 2014). Through this research, results related to the new process of dispensing hearing aid will contribute to filling up the information gap and the clinical practice gap on ear and hearing care in the region and in the country.

RESEARCH QUESTIONS

The following research questions served as a guide to this research:

1. To what extent are clients involved in the field testing of self-fitting hearing aid satisfied with the quality of the hearing aid (HD75 and HD100) and model of delivery?
2. What is the impact of the quality of the hearing aid and model of delivery on the quality.

AREA OF STUDY

This research project was carried out in the Northwest Region, one of Cameroon's English-speaking regions with a population of over 2 million inhabitants according to the 2010 government census. This area was chosen because it plays host to the major health facilities of the CBCHS with the main ENT services. It was easier to get access to the clients who were purposively selected to constitute the population of study.

At the time of writing, the NWR was experiencing and continues to experience significant crisis and conflict compounding hearing care services and data collection processes. That is why the study was a hospital based and data was collected from clients who presented themselves for hearing care in the hospitals and who consented to take part in the study.

STUDY DESIGN

This study used a descriptive survey research method. Both qualitative and quantitative processes were engaged. The quantitative design was used for self-reported hearing loss and clinical assessments to determine the level of hearing of the client before, during and after the use of hearing aid. This was done using a combination of the Washington Group Question for hearing and the pure tone audiometry test on a scale of 1 to 5 with 1 being a normal hearing level; 2, mild hearing loss; 3, moderate hearing loss; 4, severe hearing loss; and 5, profound hearing loss. This permitted the research team to ascertain the degree of hearing loss between mild to moderate for a hearing aid to be very effective in restoring sounds for daily life. In addition, through a survey some qualitative and quantitative information was collected related to the perceptions of clients and professionals about the SWS hearing aids.

This study took a period of 6months during which the participants took part in the following;

1. Respond to a questionnaire (WGQ) for self-declaration of hearing impairment or not
2. A routine clinical exam to ascertain the degree of hearing impairment (audiometry)
3. Consent to participate in the study
4. Respond to HHIA and HIA questionnaires
5. Training on the use of the Hearing Aids (HD75 and HD100)

6. Three to six months period to use the hearing aid
7. Respond to HAFF and HASS questionnaire after three to six months
8. End of Investigation

STUDY POPULATION AND SAMPLING STRATEGY

The study involved three groups of 30 respondents selected through purposive sampling. These included clients who presented themselves with different ear and hearing care related pathologies. Those who were clinically tested to fall within the study population and who consented to participate were selected and further disaggregated according to age and sex. In which case, we had 10 youths aged 3 to 17, 10 adults aged 18 to 59 years and 10 old people from 60 and above with a gender disaggregated representation of 16 females making 53.3% of the population and 14 males representing 46.7 %. All these respondents were clients of the CBCHS health facilities and were available for the study period.

Table 1. Summary of Population

Group	Description	Number	Percentage
Group I	Clients aged 3 to 17 years	**10**	**33.3**
Group II	Clients aged 18 to 59years	**10**	**33.3**
Group III	Clients aged 60 and above	**10**	**33.3**
Totals		**30**	**100**

DATA COLLECTION

Data collection involved a survey using a questionnaire and a clinical test. The preliminary survey assessed the clients' general quality of life and level of difficulty in hearing. After this, the clinical assessment of the level of hearing loss was done prior to hearing aid dispensation. The results of these 2 tests determined the dispensation of the hearing aid to clients prior to their training by the research assistants (RAs) on how to use the hearing aid. After three months, clients went through the same exercise and this time around the focus was to evaluate the levels of improvement in health-related quality of life as well as general improvement in wellbeing.

Both the survey and the clinical tests were run by specialist Ear Nose and Throat (ENT) nurses who doubled as Research Assistants. These RAs had prior training on the research protocol. They were carefully selected because they were familiar with ear and hearing care protocols. All results collected were inputted into a database system for further analysis.

ETHICAL CONSIDERATIONS

Miles and Huberman (1984) maintain that the ethics of research involving the participation of humans is built around the principle of causing no harm. The study was guided by the Declaration of Helsinki, which spells out the ethical considerations when conducting research involving human subjects (World Medical Association, 2013). Thus, informed consent was sought both verbally and in writing and in the case of minors, assent to conduct interviews with them was obtained, as well as consent from their legal guardians. Concerning the safety of minors, all RAs were staff of CBCHS and are legally bound by the CBC's Child Safeguarding Policy which sets out, inter alia, guidelines for adult-child interactions intended to safeguard the welfare of children.

The research received ethical approval from the Institutional Review Board (IRB) of the Cameroon Baptist Convention Health Board (CBCHB).

DATA ANALYSIS

Data was analyzed following procedures related to quantitative and qualitative analysis with inferences derived from the data collected about access and improvement in the quality of life of clients who are the study participants.

The data was analyzed with reference to the research questions as well as the research tools within the key areas of study.

FINDINGS AND DISCUSSIONS

The results are presented with consideration given to the exam conducted at onset or when clients showed up for hearing assessment and 3 to six months after using the hearing Aids.

LEVELS OF HEARING CHALLENGES IDENTIFIED IN THE STUDY

To do a preliminary selection of participants, the Washington Group set of questions with focus on hearing impairment on a four-point scale: 'no difficulty', 'some difficulty', 'a lot of difficulty' and 'cannot do at all was used. The focus was to identify participants with self-reported hearing impairment that could qualify them for further clinical audiometry examination. The analysis begins with the self-reported hearing loss prior to using the hearing Aid and the self-reported hearing levels after using the hearing Aid for 3 to 6 months.

HEARING LOSS WITHOUT HEARING AIDS

At this stage, all respondents self-reported hearing loss at various degrees ranging from some difficulty (6.6%) to a lot of difficulty (66.6%) and cannot do at all (13.4%) even when using hearing aids. These statistics were significant and corroborated by the inquiry on hearing loss when using hearing aids both in a noisier room, with a cumulative percentage of 83.3% of the respondents having some difficulty and a lot of difficulty hearing as seen in the table 3 below.

Table 2. Hearing loss in both quiet and noisy environment

1. [Do/does] [you/he/she] have difficulty hearing what is said in a conversation with one other person in a quiet room [If HEAR_1 = 1: even when using [your/his/her] hearing aid(s)]?		
	Frequency	**Percent**
2 = Yes – some difficulty	15	50
3 = Yes – a lot of difficulty	10	33.3
4= Cannot do at all	3	10
6 = Don't Know	2	6.6
Total	**30**	**100.0**
2. [Do/does] [you/he/she] have difficulty hearing what is said in a conversation with one other person in a noisier room [If HEAR_1 = 1: even when using [your/his/her] hearing aid(s)]?		
2 = Yes – some difficulty	10	33.3
3 = Yes – a lot of difficulty	15	50
4= Cannot do at all	3	10
6 = Don't Know	2	6.6
Total	**30**	**100.0**

On the frequency of use of hearing aids, they attested that for those using hearing aids, they used it mostly when going out of home, to church, market, school, in meetings. A minimal number of participants just 4 (13.4%) out of 30 had not used hearing aids and this constituted those who showed up at the health facility for the first time, while 20 (66.6%) and 4 (13.4%) respectively used hearing aids most of the time or had not used it at all. It should be recalled that these were the refurbished hearing aids provided by the CBCHS prior to the field testing of SWS hearing aids.

After using the hearing aids for 3 to 6 months, there was a high improvement in terms of self-reported hearing as 50% of the respondents reported no difficulty and even though up to 40% reported a lot of difficulty it is important to note the improvement form I don't know and cannot do at all as no respondent reported they could not hear at all after using the hearing aids or don't know as weas the case prior to the use of the hearing aids as indicated in the statistics on the table below.

Table 3. Level of difficulty after while using hearing Aid

3. [Do/Does] [you/he/she] have difficulty hearing, [If HEAR_1 = 1: even when using a hearing aid(s)]?				
	Frequency			Percent improv-
	before	After	diff	
1 = No difficulty	0	15	15	50
2= some difficulty	2	5	1	6.6
3 = A lot of difficulty	20	8	12	40
4 = Cannot do at all	4	2	2	3.3
6 = Don't Know	4	0	0	00
Total	**30**	**30**	**30**	**100.0**

LEVEL OF HEARING LOSS AFTER CLINICAL EXAM

For the clinical exam, A pure tone audiometry test was conducted to measure the softest, or least audible, sound that the client could hear in a scale of 1 to 5 with 1 being a normal hearing level; 2, mild hearing loss; 3, moderate hearing loss; 4, severe hearing loss; and 5, profound hearing loss. This permitted the research team to ascertain the degree of hearing loss between mild to severe for a hearing aid to be very effective in restoring sounds for daily life. The level was determined and described as follows;

Table

1. Normal = less than 25 db HL
2. Mild = 25-40 db HL
3. Moderate = 41-65 dB HL
4. Severe = 66-90 db HL
5. Profound = more than 90 db HL

Based on this clinical test, clients that were found eligible for the study included those who had moderate (41-65 dB HL) to severe (66-90 db HL) hearing loss. Those with Normal (less than 25db HL) and with profound (90db HL) were eliminated from the study. So, the 30 participants included the two groups with moderate and sever hearing loss. These constituted clients eligible to access hearing aids. Results from this test are presented in the table below.

Table 4. Audiometric Test Score

1. Audiogram test score		
	Frequency	Percent
Mild= 26-40 dB	10	33.3
Moderate:41-70 dB	15	50
Severe: 71-90 dB	5	16.7
Total	**30**	**100.0**

HEARING LOSS AND QUALITY OF LIFE

It is important to note that the centrality of hearing to quality of life and the key role it plays in communication, speech, attentional abilities and overall wellness and stability cannot be overemphasized. Studies have shown different levels at which hearing loss can affect quality of life. While discussing quality of life, this study recognized the versatility of the terminology. In effect, WHO defines quality of life as "An individual's perception of their position on life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns." This is a broad-ranging concept related to a person's physical health, psychological state, level of independence, social relationships, personal beliefs and their relationship to salient features of their own environment. There is a distinction between health-related quality of life and general quality of life as defined by the persons daily activities.

Even a mild degree of hearing loss can affect general life qualities like academic achievement and can have negative effects on social interactions and can lead to sleep disturbance and stress. For this section of the analysis, we will do a comparative

analysis of data collected at onset or when study participants showed up for first interview and the data collected after 3 to 6months duration which the hearing Aids were used.

QUALITY OF LIFE PRIOR TO USING HEARING AIDS

subjects reported adverse effects on quality of life due to hearing impairment, including frustrations due to inability to use different modern information and communication gadgets, psychosocial issues including depression, limitations in daily human interactions.

INABILITY TO USE COMMUNICATION GADGETS

Respondents reported acute inability to use communication gadgets like phones for audio calls, television programs as well as radio programs. It is important to note that these gadgets constitute part and parcel of daily life in modern days. It becomes challenging or almost impossible to get abreast with daily realities without using them. This has had very negative effect on daily life for people who live in a conflict affected area and much information is audio recorded and sent online. Those old parents who equally have eye problems or are illiterate cannot even read the text messages and depend mostly on audio messages, that are now very difficult or impossible for them to listen to. This is significantly affecting the standard and quality of life they have been living prior to the onset of hearing impairment. The table below shows the level of dissatisfaction clients expressed when using communication gadgets and interacting with their entourage with an overwhelming average frequency of over 94% level of difficulty.

Table 5. Level of difficulty when using communication gadgets

Level of difficulty when using gadgets		
Answer Choices	**Frequency**	**Percentage**
Watching TV	27	90%
Listening to Radio	28	93%
When in theatre/in the movies	30	100

PSYCHOSOCIAL REALITIES OF HEARING IMPAIRMENT

The study revealed reported cases of psychosocial disorders due to the onset of hearing impairment. 80% of the respondents got embarrassed by the situation and found themselves plunging into depression because they secluded themselves from friends and from attending social gatherings like parties, restaurants and leisure gatherings. This seclusion and isolation have led to the onset of depression in all (100%) of the respondents. Some are becoming very nervous and cannot withstand the shame of entertaining an intermittent conversion with friends; something that was not the case before. The chart below shows the level of embarrassment faced by users of hearing aids who are people with hearing impairment.

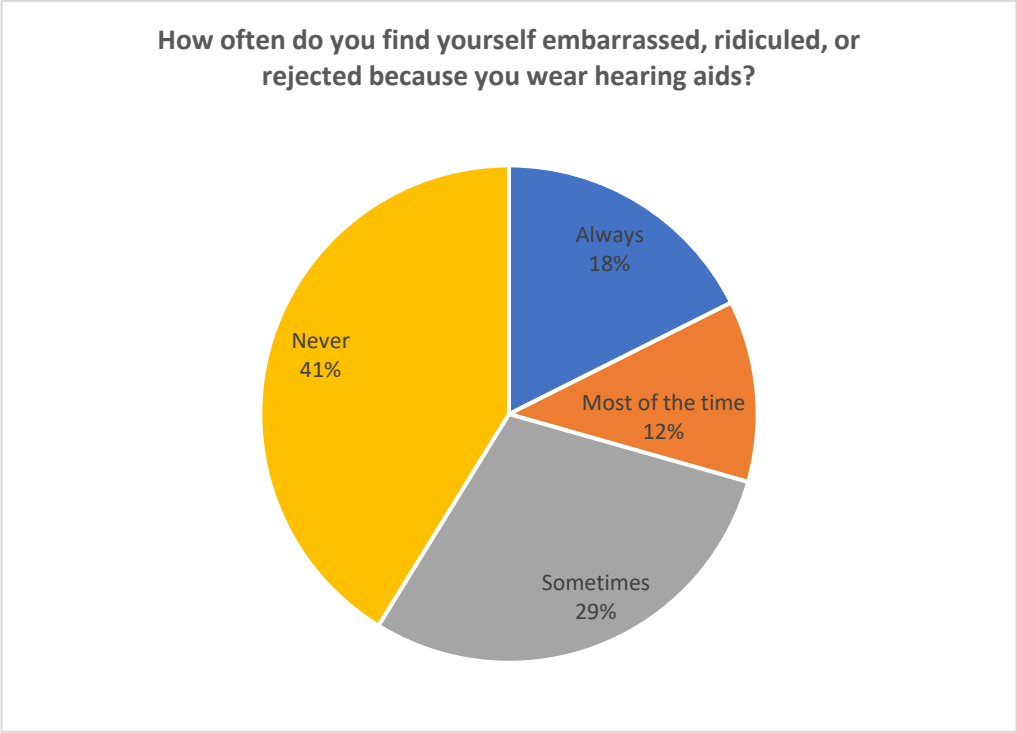

Fig. 1. Embarrassed, ridiculed, or rejected because you wear hearing aids

From this chart, we further see that 18% of the respondents were always embarrassed, most of the time and sometimes for a cumulative percentage of 59% meaning that a majority of the respondents find themselves in difficult psychological situations just for putting on a hearing aid which is tantamount to presenting with hearing impairment. Society contributes in aggravating the situation when they fail to understand and instead attribute hearing impairment to witchcraft or old age or other derogatory comments. Even the feeling of pity towards those with hearing impairment is reported to have rather aggravated the situation.

REDUCTION IN HUMAN INTERACTIONS

As social beings, human interaction is very essential for daily life. The study reported low levels of interaction for respondents suffering from hearing impairment. It is for example very difficult interacting with colleagues (for those who are able to still continue work), friends, family, classmates and so on. The mainstream does not consider making an extra effort to speak aloud, produce accessible material to enable those with hearing loss to grasp. Such a situation has led to low self-esteem and exclusion of self from society as mentioned earlier. According to the respondents, who clamored for the hearing aid, it is important to restore their hearing to enable them feel human once more. Such frustrations have drastically reduced the quality of life rendering them more vulnerable. The table below shows that the different levels of difficulty for clients with at the level of human interactions with very high frequency rates of between 73% to 100% at the beginning of the inquiry

Table 6. Feelings developed with hearing loss

Does a hearing problem cause you to feel		
Answer Choices	**Frequency**	**Percentage**
left out when you are with a group of people	26	88.24%
frustrated	25	83%
Nervous	22	73%
Hampers social life	30	100%
Talking with Friends	30	100%
Feel left out	26	88%

LIVELIHOOD

Hearing has an inextricable link to livelihood and survival. Most clients (65%) reported to have either lost their jobs or failed in exams or are not able to successfully carry out their businesses because of the onset of hearing impairment. Those attending school are not able to listen to the lectures and to take part in study group discussions leading to consequent failure in examinations. Those operating businesses find it difficult carrying our business transactions while those working have found the exercise of their duties very challenging and others have been relieved of their duties. This has led to a drastic reduction in welfare and livelihood which has negatively impacted the quality of life of those with hearing loss. The table below shows levels of frustrations with challenges related to livelihood issues.

Table 7. Livelihood related challenges

Challenges with livelihood related issues		
Answer Choices	**Frequency**	**Percentage**
left out when you are with a group of people	26	88.24%
Talking with co workers/clients	26	88.2%
Feeling left out	26	88.2%
Talking with Friends/colleagues	30	100%
Feel left out	26	88%

QUALITY OF LIFE AFTER USING HEARING AIDS FOR TO 6 MONTHS

The quality of life examined above was done when we received the client and the same tool was used three to six months after using the hearing aid to determine if there is any improvement or change as a result of the use of the hearing aid. Overall, results from the study show that while using hearing aids, the challenges noted above greatly improved with a cumulative improvement rate of 95% from the initial situation which was generally very low with none of the situations recording a 50% level of ease. Respondents reported improvements in the previously recorded aspects such as frustrations due to inability to use different modern information and communication gadgets, psychosocial issues including depression, limitations in daily human interactions.

COMMUNICATION

Respondents reported high level ability to use communication gadgets like phones for audio calls, television programs as well as radio programs which they were not able to use before. Given the almost imperative nature of these gadgets' respondents felt pleased that they were able to return to almost complete use of their phones, could not watch their programs over television and could effectively listen to radio programs with very minimal challenges when using hearing aids. This has significantly improved the standard and quality of life they have been living with the onset of hearing impairment. The level of difficulty which was attested by 94% of respondents at onset as seen on table 6 above, reduced to 30% while using he hearing Aids. In effect, according to the respondents, the Hearing Aid has become part and parcel of their daily lives.

PSYCHOSOCIAL REALITIES

As reported earlier 80% of the respondents got embarrassed by the situation and found themselves plunging into depression (100%) because they secluded themselves from friends and from attending social gatherings like parties, restaurants and leisure gatherings. The situation turned around as the use of Hearing Aids removed them from seclusion and shame. Even though they felt the stigma of wearing hearing Aids, the SWS type was more user friendly than the previous. With the Hearing Aids, they are now able to engage in conversions with friends; something that was not very possible before and had made 83% of the respondents frustrated as seen in table 7 and 88% feeling totally left out as seen on table 8. Most of the societal stigma due to their inability to sustain fluent conversations has disappeared with little or no feeling of pity expressed towards them as before.

HUMAN INTERACTIONS

As indicated earlier, social and human interactions are indispensable for human beings and this is facilitated by communication which in the mainstream needs the sense of hearing. For respondents who had been used to verbal communication, the onset of hearing impairment was almost a disaster. As expected, the highest joys of using Hearing Aids by the respondents after 6 months was the fact that they were now able to consistently engage in daily communication needs with much ease. The study reported low levels of interaction for respondents suffering from hearing impairment with an cumulative level of difficulty rated at 90% as seen on table 7 drastically reduced to very minimal or 00% levels. With the Hearing Aids, it was now for example very easy interacting with colleagues at work, friends, family, classmates, and so on with little to no difficulty. This has improved self-esteem and erased the feeling of exclusion from society as mentioned earlier. According to the respondents, who used the Hearing Aids within this period, restoring their hearing has once more made them feel the sense of belonging to the human race, erasing their frustrations and drastically improved their quality of life as we shall further see in the next section.

LIVELIHOOD

As mentioned earlier, hearing has an inextricable link to livelihood and survival. Study participants who reported to have either lost their jobs or failed in exams or were not able to successfully carry out their businesses because of the onset of hearing impairment as reported on table 8 above saw great change using hearing aids. Those attending school were now able to listen to their lectures and to take part in study group discussions with resultant improvement in academic performance. Those operating businesses could now carry out business transactions easily unlike before while those working have found the exercise of their duties no longer challenging as was the case without Hearing Aids. This has led to a drastic improvement in welfare and livelihood positively impacting the quality of life for users of hearing aids as the proceeding discussion will elucidate.

HEARING AID LEVELS OF SATISFACTION

This section of the analysis focuses on an evaluation of client satisfaction after using the Hearing Aids. The results of client satisfaction are presented in 3 key levels including a sub section on satisfaction with services provided, one on client satisfaction with the Hearing Aids itself, and the third level on factors that motivated acquisition of the Hearing Aids.

SATISFACTION WITH SERVICES PROVIDED

The services provided to the client included reception information and orientation on the research and consent, information on fitting of the Hearing Aids and practically fitting the Hearing Aids. On the reception and information consent, all the clients (100%) were satisfied with the service they received with the initial service they received. The quality of service provided during fitting and after purchase of the Hearing Aids was regarded as excellent by 80% of the participants. Given that this was both a study and a clinical process, there was a lot of practical demonstration on how to fit the Hearing Aids. Overall, 80.6% very satisfied with the services. This gives credit to the RA's who were ENT nurses and at the center of service provision as seen on the bar chart below.

Even though this Hearing Aids does not need a lot of technical expertise to acquire, it is important that those in the domain should be in charge because it gives the clients more confidence in the product. Even if it is sold over the counter not necessarily in the hospital, there is need for preliminary hearing care examination to determine if the client needs the Hering Aids or it is a different pathology that needs a different intervention.

SATISFACTION WITH THE SELF-FITTING SWS HEARING AIDS (HD75 AND HD100)

One key objective of this study was to determine the participants' level of satisfaction with the product. Given that it is a new product in the area of study, the researchers needed to determine whether clients were able to derive satisfaction from using the product after a period of 3 to 6 months and if satisfied could they actually purchase it and also recommend it to another client? This level of analysis can be subdivided into 3 categories; satisfaction with the quality of the product, price, overall satisfaction.

SATISFACTION WITH QUALITY OF THE PRODUCT

By quality of the product, we mean the client's overall appreciation of the internal quality, the external quality and the quality of the service the product renders. It is understood that clients do not have technical expertise to ascertain quality assurance but we also recognise that as users of the product they are able in their own way to evaluate the technical quality related to their use of the product and how the product responds to their needs.

In terms of the internal quality, participants were generally satisfied with the size, battery lifespan, ease of charging and ease of volume adjustment and packaging. In general, a cumulative 80% of the clients were satisfied with the above qualities of the Hearing Aids and thought that the product was reliable for use. However, the fact that 20% were either neutral (10%) and dissatisfied (10%) with the product shows there is still need either for further adjustments in areas like the volume adjustment, whistling, feedback buzzing noise, frequency cleaning and general reliability that scored a lower percentage (30percent not satisfied).

Evaluating the quality of services the Hearing Aids rendered to the client, we evaluated the clearness of tone, sound emission, and ability of the Hearing Aids to assist the client sustain conversations in different locations such as in a car, cinema and noisy places just to name these few. Overall, clients found that the level of comfortability using the Hearing Aids in diverse locations to sustain different conversations was comparatively very high (80 to 90%). That is why they could easily use the Hearing Aids in telephone conversations, in a car, to listen to music and watch films and other diverse leisure activities. They were equally satisfied with the sound of their voice as well as situations of loud sound. The areas that scored lower percentages (70%) included the ability to tell the location of the sound, neutral sounds and frequency cleaning. Such areas need further adjustments to meet the satisfaction needs of the clients or further examination to ascertain the level or reason for dissatisfaction. Some could be related to the client's inability to adjust the frequency for example or an actual technical fault at the level of the Hearing Aids.

Lastly, the overall satisfaction of clients with the quality of the HA was evaluated with reference to their overall satisfaction with the product, value of performance versus cost and if they could recommend the product to someone else. With reference to the value of performance to cost, 25/30 of the clients felt that the cost and performance of the product were satisfactory and that they could easily recommend the product to other clients who need it with an 80% assurance. That is why the average number of hours for use of the product a day stood at 8hours – which represents the working or active hours of the day as the table below shows.

On the contrary, results from the item that checked if clients were comfortable with ongoing expenses proved abortive as many clients (40%) were not very sure and could not attest to the ease of related costs when using the Hearing Aids. While we agree that this was explained to them by the RA, the team found that clients live in abject poverty and in an ongoing war zone and everything is just so unpredictable especially cost. It is natural for them to fear the impending cost with a new product. Hopefully when they must have used the product for a year or more, they will be able to ascertain the cost of the product related to ongoing expenses. That is why, 30% of the clients did not see the need or were not sure they could recommend the product to someone else or will purchase it once the current one malfunctions as seen on the table below.

Table 8. Recommending Hearing Aids

Would you recommend a hearing aid to a friend or family member with a hearing problem?		
	Frequency	**Percent**
Yes	26	87
Not sure	4	13
Total	**30**	**100**
Would you recommend the person/office who fit your most current hearing aid(s) to a friend or relative with a hearing problem?		
Yes	25	83.3
No	2	6.7
Note sure	3	10
Total	**30**	**100**

Summarily, in terms of client's satisfaction with the quality of the product, the study found out that 80.8% of the clients were generally satisfied with the internal quality, the external quality and the services the Hearing Aids offered them and could

recommend it for use by others by more than 70% of respondents as seen on the table below. The challenges presented by 20.2% of the users, related to inability to predict ongoing expense and value of performance vs cost that need to be taken into consideration by the production company. The clients were either, slightly or very dissatisfied including 11% who were undecided.

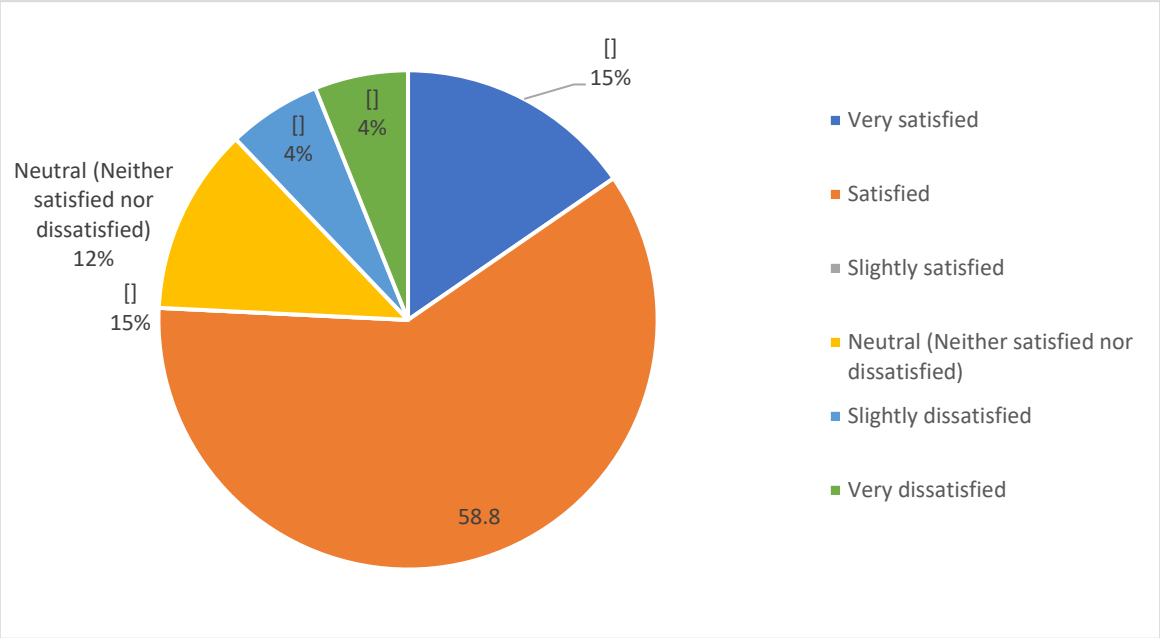

Fig. 2. Figure 3 Overall satisfaction with the quality of the product

It is important to note that some factors influenced the choice of this product ranging from physician recommendation at 100% to reputation and recommendation at 60%. Therefore, the need to associate physicians in the process of product delivery even more than just simple delivery at any counter is important.

CHALLENGES WITH THE HEARING AIDS

From the discussion of findings above and inquiry from clinicians who administered the hearing aid, some challenges that clients faced using the Hearing Aids were identified around the following areas.

1. Battery lifespan: Given the electricity challenges in the context, there is need to increase the lifespan of the battery
2. Challenge with ease with charger and charging
3. Volume adjustment,
4. whistling, feedback buzzing noise,
5. Neutral Sounds
6. Future cost of the product and affordability

CONCLUSION

Informed by the growing prevalence of ear and hearing care challenges and the enormity of clients that show up for hearing care within the CBCHS with limited rapidity to respond especially to clients who need Hearing Aids due to lengthy procedures, this study set out to investigate the dispensation and conduct a field testing of SWS Hearing Aids with the aim of investigating user satisfaction vis a vis the quality and model of delivery of SWS Hearing Aids (HD75 and HD100). The study also measured improvements in the quality of life of persons with hearing impairment who use SWS Hearing Aids. After the collection and analysis of data, following the key research questions that findings revealed that;

All 30 clients that constituted the population of study self-reported hearing loss having a lot of difficulty and some difficulty hearing and were further clinically screened using the pure tone audiometry test with clients tested positive for hearing loss

including those who had moderate (41-65 dB HL) to severe (66-90 db HL) hearing loss. Those with Normal (less than 25db HL) and with profound (90db HL) were eliminated from the study.

With regards to the use of hearing Aid and quality of life, the study found out that after using Hearing Aids for 3 to 6 months, clients reported improvements in quality of life that was drastically adverse at onset of hearing impairment with frustrations due to inability to use different modern information and communication gadgets, psychosocial issues including depression, limitations in daily human interactions. The study reported low levels of interaction for respondents suffering from hearing impairment drastically reduced to very minimal or 00% levels. With the hearing aids, it was now for example very easy interacting with colleagues at work, friends, family, classmates and so on with little to no difficulty. This has improved self-esteem and erased the feeling of exclusion from society as mentioned earlier.

In terms of satisfaction with the Hearing Aids, the study reported an overall 80% satisfaction with the Hearing Aids itself including its technical quality, the services provided and the motivation to recommend the Hearing Aids to another client. Through this research, results related to the new process of dispensing Hearing Aids will contribute to filling up the information gap and the clinical practice gap on ear and hearing care in the region and in the country. The Study recommends a review of current protocols related to hearing aid dispensation in the region.

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