



Prevalence of the use of Hearing Aid Compared to the use of Seeing Aid among Nigerian Youths

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Needed attention has not been paid to hearing defects and the use of hearing aids compared to the enormous attention given to visual problems. This study aimed to compare the prevalence of visual defect to hearing defect and by extension the frequency of use of medicated glasses compared to the use of hearing aid. A total of 500 questionnaires were distributed randomly among students of Nnamdi Azikiwe University, Nnewi campus. Four hundred and seventy eight was retrieved, out of which 11 were disqualified due to improper filling, leaving us with a total of 467 properly filled questionnaires (representing 93.4% of the total number). Results were computed in simple percentages. Our results show that only 1.5% of the study population reported positive for hearing defect. Out of this number, only one respondent uses a hearing aid (representing 0.21% of the population). This is unlike seeing defect in which 117 (25.05% of total population) reported positive and 41.81% of them attested to the use of medicated glasses (representing 15.85% of the total population). All subjects who had hearing defects are aged between 15 and 25 (15-20 = 57.14%; 21-25 = 42.86%). This is similar to the case of seeing defects where the majority (70%) is aged 15-20 and 26% are aged 21-25, totally 96% of cases. We believe the enormity of persons subscribing to seeing aids are so because of massive awareness and affordability of medicated

glasses, which in some cases is made available at no cost to the patient. The lack of data on persons with hearing defect in the country as well as the lack of publicity and investment in hearing aids has contributed greatly to the lack of interest and unwillingness on the part of patients to reach for hearing aids. Our results also show that females reported more both for hearing defects and seeing defect relative to their number. We therefore propose a better information system in which hearing aids are not only made available but also affordable and the masses are rigorously enlightened as to the health and social benefits.

Keywords: Hearing aid; seeing aid; deafness.

1. INTRODUCTION

Reports have shown the incidence of congenital, bilateral sensorineural hearing loss (greater than 40 dB) in developed countries is estimated at 2 to 4 per 1,000 live births, while in developing countries like Nigeria, it is estimated to be about 6 per 1000 live births [1]. In addition to the unavailability of proper healthcare and endemic poor living conditions contributing to congenital hearing impairment, there are cultural related issues that contribute to hearing impairment.

The World Health Organization estimated the number of people with disabling hearing difficulties worldwide (defined as moderate or worse hearing impairment in the better ear) at around 250 million people [2-4] reports that more than 278 million people have moderate-to-profound hearing loss in both ears, and that most people who have hearing loss live in developing countries. There is concern however over the huge lack of accurate population based data on the prevalence and causes of hearing impairment in developing countries.

Notwithstanding the poor health and economic situation in many African countries like Nigeria, many are accustomed to the use of seeing aids, especially medicated glasses. Visual problems appear to be more common than hearing problems as we see more people with medicated glasses than we see people with hearing devices. Many consider hearing problems a milder health issue compared to visual issues [5]. Majority in this part of the world are not even aware of the existence of hearing aids. Public enlightenment on hearing aid is not popular compared to the elaborate and regular publicity associated with advocacy for the use of medicated glasses. Many are even unaware where to access help from for hearing problems.

Here in Nigeria, it is difficult to find persons using hearing aid. This could be associated with lack of finances, lack of public awareness and / or unwillingness on the part of individuals with

hearing problems to even make an attempt at finding solution [6]. There is very sparse data as to the number of individuals having hearing defects in this part of the world, unlike the numerous data available for seeing defects [7], hence the need for this research. The paucity of data also reveal the poor interest even on the part of researchers to delve into studies on hearing defects, further buttressing the people's perception that hearing defects may not constitute a serious public health problem. Meanwhile, other scientists believe that hearing aids should be recommended and prescribed as early as possible in order to prevent deprivation of the hearing pathway and especially of the auditory cortex [8]. Several countries in recent years, including the US and UK have introduced newborn hearing screening programmes. Such programmes are not popular in Africa and is practically absent in most. Therefore early detection of hearing defects is delayed and parents only wait until the child can detect instructions to suspect hearing defects. By this time, a lot might have already gone wrong, thereby making restoration of normal sense of hearing even more difficult.

Even in the advanced countries, there is still the reluctance to wearing hearing devices owing to stigmatization. Manufacturers of hearing devices have over time made it as fashionable and small as possible such that today, some of the devices can be comfortably hid from sight [9]. Recent investigations demonstrated the benefit of early hearing aid use in patients with mild and moderate hearing loss since this may help to reduce subsequent damages as auditory deprivation, social isolation, development of dementia, and cognitive decline [10]. Notwithstanding these giant strides, the care for hearing impaired people remains poor especially in underdeveloped and developing climes. In developed nations, stigmatization and the poor reputation of hearing aids are the major factors that keep hearing impaired people from accepting adequate hearing systems or aids [11].

A report shows that hearing loss was 9.9% among school adolescents aged 18 and above [12]. The report has claimed that around 22% of the population of Europe is hearing impaired to a greater or lesser extent. Research in the UK and Scandinavia has shown that, on average, around 3% of the population owns a hearing aid.

In a large epidemiologic study in the USA performed between 2005 and 2008 (Beaver Dam Offspring Study), 3285 patients with an average age of 49 years were questioned about hearing aids and their usage: 34% had a hearing problem and had undergone hearing test. Only 22.5% of the people with moderate to severe hearing loss wore hearing aids [13]. Different researchers have attempted to estimate the prevalence of hearing defects in several countries across Europe. Although method of sampling and study designs and age group of study vary, the results are relatively consistent [14-16] Sorri et al., [17]

Another report by ASHA shows that 4.6% of individuals between the ages of 18 and 44, 14% between the ages of 45 and 64, and 54% of the population over 65 have hearing loss [18]. While it is well known that older people are more likely than younger people to be affected by hearing loss, there is some evidence of relationships between hearing impairment and gender. In the UK the RNID reports that above 40 years of age more men than women become hard of hearing, probably because more men are exposed to industrial noise. However, over the age of 80 there is a greater number of hard of hearing women than men [19]. Several other reports across Europe found that men above 60 years of age had more cases of hearing loss than women within the same age bracket [20-24]. Some others reports disagree with this findings and suggests no significant differences between hearing levels of men and women [25-26]. Also, The American Academy of Audiology reports found that men are more frequently affected than women in the 35 to 60 year age group [27]. In analysing the 1994 NHIS data O'Neill [28] found that 61% of people with hearing loss were male although only approximately 50% of the population was male. Men of all ages were found to be more likely than women to have hearing loss, but the gap widened with age. In the 0-17 age range 0.6% of the female population was hearing impaired compared with 0.8% of the male population, but in the 65+ age group the percentages have increased to 10% (female) and 19% (male).

In the last two decades, most of the adapted hearing aids were products to be used in the ear with the claim to be mostly invisible and to thus avoid stigmatization. Nowadays, modern hearing aids are openly adapted behind-the-ear versions with a visible device and an integrated microphone. This makes wearing hearing aids more comfortable because the discomfort caused by the closure of the auditory canal is avoided and especially the high frequencies are effectively amplified [29]. The four primary hearing aid styles vary in size, appearance, features, power capacity, and the ease with which the device can be operated [30]. A behind-the-ear (BTE) hearing aid is a shrimp-shaped device that hangs on the pinna by an ear hook. Sound is directed to the ear canal via a tube and ear mold. BTE aids are appropriate for any degree of hearing loss, and are also the best option for children and infants whose pinnae and ear canals grow quickly [12] In-the ear (ITE) hearing aids fill most or all of the concha. They are the most widely recommended style of hearing aid and are appropriate for mild-to-severe hearing loss. In-the-canal (ITC) aids fill only a small portion of the cavum concha. They are relatively inconspicuous but visible in the ear. ITC aids are best for persons with mild-to-moderate hearing loss but may sometimes accommodate a severe loss. Completely-in-the-canal (CIC) aids do not protrude into the concha at all and are practically invisible to the casual observer. Their size does not permit the inclusion of many features, but CIC aids make the best use of the natural acoustic properties of the pinna. CIC aids can accommodate only a mild-to-moderate hearing loss, and may be unsuitable for those with straight and narrow ear canals that make device retention difficult [31].

2. MATERIALS AND METHODS

A two-tailed questionnaire was distributed among students of the Nnewi campus of Nnamdi Azikiwe University Awka. A total of 500 questionnaires were distributed. Four hundred and sixty were recovered, representing 93.4% of the number. The study adopted a simple random sampling method. Data was analyzed using simple percentages and results were presented in tables.

3. RESULTS

Table 1 shows the distribution of the retrieved questionnaires. Out of a total of 467 retrieved questionnaires, 138 (29.55%) were from male

respondents while 329 (79.45%) were from female respondents.

Table 1. Data distribution summary

Sex	Number	Percentage
Male	138	29.55%
Female	329	79.45%
Total	467	100%

Table 2 shows the distribution of hearing defect among the sample population. A total of 7 (1.5%) respondents had confirmed cases of hearing defects. Three of them are males (42.86%) while 4 (57.14%) were females.

Findings showed that overall, 1 in 4 participants (25.1%) reported having sight problems. In terms of gender, more females (1 in 4) (26.7%) had more cases than males (1 in 5) (21.0%) of reported sight defect, although there is no significant difference in sight defect by gender ($p>0.01$).

Table 2. Prevalence of hearing defect by sex

Sex	Having hearing defect?		Total
	Yes	No	
Male	3 (2.2%)	135 (97.8%)	138
Female	4 (1.2%)	325 (98.8%)	329
Total	7 (1.5%)	460 (98.5%)	467

$p>0.01$

From Table 5 above, we see that out of the 117 subjects with reported sight problems, 77 (65.81%) were aged between 15-20. 35 (29.91%) were aged between 21-25. 3(2.56%) were aged between 26-30 while 2(1.71%) were

persons aged 30 and above. This therefore shows a clear trend of reduction in number of cases with increasing age. This could mean that most cases of sight problems might be congenitally related than acquired.

Table 6 shows that only 1 (14.28%) of those having hearing problems subscribed to the use of hearing aid. This is comparably lower than the% of those with seeing problems who use medicated glasses.

Contrary to findings in Table 6 above, 15.8% of the sample population is using medicated glasses. This represents a total of 74 participants. The use was higher in females (77%) than in males (23%).

With respect to age, Table 8 shows the distribution of respondents using hearing aids. Only one individual, representing age bracket 21 to 25 subscribed to the use of hearing aids. This is only 0.21% of the total sample population.

Table 9 shows that 70% of persons using medicated glasses were aged between 15-20. It followed a downward trend with declining age, as we see 26% for 21-25 age range, 2,70% for 26-30 and 1.30% for above 30 age range.

4. DISCUSSION

Our data in Table 1 reveals that out of the 500 questionnaires distributed, 467 (93.4%) were properly filled and returned and were used for the research. Out of this number, 29.55% (138) are males and the remaining 79.45% (329) are females.

Table 3. Prevalence of sight defect by sex

Sex	Having sight defect?		Total
	Yes	No	
Male	29 (21.0%)	109 (78.9%)	138
Female	88 (26.7%)	241 (73.3%)	329
Total	117 (25.1%)	350 (74.95%)	467

$p>0.01$

Table 4. Prevalence of hearing defect by age

Age	Having eye defect?		Total
	Yes	No	
15-20	4 (1.3%)	306 (98.7%)	310
21-25	3 (0.7%)	146 (97.9%)	149
26-30	0 (0%)	5 (100%)	5
Above 30	0 (0%)	3 (100%)	3
Total	7 (1.5%)	460 (98.5%)	467

$p>0.01$

Table 5. Prevalence of sight problems by age

Age	Having sight defect?		Total
	Yes	No	
15-20	77 (24.8%)	233 (75.2%)	310
21-25	35 (23.5%)	114 (76.5%)	149
26-30	3 (60%)	2 (40%)	5
Above 30	2 (66.7)	1 (33.3%)	3
Total	117 (25.1%)	350 (74.9%)	467

$p>0.01$

Table 6. Use of hearing aid by sex

Sex	Using Hearing Aids?		Total
	Yes	No	
Male	0 (0.00%)	138 (100%)	138
Female	1 (0.30%)	328 (99.70%)	329
Total	1 (0.3%)	393 (99.7%)	467

Table 7. Use of medicated glass by sex

Sex	Using medicated glass		Total
	Yes	No	
Male	17 (12.3%)	121 (87.7%)	138
Female	57 (17.3%)	272 (82.7%)	329
Total	74 (15.8%)	393 (84.2%)	467

$p>0.01$

Table 8. Use of hearing aid by age

Age	Using hearing aid?		Total
	Yes	No	
15-20	0 (0%)	309 (100%)	309
21-25	1 (0.21%)	149 (100%)	149
26-30	0 (0%)	5 (100%)	5
Above 30	0 (0%)	3 (100%)	3
Total	1 (0.21%)	466 (99.79%)	467

Table 9. Use of medicated glass by age

Age	Using medicated glass?		Total
	Yes	No	
15-20	52 (16.7%)	259 (83.3%)	311
21-25	19 (12.8%)	129 (87.2%)	148
26-30	2 (40%)	3 (60%)	5
Above 30	1 (3.3%)	2 (66.7%)	3
Total	74 (15.8%)	393 (84.2%)	467

$p>0.01$

Our results show that only 1.5% of the sample population agreed to have hearing defects. Out of a total number of 7 positives, 3(42.86%) are males while 4(57.14%) are females. This number was highest among those aged 15 to 20 years (57.14%) and those aged 21 to 25 (42.86%). Our results therefore seem to suggest that cases of

hearing defect were more in the younger population compared to the older. This is contrary to reports that suggest that hearing defects increase with age [16]. In analyzing the 1994 National Health Interview Survey data O'Neill [28], observed that 43% of the hearing impaired population are 65 or older, 29% are

aged from 45 to 64; 23% are aged 18 to 44; and the remaining 5% are under 18.

Of the 7 subjects who consented to having hearing problems, only one (1) representing 14.28% is using a hearing aid. This represents 0.21% of the study population. This may either suggest lack of awareness on the part of the others, lack of funds or a combination of both. This also is found within the 21 to 25 age bracket. Our results in Table 3 considered the prevalence of sight defect by sex within the sample population. Twenty nine males (29) (21%) had confirmed sight defects while 109 (78.9%) had normal vision. For the females, 241 (73.3%) had normal vision while 88 (26.7%) had defective vision. In total, 117 (25.1%) had eye defect while 350 (74.95%) had normal vision. Here also females represent 75.21% while males represent 24.79% of the number.

Again, the majority (65.81%) are in the 15 to 20 age bracket. Another 29.91% are aged 21-25. This totally represents 95.72% of cases. The remaining 4.28% is shared among those aged 26 to 30 (2.56%) and 30 and above (1.71%). This represents a clear downward trend. Age was inversely proportional to the incidence of seeing defects in the population. This again beams the search on possible underlying congenital rather than acquired causes.

Contrary to what we find for hearing defects, a total of 74 respondents representing (41.81%) of those having seeing defects use medicated glasses. This represents about 300% higher than the persons with hearing defects that use hearing aids. This justifies the fact that more awareness has been created on the solutions to visual problems, much more than what we have seen or heard about hearing problems. It is also possible that people consider hearing problems a less severe health issue than seeing defects. The logic is understandable. People with visual problems may find it difficult to go about their daily duties without support. They need to find their way to work and read through notices and documents. As such, persons tend to find solutions faster for visual problems. In cases of hearing defects, people as long as they can see and move around freely acquire adaptive habits to hearing clearly, like sitting in front of the class or in meeting, lip observation while people talk as well as visual signs to make up for their hearing deficits.

To a great extent, people in Nigeria and around Africa prioritize expenditure to navigate the

poverty in the country. There are lots of bills to pay and less resources available to individuals to sort themselves and their families out. Unlike the western world where government provide lots of amenities and funds for the public, including health insurances, the burden of survival for the African rests mostly on the individual and his family. As such, expenses are curtailed and available funds are channeled only to things considered necessary.

In the past decade there has been tremendous effort by government and organizations to succor the impact of visual problems among Nigerians and Africans. Top of the list among these efforts is the provision of free and accessible medicated glasses to those in need of it. Also, several medical outreaches have focused on eye examination and provision of medicated glasses to match. The development of the Doctor of Optometry course in Nigerian Universities have also given boost to this mass awareness campaigns.

The case is not the same with the ear and hearing. There is no first degree course studied in Nigeria targeting ear and hearing defects. This informs the assumption that the nation and its citizenry have not considered it a serious problem. As a result, there is poor awareness and no readily available and affordable means of acquiring hearing aids. People therefore go about with hearing problems unchecked. Researchers are not left out of the blame. There is high deficiency in information as to the incidence of hearing problems among Nigerians and Africans. The numbers are not adequately reported. Research grants are rarely available to research in areas of hearing problems. As a result, it has not been brought to light the enormity of the need for hearing aids. The present research was carried out among healthy undergraduate students in a Nigerian University. A study among soldiers who are faced with deafening sounds in the war front, airport staff and rural dwellers will reveal much more the massive number of individuals moving around with hearing defects unchecked. This may be the cause of many road traffic accidents as well as unreported inefficiency in interpersonal communication as hearing problems is not obvious for others to see. Individuals find it easier to manage and hide defects which cannot be detected by the next person [32]. There may be no physical sign on an individual indicating they have hearing problems. Job interviews are conducted in close range that the interviewee

can manage to hear and cruise through the interview process. So, they successfully hide it away from prying eyes and pretend everything is okay. This helps them deal with the stigma that could have been the case if there was a physical indication. But if the remedies are readily available and funds are channeled to that either to subsidize or make hearing aids entirely free as we have seen for visual aids, then a lot more people will open up and opt for these solutions.

Although this research was not carried out among members of the armed forces, the problem of hearing defect is more rampant amongst them. This is as a result of their involvements in battles and the deafening noise emanating from the weapons of warfare engagements [33-34]. This class of persons for example deserves readily available assistance to live a relatively normal life with relation to hearing. When these devices are not available and there is little or no public awareness as to the importance of going for hearing aid when one's hearing is impaired as is the case in Nigeria, then we have a society filled with people who are "suffering and smiling." We also know from available literature that the sense of hearing also plays a role in maintenance of balance. As such the vestibular component of the vestibulocochlear apparatus ensures one moves in a coordinated manner. When people move around with unchecked hearing problems, by extension their balance is also affected. If their balance is affected, then they pose serious danger to other members of the public. Many of these individuals are seen behind wheels, driving, biking or even flying. There is therefore high chance that accidents may occur due to lack of hearing and also from poor coordination.

It is therefore of utmost importance for the government, public and private sector to begin massive investment in hearing aids. It will help the citizenry live a relatively normal life notwithstanding the hearing impairment they may suffer. It will also minimize road traffic accidents that may result from hardness of hearing, absence of hearing and lack of motor coordination.

5. CONCLUSION

The incidence of hearing defects may not be as much as visual defect, but it remains a serious public health concern affecting several members of the population. There have been minimal efforts in making hearing aids readily available

that can support the average citizen with a hearing deficit. It is shocking that despite improvements in hearing aid technology over time, only very few use them. The benefits of hearing aids have been demonstrated in many research projects over many years, and the extent to which they can improve the quality of life of hearing impaired people shown in many studies. The hearing aid industry needs to promote the results of these studies among the hearing impaired community, the general public and the medical profession. Quite apart from the costs to society that could be reduced by appropriate prescribing and wearing of aids, it is a tragedy that so many hearing impaired people are not aware of and so cannot take advantage of the benefits that hearing aids offer.

CONSENT AND ETHICAL APPROVAL

As per international standard or university standard guideline participant consent and ethical approval has been collected and preserved by the authors.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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