

# Profile of Adult Deafness in a Second-Line Health Center in Africa

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**Abstract:** The aim of this study was to establish the epidemiological, etiological and therapeutic mapping of adult deafness in a second referral hospital in Black Africa. Our retrospective study covered a period of one year from January 1 to December 31, 2018, in the ENT department of the CSREF of the commune I of the district of Bamako in Mali. The study focused on patients treated as outpatients for Deafness and presenting a complete file with a tonal audiometry form. During the study period, 39.28% of the patients admitted to outpatient clinics were adults, 10% had hearing loss, representing 3.9% of all admissions received. The male gender was the most represented, 54.67% with a sex ratio of 1.2. The 18-28 year olds were more numerous (40%), students/pupils 29.33%. Hearing loss was the most common reason for consultation with a rate of 53.33%. Tinnitus was the most frequent associated symptoms with a rate of 44%. The mode of onset was most often progressive (68%). The most common medical conditions were hypertension (22.66%), followed by meningitis (6.66%), with 53.33% of the cases having no particular medical condition. Trauma with 9.33% was the most mentioned risk factor. Chronic otitis media of all kinds was the dominant etiology 61%. 26.67% had a surgical indication and 33.33% a hearing aid. The prevalence of deafness in our context is relatively similar to the literature with similar epidemiological and clinical variables. Regarding the management, we note nevertheless some insufficiencies in particular as for the use of the tools of functional exploration in particular the vocal audiometry and especially at the level of the management but it should be noted that efforts are being accomplished concerning the levelling of the human resources, the surgery and the means of rehabilitation.

**Keywords:** Adult Deafness, Exploration, Rehabilitation, Ear Surgery

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## 1. Introduction

Deafness is an alteration or disappearance of hearing [1]. In its general acceptance, the term deafness most often refers to a complete abolition of hearing, whereas in medical language deafness or hypoacusis refers to any decrease in hearing, regardless of its importance [2].

Deafness can therefore be mild, moderate, severe, profound or total, in the latter case it is called cophosis or anacusis.

Deafness is a symptom of various and varied causes. It is

classified into two clinical entities: conductive deafness and sensorineural deafness. Often these two entities can be combined to give a mixed hearing loss. It can be assessed by tone and/or speech audiometry in silence as well as in noise [2-4].

According to new WHO estimates, 1.5 billion people worldwide have some degree of hearing loss. Among them, 466 million people suffer from disabling hearing loss (hearing loss greater than 40dB in the better ear in adults). Nearly 80% of people with hearing loss live in low- and middle-income countries [5].

WHO estimates that by 2050, more than 2.5 billion people

will suffer from hearing loss; 1.1 billion young people (12-35 years old) are at risk of hearing loss from recreational noise exposure. The prevalence of hearing loss increases with age: more than 25% of people over 60 years of age have a disabling hearing loss. In Canada, approximately 20% of adults aged 20-79 years have hearing loss as measured by audiometry; the prevalence increases with age, approaching 65% in adults aged 70-79 years. In the US, more than 30 million adults, representing nearly 15% of all Americans, have some degree of hearing loss; it is most common in older adults, occurring in about half of adults aged 70 years and 80% of those aged 85 years and older. aged. [5-8]

In Mali, a longitudinal study conducted in 1995 on the one-year activity report of the ENT department of the Gabriel TOURE hospital found 361 cases of deafness out of 9770 patients seen in outpatient clinics, representing 3.7% [9].

Hearing is a pillar of human communication and social relations, and is a determining factor in the perception of space [10].

Hearing loss is one of the most widely recognized sensory impairments in the world, and is greatly detrimental to the overall well-being of the patient, affecting physical health, finances, social inclusion, and mental health, in terms of inconvenience to understanding in daily life (telephone, television, waiting room), insecurity (doorbells, fire alarms), and major difficulties in communicating. It has been shown to have a significant impact on the patient's overall well-being, major difficulties in integrating into groups (conversations, meetings), and abandonment of activities [11, 12].

The lack of solutions to hearing loss costs the world economy approximately \$980 billion per year due to health care costs (excluding the cost of hearing aids).

This study will provide statistics: epidemiological, etiological and therapeutic on adult hearing loss in the ENT department of a second referral hospital and evaluate its management.

## 2. Materials and Methods

This was a retrospective study. It spanned a one-year period from January 1 to December 31, 2018. The study focused on patients treated in ambulatory for Deafness and presenting a complete file with an audiometry form.

The sample size was 75 cases of patients aged 18 and over with hearing loss who underwent audiometry in the ENT department of the reference health center in municipality I of the Bamako district in Mali, an west Africa country. Each file was assigned an audiometry form.

The information was obtained from the patients' files. The data were recorded on a survey form established for this purpose.

The variables considered were: the socio-epidemiological situation (age, sex, profession), clinical data (reason for consultation, mode of installation, medical and otological history, associated signs, suspected etiologies and treatment) and para-clinical and clinical data (baseline tonal audiometry, vocal and instrumental acoumetry).

Data were entered into EPI INFO software version 7.1.3.3. The data were analyzed on the EPI INFO software version 7.1.3.3. Several variables were recoded and analyzed.

## 3. Results

During the study period, the ENT department of the reference health center of municipality I recorded 4903 outpatient admissions, including 1926 adults, representing 39.28% of adult patients, of whom 190 patients had hearing loss, representing 10% of adults and 3.87% of all admissions received.

Due to the inclusion and exclusion criteria, our study included 75 patients with hearing loss in the ENT department of the Reference health center of municipality I in the district of Bamako. The male sex was the most represented, 54.67% with a sex ratio of 1.2.

40% of patients were aged [18-28 years]. Students and pupils are the most represented with a rate of 29.33%.

Hearing loss was the most represented reason for consultation with a rate of 53.33%.

Tinnitus was the most frequent associated symptom with a rate of 44%.

The most common medical history was hypertension (22.66%), followed by meningitis (6.66%), with 53.33% of the cases having no particular history.

66.66% of the patients had no risk factors; trauma was also mentioned with 9.33% (table 1).

The mode of installation was most often progressive (68%).

Patients with normal otoscopy were the most represented with a rate of 54.67% in the right ear and 49, 33% in the left ear.

Mixed deafness was the most represented type of deafness: 41.33% representing 31 cases (table 2).

Cholesteatomatous chronic otitis media and meningitis are the etiology found in the cases of cophosis, representing 4 cases.

The patients who had as therapeutic indication the medical treatment are the most represented with a rate of 40% (table 3).

*Table 1. Distribution of patients according risk factors.*

| Risk Factors                     | Number | Percentage (%) |
|----------------------------------|--------|----------------|
| Traumatism                       | 7      | 9,33           |
| Exposure to high intensity noise | 4      | 5,33           |
| Meningitis                       | 5      | 6,66           |
| Family deafness                  | 3      | 4,00           |
| Others                           | 6      | 8,00           |
| Total                            | 25     | 33,34          |

Others: untimely use of cotton swabs, pregnancy, Traumatism: slap, public road accident, blow and voluntary injuries

*Table 2. Distribution of patients according type of hearing loss.*

| Type of hearing loss       | Number | Percentage (%) |
|----------------------------|--------|----------------|
| Conductive hearing loss    | 30     | 40             |
| Sensorineural hearing loss | 14     | 18,67          |
| Mixed hearing loss         | 31     | 41,33          |
| Total                      | 75     | 100            |

**Table 3.** Distribution of patients according treatment received.

| Treatment            | Number | Percentage (%) |
|----------------------|--------|----------------|
| Surgery              | 20     | 26,67          |
| Fitting of prothesis | 25     | 33,33          |
| Medical treatment    | 20     | 40             |
| Total                | 75     | 100            |

## 4. Discussion

We registered 190 adult patients with hearing loss on an outpatient basis, but only 75 were able to meet the inclusion criteria, which were a complete file with a tonal audiogram. This rate of patients who could not perform the audiometric examination was due to the high cost of the examination and difficult access. Prevalence approximately equal some author, representing 3% [13].

The age range of 18 to 28 years is the most represented with a rate of 40%; the average age of our patients was 35 years with extremes of 18 years and 83 years. Similar to those obtained by SANGARE representing 38.6% of this age group [14]. This high frequency in the [18-28] age group, which is often the victim of trauma due to road accidents, could be explained by the fact that road accidents are generally caused by motorized two-wheelers, which are the means of transportation for most of this population. In addition, young people, who are the most mobile segment of society, do not wear helmets and do not know the rules of the road.

If we add up the 18 to 48 years old, we obtain 66%, the most active part of the population is there, the hypoacusis becoming disabling, it motivates the consultation.

In our sample, the male sex was the most affected with a rate of 54.67% of cases against 45.33% of female sex representing a sex ratio M/F of 1.2.

Our results are consistent with the literature who note that ENT pathologies and particularly otological pathologies in our region are generally more frequent in men [15-17]. The predominance can also be explained by their lifestyle, much more exposed to noisy environments due to their professions or leisure activities in our context.

Among the different professional classes represented in our study, students were in the majority, 29.33%. This prevalence of pupils and students can be understood, given that hearing is the essential pillar of learning, so any decrease in hearing becomes worrying. Two-wheeled vehicles, which are the means of travel for the latter, are the most incriminated in the occurrence of our results are consistent with the literature. Excessive use of headphones and frequenting discotheques contribute to this. Indeed, exposure to excessive noise is the most common preventable cause of hearing loss [18]. In the United States, among non-noise exposed workers, 7% have hearing loss, 5% have tinnitus, and 2% have both hearing loss and tinnitus. However, among noise-exposed workers, the prevalence is significantly higher at 23, 15, and 9%, respectively [19].

The reason for consultation was much more hypoacusis and this more so as it was bilateral with 29.33%. Hearing loss

becomes more troublesome when it is bilateral. It is usually the main sign of call for ear damage [20]. In other cases, patients were motivated by other more annoying signs such as tinnitus.

In our study, tinnitus was the sign most associated with deafness (44%). Ear pathologies are subjective causes of tinnitus. In our study, we hypothesized an alteration of the impedance of the tympano-ossicular system because the etiology is dominated by Otitis media. According to Londero, tinnitus is often the only auditory sign associated with deafness and more than 80% of patients with tinnitus have an abnormal audiogram [21, 22].

The analysis of the data allowed us to observe that patients with no medical history are the most represented with 53.33%. Associated pathologies were found such as meningitis in 5 patients. Indeed, the prevalence of deafness after bacterial meningitis could be as high as 40% [23]. On the other hand, 22.66% were hypertensive.

Adults with deafness and a risk factor were found in 33.34% of cases. These factors include chronic otitis media, a family history of deafness, bacterial meningitis, slapping, particularly in women who have suffered domestic violence, road accidents, the abusive use of cotton swabs, and exposure to loud noise, generally among factory workers.

The rate of use of ototoxic drugs (quinine salts, gentamicin, aminoside) can be justified by the persistence of diseases such as malaria, meningitis and otitis suppurativa which are still prevalent in our countries. Fortunately, the new therapeutic protocols for the management of malaria and the vaccination coverage against meningitis have evolved.

In 2002, according to the WHO, the majority of people with hearing loss in Africa had lost their hearing as a result of meningitis [24, 25].

Patients with simple chronic otitis media are the most numerous with a rate of 32%. Cholesteatomatous chronic otitis media and meningitis are the most common etiology among cophoses, representing 5.33% of cases. The poor hygiene conditions of the environment, the difficult economic conditions, the trivialization of the treatment since childhood, the traditional practices could be factors favoring the chronic otitis media.

Presbycusis was the main etiology found in people aged 58-83 years, representing 10.67% of cases. Indeed, sensory abilities decrease with age, the onset of hearing loss is progressive and subtle, affecting first the detection of high-pitched sounds and with difficulties in understanding speech in noisy environments but not in quiet ones. As a result, delays in recognizing and seeking help for hearing difficulties are common. It is especially problematic because it is often associated with many health problems, including accelerated cognitive decline, depression, increased risk of dementia, poor balance, falls, hospitalizations and early mortality. There are also social implications, such as reduced communication function, social isolation, loss of independence, inability to drive impaired, and financial decline [26].

In our study, mixed deafness was the most represented

with a rate of 41.33% of our patients. We also recorded 40% of cases of conductive hearing loss and 18.37% of cases of sensorineural hearing loss. We can explain this by the fact of the duration of the evolution of the deafness, the diversity of the etiologies which can involve a deafness. This high rate of mixed deafness can be explained by the history of our patients, in this case chronic otitis media which tended to evolve linked to the social context of the patients: low income of the population delaying the adapted care and favoring the evolution of simple Chronic otitis media towards cholesteatomatous otitis.

We were able to distinguish the five (5) different degrees of deafness in accordance with the BIAP classification: moderate deafness was the most frequent with a rate of 45.33% of our patients. The majority of the patients only consulted us when the deafness became socially embarrassing, when they had difficulty communicating. At this degree of hearing loss, speech is only perceived when the voice is raised. We recorded 4 cases of cophosis, representing 5.33%.

Depending on the case, various treatments were proposed. These included medical, surgical and prosthetic (hearing aid) treatments.

Above all, hearing loss can occur for various reasons. However, it is important to adopt certain behaviors to prevent this deficiency. These include limiting exposure to loud noises, protecting oneself from various acoustic aggressions by wearing custom-made protections, avoiding smoking, self-medication and ototoxic drugs [27].

Information, Education, Counseling (IEC) was performed on all patients in consultation.

Generally, the medical treatment was that of the cause. In our study, we had 36 patients who received medical treatment. The majority were those with Acute otitis media, otomycosis, simple chronic otitis media. The treatment was most often based on local and oral antibiotic therapy.

Fitting includes conventional prostheses, bone anchors and cochlear implants. We proposed a fitting to 29.33% of our patients. Only 13.64% of them: 3 cases were able to benefit from a hearing aid, relatively close to the figures issued by the WHO; only 17% of people for whom a hearing aid would be useful actually use one. The proportion of people who do not use these devices when they should is high all over the world; it ranges from 77% to 83% in the different WHO Regions and from 74% to 90% according to income levels. [28]. In the United States, more than 30 million American adults, representing nearly 15% of all Americans, have some degree of hearing loss. Despite this high prevalence, hearing loss is underdetected and undertreated. Only about one-third of people with self-reported hearing loss have ever had their hearing tested, and only 15% of those eligible for hearing aids use them regularly, citing factors such as cost, difficulty using them, and social stigma [29].

The follow-up of our patients has been difficult, with some cases of long-term vision loss. This is sometimes due to distance; popular beliefs that, for some after clinical improvement of the treatment, it is not necessary to return to

the health center; difficult access to audiometry; the cost of prostheses and medication.

Today, we can note a considerable improvement in the accessibility of functional exploration in adults, which is becoming more and more available in our country, and the awareness that we are raising through the IEC is also contributing to the fact that patients are more willing to be screened and are beginning to embrace the idea of wearing a hearing aid. However, difficulties remain at the level of management where the cost of surgery and especially of rehabilitation remains very high and qualified personnel to adapt it, rare, which is felt on the attempts to set up multidisciplinary teams.

The limits were constituted by the absence of systematic realization of vocal audiometry in the patients, practice today recognized as necessary in the management of deafness, in particular that of the adult. This could be explained, unfortunately, as mentioned above, by the cost of performing functional auditory explorations, the availability of qualified personnel, but also by the fact that practitioners themselves have not yet appropriated this examination due to a lack of knowledge of its clinical value.

## 5. Conclusion

The disability caused by hearing impairment affects not only the personality of the subject, his social life, but also his professional performance and the socio-economic development of the country.

The prevalence of deafness in our context is relatively similar to the literature with similar epidemiological and clinical variables. Regarding the management of hearing loss, we note some insufficiencies in the use of functional exploration tools, especially voice audiometry, and especially in the management of hearing loss: the cost of hearing aids remains high, and cochlear implants are almost inaccessible to adults. Nevertheless, efforts are being made to upgrade human resources, surgery and rehabilitation means. Prevention through awareness remains the best therapeutic means available to us, especially good practices in ear hygiene and hearing protection, as well as shortening the time of consultation after the first symptoms appear.

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