

Audiometric Profile of Deafness at the University Hospital Center Gabriel Toure of Bamako

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Abstract

Objective: To determine the audiometric profile of deafness in our practice. **Materials and Methods:** Longitudinal prospective study was conducted out in the ENT department and cervicofacial surgery of Gabriel Toure University Hospital in Bamako, we made an exhaustive sampling of all the patients who consulted for hearing loss, tinnitus, vertigo, hearing report, medical expertise and whose deafness was confirmed to tonal audiometry with an age greater than or equal to 15 years. It was spread over 10 months (June 2016 to March 2017). A total of 200 patients were collected. Exclusion criteria were all patients under 15 years of age as well as deafness related to earwax or foreign bodies, and refusal to participate in the study **Results:** During our study period, 6055 outpatients were admitted out of which 734 patients underwent audiometric testing and 200 patients (3.30%) met our criteria. The male sex was the most represented with a rate of 60%. The sex ratio was 1.5 or 3 men for 2 women. The 15 to 25 age group was the most represented at 37.5%. The average age was 37.18 years old with extremes ranging from 15 to 83 years old. Pupils/students were the most represented with a rate of 29.5%, followed by housewives in 23%, farmers in 10.5% and military in 10%. As antecedent 26% of our patients had a chronic otitis media (OMC), against 23% who had no antecedent otological and 17% had a traumatic antecedent. Bilateral deafness was the most common with a rate of 64.5%. The mode of progressive appearance was the most frequent in 74.5%. As functional signs 46.22% of our patients had a hearing loss associated with tinnitus. Otoscopic examination was pathological in 34.5% of our patients. Mixed deafness was the most common in 43.35%, followed by perception deafness in 32.19% and transmission

deafness 24.46%. Mean deafness was the most common with a rate of 48.91%, was severe in 20.22%, mild in 18.31%, deep in 11.47% and cophotic in 01.09%. Asymmetrical curves were the most found in 65.89% of our patients. **Conclusion:** Deafness is a sensory disability responsible for communication disorder, sometimes disabling. Audiometry, although subjective, remains essential in the diagnosis of deafness.

Keywords

Deafness, Tonal Audiometry, Bamako

1. Introduction

The loss of hearing felt by the patient or his relatives is a cause of frequent consultation in otolaryngology [1]. According to new WHO estimates, 466 million people worldwide have a disabling hearing disability, 34 million of whom are children. It is estimated that by 2050, more than 900 million people, or one in 10 people, will suffer from disabling hearing loss [2]. Faced with this symptom, it is necessary to evaluate the patient's discomfort in daily life, to look for associated signs and to know the major types of deafness and their etiologies in adults. Personal effects can range from social isolation to depression, security problems, mobility limitations, and income and employment opportunities [3]. Otoscopy plays a key role in etiological diagnosis as well as tonal and vocal audiometry [4]. In our under-equipment exercise conditions, tonal audiometry remains a crucial examination in the diagnosis of deafness, since it allows us to confirm or refute deafness, to guide etiological research and to define the modalities of its diagnosis therapeutic care. Thus the objective of our study was to determine the audiometric profile of deafness in our practice.

2. Materials and Method

Longitudinal prospective study was conducted out in the ENT department and cervicofacial surgery of Gabriel Toure University Hospital in Bamako, we made an exhaustive sampling of all the patients who consulted for hearing loss, tinnitus, vertigo, hearing report, medical expertise and whose deafness was confirmed to tonal audiometry with an age greater than or equal to 15 years. It was spread over 10 months (June 2016 to March 2017). A total of 200 patients were collected.

2.1. Criteria Inclusion

- Patient of minimum age of 15 years.
- Surdity confirmed by tonal audiometry.

2.2. Criteria of Non-Inclusion

- Patient under 15 years old.

- The deafness related to plugs of cerumen or foreign bodies.
- Refused to participate in the study.

2.3. Data Collection Technique

The information was obtained using our questionnaire prepared for this purpose, either by the patient himself or his parents in case of profound deafness or speech disorder. Data logging was done on our survey form.

2.4. Variables Studied

- Social-demographic situation (age, sex, occupation, residence).
- Clinical data (reason for consultation, mode of occurrence, antecedents medico-surgical, otological signs associated).
- Paraclinical data (threshold tonal audiometry).

2.5. Data Processing and Analysis

The data was analyzed on Epi info version 3.5.3. The graphics were made on Word and Excel Office 2013.

3. Results

During our study period, 6055 outpatients were admitted out of which 734 patients underwent audiometric testing and 200 patients (3.30%) met our criteria. The male sex was the most represented with a rate of 60%. The sex ratio was 1.5 or 3 men for 2 women. The 15 to 25 age group was the most represented at 37.5% (**Table 1**). The average age was 37.18 years old with extremes ranging from 15 to 83 years old. Pupils/students were the most represented with a rate of 29.5%, followed by housewives in 23%, farmers in 10.5% and military in 10%. As antecedent 26% of our patients had a OMC, against 23% who had no antecedent otological and 17% had a traumatic antecedent. Bilateral deafness was the most common at 64.5% (**Table 2**). The mode of progressive appearance was the most frequent in 74.5%. As functional signs 46.22% of our patients had a hearing loss associated with tinnitus. Deafness ranging from 1 to 5 years were the most

Table 1. Distribution of patients by age.

Age	Effective	Percentage (%)
[15 - 25 years]	75	37.50
[25 - 35 years]	41	20.50
[35 - 45 years]	28	14.00
[45 - 55 years]	16	08.00
[55 - 65 years]	26	13.00
[65 - 75 years]	9	04.50
[75 - 85 years]	5	02.50
Total	200	100.00

Table 2. Distribution of patients according to the laterality of deafness.

Laterality of deafness	Effective	Percentage (%)
Bilateral	129	64.50
Unilateral	71	35.50
Total	200	100.00

represented with a rate of 34%. Otoscopic examination was pathological in 34.5% of our patients. Mixed deafness was highest in 43.35%, followed by perceptual deafness in 32.19% and transmission deafness 24.46% (**Table 3**). Mean deafness was the most common with a rate of 48.91%, was severe in 20.22%, mild in 18.31%, deep in 11.47% and cophotic in 01.09% (**Table 4**). Asymmetrical curves were the most found in 65.89% of our patients. Of patients with transmission deafness, 75.44% were bilaterally affected and mean was 68.00%. Patients with bilateral hearing loss were most strongly represented at a rate of 50.67% and averaged 61.06%. Bilateral mixed hearing loss was the most common with a rate of 51.49%.

4. Comments and Discussion

4.1. Methodological Aspects

We faced certain limitations during this study, including:

- Calibration of the audiometer.
- Diversity of skills level of audiometrists.
- The educational level of patients to differentiate sound from vibration.

4.2. Sociodemographic Aspect

4.2.1. Sex

The male sex was the most affected in 60% of cases against 40% of the female sex is a sex ratio of 1.5. DJIDONOU A [5] in Benin, POUMALE F [6] in Bangui found similar results during their various works with respectively 63% and 50.51%. This high male rate can be explained by their frequentation of noisy environments (professions or hobbies) [3].

4.2.2. Age

The age group between 15 and 25 years was the most represented with a rate of 37.5%. The average age of our patients was 37.18 years old, with the extreme age of 15 and 83 years. This age group corresponds to that of the young population. Recall that according to the National Institute of Statistics in Mali, the young population under 15 years represents about 53% and only 4% are 65 years or older [7]. At this young age, hearing is essential in human relations, so any decline in hearing is quickly perceived by the individual or his entourage and motivates a consultation. In fact, it is at this age that learning needs hearing more than ever.

Table 3. Distribution of patients according to the result of audiometry.

Type of deafness	Effective	Percentage (%)
Mixed		
Bilateral	52	43.35
Unilateral	49	
Transmission		
Bilateral	43	24.46
Unilateral	14	
Perception		
Bilateral	38	32.19
Unilateral	37	
Total	233	100.00

Table 4. Distribution of patients by level of mean auditory loss.

Degree of loss	Effective	Percentage (%)
Mild deafness	67	18.31
Average deafness	179	48.91
Severe deafness	74	20.22
Deep deafness	42	11.47
cophosis	4	01.09
Total	366	100.00

4.2.3. Profession

All professional classes were represented in our study. However, students and students were the most represented with a rate of 29.5%. This prevalence of students can be understood, since hearing is the essential pillar of learning so any decline in hearing becomes a concern. Two-wheeled vehicles, which are the means of movement of the latter, are the most incriminated in the occurrence of road accidents (AVP). Nearly 75% of AVPs are accompanied by head trauma and about 5% of them result in fracture of the rock [7].

4.3. Clinical Aspect

During our study, our patients consulted for bilateral hypoacusis in 64.5%, but it should be noted that we obtained 84% of bilateral hearing impairment on audiometric examination. This situation is attributable to the fact that the discomfort becomes more and more perceptible, so the patient is forced to find a solution. This is superimposable to the severity and type of deafness. Our results are comparable to those of Frederik and Tatiana [8] [9] who obtained 77% and 98.24%. On the other hand, the unilateral loss was predominant in that of Josef Shargorodsky [10].

4.4. Mode of Appearance and Evolution

The mode of onset of deafness was generally progressive in 74.5% with a

duration of evolution between 1 to 5 years in about 34%. Deafness changes over time and in most cases, patients experience some degree of hearing loss. Patients only consider it when it becomes socially embarrassing. Other reasons can also be highlighted: the inaccessibility of proper care, poverty and ignorance.

4.5. Associated Signs

In our study, tinnitus was the most common sign of deafness in 46.22% of cases. According to Londero [11], tinnitus is often the only auditory sign associated with hearing loss and more than 80% of patients with tinnitus have an abnormal audiogram. This same finding was shared by Kudamo Song in South Korea and Betty in California [12] [13].

4.6. Otosopic Appearance

Otosopic examination of our patients was pathological in 34.5% of cases, with tympanic perforations and changes in the appearance of the eardrum. This state is related to the two major entities of deafness. According to Thomassin [14], the initial otoscopic examination allows two large entities to be determined: deafness with pathological otoscopy and deafness with normal otoscopy.

4.7. Audiometric Data

4.7.1. Types of Deafness

In our study, mixed hearing was the most common in 43.35% of our patients. We also recorded 32.19% of cases of perception deafness and 24.46% of cases of deafness. This could be explained by the duration of deafness evolution, the diversity of etiologies that can lead to deafness and also the possibility of association of two different etiologies. Our results are comparable to that of Adjibabi [15], who found a prevalence of mixed deafness in 46.7%. In the study by Tatiana MG and Isabela de Souza, however, 60.78% and 71.8% of the surveyed population had sensorineural hearing loss and only 14.70% and 17.9% had mixed hearing loss [9] [16].

4.7.2. Degree of Hearing Loss

We were able to distinguish the five (5) different degrees of deafness in accordance with the BIAP classification. Essentially average deafness was the most common in 48.91% of cases. The majority of patients consulted only when deafness became socially embarrassing when they had trouble communicating. At this degree of hearing loss, speech is perceived only when the voice is raised. We recorded four (4) cases of cophosis, which is 01.09%. These results corroborate with those of the literature [10] [15].

4.7.3. Aspect of the Audiometric Curves

The curves we obtained were largely asymmetrical at a rate of 65.89% of cases. This predominance can be explained by the bilaterality of deafness to different degrees and the possible coexistence of different types of deafness.

5. Conclusion

The diagnosis of deafness is certainly clinical, but the paraclinical examination allows us to refine the diagnosis in this case audiometry. Key tonal audiometry has been our preferred means of exploration. This technique allows us to determine the auditory threshold at different frequencies and intensities. Although it is subjective, it remains unavoidable in the diagnosis of deafness in our context of under-equipment, since it allows to confirm or deny this deafness. Depending on the result of audiometry, the etiological assessment will be requested to ensure better care.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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