



Original Article

Clinical Audiometric Profile of Nightclub Employees in the City of Parakou in 2021

Profil clinique audiométrique des employés des boîtes de nuit de la ville de Parakou en 2021

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ABSTRACT

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Introduction. Employees of nightclubs are exposed to high intensity noise and may experience work-related hearing impairment. The present study aims to describe the audiometric clinical profile of nightclub employees in the city of Parakou in 2021. **Material and methods.** This was a descriptive cross-sectional study with an analytical aim carried out on 114 employees of the city of Parakou in 2021. **Results.** A total of 114 employees were collected. The mean age was 26.38 years \pm 4.81 and the sex ratio was 0.87. The noise level was between 90 and 100 dB for 51.75% of the employees. Tinnitus was the most expressed complaint, respectively 21 (18.40%) on the right and 22 (19.30%) on the left. They were followed by bilateral hearing loss 6 (5.30%). The prevalence of deafness was 37.72%. The risk of occupational deafness was 2.80 times higher (RP=2.80; CI= [1.02-7.67]) in subjects exposed to a sound level between 90 and 100 dB than in those exposed to a sound level below 80 dB. Sound level between 90 and 100 dB ($p=0.017$), exposure time per day > 08h ($p=0.018$), exposure time per week > 40h ($p=0.002$) and seniority in the nightclub of 32 to 38 months ($p=0.024$) were significantly associated with occupational deafness. **Conclusion.** Employees of nightclubs in the city of Parakou have significant hearing problems related to noise exposure and detectable by audiometry. It is important to put in place preventive measures against noise pollution in these nightclubs by including periodic medical examinations.

R SUM 

Introduction. Les employ s des boîtes de nuit sont expos s   des bruits de forte intensit  et peuvent subir des troubles de l'audition dus au travail. La pr sente  tude a pour but d' tudier le profil clinique audiométrique des employ s des boîtes de nuit de la ville de Parakou en 2021. **Mat riels et m thodes.** Il s'est agi d'une  tude transversale descriptive   vis e analytique r alis e sur 114 employ s de la ville de Parakou en 2021. **R sultats.** Au total 114 employ s ont  t  collig s. L' ge moyen  tait de 26,38 ans \pm 4,81 et le sex ratio est 0,87. Le niveau sonore  tait compris entre 90 et 100 dB pour 51,75 % des employ s. Les acouph nes  taient les plaintes les plus exprim es, respectivement 21 (18,40 %)   droite et 22 (19,30 %)   gauche. Elles  taient suivies par l'hypoacousie bilat rale 6 (5,30 %). La pr valence de la surdit   tait de 37,72 %. Le risque de surdit  professionnelle  tait 2,80 fois plus  lev  (RP=2,80; IC= [1,02-7,67]) chez les sujets expos s   un niveau sonore compris en 90 et 100 dB que chez ceux expos s   un niveau sonore inf rieur   80 dB. Le niveau sonore compris entre 90 et 100 dB ($p=0,017$), la dur e d'exposition par jour > 08h ($p=0,018$), la dur e d'exposition par semaine > 40h ($p=0,002$) et l'anciennet  dans la bo te de nuit de 32   38 mois ($p=0,024$)  taient significativement associ s   la surdit  professionnelle. **Conclusion.** Les employ s des boîtes de nuit de la ville de Parakou ont de fa on significative des troubles auditifs li s   l'exposition au bruit et d celables   l'audiom trie. Il importe de mettre en place des mesures pr ventives contre les nuisances sonores dans ces boîtes de nuit en y incluant des visites m dicales p riodiques.

HIGHLIGHTS**What this study adds to our knowledge**

- The prevalence of deafness was 37.72%
- The risk of occupational deafness was 2.80 times higher in subjects exposed to a sound level between 90 and 100 dB than in those exposed to a sound level below 80 dB

How this is relevant to practice, policy or further research.

- Employees of nightclubs in the city of Parakou have significant hearing problems related to noise exposure and detectable by audiometry. Preventive measures against noise pollution in the nightclubs including periodic medical examinations are necessary.

INTRODUCTION

Worldwide, noise is the second leading cause of early hearing loss in adults after presbycusis and 16% of hearing loss is linked to occupational exposure to noise [1]. It can be responsible for various nuisances including hearing disorders [2, 3]. It therefore remains the most harmful occupational risk factor for hearing. Prolonged and repeated exposure to high sound levels is responsible for impairment of the auditory system that can range from tinnitus to irreversible sensorineural hearing loss due to damage to the inner ear [4]. Ayelo *and al.* report in 2012 that deafness, respiratory diseases and musculoskeletal disorders are the most frequent occupational diseases reported in Benin from January 1997 to December 2011 [5]. Nightclub workers whose jobs expose them to high-intensity sounds can also develop this hearing loss. However, few studies published in the city of Parakou address this subject, which is nevertheless of great importance. To overcome this deficit, and with the aim of better promoting the hearing health of nightclub employees, the present study was conducted.

MATERIALS AND METHODS

The study was carried out in the city of Parakou, one of the four cities with special status among the 77 communes of Benin. This was a cross-sectional, descriptive and analytical study with prospective data collection. Data collection took place from March 14 to June 15, 2021. It concerned the employees of the 13 nightclubs in this city. Were included in the study, employees with at least 03 months of practice and aged at least 18 to 50 years at most on the date of the survey and who had given their informed consent to participate in the study. An exhaustive census of all the employees of the various nightclubs of the city of Parakou having a soundproof room was carried out with the exception of those having at least one of the following medical antecedents: chronic otological affection (chronic otitis etc.), a otological malformation, a history of otological surgery, a notion of hearing loss before exercise in a nightclub, recent medication.

The dependent variable was occupational deafness. It is a bilateral, symmetrical and irreversible sensorineural deafness. Independent variables were socio-demographic characteristics (age, sex), professional characteristics (position held in the nightclub, seniority in the profession), characteristics of noise exposure (duration of

noise exposure per day and per week, noise level at the workstation, wearing of personal protective equipment) and the audiometric characteristics. Data collection was done during a face-to-face interview. A data collection sheet was used. Each employee benefited from an audiogram taking into account the frequencies 125, 250, 500, 1000, 2000, 4000 and 8000 Hz. The research of the thresholds was carried out according to the method of the ascending thresholds. A correction factor of -05 dB was applied to all audiograms, due to the absence of a soundproof booth. The average hearing loss (MAP) is calculated from the audiogram using the formula: $MAP = 2 \times (\text{loss in dB } 500\text{Hz}) + 4 \times (\text{loss in dB } 1000\text{Hz}) + 3 \times (\text{loss in dB } 2000\text{Hz}) + 1 \times (\text{loss in dB } 4000\text{Hz}) \times 10^{-1}$.

Data entry was done using Epi Data version 3.1 software. Text processing, production of tables and graphs were done using Microsoft Word and Excel application software and analysis using Epi Info version 7 software. The central tendency parameters (Mode, Mean, Standard deviation) were used for the description of the quantitative variables and the proportions for the qualitative variables. The authorization of the local ethics committee for biomedical research of the University of Parakou (Reference 0395/CLERB-UP/P/SP/R/SA of March 12, 2021), as well as the authorization of the municipal authorities have been obtained prior to data collection. Respondents freely joined the study. The information collected was treated with confidentiality and the survey forms filled in anonymously.

RESULTS**General characteristics of the population**

A total of 114 nightclub employees were surveyed. The average age was 26.38 years \pm 4.81 with extremes of 18 and 45 years. The study population consisted of 53.50% women and 46.50% men. The sex ratio was 0.87. In the nightclubs surveyed, 57.00% were waiters, 16.70% managers and 14.90%-disc jockeys. Among them 31.60% exercised for a period of between 03 and 09 months.

Characteristics related to occupational noise exposure

Employees were exposed to noise for more than 8 hours a day and more than 40 hours a week; i.e. 76.32% and 81.58% respectively. The noise level at the workstation was between 90 and 100 dB for 51.75% of respondents; with extremes of 75 and 114 dB; and an average of 94.76 dB [Table I]. All respondents (100%) had a sound level above 70 dB. Among them, those working more than 40 hours/week, 52 or 45.61% were exposed to a noise level \geq 85 dB. Employees did not wear PPE while working in 97.40% of cases. The main reason cited was ignorance of the existence of PPE or its importance (62.20%).



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Table I : General characteristics of the study population

Workplace	Effective	Percentage
Servers (its)	65	57.00
Managers	19	16.70
Disc jockey	17	14.90
Bartender	11	9.60
Bouncers	2	1.80
Total	114	100.00
Seniority in position		
03 to 09 months	36	31.60
10 to 16 months	31	27.20
17 to 23 months	32	28.10
24 to 31 months	1	0.90
32 to 38 months	14	12.30
Total	114	100.00
Noise exposure time		
Exposure time per day		
≤ 08 hours/day	27	23.68
> 08 hours/day	87	76.32
Exposure duration/week		
≤ 40 hours/week	21	18.42
> 40 hours/week	93	81.58
Total	114	100.00
Sound level		
< 80dB	5	4.39
[80dB-90dB [26	22.81
[90dB-100dB [59	51.75
≥ 100dB	24	21.05
Total	114	100.00

Audiometric clinical characteristics of the population
 Overall, 82 nightclub employees in the city of Parakou had hearing loss, out of a total of 114 employees; i.e.

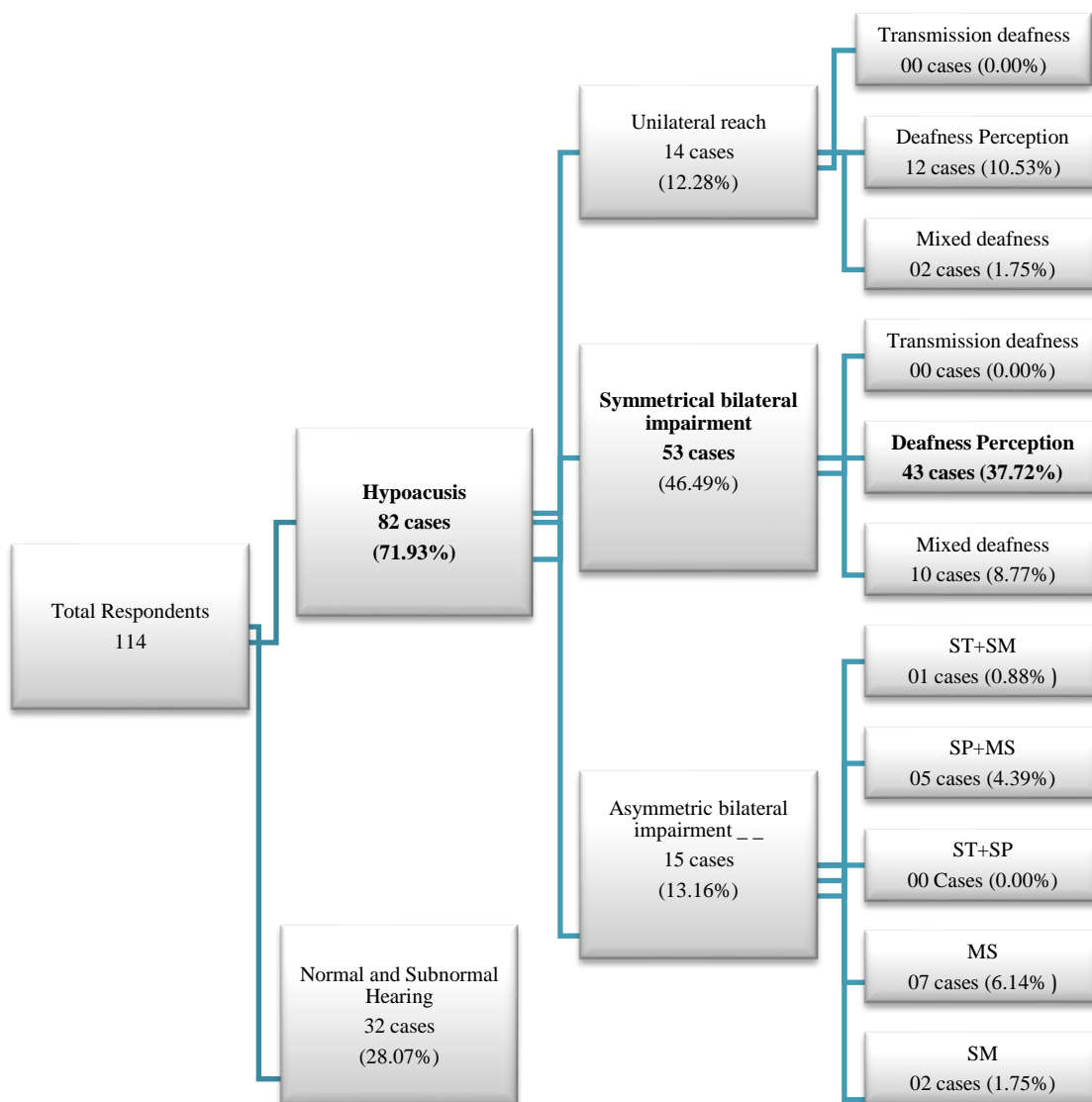
71.93%. The prevalence of noise-related hearing loss in nightclubs in the city of Parakou in 2021 (symmetrical bilateral sensorineural hearing loss) was 37.72% [Figure 1] . Hearing loss was mild in 58.80% for the right ear and 49.10% for the left ear [Table II] . Notches were present on pure tone audiometry in 8.80% of cases for the right ear and 10.50% for the left ear. The latter were observed at the frequency of 4000 Hz in 70% of cases for both ears. On the right, average hearing losses ranged from 11.5 to 92.5 dB with an average deficit of 28.38 ± 2 dB. On the left, they ranged from 6.5 to 56.4 dB with an average deficit of 27.94 ± 1.93 dB.

Table II: Distribution according to the degree of deafness on pure tone audiometry, of employees of Parakou nightclubs in 2021

	Right ear (RO)		Left ear (LE)	
	NOT	%	NOT	%
Normal hearing	0	0.00	2	1.80
Subnormal hearing	38	33.30	38	33.30
Mild deafness	67	58.80	56	49.10
Average deafness	8	7.00	18	15.80
Profound deafness or cophosis	1	0.90	0	00.00
Total	114	100.00	114	100.00

The risk of occupational deafness was 2.80 times higher (RP=2.80; CI= [1.02-7.67]) in subjects exposed to a sound level between 90 and 100 dB than in those exposed to a sound level below 80 dB. The sound level (p=0.017) was significantly associated with occupational deafness among the respondents.





ST: conductive hearing loss; SP: Sensorineural hearing loss; SM: Mixed deafness

Figure 1: Distribution according to type of deafness, laterality and symmetry on pure-tone audiometry of employees of Parakou nightclubs in 2021; N=114.

DISCUSSION

The sound level in nightclubs in the city of Parakou was between 90 and 100 dB for 51.75% of employees. They were mostly exposed for more than 8 hours per day (76.32%) and more than 40 hours per week (81.58%). These figures are well above the standards [6,7]. Most of them, 31.60%, had been working in the profession for between 03 and 09 months. These measurements revealed that the sound levels measured are above the tolerable threshold for their daily exposure time, since for a maximum daily exposure time of 8 hours, the weighted equivalent sound level should be 85 dB(A) [8]. Other authors have reported similar sound levels and durations of exposure: Lalut and Para. [9] in a study carried out in the nightclubs of Île de France in 2010 reported averages between 91.5 dB and 106.2 dB. Wannou [10] found high sound pressure levels which varied on average between 89.1 dB and 116.4 dB in military musicians. They were

exposed for an average of 5 hours a day, 2 to 6 days a week. The average duration of music practice was 12.1 ± 6.9 years. In a study on the risk of amplified music for disc jockeys working in three discotheques in France in 2009, Potier et al. [11] found sound levels between 92.3 and 102.1 dB with an average of 98.7 dB. Nyarubeli et al. [12] in a study carried out on noise-induced hearing loss among Tanzanian iron and steel workers in 2019, found a sound exposure of 92 dB for an average exposure duration of 05 years. Regarding preventive measures, the vast majority of nightclub employees in the city of Parakou, or 97.40%, did not wear PPE in the workplace. The main reason cited was ignorance of the existence of PPE or its importance; i.e. 62.20%. These results are similar to the literature data. Indeed, Kitcher et al. [13] found in Ghana in 2014 among factory workers, a proportion of non-wearing PPE equal to 95%. El Dib et al. [14] also found that 85.40% of employees did not use PPE to protect themselves in the

workplace . Of the 114 employees collected, at least 01 out of 02 had sensorineural hearing loss with 52.60% in the right ear and 50.00% in the left ear. It was mild in the majority of cases; i.e. 58.80% for the right ear and 49.10% for the left ear. Deafness was bilateral in 82.90% of cases and symmetrical in 79.30% of cases. Notches were found on pure-tone audiometry in 8.80% of cases for the right ear and 10.50% for the left ear. The latter were observed at the frequency of 4000 Hz in 70% of cases for both ears. Wannou [10] , in his study on military musicians in Cotonou, objectified sensorineural deafness in 25.50% of respondents. Deafness was bilateral in 69.60%, and of slight degree in 38.20 % of cases. Kitcher *et al.* [13] reported that 60.40% of market factory workers had normal hearing in both ears and 39.60% had sensorineural hearing loss in one or both ears. The notches were found in 83.17% at the frequency of 4000 Hz. Pouryaghoub *and para.* [15] reported the presence of a notch in one or both ears in 42.40% of cases among professional musicians in Iran. The study by Schmidt *et al.* [16] on the PAIB in 2014, found that occupational sound exposure of five groups of symphony orchestra musicians led to noise-induced hearing loss with higher hearing thresholds between 3000 and 6000 Hz. Noise-related effects on audiograms in said study, were shown at 3000 and 4000 Hz. For Emmerich *et al.* [17] as well as Jansen *et al.* [18] , hearing loss predominated at 4000 Hz or 6000 Hz. This aspect appears to be the most specific of noise-induced hearing loss. Conventional audiometry showed in the nightclub workers in the present study that the greatest hearing losses were not in the 3000 to 6000 Hz frequencies usually implicated in noise-induced hearing loss, but rather in frequency 500 Hz. Wannou [10] also found similar results in his study.

CONCLUSION

Hearing damage, caused by noise pollution in nightclubs in the city of Parakou, is a reality. The vast majority of employees in these nightclubs do not wear PPE in the workplace. Conventional audiometry showed very significant hearing losses on the 500 Hz frequency rather than on the 3000 to 6000 Hz frequencies usually implicated in noise-induced hearing loss. To remedy these hearing impairments, it is necessary to educate both employers and employees on compliance with labor standards, the wearing of PPE and periodic medical examinations including audiometry.

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