

# HEARING COMPLAINTS OF WORKERS IN A POTTERY INDUSTRY OF THE CITY OF JOÃO PESSOA/PB

## *Queixas auditivas de trabalhadores de uma indústria cerâmica da cidade de João Pessoa/PB*

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### ABSTRACT

**Purpose:** to investigate the auditory complaints of workers exposed to occupational noise in a pottery industry, in the city of João Pessoa/PB. **Methods:** this is a descriptive, observational and cross-sectional study with 83 workers from this industry, with conducting interview about hearing complaints. **Results:** among workers, 14.7% reported some general health complaints and 56% claimed to have any auditory complaint related to noise exposure in their work. The main auditory complaints were discomfort to intense sounds (30.1%) and tinnitus (24%). There was a significant correlation ( $p < .05$ ) between the time of working of the employees in their jobs and discomfort to intense sounds, tinnitus, hearing loss and ear fullness. **Conclusion:** the results of this study show a direct association between time of exposure to noise and auditory symptoms, which suggests that better hearing health education politics may be necessary. In addition, it was found that workers knew the risks of noise on health, but did not comprehend that the auditory symptoms they have may be associated with this important physical risk, which can hinder actions to prevent noise hazards.

**KEYWORDS:** Noise Effects; Occupational Noise; Hearing

### ■ INTRODUCTION

Technological advances in industries brought benefits to society, but also brought a number of implications that can influence and also compromise the physical and psychological health of workers, and their quality of life as well<sup>1</sup>. So, the workers began to come across many health-related issues, from the risk agents that began to emerge in this environment<sup>2</sup>.

There are many stressors agents in the workplace, such as physical and chemical agents, in addition to organizational stressors, which are associated to the organization of work, as the pace of work, ergonomics and shift. Among the harmful physical agents, noise still represents the main trigger of hearing loss, as well as be present in the

workplace, it is common in everyday life, in the form of existing noise pollution in cities and also in various leisure activities, where high sound pressure levels are often greater than or equal to those found in industries<sup>3</sup>.

Noise is usually defined as an audible acoustic energy that can be detrimental to the physiological or psychological welfare of people, being associated with an undesirable<sup>4</sup> sound. It is considered as a factor of bigger prevalence of the origins of occupational diseases and one of the most serious health problems affecting Brazilian workers<sup>5</sup>.

Occupational noise can cause numerous health effects on individuals. However, the natural history of hearing loss of these workers is not as defined, with great uncertainty in quantifying the level of exposure to noise in Brazilian industries<sup>6</sup>.

The effects of the systematic noise exposure are classified in two ways: auditory and extra-auditory effects. Both can cause psychological, physical and social impairments in individuals. Among the effects classified as auditory, tinnitus and discomfort to loud

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sounds are the most commonly reported by workers exposed to noise above 85 dB. In addition to these, they are also reported hearing decrease, difficulty in speech understanding and pain<sup>7,8,9</sup>. However, the perception of these symptoms may be related to the time of exposure and to the function. It means that the longer is the exposure, greater will be the occurrence of symptoms<sup>9</sup>.

Noise can also be seen as a potential stressor risk agent, commonly connected to a large extended symptoms related to stress, inserted between the extra-auditory effects. Among other effects classified as extra-auditory are: nervousness, irritability, headache, insomnia, cardiocirculatory and gastrointestinal disorders, vision changes and social isolation<sup>7,8,10</sup>.

In each country, there are tolerance boundaries to occupational noise exposure determined by its government entities, depending on the amount of hours that workers are exposed. In Brazil, the maximum limit of exposure permitted by 8 hours is 85dB. Thus, companies with high sound pressure levels should prepare a Hearing Conservation Program (HCP), containing actions that include the analysis of the work environment, control of aggressive agents, auditory profile study and implementation of educational activities and evaluation of interventions<sup>11</sup>.

Given the above, the present study aimed to investigate the hearing complaints of workers exposed to occupational noise in a pottery industry in the city of João Pessoa / PB.

## ■ METHODS

The research project was approved by the Ethics Committee on Human Research of the Health Science Center (CCS) of the Federal University of Paraíba - UFPB, under number 2005893.1.0000.5188.

The survey was conducted with 83 workers of a pottery industry, which deals with the industrial

segment of bathroom wares, located in the industrial district of João Pessoa/PB. All the participants were male and they have an average of work daily journey of eight hours and exposure to noise intensity exceeding 85dB, according to the Program for Environmental Risk Prevention (PERP) company. The study was conducted from November 2013 to February 2014. The participants presented the noise exposure time ranging 5-64 months of work.

Exclusion criteria were considered: exposure to high sound pressure levels outside the company work environment, like acting as DJ, waiter or extra-occupational exposure as a professional or not. They were excluded even five subjects who reported working under exposure to intense noise in previous company. Even if it is not an exclusion criterion, none of the participants reported hearing change history and use of ototoxic drugs.

The company has a HCP containing technical and administrative measures aimed at the protection of workers, including the use of personal protective equipment (PPE) for all workers who are exposed to noise.

As data collection instrument, it was applied a semi-structured interview, adapted from Macedo and Andrade<sup>12</sup>, with responses that indicate frequency of occurrence of complaints reported on a Likert scale of five points, where 0 corresponds to «never» 1 to «rarely», 2 to «sometimes», 3 to «often» and 4 to «always». The interview consisted of 10 questions and it was applied by the researchers in the room of the company's speech therapists, preceding the periodic audiometric exams. All subjects were informed verbally and in writing about the study and testified their participation by signing a free and informed consent form (ICF).

The results of the research were stored in a Microsoft Excel 2010 spreadsheet and analyzed using the Statistical Package for Social Sciences software (SPSS) version 16.0. Descriptive and inferential statistics were used, using the Pearson correlation coefficient ( $r$ ), being considered  $p < .05$  as level of statistical significance.

**INTERVIEW WITH THE PARTICIPANTS**  
(adapted from MACÊDO; ANDRADE, 2011)

**SOCIO-DEMOGRAPHIC CHARACTERISTICS**

Name: \_\_\_\_\_  
Age: \_\_\_\_\_ Phone: \_\_\_\_\_ Sex: ( ) M ( ) F  
E-mail: \_\_\_\_\_  
Sector of work: \_\_\_\_\_ Function: \_\_\_\_\_

**EXPOSURE TO HIGH SOUND PRESSURE LEVELS**

1) Displays any complaints related to noise exposure?  
\_\_\_\_\_

2) Action time in function \_\_\_\_\_

3) Daily exposure estimated time (in hours) and weekly (every other day) to occupational noise: \_\_\_\_ / \_\_\_\_

**GENERAL KNOWLEDGE ABOUT THE RISKS OF NOISE**

4) Are you aware of the risks of noise for overall health?  
( ) Yes ( ) No  
What? \_\_\_\_\_

5) What situations can bring risk to your hearing? \_\_\_\_\_

**HEARING COMPLAINTS**

6) Tinnitus  
( ) Never ( ) Rarely ( ) Sometimes ( ) Common ( ) Always  
Note: \_\_\_\_\_  
Since when? \_\_\_\_\_

7) Pain in the ear after exposure to noise (earache)  
( ) Never ( ) Rarely ( ) Sometimes ( ) Common ( ) Always  
Note: \_\_\_\_\_  
Since when? \_\_\_\_\_

8) Feeling stuffy ear (ear fullness)  
( ) Never ( ) Rarely ( ) Sometimes ( ) Common ( ) Always  
Note: \_\_\_\_\_  
Since when? \_\_\_\_\_

9) Discomfort to intense sounds  
( ) Never ( ) Rarely ( ) Sometimes ( ) Common ( ) Always  
Note: \_\_\_\_\_  
Since when? \_\_\_\_\_

10) Decreased hearing  
( ) Never ( ) Rarely ( ) Sometimes ( ) Common ( ) Always  
Note: \_\_\_\_\_  
Since when? \_\_\_\_\_

**Figure 1 – Interview with the participants**

## ■ RESULTS

As for the characterization of the sample, the study participants have an average age of 28.9 years, with standard deviation of 8.17 years. The most frequent age group is that formed by workers from 18 to 25 years (40% of the sample). 89% of respondents have 39 years or less (Table 1).

With respect to time acting some function, workers up to 12 months at the workstation are the most frequent in the sample group (52%). 69% of the subjects have up to 24 months of experience in their job (Table 2). During the study period, these workers reported getting exposed to noise in their working space for an average of 7.9 hours / day (SD = 1.03) and 5.1 days / week (SD = 0.45).

When asked about the personal knowledge of the risks of noise on health, 76% of workers claimed to know these risks, both for general health and for the hearing health (Table 3).

When asked, in general, about their health condition and about any complaints that could be

associated with exposure to noise, 14.7% of workers mentioned a type of complaint or more. However, when faced with specific auditory complaints, the percentage of workers who reported at least one complaint has risen to 56%. Of these, 30.1% of workers report discomfort to strong sounds; 24% referred tinnitus; 22.9% complain of ear fullness; 21.6% reported hearing loss and 13.2% reported earache after exposure to noise at high intensities and some mentioned more than one complaint (Table 4).

Assessing the possible relationship between the time of exposure to noise and the reported frequency of experience of the auditory symptoms, moderate and positive associations were observed as statistically significant: between the noise exposure and tinnitus ( $p < .05$ ) ear fullness ( $p < .05$ ), the high intensity sounds discomfort ( $p < .01$ ) and hearing loss ( $p < .05$ ) (Table 5). It is clear, therefore, that there is a direct association between noise exposure time and the occurrence of such hearing complaints in the surveyed workers.

**Table 1 – Distribution of workers according to age (João Pessoa, 2013/2014)**

Groups of age	Frequency	Relative freq.	Percent freq.	Cumulated freq.
18   25	33	0,40	40%	40%
25   32	27	0,33	33%	73%
32   39	13	0,16	16%	89%
39   46	7	0,08	8%	97%
46   53	2	0,02	2%	99%
53   60	1	0,01	1%	100%
Total	83	1	100%	100%

**Table 2 – Distribution of workers according to time of function in the company (João Pessoa, 2013/2014)**

Time of function	Frequency	Relative freq.	Percent freq.	Cumulated freq.
1   13	43	0,52	52%	52%
13   25	14	0,17	17%	69%
25   37	3	0,04	4%	73%
37   49	2	0,02	2%	75%
49   61	2	0,02	2%	77%
61 months or more	19	0,23	23%	100%
Total	83	1	100%	100%

**Table 3 – Distribution of workers according to the knowledge of risks of exposure to noise (João Pessoa, 2013/2014)**

Knowledge	N	%
Yes	63	76
No	20	24
Total	83	100

**Table 4 – Distribution of workers according to the prevalence of reported hearing complaints (João Pessoa, 2013/2014)**

Hearing complaints	n	%
Discomfort to intense sounds	25	30,1
Tinnitus	20	24,0
Ear fullness	19	22,9
Hearing decreasing	18	21,6
Earache	11	13,2

**Table 5 – Pearson (r) correlation coefficients between practice time in function and frequency of occurrence of hearing complaints (João Pessoa, 2013/2014)**

		Hearing complaints				
		Tinnitus	Ear fullness	Discomfort to strong sounds	Hearing decreasing	Earache
Practice time in function	r	0,476*	0,571*	0,572**	0,520*	0,027
	Sig.	0,018	0,022	0,007	0,019	0,932
	N	22	15	20	20	11

Subtitle: r = Pearson correlation coefficient; Sig = p value; \* = significant to  $p < 0,05$ ; \*\* = significant to  $p < 0,01$ ; N = number of participants.

## ■ DISCUSSION

The survey was done with 83 male workers, what can be observed in other researches with workers who are exposed to occupational noise<sup>8,13,14,15,16</sup>, in which is the most occurring sex.

It was observed an average age of 28.9 ( $\pm$  8.17) years among workers. It is evident that it is a young population. Other studies<sup>9,16</sup> also identified an average age close to 30 years among workers exposed to noise over 85dB.

During the study period, workers said they are exposed to noise in their working place by an average of 7.9 hours daily, also similarly to the results from other other studies<sup>8,17</sup> with workers that have labor activity involving noise by an average of 8 hours daily.

General health complaints due to noise exposure were reported by 14.7% of workers. In addition, 56% reported to have some specific hearing complaints,

a result similar to that of Lopes et al.<sup>14</sup> which found that half of the wood stuff company workers studied mentioned the occurrence of hearing complaints.

Although 76% of employees claiming to know the risks that noise can cause to general health and situations that can cause risk to hearing, 58% report some of the questioned hearing complaints (discomfort to loud sounds, tinnitus, ear fullness, hearing loss and earache). This is a given intriguing result because the workers say to know the risks caused by this harmful physical agent, but they have some hearing complaints, which can show that the use of PPE is not being correct or systematic or their work environment may not offer preventive methods understood as essential for environments with exposure to high noise levels. The hearing protector is an acoustic barrier that seeks to protect the hearing of the worker<sup>18</sup> and having the attenuation of the sounds that enter in the auditory system

thus avoid or reduce the occurrence of hearing order of complaints.

In a study of workers at an industry<sup>14</sup>, a greater number of workers (93.75%) claimed to know the causal relationship of noise with hearing loss, but a smaller percentage (50%) mentioned having hearing complaints and 50% said they use EPI during working hours (8 hours). Thus, strategies for prevention of noise effects on the auditory health should be reconsidered, given that they can not be having the desired effect.

Continued exposure to high sound pressure levels in work environments can cause various hearing and extra-hearing effects. The hearing effects more reported by workers in this study were, in descending order: discomfort to intense sounds, tinnitus, ear fullness, hearing loss and earache. In another study with workers exposed to noise<sup>14</sup>, auditory symptoms were cited by 50% of the sample and the most common were earache (25%) and tinnitus (12.5%). These results differ from the present data, wherein the symptom was earache the least above.

Several studies related to the auditory and non-auditory complaints of workers<sup>3,8,14,19</sup> point tinnitus as the most reported complaint by the subjects exposed to occupational noise. This symptom is increasingly present in the population due to various factors, such as increasing exposure to high sound pressure levels, in the occupational environment, lifestyle, eating habits, overwork, stress, anxiety and depression<sup>20</sup>.

About the correlation between the time that workers are at their job with hearing complaints reported, which were ringing, ear fullness, discomfort to high intensity sounds and hearing loss, it can be said that there is a direct relationship, i.e., the higher the noise exposure time, the greater the likelihood

worker present such hearing complaints. Whereas presbycusis becomes frequent from 55 years<sup>21</sup> and the fact that there is only one subject over the age of 53, it is believed that age was not leading to the observed result. Study<sup>9</sup> corroborates the relationship between the occurrence of complaints reported by workers and the time when they were exposed in their functions.

## ■ CONCLUSION

It was found that all the hearing complaints investigated (discomfort to intense sounds, tinnitus, ear fullness, hearing loss and earache) were reported by workers exposed to noise.

There was a statistically significant correlation between the time of action of workers and the frequency of discomfort complaints to sounds of high intensity, tinnitus, ear fullness and hearing loss. It may be concluded that better policies for health education and prevention of diseases and disorders are still needed to ensure the workers the right to work with health.

Secondarily, it was noted that although most workers refer knowing the risk that noise may have on health in general, including the hearing health, only few workers could report an abuse spontaneously, although many of them presented the hearing complaints mentioned.

It can be seen, therefore, that, although the workers assert know the risk of noise to the health, they were unable to understand that the hearing symptoms they present may be associated with this important physical risk, that is, such knowledge about the risks of noise seems to be limited and inefficient from a practical point of view.

**RESUMO**

**Objetivo:** investigar as queixas auditivas de trabalhadores expostos ao ruído ocupacional em uma indústria cerâmica da cidade de João Pessoa/PB. **Métodos:** trata-se de um estudo descritivo, observacional e transversal, feito com 83 trabalhadores dessa indústria, com realização de entrevista sobre queixas auditivas. **Resultados:** dentre os trabalhadores, 14,7% referiram alguma queixa de saúde geral e 56% alegaram ter alguma queixa auditiva relacionada à exposição ao ruído em seu trabalho. As principais queixas auditivas foram desconforto a sons de forte intensidade (30,1%) e zumbido (24%). Houve correlação significativa ( $p < .05$ ) entre o tempo de atuação dos trabalhadores no seu posto de trabalho e as queixas de desconforto a sons de forte intensidade, zumbido, diminuição auditiva e sensação de plenitude auricular. **Conclusão:** os resultados deste estudo apontam para uma associação direta entre tempo de exposição ao ruído e sintomas auditivos, o que permite concluir que melhores políticas de educação em saúde auditiva podem ser necessárias. Além disso, verificou-se que trabalhadores afirmaram conhecer os riscos do ruído para a saúde, mas não compreendem que os sintomas auditivos que apresentam podem estar associados a este importante risco físico, o que pode dificultar as ações de prevenção dos riscos do ruído.

**DESCRITORES:** Efeitos do Ruído; Ruído Ocupacional; Audição

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