HEARING CONDITIONS OF GAS STATIONS ATTENDANTS

Condição auditiva de frentistas

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ABSTRACT

Purpose: to evaluate the hearing threshold in the conventional frequencies and high frequencies, and the integrity of the acoustic reflex, in subjects exposed to fuels. **Method**: attendants of three gas stations were evaluated in Santa Maria/RS. After the adaptation to the inclusion criteria, the sample was composed of 24 subjects. It was used the Pure Tone Audiometry, high frequency audiometry and acoustic immitance assessment to evaluate the sample. The time of exposition ranged from one to seventeen years. The control group was composed by 24 not exposed subjects. **Results**: the average of the thresholds of the PTA and of the high frequency audiometry was superior in the study group in all the tested frequencies. A statistically significant difference of thresholds was verified on the frequencies of 0,5 (p=0,004), 2 (p=0,001), 3 kHz (p=0,025), and frequencies of 9 (p=0,007) e 10 kHz (p=0,026). In 16, 18, 20 kHz a greater absence of responses was observed in the study group (p>0, 05). Also it was observed a greater absence of acoustic reflexes (ipsilateral and contralateral) at the study group, on the right ear. On the left ear, there was no difference between the groups, for the occurrence of ipsilateral reflex. The absence of the contralateral reflex was superior in the study group on all frequencies tested. **Conclusion**: individuals exposed to fuels with normal hearing thresholds may have cochlear and central alterations.

KEYWORDS: Solvents; Hearing; Hearing Loss, Central

INTRODUCTION

Chemicals such as organic solvents, are present in several industrial areas and may cause damage to workers' health as they have varied toxic characteristics, ranging from cancer to ototoxic.

Organic solvents are chemicals that contain at least one carbon atom and a hydrogen atom, lipophilic and have a high affinity with rich tissues in lipid such as the brain tissue. They are known to be neurotoxic substances that are harmful to the CNS (central nervous system), causing damage to brain stem, cerebellum and cerebral cortex[1].

Many toxicological research centers in the field of neurology and neurotology are researching the action of organic solvents in the auditory system. The main reason is that the organic solvents, widespread in the industry, are characterized by high volatility and lipid solubility, which facilitates their absorption in tissues and their binding to lipids. As the nerve tissue is composed mainly of lipids, it is particularly sensitive to the toxicity of solvents[2].

Hearing loss induced by chemical exposure is often moderate to severe, as well as hearing loss induced by high sound pressure levels (HSPLIHL). However, the high-frequency audiometry, unusual in HSPLIHL assessments, should be presented in investigations of chemical exposures in the long term, and some studies indicate that a wider range of frequencies are affected in exposures to chemicals, when compared to the frequency range affected by noise[3].

Several studies suggest damage to the central portion of the auditory system or in the brain stem

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caused by organic solvents, which is not observed in the case of HSPLIHL[4-6].

Toluene can depress the central auditory system that controls the acoustic reflex of the middle ear. This may partially explain the synergistic effects of co-exposure to noise and solvent[7].

Thus, the present study aimed to evaluate the hearing thresholds in conventional frequencies and high frequencies, and even integrity of the reflex arc of the middle ear in gas station attendants.

METHOD

This study is a quantitative study.

The inclusion criteria of the selected gas stations were: gas stations in the city of Santa Maria (RS) with higher fuel marketing and open for 24 hours. According to this criterion, we selected three gas stations and a total of 78 workers.

Inclusion criteria for the subjects were: not having otologic past, presenting normal hearing thresholds (250-8000 Hz) and tympanogram curve type A, being younger than 40 years old, having no history of exposure to noise, organic solvents or pesticides, not making use of ototoxic medication. The subjects could not have a history of noise exposure or other harmful agent to audition before having worked in the Gas Station, i.e., the first exposure to harmful agents must have been at the gas station.

After the application of the inclusion criteria with the 78 subjects who worked in the three gas stations the sample consisted of 24 subjects, 21 males and three females, aged from 20 to 40 years old.

All subjects worked in the supply platform of the station, getting exposed to vapors of organic solvents that make up gasoline. The exposure time varied from one to 17 years because some gas station attendants have worked a lifetime at gas stations, reaching 17 years of exposure.

A control group was used to make it possible to compare subjects exposed and not exposed to chemical agents. The control group consisted of subjects with no history of noise exposure or chemicals, and also no history of hearing disorders. There were 21 men and three women, aged from 20 to 38 years old.

We studied the auditory thresholds in conventional frequencies and high frequencies and even the integrity of the reflex arc in gas station attendants.

The subjects were evaluated after reading and signing the free and informed consent (IC).

Data collection was performed at the Speech Language Pathology room of the CEREST of Santa Maria.

The used procedures were: audiological anamneses, inspection of the external auditory canal, pure tone audiometry (PTA), high-frequency audiometry, tympanometry and acoustic reflex.

Inspection of the external auditory canal was performed with the Clinical Klinic Welch-Allyn Otoscope, to verify the presence of excessive cerumen or other change that would prevent the tests or that could alter the outcome of the same. Audiological evaluations were conducted in a quiet environment, inside a soundproof booth.

Examination of pure tone audiometry (PTA) was performed in a soundproof booth, with two-channel digital audiometer Interacoustics AC40 model with TDH-39. The PTA assessed the patients' hearing thresholds at frequencies of 0.5, 1, 2, 3, 4, 6 and 8 kHz.

The hearing by airborne was considered normal when the thresholds at frequencies between 0.25 and 8 kHz were less than or equal to 25 dBHL[8].

The high-frequency audiometry was performed on an audiometer Interacoustics AC40 model at frequencies of 9, 10, 12.5, 14, 16, 18 and 20 kHz, with headphones Koss R/80. For the threshold study, the used technique was descending with 10 dB intervals until the individual no longer responded to sound. From this intensity, the ascending technique was used at intervals of 5 dB until the subject could hear the sound.

The tympanometry and the research on the acoustic reflexes in the ipsilateral modes (1 and 2 kHz) and contralateral (0.5, 1, 2 and 4 kHz) were evaluated in middle ear analyzer Interacoustics model AT 235. The tympanometry were classified into A, As, B or C[9]. The contralateral acoustic reflections were classified as normal, when triggered an intensity from 70 to 90 dBHL above threshold established in the PTA; absent when not triggered until the maximum intensity reached by the device, and exacerbated when the difference between the threshold and the PTA acoustic reflex threshold was greater than 90 dB HL in the frequency test.

To exclude the possibility of hearing disorders caused by high sound pressure levels, the sound pressure level at the three stations in the study was measured. The measurement was performed with a dosimeter Model Q-400, adjusted for compensation scale "A" and slow response speed. The device was placed at the waist of the worker and a microphone was stuck to his ear without interfering with his movements. The dosimeter was installed at eight o'clock in the morning and removed at four o'clock in the afternoon corresponding to the daily working hours.

The average threshold of the high-frequency audiometry of exposed subjects was compared with the average of the control group, according to the time of exposure to the fuel by the workers. Thus,

the subjects in the study group were divided into three subgroups according to the time of exposure: 1) one to three years, 2) three years and one month to five years, and, 3) over five years exposure. The three groups of exposure were divided according to the suggested by previous studies[4,10].

The research project was approved by the Ethics Committee and Human Research of the Federal University of Santa Maria (UFSM) under number 23081.011007/2010-80 and was run in partnership with the Center for Excellence in Occupational Health (CEREST) Santa Maria (RS).

The findings of PTA and high frequency audiometry were analyzed without distintion as to each ear, as the comparison between them was not significant (p> 0.05). For comparison between the ears, we used the Wilcoxon test.

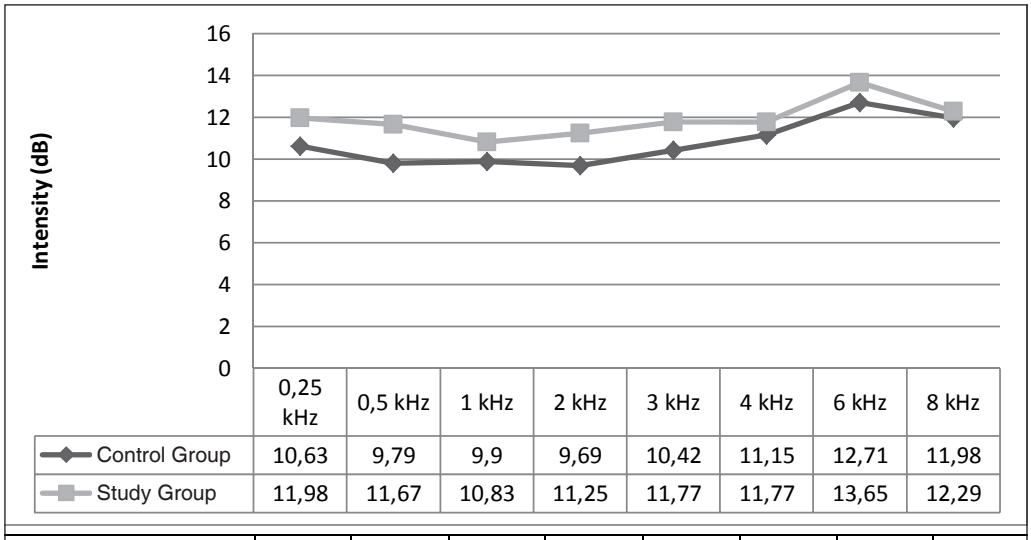
The comparison between groups of hearing thresholds in PTA and high frequency audiometry was performed using the nonparametric Mann--Whitney test.

For statistical analysis of the frequencies of 9, 12.5 and 14 kHz was used Mann-Whitney test, as the comparison is between independent nonparametric samples. The frequency of 10 kHz, as a parametric variable was analyzed using the t test. Results were considered significant when p <0.05.

For statistical analysis of the acoustic reflex the chi-square test was used.

RESULTS

Although all individuals in the study group and the control group have presented hearing thresholds within normal limits in conventional audiometry, the average hearing threshold was higher in the study group at all frequencies, being the difference of threshold statistically significant at frequencies of 0,5 (p=0.004), 2 (p=0.001) and 3 kHz (p=0.025), when compared the study group and the control group (Figure 1).



	0,25 kHz	0,5 kHz	1 kHz	2 kHz	3 kHz	4 kHz	6 kHz	8 kHz
Control Group	10,63	9,79	9,9	9,69	10,42	11,15	12,71	11,98
Study Group	11,98	11,67	10,83	11,25	11,77	11,77	13,65	12,29
p value	0,190	*0,004	0,070	*0,001	*0,025	0,519	0,342	0,632

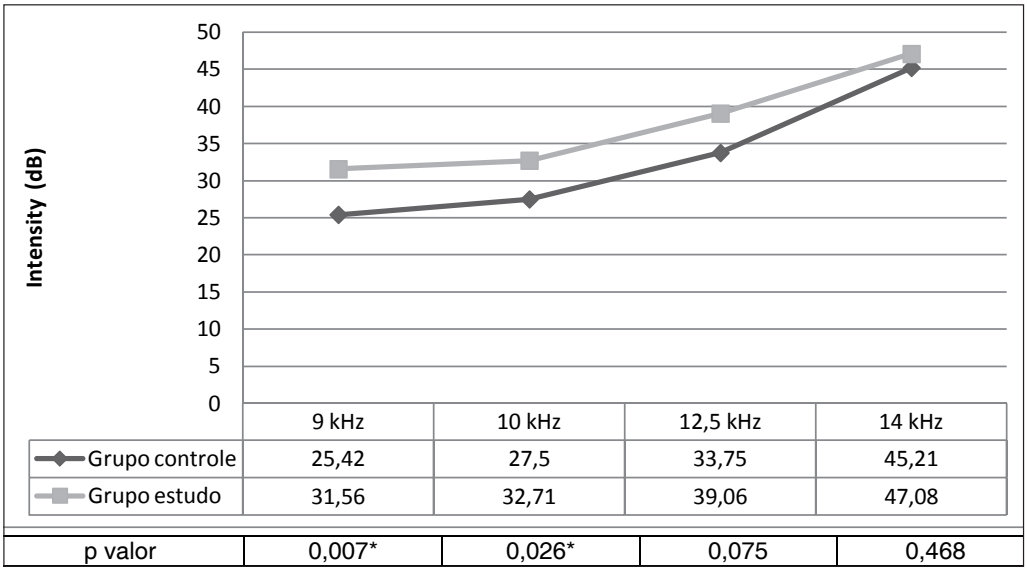
kHz: kilohertz, dB: decibel, Mann-Whitney test (p <0.05)

Figure 1 – Average thresholds of PTA from the study group and the control group in both ears, according to the frequency

The data from the high-frequency audiometry were analyzed separately because the frequencies from 9 to 14 kHz, and continuous variables were the frequency of 16, 18 and 20 kHz was variable not continuous as some responses were absent.

The average threshold at high frequencies were higher in the study group compared to the control group, for all frequencies. However, statistically significant differences in the frequencies of 9 (p = 0.007) and 10 kHz (p = 0.026) (Figure 2).

The absence of responses to frequencies of 16, 18 and 20 kHz was higher in the study group compared to the control group, but no statistically significant difference (p> 0.05) (Table 1).



	9 kHz	10 kHz	12,5 kHz	14 kHz
Grupo controle	25,42	27,5	33,75	45,21
Grupo estudo	31,56	32,71	39,06	47,08
p valor	0,007*	0,026*	0,075	0,468

kHz: kilohertz, dB: decibel, Mann-Whitney test (p <0.05)

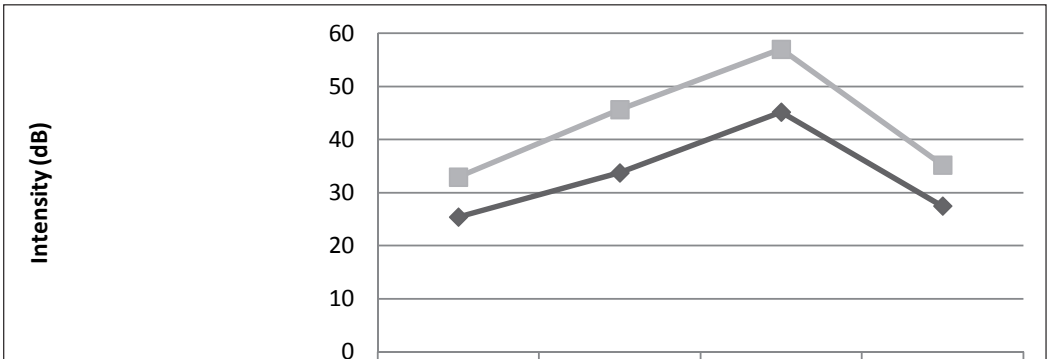
Figure 2 – Average thresholds of high-frequency audiometry in the study group and the control group in both ears, according to the frequency

Table 1 – Occurrence of responses for high frequency in both ears, according to the group

Frequencies (kHz)	Responses	Control Group		Study Group		p- value
		N	(%)	N	(%)	
16	Absent	3	42,9%	4	57,1%	0,695
	Present	45	50,6%	44	49,4%	
18	Absent	2	33,3%	4	66,7%	0,399
	Present	46	51,1%	44	48,9%	
20	Absent	8	33,3%	16	66,7%	0,059
	Present	40	55,6%	32	44,4%	

kHz: kilohertz, the chi-square test (p <0.05)

The average thresholds of the study group and control group, for the frequencies of 9, 10, 12.5 and 14 were also compared in regards to the exposure time (subgroups 1, 2 and 3). There was no statistically significant difference for the average threshold (p> 0.05) in any frequency when compared to the control group subgroups 1 and 2. However, there was a statistically significant difference in the frequencies of 9 (p = 0.009), 10 (p = 0.003), 12.5 (p = 0.002) and 14 kHz (p = 0.011) when compared to control group and subgroup 3 (Figure 3).



	9 kHz	10 kHz	12,5 kHz	14 kHz
Control Group	25,42	33,75	45,21	27,5
Study Group, Subgroup 3	32,95	45,68	57,05	35,23
p value	0,009*	0,002*	0,011*	0,003*

kHz: kilohertz, dB: decibel, Mann-Whitney test (p <0.05)

Figure 3 – Average thresholds of high-frequency audiometry in the study group (subgroup 3) and the control group in both ears, according to the frequency

In the analysis of the acoustic reflex, there was a statistically significant difference between the ears, therefore analyzes were made for each ear separately.

There was a greater absence of ipsilateral acoustic reflex in the study group when compared to the control group, the frequencies of 1 and 2 kHz, although the results were not statistically significant (p> 0.05) (Table 2).

The ipsilateral acoustic reflex of the right ear showed a higher percentage of absence when compared to the contralateral acoustic reflex of the same ear (Tables 2 and 3).

The absence of contralateral acoustic reflex on the right ear was higher in the study group than to the control group, in the frequencies of 0.5 and 4 kHz. The number of subjects with exacerbated contralateral acoustic reflex was higher in the study group than in the control group at all frequencies (0.5, 1, 2 and 4 kHz), while in the frequency of 1k Hz no individual of the control group showed exacerbated reflection acoustic. The results of the contralateral acoustic reflex of the right ear were not statistically significant (p> 0.05) (Table 3).

Table 2 – Occurrence of acoustic reflex in ipsilateral mode in the right ear at frequencies of 1 and 2 kHz, according to group

Frequencies (kHz)	Responses	Control Group N	Control Group (%)	Study Group N	Study Group (%)	p- value
1	Absent	2	22,2	7	77,8	0,064
	Present	22	56,4	17	43,6	
2	Absent	1	20,0	4	80,0	0,156
	Present	23	53,5	20	46,5	

kHz: kilohertz, the chi-square test (p <0.05)

Table 3 – Occurrence of acoustic reflex in contralateral mode in the right ear at frequencies of 0.5, 1, 2 and 4 kHz, according to group

Frequencies (kHz)	Responses	Control Group		Study Group		p- value
		N	(%)	N	(%)	
0,5	Absent	0	0,0	2	100,0	0,100
	Normal	21	58,3	15	41,7	
	Exacerbated	3	30,0	7	70,0	
1	Absent	1	50,0	1	50,0	0,201
	Normal	23	53,5	20	46,5	
	Exacerbated	0	0,0	3	100	
2	Absent	1	50,0	1	50,0	0,364
	Normal	22	53,7	19	46,3	
	Exacerbated	1	20,0	4	80,0	
4	Absent	9	47,4	19	52,6	0,574
	Normal	13	56,5	10	43,5	
	Exacerbated	2	33,3	4	66,7	

kHz: kilohertz, the chi-square test ($p < 0.05$)

In the left ear, there was no difference between groups in relation to the absence of ipsilateral acoustic reflex frequency of 1kHz. Yet, in the frequency of 2kHz, the control group showed greater changes than in the study group, but no statistically significant difference ($p > 0.05$) (Table 4).

Table 4 – Occurrence of acoustic reflex in ipsilateral mode in the left ear

Frequencies (kHz)	Responses	Control Group		Study Group		p- value
		N	(%)	N	(%)	
1	Absent	2	50,0	2	50,0	1,000
	Present	22	50,0	22	50,0	
2	Absent	3	60,0	2	40,0	0,637
	Present	21	48,8	22	51,2	

kHz: kilohertz, the chi-square test ($p < 0.05$)

The absence of contralateral acoustic reflex was higher in the study group than in the control group at all frequencies (0.5, 1, 2, 4 kHz), while in the frequency of 0.5 kHz there was no acoustic reflex in the control group. Similarly, the exacerbated acoustic reflex had higher incidence in the study group, but only at frequencies of 0.5, 2 and 4 kHz. There was no statistically significant difference ($p > 0.05$) between the results of contralateral acoustic reflex of the left ear, when comparing the control group and study group (Table 5).

Table 5 – Occurrence of acoustic reflex in the contralateral mode in the left ear

Frequencies (kHz)	Responses	Control Group		Study Group		p- value
		N	(%)	N	(%)	
0,5	Absent	0	0,0	2	100,0	0,308
	Normal	20	54,1	17	45,9	
	Exacerbated	4	44,4	5	55,6	
1	Absent	1	33,3	2	66,7	0,836
	Normal	21	51,2	20	48,8	
	Exacerbated	2	50,0	2	50,0	
2	Absent	2	33,3	4	66,7	0,389
	Normal	22	53,7	19	46,3	
	Exacerbated	0	0,0	1	100,0	
4	Absent	5	33,3	10	66,7	0,202
	Normal	16	61,5	10	38,5	
	Exacerbated	3	42,9	4	57,1	

kHz: kilohertz, the chi-square test ($p < 0.05$)

DISCUSSION

The thresholds of pure tone audiometry were within the normal range in all subjects evaluated in this study, both in the study group and in the control group. These findings corroborate those of previous studies[11], we found thresholds of PTA better than 20 dB in subjects exposed to solvents, but with changes in auditory processing. Researches[2,12] showed different results from the present study because they were found abnormal audiograms in both the study and the control groups, although a smaller number of changes have been observed in the control group. In a project carried out by CEREST Campinas – SP, 59 gas station attendants have undergone audiological assessment, in which 27% had abnormal results in PTA[13].

Although subjects in both groups of this study have shown normal thresholds, we observed An average threshold of the study group superior than the average threshold of the control group at all frequencies. A statistically significant difference was observed at frequencies of 0.5 ($p = 0.004$), 2 ($p = 0.001$) and 3 kHz ($p = 0.025$) (Figure 1). In contrast to these findings, two studies[14, 15] evaluated subjects exposed to organic solvents through PTA and did not observe any statistically significant differences between groups in relation to thresholds. The findings in terms of average thresholds observed in this study partially agree with other findings[12] where the average threshold was observed higher in the study group than in the control group, in both ears, with the exception of the frequencies of 0.25 and 6 kHz in the right ear, and the frequency of 0.25 kHz in the left ear. A study[16] observed the presence of hearing loss in the group exposed to toluene and n-hexane together, when compared to the group exposed to a mixture of other solvent, which is most prevalent in the group.

The subjects of this study were only exposed to solvents and did not have any change in frequency of PTA. On the other hand, study[17] refer abnormal audiograms in workers exposed to solvents and noise, where there was 63% degradation of subjects with one or more high frequencies unilaterally or bilaterally.

Individuals exposed to noise and solvents[5,18,19] and workers exposed to noise and toluene[4,20] presented a higher prevalence of sensorineural hearing loss, affecting mainly the frequencies 3-6 kHz, when compared to other groups.

Out of the 328 workers assessed by researchers[21], 46 had hearing loss in PTA, with the highest prevalence of hearing loss (54.9%) in the group exposed to noise and solvents. A study that examined the auditory risk in subjects exposed to harmful agents, reported increased risk for subjects exposed to the mixture of chemicals (40%), even when compared to subjects exposed to chemicals and noise (30%)[22]. On the other hand, a study[4] reported a risk for hearing loss five times higher for the group exposed to the solvent mixture, and eleven times greater for the group exposed to noise and toluene. In another study[23], it also showed higher likelihood of hearing loss in the group exposed to noise and solvents (five times). The authors pointed out that the frequency of 8 kHz was the most affected for the group exposed to both agents (noise and toluene).

Research on workers exposed simultaneously to noise and solvents highlight the synergistic action

of these agents. Thus, the findings of this study did not show hearing loss in PTA in subjects exposed to chemicals and sound pressure levels within the recommended limit. However, by being exposed to chemicals that inhibit the protective action of the acoustic reflex, the inner ear is partially unprotected and hearing loss from noise can happen, even this being within the recommended limits.

The studies mentioned above used the PTA as the primary assessment tool. It is assumed that because the subjects are not only exposed to the solvent, but also to noise, abnormal audiograms were found in the majority of workers. Such changes predominated in the higher frequencies of the PTA, and the groups exposed to noise and solvent present in most studies, a higher prevalence of change. Thus, it emphasizes the importance of conducting a more extensive hearing evaluation in this population, due to the risk of hearing loss to be greater when there is co-exposure of agents. Another critical issue is that the conventional PTA cannot detect hearing loss that occurs in the range of high frequencies above 8 kHz [24].

There are, however, few studies with high--frequency audiometry in subjects exposed to solvents or solvent exposed and noise, although this test is of great importance in occupational assessment, as it complements the findings of PTA and indicates the occurrence of early changes in the auditory system. Furthermore, authors[24] emphasize that the findings in human studies are not necessarily correlated with the findings in animals (hearing loss in average frequency).

In the data analysis of high-frequency audiometry, it was observed higher thresholds in the study group when compared to the control group at all frequencies where responses were present (9, 10, 12.5 and 14 kHz). Statistically significant difference in the thresholds between the groups in the frequency range of 9 ($p = 0.007$) and 10 kHz ($p = 0.026$) (Figure 2). These are similar to findings from a study[25] that, although it has studied subjects exposed to solvents and noise, its authors observed thresholds higher in the group exposed to noise and solvents, when compared to the group exposed only to noise and the control group. The same authors state that the difference in the thresholds was statistically significant in the high-frequency audiometry, while PTA results showed no significant differences. The level of exposure to the solvent can be decisive for the occurrence of hearing loss in high frequencies, for exposed workers had slightly better hearing thresholds at high frequencies than workers exposed to high levels of solvents (about 60%) [26].

The other frequencies (16, 18 and 20 kHz) were analyzed as present or absent response to both groups. The lack of answers was higher in the study group than in the control group in the three frequencies examined, however, there was no statistically significant difference (Table 1).

Regarding the exposure time, the hearing thresholds differed significantly at all frequencies (9, 10, 12.5 and 14 kHz) when compared to control group and subgroup 3 (exposed for more than five years) (Figure 3).

Changes in hearing thresholds for high frequencies found in this study reinforce what has been suggested by other researchers[24], highlighting the importance of the presence of high-frequency audiometry in the battery of tests performed in evaluating occupational hearing.

Even though the hearing thresholds of all subjects were normal, there was no acoustic reflex of the middle ear in some individuals. Acoustic reflections at high levels or absent in an individual without conductive pathology or facial nerve involvement, are considered indicators of the involvement of the auditory low nerve/brainstem[27].

The absence of the acoustic reflex in the ispilateral mode in the right ear was prevalent in the study group compared to the control group, the two frequencies tested (1 and 2 kHz) (Table 2). However, this did not occur in the left ear, where the number of subjects with acoustic reflex was equal for both groups, the frequency of 1 kHz and the absence predominated in the control group at 2 kHz (Table 4). The occurrence of ipsilateral acoustic reflex was not statistically different between the study and control groups, in the right ear.

In the contralateral acoustic reflex of the right ear, the absence was prevalent in the study group when compared to the control group, in the frequencies of 0.5 and 4 kHz. The number of subjects with exacerbated contralateral acoustic reflex was higher in the study group than in the control group at all frequencies (0.5, 1, 2 and 4 kHz), while the frequency of 1kHz individuals of the control group showed acoustic reflex exacerbated. The results of the acoustic reflex contralateral right ear were not statistically significant (Table 3).

On the other hand, on the left, the study group was higher incidence of acoustic reflex at all frequencies tested (0.5, 1, 2 and 4 kHz), and the frequency of 0.5kHz no no acoustic reflex in the control group. Similarly, the acoustic reflex exacerbated had higher incidence in the study group, but only at frequencies of 0.5, 2 and 4 kHz. The results of contralateral acoustic reflex of the left ear were not statistically significant (Table 5). It was observed in a previous study[28], thresholds of the acoustic reflex elevated or absent in individuals exposed to solvents who had normal hearing. According to the author, these

findings suggest the retrocochlear and/or central involvement, caused by exposure to solvents. Another study[12] also found a higher percentage of subjects with normal hearing and no acoustic reflex (ipsilateral and contralateral) in the group of workers exposed to solvents. The data from this study corroborate those of CEREST of Campinas/SP[13], where only 27% of the evaluated attendants had abnormalities in the PTA, and yet, 63% of subjects showed changes in acoustic reflexes.

In the present study, there was no predominance of contralateral acoustic reflex over the ipsilateral in the right ear (Tables 2 and 3). In contrast another research[12] observed prevalence of absence of acoustic reflex in the ipsilateral mode when compared to contralateral in the right ear in workers exposed to solvents.

In this research, the acoustic reflex with the highest rate of absence in the right ear was contralateral reflex frequency of 4 kHz, in the exacerbated reflection the frequency with the highest subjects was 0.5 kHz (Table 3). The same was observed in a previous study[5], in relation to the exacerbated acoustic reflex, however, the absence of the acoustic reflex prevailed at 2 kHz.

In the left ear, of the subjects of this study, it was observed the same result from the right ear in relation to the acoustic reflex and exacerbated acoustic reflex (Table 5). Different results were observed by other researchers[5] in the left ear, where the highest percentage of ipsilateral absence was at 2 kHz, and the higher occurrence of exacerbated acoustic reflections, was observed at a frequency of 1kHz (contralateral).

The findings of this study suggest that even subjects with normal hearing in the absence of PTA and with the lack of conductive component may have retrocochlear changes manifested by the absence of the acoustic reflex and exacerbated acoustic reflex, indicating involvement of the auditory nerve (lower brainstem)[27] .

CONCLUSIONS

Gas station attendants exposed to fuels, which have normal hearing showed changes at high frequencies, as well as missing or exacerbated acoustic reflexes, indicating, respectively, cochlear and central change. The exposure time was directly proportional to the extent of the damage.

RESUMO

Objetivo: avaliar os limiares auditivos nas frequências convencionais e altas frequências, e ainda a integridade do arco reflexo, em frentistas. **Método:** foram avaliados frentistas de três postos de gasolina da cidade de Santa Maria/RS. Após adequação aos critérios de inclusão, a amostra ficou composta por 24 frentistas expostos a combustíveis, 21 do gênero masculino e três do gênero feminino, com faixa etária entre 20 e 40 anos. Os exames utilizados foram audiometria tonal liminar, audiometria de altas frequências e imitanciometria. O tempo de exposição variou de um a 17 anos. O grupo controle foi composto por 24 sujeitos não expostos a qualquer agente nocivo à audição. **Resultados:** a média dos limiares da audiometria tonal liminar e da audiometria de altas frequências foi superior no grupo estudo em todas as frequências testadas. Verificou-se diferença de limiar estatisticamente significante nas frequências de 0,5 (p=0,004), 2 (p=0,001) e 3 kHz (p=0,025), e nas frequências de 9 (p=0,007) e 10 kHz (p=0,026). Os limiares das frequências de 12,5 e 14 kHz não diferiram estatisticamente (p>0,05). Em 16, 18 e 20 kHz foi observada maior ausência de respostas no grupo estudo (p>0,05). Também se observou maior ausência de reflexos acústicos (ipsi e contralateral) no grupo estudo, na orelha direita. Na orelha esquerda, não houve diferença entre os grupos, para a ocorrência do reflexo ipsilateral. A ausência de reflexo contralateral foi maior no grupo estudo em todas as frequências testadas. **Conclusão:** frentistas com limiares auditivos normais podem apresentar alterações cocleares e centrais.

DESCRITORES: Solventes; Audição; Perda Auditiva Central

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