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Perceptions of music students about the effects of loud music and protective practices

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ABSTRACT
As with professional musicians, also students can be exposed to dangerous sound pressure levels in the course of their academic activity, which can result in hearing damages. However, there are very few studies focused on the problem of music students' exposure to loud music, particularly about the students' perceptions and behaviours. In view of this, this study attempts to analyse the perceptions of the students about loud music risks, as well as to characterize their preventive behaviours and health effects. To analyse this issue, a questionnaire was developed and applied to music students of a secondary school. 123 students participated in the study. The results showed that most of students perceive ensemble classes and group study as noisy. However, several students assessed the sound levels in the different classes and in the additional study as low or moderate. Brass and percussion were identified as the noisiest instruments and strings were perceived as producing low and moderate sound pressure levels. The results also showed that only a part of the students were concerned with the health effects related to the exposure to high sound levels and the majority reported do not use hearing protection, since they never tried to use it or they seen it as non-necessary. The findings of this study showed that music students are not entirely aware of the risks associated with the exposure to high noise levels in the course of their practice and a strategy to improve protective behaviours need to be implemented in the music schools.

Keywords: Hearing loss; Music; Perception; Sound levels; Students.

1. INTRODUCTION

Several studies have shown that professional musicians are often exposed to dangerous sound levels in the course of rehearsals and performances (e.g. O'Brien *et al*., 2008; Rodrigues *et al*., 2013; Rodrigues *et al*., 2014b), individual practice (O'Brien *et al*., 2013) and teaching activities (Behar *et al*., 2004). Such exposure has been frequently related to Music Induced Hearing Loss (MIHL) (Schink *et al*., 2014), and other hearing loss-related symptoms such as tinnitus, hyperacusis and diplacusis (Laitinen, 2005; Morais *et al*., 2007). In view of this, the auditory acuity of musicians can be compromised putting in question their professional career. However, it is important to note that the musicians' exposure to loud music may start very early, in the course of their academic training.

Professional musicians can begin their training at a very young age, in most of cases with personal classes. After, they can integrate secondary schools that provide musical formation. In those settings, students can be exposed to loud music in the course of individual classes and ensembles, along a broad range of weekly hours (Phillips & Mace, 2008; Rodrigues *et al*., 2014a). In fact, Rodrigues *et al*. (2014a), in a study with Portuguese students of both secondary school and higher education school, showed that students are exposed to high sound pressure levels in the course of the classes, suggesting that students are at risk of hearing damage. The sound pressure levels found for the jazz students in the classes with instrumental practice ranged between 66.6-101.6 dB(A) and for the classical music students between 73.9-96.5 dB(A). The authors also have found high peak sound pressure levels for saxophone and percussion (>135 dB(C)). These findings suggest that such as professional musicians also students can be exposed to dangerous sound levels in the course of their academic activity. Therefore, it is important the students be aware of the risks related to the exposure to high sound levels and protect themselves against such risks.

Despite the importance of this issue, there are very few studies focused on the problem of music students' noise exposure, particularly about the students' perceptions and behaviours. In view of this, this study attempts to analyse the perceptions about students in relation to the loud music risks, as well as to characterize their preventive behaviours and health effects.

It is important to note that the results present in this work are a piece of work of a bigger project, where the sound pressure levels and the different factors that can have influence on students' exposure to loud music are being studied, as well as the hearing effects analysed.

2. MATERIALS AND METHOD

2.1. Sample

The study was developed in a secondary music school. The school comprises a total of 140 students in the instrument courses, of which 123 participated in the study. Most of the participants were males (69%), and their mean age was 15.3 years old (SD = 1.9; interval range 11-20 years old).

2.2. Students' risk perception analysis

With bases on the questionnaire for symphony orchestras proposed and applied by Laitinen (2005), a questionnaire to analyse of students' perceptions about sound pressure levels, the health effects related to the exposure to loud music and preventive behaviours was developed and applied.

The questionnaire was divided in five parts. In the first part of the questionnaire, students' were asked about age, gender, course and year in school. The second part included questions about the weekly exposure to loud music and other noisy activities. The third part of the questionnaire analysed the perception of students about the sound levels in what concerns to: (1) different types of classes; (2) individual and group training; (3) different instruments. The implications of the sound levels on the students' performance was also analysed in this group. The fourth part was composed of seven questions aimed at gathering students' views about heath effects on the following: (1) general negative health effects; (2) degree of care about health effects; (3) previous hearing exams; (4) ear symptoms. In the last and fifth part of the questionnaire, students were asked about the measures for sound levels reduction, particularly regarding usage of hearing protection in different situations. If they answered to use hearing protection, they were queried about the type that they use, and if not, they were asked about the motive to not use it. They were also asked about the use of mutes. At the final, they were inquired about additional care to reduce the sound levels at their own practice.
Students completed the questionnaires in the course a theoretical class. They were notified that their participation was voluntary and confidential and that the results would only used to purpose of this research.

3. RESULTS AND DISCUSSION

The students were asked to assess the sound level of the different classes, the individual and group study, as well as of the different instrument groups, being the results presented in Table 1. The results showed that ensembles and group study were perceived as the noisiest activities. The results also show a significant percentage of students that perceive the sound levels in the different classes and in the additional study as low or moderate. This contrasts with the sound pressure levels identified in other studies. According findings of Rodrigues *et al*. (2014a), the sound levels tend to be higher in ensemble classes for jazz students. However, for classical music students, in some cases, the sound levels were higher in individual classes. However, in general, dangerous sound levels were found in all classes with instrument. Furthermore, also in the course of individual study the students can be exposed to high sound levels. In fact, previous studies have showed that sound levels during individual practice are, in some cases, higher than in ensembles (O'Brien *et al*., 2013).
In relation to the instrument groups, higher sound levels were perceived for brass and percussion/timpany. This is in accordance with previous studies that identified these groups of instruments as the most exposed to loud music (O'Brien *et al*., 2008; Rodrigues *et al*., 2013; Rodrigues *et al*., 2014a; Rodrigues *et al*., 2014b). It is important to note that according these studies string musicians are also exposed to dangerous sound pressure levels. However, in this study, most of the students perceived the sound pressure level produced by this group of instruments as low or moderate.

Table 1- Perception about the level of sound by class and instrument (%)

		VL	L	M	H	VH
Classes	Individual	1.6	12.3	69.7	13.1	3.3
	Ensemble	0.9	3.5	43.5	40.9	11.3
	Other group classes	3.4	22.9	62.7	10.2	0.8
Study	Individual study	1.6	20.5	62.3	13.1	2.5
	Group study	7.1	6.1	43.4	37.4	6.1
Instrument	Strings	2.4	32.5	50.4	13.8	0.8
	Woodwinds	0.8	7.4	51.6	38.5	1.6
	Brass	0.0	0.8	8.2	56.6	34.4
	Percussion/Timpany	0.8	0.0	13.0	53.7	32.5
	Piano	1.6	13.0	57.7	26.0	1.6

VL= "Very Low"; L="Low"; M="Moderate"; H="High"; VH="Very High".

Students were also questioned in relation to the negative health effects of the exposure to high sound pressure levels. Only a part of the students feel worried with its impact on health. In fact, a substantial number of students presented no concerns in relation to the different health effects, particularly in what regards to hearing loss (36.4%), hyperacusis (37.1%), diplacusis (44.4%) and sound distortion (41.4%). This is a critical issue, since these symptoms has been frequently related to the exposure to loud music for both professional musicians (Laitinen, 2005, Morais *et al*., 2007) and students (Gopal *et al*., 2013). Furthermore, in this study, some of the students reported to feel these symptoms. Tinnitus was the highest reported disorder, where 69.9% of the students reported this disorder, particularly after the ensembles, followed by hyperacusis (30.1%) and diplacusis (20.1%).
This study results also indicated that students are resistant to the use of hearing protection. Only few respondents reported to use it but in an occasional way (4.0% in individual classes, 10.6% in ensembles, 7.3% in individual study and 8.1% at group study). In fact, several students mentioned that they or never tried to use it (52.8%) or believe that this kind of protection is not needed for them (52.8%). These results suggest that the music students are not provided with a correct knowledge about the risks that they are exposed, and about the importance to protect themselves. Notwithstanding, the use of mutes is common among the students, where 51.2% of the students referred to use it. This can be related to some impositions of the familiars, neighbours or even the teachers in order to reduce the sound pressure levels produced.

4. CONCLUSIONS

The findings of this study showed that music students are not entirely aware of the risks associated with the exposure to high noise levels in the course of their practice. A significant number of students perceived the sound levels at different classes and at study activities as moderate or low. Furthermore, despite they reported some hearing loss-related symptoms such as tinnitus, hyperacusis and diplacusis, the study showed that they are not entirely concerned with this issue.

In view of this, it is essential that schools provide additional programs on this issue, as they are responsible to inform all the students about hazards associated with music activities. Furthermore, schools of music are in a privileged position to facilitate change, promoting preventive behaviours among students.

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