

Educational Action Focused on the Prevention of Hearing Loss due to High Sound Pressure Levels and on Tinnitus-An Experience Report

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Abstract

Introduction: Increasing urbanization and the advancement of technology favor the rise of sound pressure levels (SPL) in the streets, at work and at leisure. Research groups and scientific societies around the world; warn about the importance of promoting hearing health for the younger population, with emphasis on the effects of noise.

Objective: The aim to present an experience report of an educational activity aimed at preventing Hearing loss and tinnitus for the promotion of hearing health in a school.

Method: This is an experience report, whose methodological approach is an observational descriptive study. The study was conducted in a private educational institution. To carry out this sampling, a meeting was held for students from 6 to 11 years old in elementary school, one for students from 12 to 17 years old elementary school and middle school, and a third one for high school students, in all totaling 606 students. The methodological approach used in the educational activity was a dialogued expository lecture based on a problematizing teaching model.

Results: In the lecture the following topics were discussed: hearing anatomy and physiology, sound conduction, dangerous sounds, the consequences of dangerous sounds to general and auditory health, with an emphasis on high sound pressure level induced hearing loss and tinnitus, as well as its prevention.

Conclusion: The lecture used to promote hearing health at school was satisfactory. The recreational activities used were essential to encourage students to exchange experiences, opinions, and reflect on the topic.

Introduction

Increasing urbanization and the advancement of technology favor the rise of sound pressure levels (SPL) in the streets, at work and at leisure. Research groups and scientific societies around the world, warn about the

importance of promoting hearing health for the younger population, with emphasis on the effects of noise [1-4]. According to the World Health Organization (WHO), about that 1.1 billion young people worldwide are at risk of noise induced hearing loss due to unsafe use of personal audio devices. Almost half of all adolescents and

young adults (12-35 years old) in average and high income countries are exposed to unsafe levels of sound from the use of personal audio devices and about 40% of them are exposed to potentially harmful noise levels in clubs, discos and bars [2]. The habit of listening to music using headphones, among other noisy leisure activities, is an increasingly common behavior among young people worldwide. However, not everyone knows that excessive use of these devices may cause irreversible hearing damage [5-23]. Studies report on high frequency auditory symptoms such as tinnitus and hearing loss (temporary or permanent), after leisure activities involving noise [6,24-29]. The analysis of data from the National Health and Nutrition Examination Survey in the United States suggests that between 1994 and 2006, the prevalence of hearing loss among adolescents (12-19 years old) increased from 3.5% to 5.3% [30].

Studies [31,32] indicate an increased susceptibility to developing hearing loss in adulthood when there is early exposure to high sound pressure levels. One author [32] highlights concerns about the increased susceptibility of hearing damage and tinnitus in younger people. Although the existence of tinnitus in childhood and adolescence have been well reported since 1970, the real prevalence in this population remains uncertain, with values ranging from 6% to 59% in different studies [27] The author [27] attributes this discrepancy to methodological differences, from the selection of the sample to different models of questioning and statistical analysis. In one study [28], when evaluating a sample of 3,892 students with an average age of 16.64 years, they found temporary tinnitus prevalence of 74.9%; and in a study from 2009 [33], the prevalence of tinnitus was 61% among 9,693 subjects with a mean age of 19.2 years. Moreover, one study [29] with audiometric data and a demographic representation of 3,520 subjects between 12 and 19 years old showed prevalence identified as temporary tinnitus of only 7.5%, however, it should be emphasized that such a percentage represents around 2.5 million adolescents in the United States. In this population, the presence of tinnitus was related to the female gender, low income, passive smoking, and occupational and recreational noise exposure.

To act in a more objective and direct way for orientation, awareness and prevention of high sound pressure level induced hearing loss (HSPLIHL) and tinnitus in young people, prevention programs to promote hearing health are highly recommended [7,34-38]. Guidance actions for hearing preservation can avoid noise induced hearing loss by promoting better hearing health through educational strategies, changing lifestyle, and behavioral factors [39,40]. Thus, this study aims to

present an experience report of an educational activity aimed at preventing HSPLIHL and tinnitus for the promotion of hearing health in a school.

Material and Methods

This is an experience report, whose methodological approach is an observational descriptive study. Data collection took place between the months of November 2014 and October 2015. The study was approved by the Ethics in Research Committee under registration number CAAE 0214.0.208.000-11 and recorded in CEP: 2576.183/2011-8. All participants signed a consent form. The study was conducted in a private educational institution located in the city of Florianopolis. To carry out this sampling, a meeting was held for students from 6 to 11 years old in elementary school, one for students from 12 to 17 years old elementary school and middle school, and a third one for high school students, in all totaling 606 students. The methodological approach used in the educational activity was a dialogued expository lecture based on a problematizing teaching model [41-44] given by a speech-language therapist, lasting 30 minutes for each class, due to the participants' concentration period to listen and assimilate. The talks took place in the school auditorium, with the following topics: anatomy, physiology of hearing, sound conduction, dangerous sounds, and the consequences of dangerous sounds to general and auditory health, with an emphasis on hearing loss induced by high sound pressure levels and tinnitus, as well as its prevention. For the lecture, a projector and online videos were used as educational resources. The lectures were accompanied by fun strategies of interaction where the students were divided into small groups. The students were encouraged to reflect on the topic. Games and measurement of sound pressure levels were used, with the aid of a MINIPA decibel meter. The results of this study will be presented in a qualitative descriptive format.

Results

In the lecture the following topics were discussed: hearing anatomy and physiology, sound conduction, dangerous sounds, the consequences of dangerous sounds to general and auditory health, with an emphasis on HSPLIHL and tinnitus, as well as its prevention. First, to demonstrate the anatomy and physiology of hearing we played a video about sound conduction. The students showed interest and attention during the video. Another video was shown that demonstrated the perception of sound. In the video presentation, the sound perception of subjects with normal hearing, mild loss, severe loss, moderate loss and profound loss were shown. The lecture

was followed with an explanation of hearing loss induced by high levels of sound pressure, its causes, characteristics, effects and prevention. After the explanation, the students were asked at random to participate in a fun activity, based on one of the activities from the Dangerous Decibels program [3,35]. Stiff bristle bundles (pipe cleaners) were distributed, which represented the hair cells, and students were asked to move the bristles to the rhythm of rock music, played at high volume, and to stop moving them as soon as the song ended. Students observed that the bristles were no longer in their natural state and would not return to their initial state. It was then clear that hair cells can be damaged by intense sound and that the damage may be permanent. Students were surprised at the result.

The sound chart was presented, emphasizing the recommended intensity for certain locales, including the classroom, shows, and sports activities, among others. After the demonstration, a measurement of the sound pressure level in the auditorium was conducted. With the help of a sound level meter, the students observed the sound intensity at normal and quiet moments, and after seeing the noise intensity variations, compared them with the levels recommended by national legislation (NBR-10152) [45]. Next, the students were encouraged to participate by answering the question "What can cause HSPLIHL in you?". On a blackboard, students wrote a list of responses: airplane turbine, loud music, firearms, fireworks, and headphones, among others. Demonstrating that the information worked on previously had been understood. Then the students were encouraged to answer the question "What are the consequences of HSPLIHL?". Students reported experiences at home with people who have hearing loss and made a list that included: irritability, stress, tinnitus, and difficulty understanding speech, among others. Those topics had been previously addressed by the lecturer. Next the students were encouraged to answer the question "How can you prevent HSPLIHL and tinnitus?". The participation of students was contagious and they were willing to collaborate on the prevention list with answers such as: avoid loud music, move away from the sound source, and lower MP3 player volume, among others. The activity ended with the invitation to continue preventive actions related to noise and hearing health at the school in question.

Discussion

HSPLIHL is still considered a major health and social problem [1,4], which justifies development and implementation strategies [7,34-38]. Concerned about youth exposure to noise that is harmful to hearing,

researchers have been developing different educational programs in the classroom, generating greater awareness about the damage that excessive exposure to noise causes, as well as about the need to use hearing protection [7,34-40]. In this perspective, the earlier children start being aware of hearing risks, through campaigns and educational programs in primary school, the more effective their knowledge, attitudes and intentions will be in preventing hearing loss, thus avoiding the usual risky behavior [35,36]. The problematizing or popular education model, based on Freire's theory, allows the individual the right to have information to actively participate in health actions, which contributes to a more democratic society and promotes the development of the potential of individuals and collectives [41]. Knowledge can only be checked when the person learns from his or her own challenges, which take place continuously through knowledge sharing between professionals and individuals in the construction of new knowledge [42]. Problematizing pedagogy provides a participatory educational practice, based on people's reality from personal experience, the value of dialogue, enabling the discussion of everyday problems, and finding solutions through joint knowledge [43]. There is not a single methodology or fixed techniques, it is guided by the perception of reality, protagonism, and group work [44].

This practice focuses on the learning process through actions implemented jointly by teachers and students, from their own reality, considering their knowledge and experiences, to identify everyday problems and seek concrete solutions in order to build collective knowledge [42]. The strategies used in participative health education are diverse and should be considered as a set of possibilities. These techniques can use: illustrative materials (brochures, pamphlets, videos, newspapers, magazines); expository and/ or participatory classes; individual activities; group activities; and events [46]. Methodological resources most frequently used in health education are: workshops, group dynamics, lectures, seminars, debates and round tables, exhibitions, production/ or distribution of educational materials, display monitored videos, guidance, contests and competitions, theater, and music, among others [46]. Doing only a single intervention is not recommended, as systematic and continuous actions are reported as key to achieving success in programs for the prevention of hearing loss. Continued intervention in the family environment is important, through the support of parents, to help maintain healthier habits related to high-volume listening, and to support teachers and health professionals [36-38]. The participation of health professionals and teachers is fundamental to this process, to promote reflection on the subject, modify behaviors in

school, and promote effective parental involvement, which is essential to the success of hearing-loss prevention programs [36,37]. In this context, and linked to the pedagogical function, the school has a social and political function directed at the transformation of society, related to the exercise of citizenship and access to opportunities for development and learning – reasons for actions directed at the school community given the proposals to promote health by the Ministry of Health (2010) [46]. This study had the limitation of being based on a single intervention within the school, and not having applied a pre- or post-intervention questionnaire for students, which would quantitatively evaluate the impact of educational and preventive strategies in students. Thus, it is suggested that future studies contemplate systematic interventions with different strategies, involving the whole school community and family. In addition, the use of questionnaires is recommended to analyze the effectiveness of initiatives in changing habits and behaviors as suggested by authors [10,11,21,47,48].

Conclusion

The methodological approach used to promote hearing health in school was a dialogued expository lecture, where besides the presentation of the proposed topics, interaction strategies were performed, using fun activities. The lecture used to promote hearing health at school was satisfactory. The recreational activities used were essential to encourage students to exchange experiences, opinions, and reflect on the topic. The results showed involvement by the participating student community. The audience composed of students and teachers showed respect and attention to the topic, interest in the subject, and involvement in the project. They presented evidence of concept internalization that was spontaneously perceived throughout the discussions, something that can mobilize the implementation of a hearing health program in the next school year.

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