

The effects of leisure noise exposure on young people's hearing

BY HANNAH KEPPLER

There is growing concern regarding the effects of leisure noise exposure on young people's auditory system. Information provided by healthcare professionals should be evidence-based; **Hannah Keppler** discusses some recent findings about hearing in young people.

Excessive noise exposure can lead to hearing-related problems such as noise-induced hearing loss, tinnitus and noise sensitivity.

As well as occupational noise exposure, leisure noise exposure is also a cause for concern. Young people expose themselves to high levels of noise frequently during various leisure activities, such as listening to music through earphones, and attending nightclubs and concerts. Reports regarding the effects of leisure noise exposure on the auditory system in young people are on the rise, not only in mainstream media, but also in scientific literature. Research is focused on either investigating the association between hearing loss and leisure noise exposure, or determining the prevalence of hearing-related problems due to leisure noise exposure.

Research regarding the association between hearing loss and leisure noise exposure is complicated by the accumulation of various leisure noise activities, as well as its dependence on an individual's risk-taking behaviour. At Ghent University, Belgium, the effects of leisure noise exposure, and the effects of attitudes and beliefs toward noise, hearing loss and hearing protection devices on the auditory system of young people were investigated. A comprehensive questionnaire and an audiological test battery were used with 163 subjects ranging from 18 to 30 years old [1,2]. Hearing was assessed by an otoscopic evaluation, admittance measures, pure tone audiometry at conventional and extended high frequencies, and transient evoked and distortion product otoacoustic emissions. It was found that the majority of subjects listened to a home stereo or radio

through speakers, visited nightclubs and / or pubs, and practised a musical instrument on a weekly basis. The duration of participation in the leisure noise activities was highest for listening to a home stereo or radio, watching movies or plays, and attending sport events. Music concerts and festivals were estimated as the loudest activities. The time per week and number of years spent on each activity, as well as the self-estimated volume level, were used to calculate the weekly and lifetime equivalent noise exposures. The relative contribution of personal music players to levels of noise exposure was considerably less than that of visiting nightclubs or pubs, attending musical concerts or festivals, and playing in a band or orchestra. Furthermore, there were no significant differences in hearing thresholds, and amplitudes of transient evoked and distortion product otoacoustic emissions between groups with low, intermediate and high equivalent noise exposures for all leisure noise activities. Among other factors, it could be that a retrospective estimation of leisure noise activities is not accurate enough to evaluate the effects of leisure noise exposure on hearing in young adults. Furthermore, using a Dutch version of the Youth Attitude to Noise Scale (YANS) and Beliefs about Hearing Protection and Hearing Loss (BAHPHL) scale, it was found that subjects with more pro-noise attitudes and those experiencing difficulty in taking preventative action had significantly worse hearing thresholds and / or amplitudes of transient evoked and distortion product otoacoustic emissions.

Literature regarding the increasing prevalence of hearing-related problems due

to leisure noise exposure is inconclusive, largely due to methodological differences and / or inconsistencies [3]. In Flanders, the Dutch speaking part of Belgium, the epidemiology and risk factors of tinnitus due to leisure noise exposure was evaluated in 517 subjects between 18 and 30 years old [4]. It was found that 68.5% of the subjects had experienced temporary tinnitus in at least one ear, while chronic tinnitus in one or both ears was already present in 6.4% of the subjects. The presence of chronic tinnitus was significantly associated with self-reported higher lifetime equivalent noise exposure from nightclubs and music venues. Furthermore, using the YANS and BAHPHL scale, it was established that subjects with chronic tinnitus tend to find noise more problematic, and were more aware of their susceptibility to hearing loss and of the benefits of preventive action than the subjects with temporary or no tinnitus. They were also more willing to engage in health-orientated behaviour.

These results stress the importance of implementing preventive measures, such as controlling intensity levels during leisure noise activities, and educating young people about the risks of noise exposure. A theoretical framework explaining noise exposure risk-taking behaviour by young adults during leisure noise activities was constructed by Widen et al [5]. It combines all factors from the 'Theory of Planned Behavior' - attitudes, subjective norms and perceived behavioural control - with factors from the 'Health Belief Model' - barriers to behavioural change and triggers to action - and adds the factor, risk perception. The latter deals with an individual's awareness of the risks of noise exposure. It was found

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that more problematic health-oriented attitudes and beliefs regarding noise, hearing loss and hearing protection devices result in more deteriorated hearing [1] and that the presence of tinnitus can trigger more anti-noise attitudes and beliefs [4]: these results support Widen’s framework. Thus, knowledge of these factors can be used to optimise hearing conservation programmes aimed at inducing behavioural change at an individual level. Hearing conservation programmes usually provide information on the effects of hearing loss, thus increasing awareness of the risk of excessive noise exposure. The effects of a hearing education programme were evaluated in 78 subjects between the ages of 18 and 30 [6]. Before and approximately six months after the hearing education programme, hearing was assessed and a questionnaire was used to investigate risk-taking behaviour regarding noise exposure. After the first session, subjects were informed about their hearing status, and information regarding the risks of recreational noise exposure and preventative actions was provided. There was a significant decrease in the estimated weekly equivalent noise exposure, and in several elements of the YANS and BAHPHL scale. However, the long-term effects of hearing conservation programmes and their most cost-efficient repetition rates should be investigated. In the meantime, hearing conservation programmes should be available to all young people exposed to noise during leisure activities; for example, by implementing them in school curriculums. Finally, more longitudinal studies are necessary to investigate the development and prevalence of hearing-related problems due to leisure noise exposure in relation to the attitudes and beliefs of young people regarding noise exposure, hearing loss and hearing protection devices.

SUMMARY

- There were no significant differences in hearing between groups of young people with different amounts of self-reported leisure noise exposures.
- Young people with more pro-noise attitudes and those experiencing difficulty in taking preventative action had significantly worse hearing.
- Chronic tinnitus in at least one ear is observed frequently (6.4%) in young people in Flanders, Belgium.
- The presence of chronic tinnitus was associated with higher leisure noise exposure, and more anti-noise attitudes and beliefs regarding noise exposure, hearing loss and hearing protection devices, compared to subjects with temporary or no tinnitus.

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