Critical Review: What is the effect of noisy listening environments on personal listening levels when using a personal listening device?

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Within Groups Repeated Measures

Rice et al ( ) attempted to determine an estimation of hearing damage risk from personal cassette players. In this article the data was combined from two different studies to report listening levels and hours per week use. To date no study had combined an individual's listening levels to the hours of use they were exposed, thus fighting this previous limitation.

The first study conducted by Breslin includes 0 subjects that were tested in a laboratory and asked to adjust a calibrated personal cassette players (PCP) to a desired level in quiet and against a traffic noise background L_{Aeq} of 0 dB (equivalent continuous A-weighted sound pressure level). The differences seen here were small having users increase their desired level in quiet of 0. to . dB $L_{Aeq,}$ in noise. The second study carried out by Roper includes subjects that were stopped on the street in a variety of noisy background environments and asked to participate. A sound level meter was used to measure the L_{Aeq} over a minute period of their own PCP. Additionally, they were asked to adjust the volume of a pre-calibrated PCP and measurements were made in the same manner.

Due to the lack of difference in quiet and noise shown through statistical analysis in Berslin's study, his values were pooled with Roper's values in noise. Two analyses were performed, the first relating to listening levels (L_{Aeq}) and the second to noise exposure measured in terms of equivalent daily listening levels averaged over a 0 hour week (L_{EX}) (Rice et al.). Having L_{Aeq} values alone doesn't take into account the length of time users exposed, therefore not being able to make an estimation of damage risk involved. Converting the data to the L_{EX} allowed Rice et al ( ) to compare values against the normally accepted criteria for the estimation of noise-induced hearing loss (Robinson and Shipton,).

For the purpose of this study, hearing disability occurs when the mean hearing level of , , and kHz is equal to or greater than 0dB. When referring to Robinson and Shipton ( ), 0dB losses do not occur for noise emission levels below 00dB which is equivalent to an L_{EX} adjusted for a 0 year period (Robinson and Shipton,). Using mathematical calculation of the data, it was estimated an

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The mean $L_{Aeq, h}$ was . dB with a standard deviation of .0 dB. This conversion was done to make comparisons against the noise exposure figures used for workplace noise exposure regulations in common use around the globe (I-INCE).

The . dB $L_{Aeq, h}$ was found to be well below the noise exposure level commonly set at the level of acceptable risk for workplace noise exposure (dB) but above the level considered to represent negligible risk (dB). Although the average was below, of the population in this study was beyond levels deemed at-risk. Also, statistical analysis revealed that males showed a significant tendency toward greater noise exposure levels compared to females, 0. dB compared to . dB respectively.

A limitation of this study was that a person chosen at random could have any type of hearing loss. By including people with hearing loss you could have increased PLL and thus skew your data. One participant actually had a high frequency hearing loss and wore his headphones over his in-the-ear (ITE) hearing instruments. Also, due to the small sample size any conclusions derived from this study is constrained to the populations that match the sample statistics. By using a KEMAR you are assuming each participant has average adult RECDs. Nobody is the average and by not measuring individual RECDs you do not know what level each person is actually exposed to.

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was to use the measured PLLs to determine the permissible listening duration to reach 00 daily dose.

Thirty-eight subjects participated in this study (