

## Noise level exposure in school classrooms

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Noise exposure inside classrooms may affect several ways to school children and teachers. According to the literature, high noise levels in classrooms minimize a wide range of attainments and performances in the areas such as literacy, mathematics, attention and memory of students. Main objective of this study is to investigate the noise level and its frequency spectrum in class rooms. Noise levels in classrooms of ten schools in urban area of Matara city in Sri Lanka were measured during a two-month period using B&K Type-2250 hand held analyser. A weighted averaged noise level descriptor,  $L_{Aeq}$  (dB), with 1/3 octave band centre frequency from 6.3 Hz to 20 KHz was monitored. The noise level in a classroom depends whether the teacher is present or not in the class. The noise level in the classrooms with the presence of the teacher,  $L_{Aeq}$ , and absence of the teacher,  $*L_{Aeq}$ , were recorded. The analysis was performed under four categories of classes, grades 1-5 (Cat. I), grades 6-8 (Cat. II), grades 9-11 (Cat. III) and grades 12-13 (Cat. IV), respectively.

The noise levels inside the classrooms while teaching were lower in higher grades (Cat. IV:  $L_{Aeq} = 65 \pm 2$  dB(A)), and higher in lower grades (Cat. I:  $L_{Aeq} = 72 \pm 3$  dB(A)). However, when the teacher is absent, the noise levels are higher than the above values but shows the same pattern,  $*L_{Aeq} = 73 \pm 2$  dB(A) for Cat. IV and  $*L_{Aeq} = 81 \pm 2$  dB(A) for Cat. I. The highest noise level in the frequency spectrum was found to be in the range of 315 Hz to 1 kHz and from 160 Hz to 4 kHz while teaching and the teacher is absent, respectively. The ambient noise level inside the school halls and outside the halls were found to be in the range 50-60 dB(A) and 70 – 80 dB(A), respectively, after the school hours. All noise levels, ambient noise level inside as well as outside the classrooms, and the noise level inside the class while teaching are found to be higher than WHO recommended values in all schools studied. Therefore, teachers have to speak louder than in a normal speech (50 dB(A)) to maintain at least 15 dB(A) above the background noise to maintain the required signal-to-noise ratio of a speech. These results clearly indicate that the speech intelligibility in all classrooms is adversely affected by the background noise. The problem is worse in primary classes than in higher grades.

**Keywords:** Noise exposure, School children, Signal-to-noise ratio, WHO recommendation,  $L_{Aeq}$

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