

**NOISE-INDUCED HEARING LOSS IN SCHOOL AGE CHILDREN: QUESTIONNAIRE, OTOLOGICAL AND AUDIOMETRIC STUDY\***

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**Introduction and purpose of the study**

Some data are available that children and adolescents are put at risk of adverse health effects from exposure to environmental noise related mainly to their behaviors. According to WHO the noise-induced hearing loss (NIHL) in teenagers is estimated to be 15-17%.

This study aimed to assess the prevalence of NIHL in young people considering that even minimal loss may cause a poor school performance and next limit ability to work of prospective adult employee.

**material and methods**

The representative sample of 700 pupils of grammar and secondary schools, 13-18 years old (mean 15.98 ± 1.58) selected by two-stage random sampling was subjected to otological and audiometric examination performed by the ENT physicians and trained technicians. Hearing thresholds were obtained for each ear respectively at 250, 500, 1000, 1500, 2000, 3000, 4000, 6000 and 8000 Hz in 5 dB increments, using Interacustics Audio-Traveler AA 222 audiometer equipped with TDH 39P earphones; ambient noise levels in audiometric sound-treated room met the IEC 645 standards. The detail questionnaire was given before examination to determine the frequency and duration of visits to discotheques or pop/rock music concerts and use of personal audio players (PAPs), and to identify factors that might affect the test results (e.g. otitis media, past ear surgery, head trauma, epidemic parotitis, cerebrospinal meningitis etc.).

**material and methods continued**

**A**

School Type	Number of Pupils
grammar school	322
secondary school	378

**B**

Sex	Number of Pupils
boys	399
girls	301

**C**

Age	Number of Pupils
11	50
12	181
13	133
14	223
15	205
16	118

Fig. 1 Examined pupils by the type of school (A), sex (B) and age (C)

**results and conclusions**

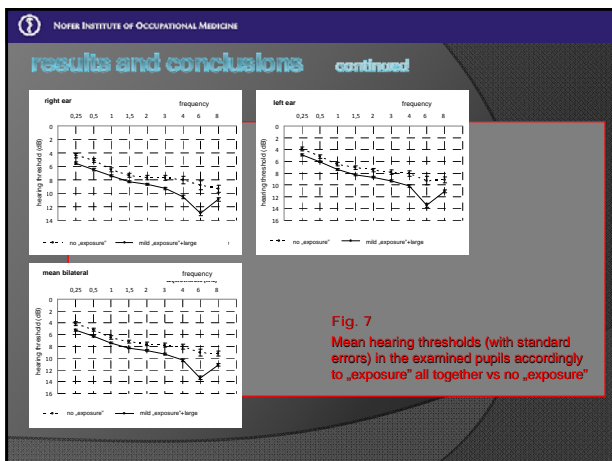
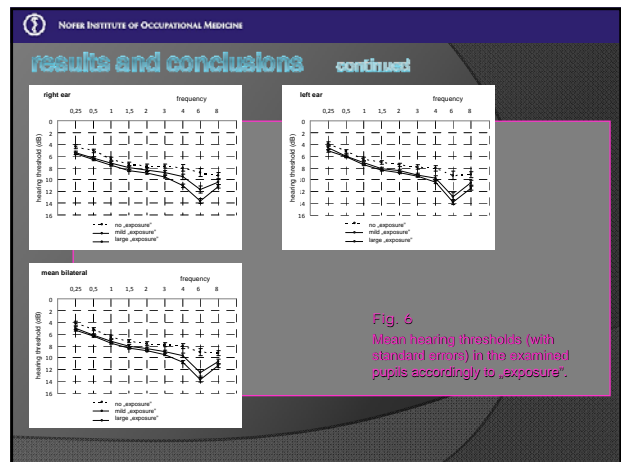
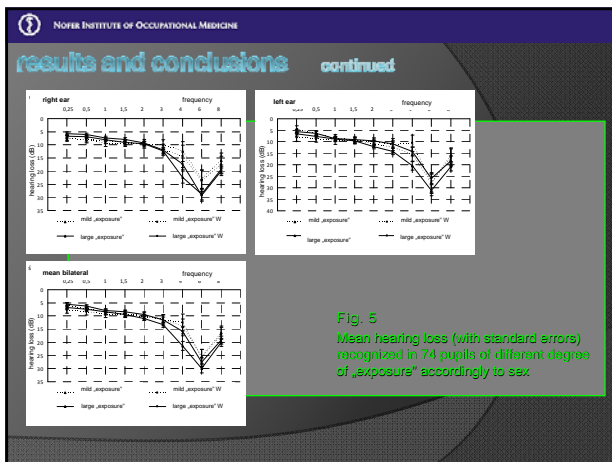
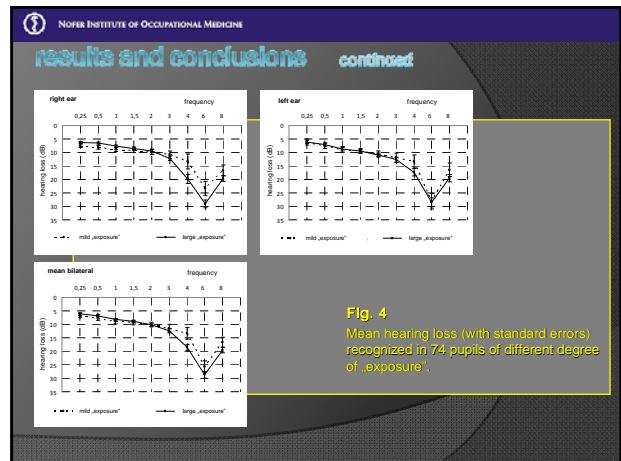
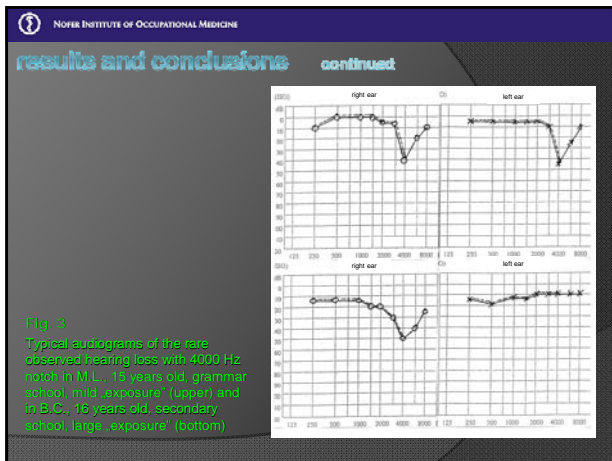
Fifty seven pupils (8.1%) were excluded from further evaluation because of recognized the middle ear pathologies and conductive hearing loss (N=50), diagnosed profound sensorineural hearing impairment due to meningitis in childhood (N=1) and incomplete questionnaires or testing (N=6). The resultant sample consisted of 643 children and the analysis of their fulfilled questionnaires have allowed to separate three groups as follow: 131 pupils (20.4%) not „exposed” (never attended discos/concerts or used PAPs), 169 (26.3%) with mild „exposure” (they reported visits to discos/concerts 1 x monthly; PAPs 1-3 hours daily, 1-3 x weekly) and 343 (53.3%) with large „exposure” (discos/concerts 1-2 x weekly or more; PAPs 4-7 hours daily or more, 4-7 x weekly).

Subjects	„Exposure”						All together	
	no exposure		mild		large		n	%
Pupils without hearing loss	131	100.0	151	89.3	287	83.7	569	88.5
Pupils with hearing loss	0	0.0	18	10.7	56	16.3	74	11.5
All together	131	100.0	169	100.0	343	100.0	643	100.0

**results and conclusions continued**


In both exposed groups the notched hearing losses at 4000 or 6000 Hz were detected respectively in 18 pupils (10.7%) with mild „exposure” and in 56 (16.3%) with large one. Tinnitus, a frequent concomitant of NIHL was complained by 24 subjects (32.4%). The mean hearing thresholds of the not „exposed” teenagers vs. those „exposed” groups differed significantly (p<0.005) amounting respectively to 4.39-9.31 dB vs. 5.53-12.97 dB.

Fig. 2 Typical audiograms of the most frequent recognized hearing loss with 6000 Hz notch in W.P., 17-years-old, secondary school, large „exposure” (bottom); normal hearing thresholds (examples) in J.K., 14-years-old, grammar school, no „exposure”



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results and conclusions continued



The above findings are similar to those obtained in the Third National Health and Nutrition Examination Survey among children 6 to 19 years of age in the US (Niskar et al., 2001, Holmes et al., 2004) and also published by Martinez-Wbaldo et al. (2009), who investigated relationship of NIHL with recreational noise in high school teenagers in Mexico City.

Our study proves that a loud music may create a risk for hearing damage in school age children and therefore promotion/education of healthy listening habits as well as the screening of hearing should be urgently introduced.



**THANK YOU  
FOR YOUR KIND ATTENTION**