

Evaluation of pupils' awareness of noise and its sources

Erikas Maëiūnas¹,

Eglë Þvirblytë Virbickienë¹,

Antanas Marcijonas²,

Algirdas Juozulynas³,

Aloyza Luköienë³

¹ State Environmental Health Centre, Kalvarijø 153, LT-08221 Vilnius, Lithuania

² Vilnius University Faculty of Law, Vilnius, Lithuania

³ Vilnius University Institute of Experimental and Clinical Medicine, Vilnius, Lithuania

Objective. To investigate the effect noise on children and youth in their household activities, in the environment where they live, study and spend their leisure time.

Materials and methods. The study cohort comprised 5135 pupils aged 9–19 years from all over Lithuania. The questionnaire consisting of 13 questions, 5 of which were open questions, was used in the study. An adapted variant of World Health Guidelines for community noise was used.

Results. In their answers, 43.6% of pupils indicated that there were noise sources close to their homes, 49.6% of all respondents suffered from ringing in the ears after being in noisy environment. Only 24% of respondents indicated that loud music was bad for them: girls twice more often than boys. But only 14% of all respondents reduced the sound volume of music while listening to it: young pupils more often than seniors, girls more often than boys. Some of them indicated that it depended on their mood.

Pupils mentioned the following means for escaping noise most frequently: to avoid noisy places, use ear-tabs or ear-plugs, eliminate noise sources, talk silently, ask others not to raise noise. Some of the pupils mentioned, that it is impossible to avoid noise.

Conclusions. Of all respondents, 86% indicated the environmental noise sources that raise anxiety. These sources can be divided into several groups: noise related to household activities (members of family, equipment); outdoor environment (people, equipment and animals); noise raised by transport (motor vehicles and different alarm signals); public institutions or places for entertainment; school (teachers, pupils, equipment), other noise sources. The pupils had a similar opinion about the character of noise sources at home. Opinions differed about the outdoor noise sources: 38% of respondents indicated that these were people, 52% – equipment, 10% mentioned animals. The pupils openly described the above-mentioned situations as raising many negative emotions, especially to teenagers. They are especially sensitive to a noisy environment: fighters, airplanes, trains, road transport, etc. The pupils are harmed by noisy neighbours, their crying children, barking dogs, as well as by noise at school and in the places where they spend their leisure.

Key words: noise, evaluation, children, environmental

INTRODUCTION

It has been proven that noise negatively affects the quality of society's life and health (1). The World Health Organization points out that noise can cause hearing disturbances, sleep disorders, stimulate emission of stress hormones, cause dissatisfaction, influence social behavior and the understanding of language, negatively affect the learning process and in-

tellectual tasks. It indicates that approximately 40% of European Union inhabitants are exposed to an increased environmental noise during the daytime and about 20% during the night (2).

The most common sources of noise are transport, construction works, and activities of neighbours, leisure time places and domestic environment. TV sets, musical instruments and recorders, children's toys, computer games and people themselves usually cause environmental noise.

Environmental sources of noise affect children and youth, i. e. the most vulnerable part in a population.

Corresponding author: Erikas Maëiūnas, email: emaciuna@takas.lt

Sources of noise usually occur in the same environment where they live, learn and spend their leisure time.

Scientists have found that noise in lodgments and rooms during the day cannot exceed an allowable limit, otherwise the normal students' activity is be disturbed. The comprehension of language is especially important in the situations when there is a need to hear and assimilate difficult and new things, such as in learning foreign languages at school.

The facts given by the American Association of Acoustics suggest that even 25% of the information given in lessons is not assimilated because of the environmental noise (3). The rate in Lithuania could be the same. When engaged in mental activity which requires good memory and attention, a student is very sensitive to environmental noise. It negatively affects the quality of exercises and durability of their accomplishments.

It has been proven scientifically that inauspicious environmental conditions, the susceptibility and increased vulnerability of a growing body's psychical and physiological functions determine the damage of children's nervous system and the neuropsychic diseases (4).

In 2002, the Public Health Centre in Vilnius performed noise measurements in fifteen different schools' classrooms that had windows facing a street. The noise level in these classrooms exceeded turre the allowable limits, although no survey on the students' attitude towards surrounding noise was done (5).

In 1995, the Parliament of Lithuanian Republic ratified the UN Convention on the Rights of the Child. Article 17 of the Convention regulates children's protection against misbehaviour, abuse, care absence and negligence. It points out that the state must protect a child against the misbehaviour of his/her parents or other persons responsible for the child's care. Article 24 covers children's right to the best health care. It points out that the state has to take care for the primary medical service, disease prevention, various types of propaganda, etc.

The European Parliament and Committee Directive 2002/49/EC regarding the estimation and control of environmental noise emphasizes one field i.e. school areas. This legal act has a recommendatory power only, therefore, implementing the attitudes stated in the directive the Lithuanian Republic has passed a law concerning noise control (6).

There are laws *de jure* that regulate noise and measures for its control. There are also conventions, which Lithuania is supposed to follow, especially as far as children are concerned, but *de facto* it means the lack of finances and measures to enforce them. Children have insufficient information about noise-caused hearing disorders, therefore they listen to loud music, play computer games and make different kinds of noises. It has a negative impact on them and their friends (7, 8).

MATERIALS AND METHODS

Data were collected on 5135 pupils aged 9–19 years (see Fig. 1) from all over Lithuania, all secondary schools in 10 regions (see Fig. 2) participating in the study, 2370 boys and 2765 girls.

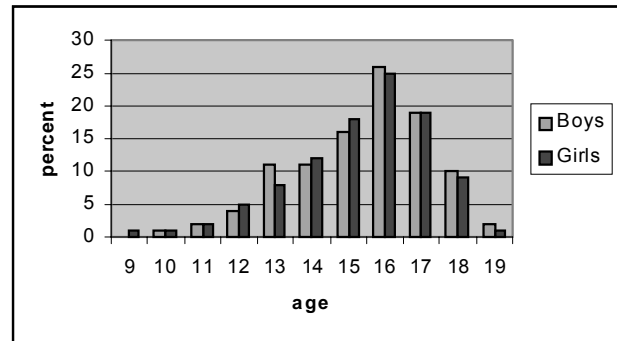


Fig. 1. The age of the survey participants

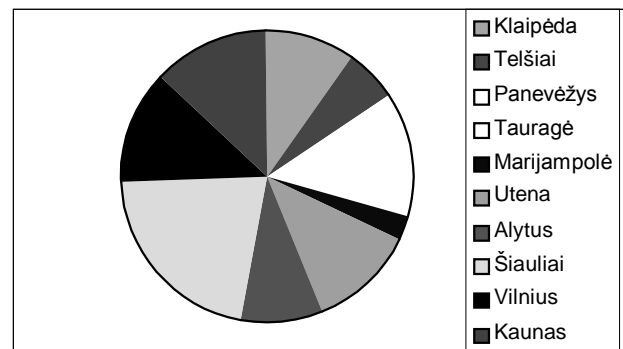


Fig. 2. Survey participants' distribution according to regions

An anonymous semi-structured questionnaire was applied for the data collection. The questionnaire consisted of 13 questions. Eight questions (statements) had several standard answers "yes" or "no". Respondents had to select just one answer out of the presented ones. Schoolchildren were asked about loud music, computer games, people's job related to noise, listening to music, diminishing of hearing ability, use of personal portable players and noise sources present near children's home. Five questions were of open type. Schoolchildren were asked about the noise protection measures, common noise sources and noise that caused most harm to them.

Quantitative and qualitative methods were used for the data analysis.

For data entering, the EpiData 2000 software was used; analysis of the results was conducted using the EPI INFO 2004 version. An adapted variant of World health Organization (1999) Guidelines for community noise was used.

RESULTS

Of those who answered the questionnaire 57.9% boys and 47.2% girls have agreed with the statement

that with time human hearing ability diminishes and this cannot be escaped. 42% of all respondents expressed their consent to the statement: "The hearing of persons on the noise-related jobs is not damaged because they perform their job tasks on a daily basis and get accustomed to the noise".

Asked whether the noise generated by computer games may cause the parents to get nervous, but it cannot damage the child's hearing, 49.3% answered "of course".

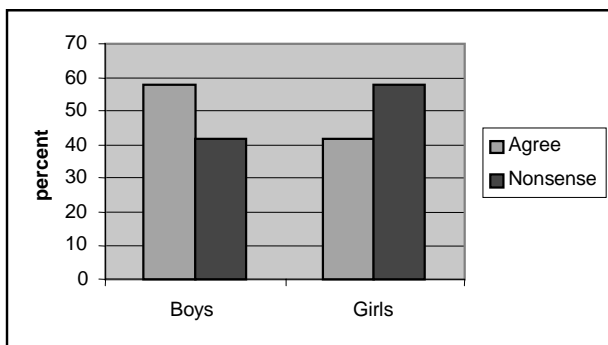


Fig. 3. Distribution according to gender of schoolchildren who thought computer games cannot damage their hearing ability

Figure 3 shows that such an opinion has been more often expressed by boys than by girls. The respondents have been asked if loud music is good or bad. Only 24.4% of all respondents answered that loud music was bad for them. Girls expressed this statement twice as often as boys. Only 14% were apt to lowering the volume while listening to music, and girls did this twice as often as boys. Some have noticed that this depends on their mood. (see Fig. 4).

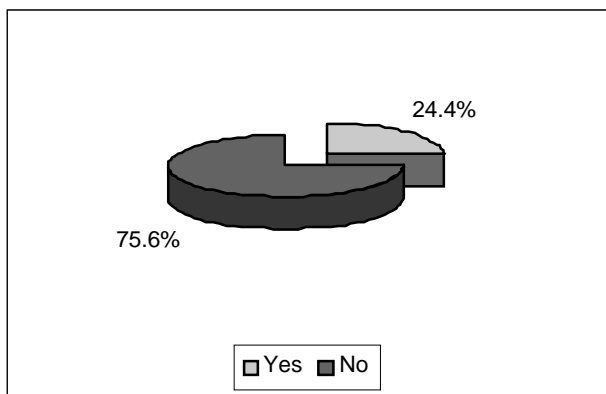


Fig. 4. Percentage of schoolchildren thinking that loud music is good

86% of all respondents have named at least one noise protection remedy, although only a small part of the study participants could name two, three or even four such remedies. The following noise protection remedies have been mentioned by the pupils: avoidance of noisy places, use of headphones and earplugs, trying not to make noise by himself, avoidance of listening to loud music, asking others not to

make noise, elimination of sources of noise and talking more silently at school. The other part has stated that it is impossible to avoid noise. A seventeen-year-old girl has noticed the best protection against noise could be concentration, common agreement, self-restriction and being an example to others.

To find out the frequency of using personal portable players among schoolchildren, some questions related to this issue were asked. 20% of respondents indicated that they had no personal portable player, and 62.5% admitted that they listen to music through such player, although about 20% of those who had a player responded they did not listen to it. The use of portable players was equally common among boys and girls, although girls stated the duration of their player use as limited to 1 hour daily, while among boys it sometimes exceeded even 3 hours.

There were cases when schoolchildren tried to suppress the environmental noise by listening music through a portable player. This was stated by the schoolchildren themselves. 49.6% have noted they could feel tingling in their ears after exposure to some noisy environment.

In evaluation of their surrounding environment (yard, region), 86% of schoolchildren stated that some noise sources were present close to their homes. 41% of boys and 46% of girls have stated this. Out of all respondents that stated the presence of noise sources in their environment, 34.6% admitted that such noise most often had been caused by persons (neighbours listening to loud music, quarreling, children crying or shouting), 56.4% mentioned some equipment present in the environment (cars, trains, all kinds of construction equipment, tractors, cafe devices, etc.), and even 9% mentioned animals (pets: dogs, cats, birds).

64.6% of schoolchildren admitted that some noise sources causing anxiety to them were close to their homes. For a more detailed analysis which type of noise was most harmful to children, see Fig. 5. According to its specifics, noise may be divided into several groups: noise related to domestic appliances, external environment, noise caused by transport, public institutions and entertainment places, school and other sources.

With age, dissatisfaction with noise caused by different environmental factors increased.

Analysis of the anxiety-causing noise sources showed that the equipment and persons present at home and in the external environment more often caused anxiety to girls than to boys. Certain dependence of answers on age was noted: teenaged girls specified more anxiety-causing noise sources, more often told about the situations that caused anxiety to them and knew more noise protection remedies. A greater dissatisfaction with noise caused by different environmental factors was also noted among the elder study participants.

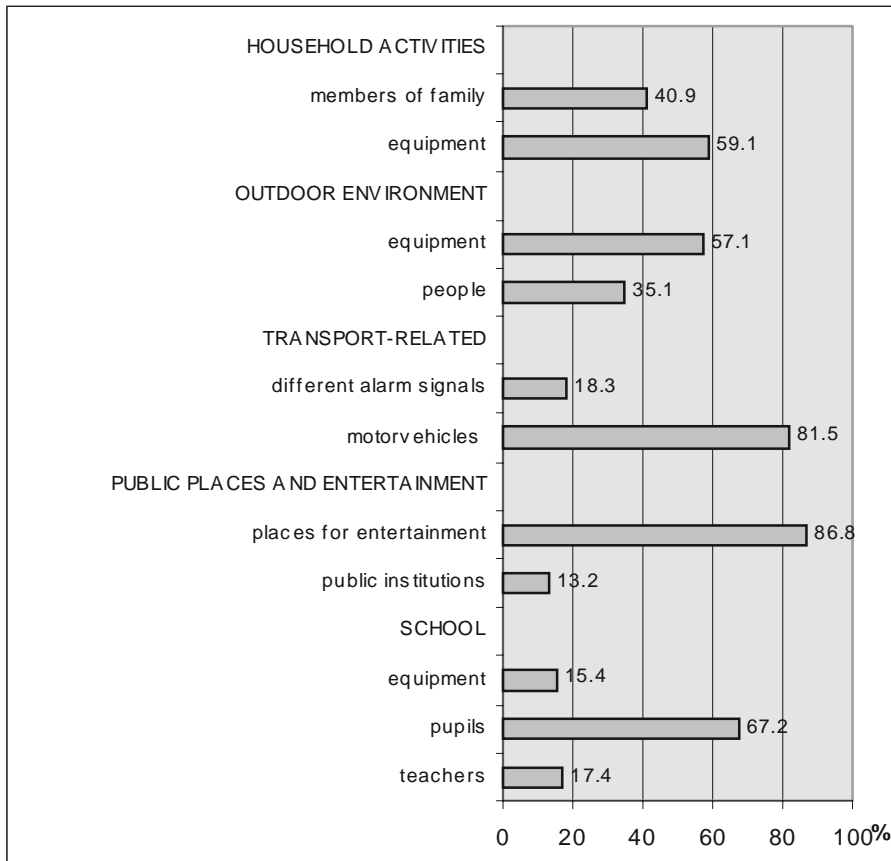


Fig. 5. Noise harmful to schoolchildren

A girl (15) noted the noise generated by the school bell and teachers' shouting: "The bell rings too loud and too long, as the person in charge of it cannot stop it properly, it even gets on my mood which is spoiled by this really badly, or when teachers are shouting at me". A boy (16) said his mood was often spoiled by teachers' "roaring" and when everybody were making noise in the classroom".

Many schoolchildren have indicated various sources of noise, including their parents when they were discussing their children's behaviour and learning results, "pothor caused by my brothers" (a girl, 16), "parents quarrelling" (a girl, 13), "my sister's crying" (a boy, 15), "when people are having a dust-up" (a girl, 18).

DISCUSSION

While analyzing the answers to the questions presented in the questionnaire, it has been noted that schoolchildren are willingly expressing their opinion. Sometimes they wish to answer a simple question with several ready-made responses more widely. It is important for them that their opinion is listened to and considered at least a bit. Boys and girls presented different answers to the same questions. A certain relation to age was also noted.

As far as the diminishing of human hearing ability is concerned, girls were more apt to disagree

than boys that with age, human hearing ability diminishes and it cannot be escaped. The answers were clearly influenced by respondents' age, younger persons being more numerous to disagree to the aforementioned statement and challenging the society's conventions that certain measures should be undertaken to prevent the processes of ageing.

Less than a half of all schoolchildren thought that the hearing ability in people professionally exposed to noise is not damaged because such people get used to the noise. It is known that people exposed to prolonged noise more often get the hypertensive disease, heart disease and atherosclerosis, so it means that such "getting used to the noise" is subjective, and the damage is still made to a human body.

Noise, being a harmful environmental factor, causes specific (hearing) and non-specific pathological alterations almost in all body systems. It is too difficult for kids to understand that the subjective adjustment to noise may reach the level when a resident of a big city feels uncomfortable in a quiet environment until a new habit develops in him/her, but noise is still impairing badly the human health.

Part of the schoolchildren stated that loud music was good and while listening they turned the volume up, and boys did this twice as often than girls. Noise suppresses secretion of gastric juices and their acidity, so such persons are at risk of developing gastritis or ulcer. These diseases are twice more common in boys than in girls. Therefore the timely information provided to schoolchildren on the issue might influence their behaviour and contribute to the prevention of these diseases.

Although the use of portable player is equally spread among boys and girls, the average duration of listening in girls was shorter than in boys. Boys were more apt to misusing the portable player.

Schoolchildren can feel the negative impact of noise, as about a half of all respondents indicated they felt some ringing in their ears after a prolonged exposure to noisy environment, but they did not pay much attention to it or it seemed unimportant to them.

Unspecific noise impact on human body is often manifested through functional disorders of the cen-

tral and vegetative nervous systems, such as headaches, reduction of concentration ability, memory and working abilities, development of neurosis. These alterations develop before the onset of hearing disorders, therefore children's complaints are worth of attention. The closest social environment, *i.e.* family, is most important to children, as this is the environment that may disturb the child's development and be one of the reasons for retardation.

Children are apt to noticing their drinking neighbors, but keep silent about their parents' drinking. The respondents' dissatisfaction was caused by noisy neighbors, singing by drunk persons, the crying, shouting and running of children being abused by their parents. Fear and anxiety caused by noise may interfere with a child's creative activities, cause concentration difficulties and difficulties in fulfilling tasks assigned to them, and, finally, such children experience more negative emotions (9, 10).

School must be the basis for a healthy education of children rather than a risk factor to their health.

The negative attitude of children towards school should be understood as a damaging factor determining their low quality of living (11). One of the guidelines for schoolchildren health care states that the educational institutions are among those most important where successful education and health strengthening of children is possible. Thus, school should contribute to the well-being of children or at least not to become a factor impairing children's health. Improvement of schoolchildren's health and their environment must be a care of the state in its attempts to increase the general economic level and the level of human socialization.

CONCLUSIONS

1. Pupils are informed about noise, its sources, protection means, but are not always able to use this information.

2. There was no major difference in the awareness of noise impact on health in different age groups.

3. Pupils emphasized the psychosocial aspect of noise.

The state should form the policy and carry out all undertaken obligations for improvement of children's wellness, information about and protection against the harmful environmental impact. The major part of the legal acts in force are much concerned about the clauses establishing the maximum allowable noise levels, however, they fail to fix the conditions allowing for a full monitoring of such maximum noise levels. The educational policy explaining noise and related hygiene is neglected.

Received 1 July 2005

Accepted 18 October 2005

References

1. Health 21: the health for all policy framework for the WHO European Region. 2000; 98–99.
2. World Health Organization Guidelines for community noise, Geneva, 1999; (<http://www.who.int/phe/> 20 November 2004).
3. Vilniaus visuomenės sveikatos centras. Triukšmas ir sveikata (http://www.vilniausvsc.lt/aplinka/triukšmas_ir_sveikata.htm 26 November 2004).
4. Ašmenskas J. ir kt. Aplinkos medicina. Vilnius, 1997; 203–437.
5. Sabaliauskas R, Zurlytė I, Ėėiupakas D. Lietuvos nacionalinis aplinkos sveikatinimo veiksmų planas ir jo įgyvendinimo klausimai. Sveikatos aplinka 2000; 2: 1–4.
6. European Parliament and Committee Directive 2002/49/EB concerning estimation and control of environmental noise. Official Journal L1, 18/07/2002; 0012-0026.
7. World Health Organization occupational and community noise No. 258 (<http://www.who.int/mediacentre/factsheets/fs258/en/>, accessed February 2001).
8. Lietuvos Respublikos triukšmo valdymo įstatymas (Valstybės žinios, 2004, Nr. 164–5971).
9. Maėiūnas E, Juozulynas A, Genytė L. Triukšmo ūtaka žmonėms sergamumui. Sveikatos aplinka 1999; 3: 46–48.
10. Jungtinių tautų organizacijos vaiko teisių konvencija (2001). Pėmogaus teisės. Regioninių tarptautinių dokumentų rinkinys. Vilnius, 2001; 12–17.
11. Kriausza V. Dėl vaikų ir moksleivių sveikatos apsaugos politikos strateginių gairių. Sveikatos aplinka 2000; 1: 1–3.

Erikas Maėiūnas, Eglė Pvirblytė Virbickienė,
Antanas Marcijonas, Algirdas Juozulynas,
Aloyza Lukėdienė

MOKINIŲ SUPRATIMO APIE TRIUKŠMĄ IR JO ĖALTINIUS ĄVERTINIMAS

Santrauka

Aplinkoje yra daug triukšmo, veikianėio jautriausia ir paėėidpiamiausia gyventojų grupė – vaikus ir jaunimą. Triukšmas lydi juos namuose, aplinkoje, kurioje jie gyvena, mokosi ir leidžia laisvalaiką. Garsios muzikos klausymas ir informacijos apie triukšmo ėalą trūkumas gali turėti neigiamos ūtacos vaiko sveikatai.

Metodika. Šiame tyrime dalyvavo 5135 moksleiviai nuo 9 iki 19 metų iš visos Lietuvos. Klausimyną sudarė iš 13 klausimų, iš kurių 5 buvo atviri.

Rezultatai. 43,6% moksleivių nurodė, kad arti jų namų yra triukšmo ūaltinių, 49,6% pabuvus triukšmingoje aplinkoje spėngė ausyse. 24% respondentų nurodė, kad jiems kenkia garsi muzika: dvigubai daugiau merginų nei vaikų. Tik 14% visų respondentų sumaėina muzikos garsą – daėniausiai jaunesni moksleiviai ir merginos. Kai kurie iš jų nurodė, kad tai priklauso nuo jų nuotaikos.

Moksleiviai minėjo ėias apsaugos nuo triukšmo priemones: vengti triukšmingų vietų, naudoti ausų kiūtukus, ėalinti

ti triukdmo daltinius, kalbėti tyliau, prađyti kitus nekelti triukdmo. Kai kuriø moksleiviø nuomone, triukdmo neánama iðvengti.

Iðvados. Apie 86% respondentø nurodė nerimà kelianėius aplinkos triukdmo daltinius. Juos galima suskirstyti á keletà grupiø: triukdmas namø aplinkoje (šeimos nariai, árenginiai), iðorės aplinkoje (þmonės, árenginiai ir gyvūnai), transporto keliamas triukdmas (motorinės transporto priemonės ir ávairūs pavojaus signalai), vieðosios ir pasilinksminimo ástaigos, mokykla (mokytojai, mokiniai, árenginiai), kiti triukdmo daltiniai. Dėl triukdmo sukėlėjø namuose

moksleiviø nuomonė sutapo. Poþiūris á iðorės triukdmo daltinius iðsiskyrė: 38% respondentø nurodė, kad tai þmonės, 52% nurodė árenginius, 10% paminėjo gyvūnus. Ðias aplinkybes moksleiviai apibūdino kaip sukelianėias daug neigiamø emocijø, ypaè paaugliams. Pastarieji yra ypaè jautrūs triukdmingai aplinkai: naikintuvams, lėktuvams, traukiniams, keliø transportui ir t. t. Moksleiviams taip pat kelia nerimà triukdmingi kaimynai, jø verkiantys vaikai ir lojantys ūnys. Jie nerimauja dėl triukdmo mokykloje ir laisvalaikio aplinkoje.

Raktaþodþiai: triukdmas, analizė, vaikai, aplinka