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Research Article

STATUS OF NOISE POLLUTION IN EDUCATIONAL INSTITUTIONS OF KATHMANDU VALLEY, NEPAL

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ABSTRACT

Along with the problems like air pollution, water pollution and solid waste, noise pollution is emerging as a threat to the inhabitants of Kathmandu Valley. Realizing its seriousness, there is an increasing number of studies on the health impacts of traffic and industrial noise in Nepal. However, noise in educational institutions, though much sensitive is least studied. This study addresses the current status of noise pollution in educational institutions located at high traffic (HT), low traffic (LT), commercial (C) and residential (R) areas of Kathmandu valley, using sound level meter and questionnaire supplied to teachers and students. Results show that more than 90% of the studied educational institutions in Kathmandu Valley have noise pollution problem, exceeding the national noise standards and WHO standard. Institutions located at HT areas have highest exposure level. The six-hour average noise level for educational institutions located at different zones follows the order HT (70.1 dBA) > C (66.2 dBA) > LT (65.7 dBA) > R (56.3 dBA). The major sources of noise in educational institutions of Kathmandu are noise from students themselves and vehicular traffic. Disturbance in studying/teaching and hearing problem during class session are the major impacts of noise pollution in educational institution of Kathmandu valley while irritation and headache were mostly experienced by the teachers and students exposed to noise pollution. The government should take appropriate measures and prescribe certain environmental criteria for establishing new educational institution in urban areas like Kathmandu. Adoption of control measures to reduce noise level in already built institutions is also recommended.

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INTRODUCTION

Kathmandu, the capital of Nepal is currently facing numerous environmental problems because of unplanned urbanization^{1,2}. Along with the problems like air pollution, water pollution and solid waste, noise pollution is also emerging as a threat to the inhabitants of the capital^{3,4}. The major sources of noise pollution in Kathmandu valley are traffic including both vehicular and air, industries, construction works, electricity generating plants and household noise. The health impact of traffic noise and industrial noise is being increasingly studied⁵⁻⁸. However, noise pollution in educational institute is the least concerned aspect of noise in most of the developing countries around the globe and Nepal is not an exception.

Due to the lack of proper legislation regulating the educational institution in Nepal, the number of educational institutions are increasing without considering the teaching- learning friendly environment especially in the capital due to rapid urbanization^{9,10}. Most educational institutions in Kathmandu valley are located near busy areas such as busy roads, market areas and in the junction where the large people pass by. Research shows that noise pollution interferes with the teaching learning process such as difficulty in hearing during the class, loss of concentration and reduces performance of both the teachers and students^{11,12}. Noise pollution in educational environment disturbs during study session. Students cannot concentrate in classroom teaching and they lose interest to study¹². Noise pollution also affects teachers. They cannot teach effectively during teaching session because of uncomfortable classroom conditions^{13,14}. In Nepal, school and other educational institution are categorized under peace zone for which the guideline value (Leq) is 50 dB for day and 40 dB

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for night time according to the National National Ambient Sound Quality Standard 2012¹⁴. There is a real need to assess if the quality of noise in the educational institution of Nepal is really polluted since there hasn't been any research in this issue before. Therefore, this study is the first one to address the present context of noise pollution in educational institution of Nepal. This study aims to assess the sound level, compare the measured sound level with the National Ambient Sound Quality Standard 2012 and WHO guideline, identify the sources and effect of noise among teachers and students in educational institution of Kathmandu valley.

MATERIALS AND METHODS

Study area

This study was carried out in Kathmandu and Lalitpur district of Kathmandu Valley. Twelve educational institutions that include Secondary Schools, Higher Secondary Schools, Campus and University located at different places of Kathmandu were taken for the study. The institutions were chosen on the basis of different zones classification as High Traffic (HT), Low Traffic (LT), Residential (R) and Commercial (C) as adopted by Sapkota (1997)¹⁵ (Table 1).

Table 1 Study Sites for Noise assessment

Zones	Educational Institution	Location
High Traffic	Amrit Campus	Thamel
	Trichandra Campus	Ranipokhari
	Mangala Devi Secondary School	Gaushala chowk
Low Traffic	Little Angels' College	Hattiban, Lalitpur
	Pashupati Campus	Mitrapark
	Divyakanti English school	Samakhushi
Residential	Tribhuvan University	Kirtipur
	New Creative English Boarding School	Ekaltar, Vanasthali
	Fluorescent higher secondary school	Baniyatar
Commercial	Shankar Dev Campus	Putali Sadak
	Balsewa Secondary School	Joche, New Road
	Future Star High School	Jawalakhel, Lalitpur

Data collection

The noise level was measured with calibrated Sound Level Meter in A scale set at 2 sec intervals for 8 hours from 9:00 hr to 17:00 hr including 6 hours class session. The sound level meter was mounted on a stand at a height of 1.2 m and positioned at a distance of 3.5 m away from the building of the institution¹⁶. The parameter like Average sound Level, Maximum Level (L_{Amax}) and Minimum Level (L_{Amin}) were obtained from the instrument in each period of measurement. Questionnaire was prepared and supplied to the teacher and students with the objectives to collect the perception on the effects of noise in the teaching- learning environment and health. MS Excel and SPSSv. 16.0 was used to process the data while tables, graphs and charts were used to present the finding. All the findings were then compared with the standard and guidelines.

RESULTS AND DISCUSSION

Noise level in educational institution

The noise assessment in educational institution of Kathmandu valley shows that noise pollution exists in all the institutions except for the institutions in residential area (Figure 1).

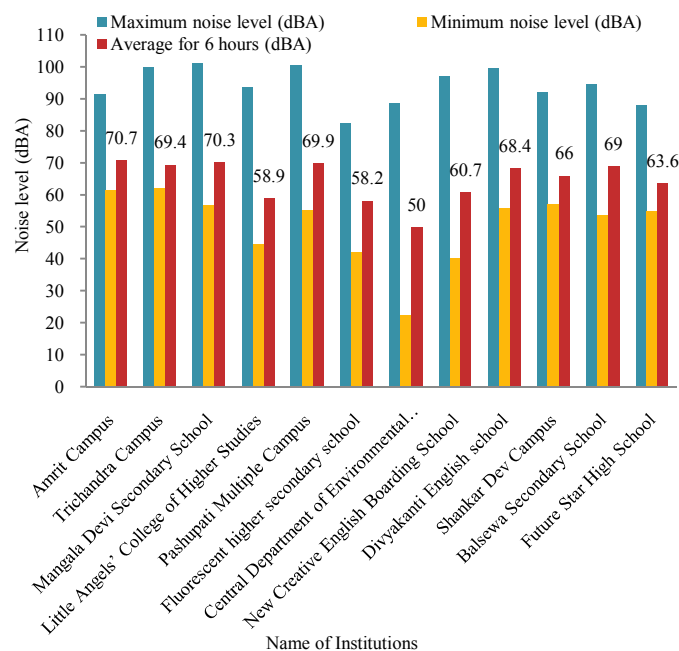


Figure 1 Observed Noise Level in Different Institutions

The noise level was found to be maximum at Mangala Devi Secondary School (101 dBA) followed by Pashupati Multiple Campus (100.4 dBA), Trichandra Campus (99.9dBA), Amrit Campus (91.6 dBA) and so on. Similarly, the minimum noise level was recorded at Tribhuvan University (22.4 dBA) followed by New Creative English Boarding School (40.2 dBA), Fluorescent Higher Secondary school (42.0), Little Angels' College of Higher Studies (44.5 dBA). Mangala Devi Secondary school lies exactly at Gaushala Chowk, which is located at the ring road in the major junction for the flow of traffic that is why it has the maximum noise level. Tribhuvan University is far from the heavy traffic routes and other noise sources due to which it has a minimum noise level. The maximum and minimum noise levels are the instantaneous noise level so, the institution having maximum noise level may not necessarily have the maximum average for six hour. The average for 6 hour noise level gives the average noise level of all the data recorded at an interval of 2 seconds for 6 hours at a particular educational institution. Since the educational institution in Kathmandu valley runs classes for 6 hours, the 6 hour average also indicates the average noise exposure level of teachers and students. The average noise level for six hour was highest at Amrit Campus (70.6 dBA) while it was lowest for Tribhuvan University (50.0 dBA). This is because Amrit campus falls under heavy traffic area very close to the road where the constant flow of vehicles occurs throughout the day. This indicates that the students and teachers of Amrit campus are at higher exposure to noise pollution than any other institution of Kathmandu. The six-hour average noise level for different zones follows the order HT (70.1 dBA) > C (66.2 dBA) > LT (65.7 dBA) > R (56.3 dBA). This is supported by the response of the people on the severity of the noise pollution problem in different zones (Figure 2). On comparing the noise level with the National Ambient Sound Quality Standard, 2012¹⁴, it was found that all the education institution except that located in residential area were beyond the standard.

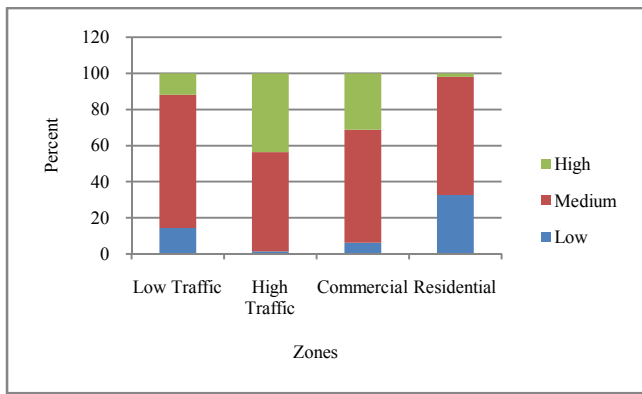


Figure 2 Level of Noise Perceived in Different Zones

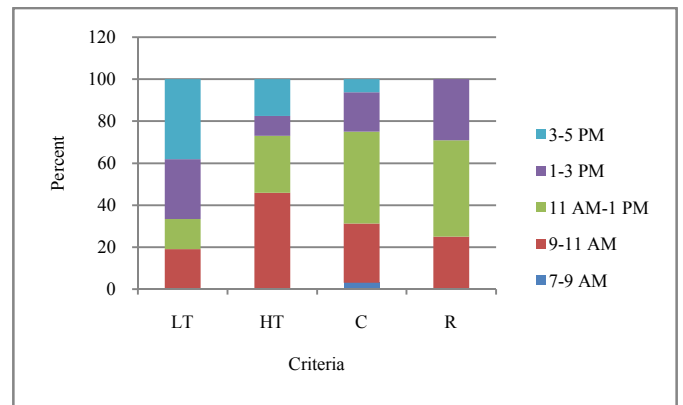


Figure 4 Temporal Noise Level as Perceived by Respondents (LT- Low traffic, HT- High traffic, C- Commercial, R- Residential)

Noise sources

While noise from students is by default a source of noise, location of educational institution determines other sources (Figure 3). Noise from students is common in all the institutions. Therefore it has a highest contribution as a source of noise pollution in all educational institutions. Traffic vehicle comes second and is a major contributor of maximum noise level. However, in educational institutions located in high traffic areas vehicular traffic is a major source. In educational institutions located at the commercial areas, shops and business are the major sources after vehicular traffic while the sources in the institutions located in residential areas have different sources where noise from the construction works and people moving on the roads are the major sources.

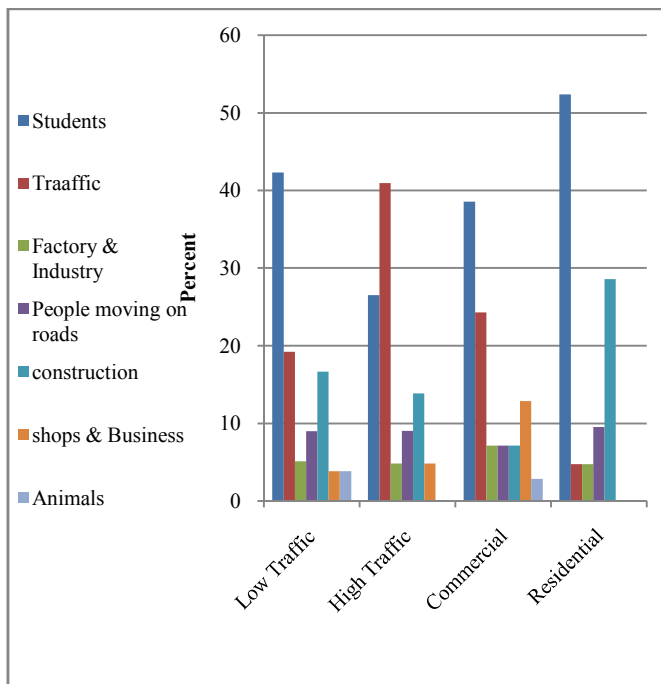


Figure 3 Major Sources of Noise Pollution in Education Institutions

When asked about when do the students and teachers felt maximum noise, majority of the respondent from the institutions at commercial and residential areas replied 11 am to 1 pm as the duration when maximum noise was felt. Similarly, maximum noise was felt in Low traffic and high traffic educational institutions at 3 pm to 5 pm and 9 am to 11am respectively (Figure 4). Similar result was shown by the instrumental record.

Effect in teaching learning process

The effect of noise pollution among teachers and students was determined by questionnaire supplied to them. So, the effects are perception based and not medically verified. All the respondents had experienced at least a negative impact of noise. About 42% were disturbed in studying or teaching, 18% had hearing problem during class, 15% felt difficult in classroom discussion and had to speak louder while the 9% had experienced all these impacts (Figure 5). Similar result was observed by other studies¹¹⁻¹³. A study carried in two public schools in Valencia, Spain showed negatives impact to teachers and pupils' performance due to the noise pollution especially from traffic activities around the educational centers¹¹.

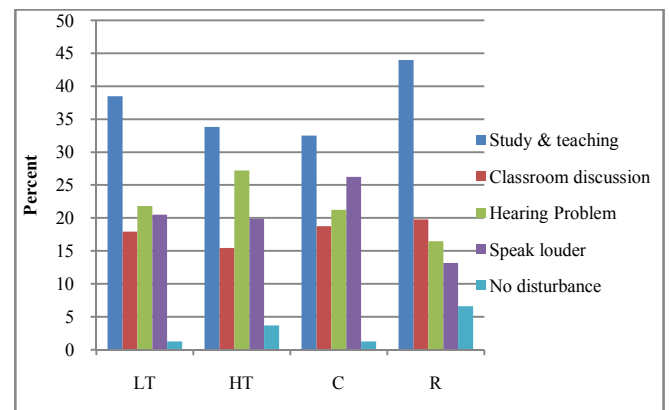


Figure 5 Effect of Noise Pollution in Teaching Learning Process (LT- Low traffic, HT- High traffic, C- Commercial, R- Residential)

Health effect

Noise pollution was also found to have brought health problems among teachers and students. Irritation by noise is a common problem among teachers and students. Headache and mental stress are other major health problems associated with noise pollution (Figure 6). Other studies also suggest that the major health effect induced by the noise pollution is observed as lack of concentration, irritation, fatigue and headache^{17,18}.

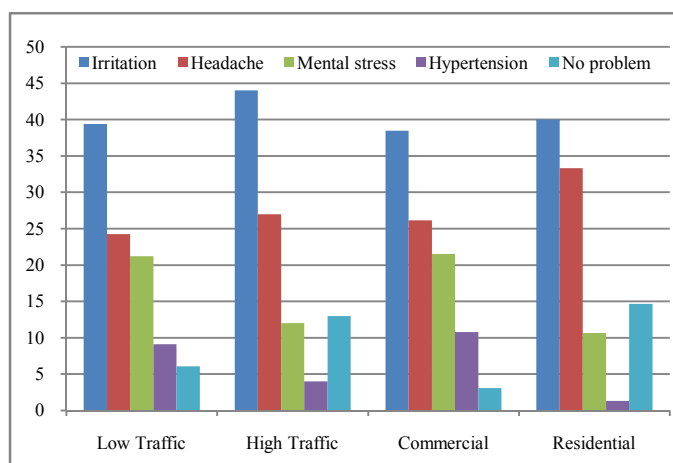


Figure 6 Health Impact of Noise Pollution in Educational Institutions (Perception based)

CONCLUSION

This study shows that educational institutions in Kathmandu Valley have noise pollution problem. The students and teachers of Amrit campus are at higher exposure due to noise pollution than other institutions. The extent of noise problem depends on where the institutions are built. In the urbanizing city like Kathmandu, vehicular traffic and noise from students themselves create a major problem of noise pollution causing negative impacts on studying/ teaching activities. Students and teachers are disturbed while studying and teaching. Another major problem created by noise pollution is difficulty in hearing during the class. Noise pollution has also adverse effect on the health of students and teachers. Headache and irritation are common among the students and teachers exposed to higher level of noise. School children are more sensitive to the impacts of noise pollution. Educational institutions should have a peace and healthy environment. Control measures need to be taken in institutions that has already been built near the noise sources. Government should formulate and implement rules and regulation and strictly enforce the noise control standards especially for sensitive areas like educational institution. More intensive research on noise pollution in educational environment is required for planning and management of noise pollution.

References

- Pradhan PK. Population growth, migration and urbanization. Environmental consequences in Kathmandu valley, Nepal. In: Unruh J.D., Krol M.S., Kliot N. (eds) Environmental change and its implications for population migration 2004 (pp. 177-199). Springer, Dordrecht.
- Pant PR, Dangol D. Kathmandu valley profile. Briefing Paper, Governance and infrastructure development challenges in Kathmandu Valley. 2009 Feb.

- Pokhrel D, Viraraghavan T. Municipal solid waste management in Nepal: practices and challenges. Waste Management. 2005 Jan 1;25(5):555-62.
- Panday AK, Prinn RG. Diurnal cycle of air pollution in the Kathmandu Valley, Nepal: Observations. Journal of Geophysical Research: Atmospheres. 2009 May 16;114(D9).
- Joshi, S.K., Devkota, S., Chamling, S. and Shrestha, S. (2003). Environmental Noise Induced Hearing Loss in Nepal. Kathmandu University Medical Journal. 1(3):177-183.
- Kadel, H.H., Regmi, S.K. and Pradhananga, T.M. (2003). Noise Level Monitoring in Kathmandu Valley. Nepal Journal of Science and Technology. 5:115-120
- Ghimire, A., Niraula, S.R., Shrestha, A. and Jha, N. (2015). Self-Assessment of Hearing Quality of Traffic Policemen Working in Dharan-Biratnagar Corridor. Journal of Chitwan Medical College. 5(14):20-26.
- Murthy, V.K., Majumder, A.K., Khanal, S.N. and Subedi, D.P. (2007). Assessment of Traffic Noise Pollution in Banepa, A Semi Urban Town of Nepal. Journal of Science, Engineering and Technology 1:1-9
- Shields R, Rappleye J. Uneven terrain: Educational policy and equity in Nepal. Asia Pacific Journal of Education. 2008 Sep 1;28(3):265-76.
- Rappleye J. Catalysing educational development or institutionalizing external influence? Donors, civil society and educational policy formation in Nepal. Globalization, Societies and Education. 2011 Mar 1;9(1):27-49.
- Sanz SA, García AM, García A. Road traffic noise around schools: a risk for pupil's performance. International Archives of Occupational and Environmental Health. 1993 Oct 1;65(3):205-7.
- Ikenberry LD. School noise and its control. Journal of Environmental Health. 1974;36(5):493-9.
- Pachpande BG, Patel VS, Patil RD, Girase MR, Ingle ST. Assessment of hearing loss in school teachers and students exposed to highway traffic noise pollution. Journal of Ecoph Occu Health. 2005; 5:123-6.
- GoN. National Ambient Sound Quality Standard, 2012. Government of Nepal.
- Sapkota B. "A study of community noise level in Kathmandu". RONAST. 1997.
- Bruel and Kjaer. "Environmental noise". Bruel & Kjaer Sound and Vibration Measurement A/S. 2000.
- Joshi SK, Devkota S, Chamling S, Shrestha S. Environmental noise induced hearing loss in Nepal. Kathmandu University medical journal (KUMJ). 2003;1(3):177-83.
- NHRC. Assessment of noise pollution and development of criteria for its prevention and control. Nepal Health Research Council. 2003:1-19

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