# Analysis of Noise Pollution: A Case Study of Malaysia's University

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**Abstract**

Extreme environmental noise beyond 65 dB can be adverse to human health, living comfort and the environment itself. In a university environment, student activities will be less disrupted if the locations of the activities are sufficiently away from noise sources. Less study had been done in noise pollution subject around Malaysia recently especially in university which needs less noise for students to be concentrated and hospital area which requires peaceful surroundings in order patients to be recovered.

The objective of this study was to determine the level of noise pollution in the National University of Malaysia. We conducted the study in dental faculty regarding more noise in a dental laboratory and the location of the faculty itself which is surrounded by Hospital Kuala Lumpur complex. Questionnaires were distributed to 170 participants from convenient sampling selected students (128 undergraduate students and 42 postgraduate students) in faculty of dentistry, National University of Malaysia, KL Campus.

From the study, we found that 96.5% of the students in dental faculty UKM KL campus experiencing noise pollution mostly at the time between 10 am until 2 pm (65.3%). But it was detected as low noise according to 84.7% participants. Since the vehicle is the first causes of noise pollution that we found in this campus area, so in the future may need new regulations in term of vehicle limitations.

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## Introduction

Noise pollution is a harmful noise in the environment which isannoying and disturbing people in their daily life activity. Normal people can bear the noise up to the certain limit (80 decibels) and it may damage the nerves directly if it exceeds that limitation.

Here are the examples of noise pollution, (a) the noise of traffic near some hospitals which may physically and mentally disturb the patients in the hospital, (b) the noise of machines used for weaving, ginning etc. which annoy workers. Such noise is harmful to the workers and could cause hearing loss problems. Another definition of noise pollution is any noise which distracts someone's attention from the work or discussion, causes annoyance, or leads to harmfulness.

Normal people can bear the noise up to thecertain limit (80 decibels) and if it exceeds that limit, it may spoil the nerves directly.

Here are some typical sound levels measured in thefollowing surrounding:

- Library - 35 dB
- Office - 60- 65
- Normal traffic noise 70 - 80 dB
- Airport (plane take off) - 120 dB

We accept and enjoy countless other sounds. However, almost every human being is affected by the unwanted, disturbing sounds. In last few decades, it has been increasing at a high rate that it has become a major hazard to the quality of human lives. The major sources of noise pollution can be air traffic, road traffic, parties (loud music), working construction, house-hold machinery like washing machines, grinders etc. Noise is pervasive in everyday life

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and can cause both auditory and non-auditory health effects.[1] The presence of public transport in undeveloped countries may cause slight decrease in systolic and diastolic pressure in relation to noise exposure and the presence of public transport near schools may serve an auxiliary indicator of noise exposure for health risk assessment with limited capacities for noise measurement.[2]

A continuously increasing noise situations and air pollution proportional to the traffic flow is inevitable due to the growing number of students vehicle and other factors such as building construction and redevelopment of existing roads.[3] Noise exposure may leads to annoyance, disturbs sleep and even causes daytime sleepiness. It also affects patient outcomes and staff performance in hospitals, increases the occurrence of hypertension and cardiovascular disease, and impairs cognitive performance.[1] Ambient noise also affects people's health by increasing general stress levels and aggravating stress-related conditions such as high blood pressure, coronary disease, peptic ulcers and migraine headaches (National Institute for Occupational Safety and Health).[5]Noisy conditions in educational place have direct negative effects on learning, particularly in language and reading development, as well as distraction in learning process.[4] However, less study yet been conducted here in Malaysia, especially in University.

The aim ofthis study was to determine the level of noise pollution in National University of Malaysia Kuala Lumpur Campus.This study conducted to determine the awareness, the causes and the effect of noise pollution on the students in general as well.

## Materials and methods

This is a descriptive cross-sectional study, with a sample size of 170 postgraduate and undergraduate students from the faculty of dentistry, Kuala Lumpur Campus, UKM, conducted between March-May 2014.The study conducted by dental faculty regarding more noise in a dental laboratory and the location of the faculty itself which is surrounded by Hospital Kuala Lumpur complex. Convenient sampling method was used and 128 undergraduate students and 42 postgraduate studentsparticipated in this study. Data were collected by means of self-administered questionnaires. Ethical approval was obtained from PPUKM Research Ethic Committee, The National University of Malaysia with approval number UKM 1.5.3.5/244/DD/2014/016(1). All data from collected questionnaires were coded and analysed using SPSSsoftware version 22.

## Results

### Demographic profiles and study level of participants

Table I shows that the majority of participants were female, age between 18-24 years old and undergraduate students.

| Variable (n=170) | | Number | Percentage |
|---|---|---|---|
| Age | 18-24 | 112 | 65.9 |
| | 25-31 | 21 | 21.8 |
| | 32-38 | 37 | 12.4 |
| Gender | Male | 31 | 18.2 |
| | Female | 139 | 81.8 |
| Level of Study | Undergraduate | 128 | 75.3 |
| | Postgraduate | 42 | 24.7 |

**Table 1.** Demographic profiles and study level of participants.

| Variable (n=170) | | Yes (%) | No (%) | Missing (%) | Total (%) | Chi-square P value |
|---|---|---|---|---|---|---|
| Gender | Male | 30 (96.8) | 1(3.2) | 0 | 31 (100) | P= 0,890 |
| | Female | 134 (96.4) | 4(2.9) | 1(0.7) | 139 (100) | |
| Level Study | Post graduate | 42 (100) | 0(0) | 0(0) | 42 (100) | P=0,360 |
| | Under graduate | 122 (95.3) | 5(3.9) | 1(0.8) | 128 (100) | |

**Table 2.** Noise pollution experiencing between gender and level study.

From Pearson Chi-square test ($\alpha$=0.05) above showed that there is no significant difference in experiencing noise pollution between gender and level study.

| Time Range | Number | Percentage |
|---|---|---|
| 06.00-10.00 | 16 | 9.4 |
| 10.01-14.00 | 111 | 65.3 |
| 14.01-18.00 | 32 | 18.8 |
| Not Experiencing | 11 | 6.5 |
| Total | 170 | 100 |

**Table 3.** Time of experiencing noise pollution.

| Degree | Number | Percentage |
|---|---|---|
| Low | 144 | 84.7 |
| Moderate | 12 | 7.1 |
| High | 1 | 0.6 |
| Irrelevant | 7 | 4.1 |
| Missing | 6 | 3.5 |
| Total | 170 | 100 |

**Table 4.** Degree of annoyance.

| Source | Number | Percentage |
|---|---|---|
| Vehicle | 128 | 75.3 |
| People | 33 | 19.4 |
| Religious Place | 5 | 2.9 |
| Household item | 4 | 2.3 |
| Total | 170 | 100 |

**Table 5.** Source of noise pollution.

From table IV, we found most of the participant (84.7%) stated low degree in term of annoyance caused by noise pollution in the campus. Table V summarizes the sources of noise pollution in UKM KL campus. The first source of noise is a vehicle (75.3%) and followed by people (33%).

| Gender | Vehicle(%) | People(%) | Religious Places(%) | Household Items (%) |
|---|---|---|---|---|
| Male | 26 (15.3) | 3 (1.8) | 1 (0.6) | 1 (0.6) |
| Female | 102 (60) | 30 (17.6) | 4 (2.4) | 3 (1.8) |

**Table 6.** Source of noise pollution between gender.

| Problem | Number | Percentage |
|---|---|---|
| Concentration Disturbance | 18 | 10.6 |
| Annoyance | 137 | 80.6 |
| Headache | 0 | 0 |
| Stress | 7 | 4.1 |
| No problem | 8 | 4.7 |
| Total | 170 | 100 |

**Table 7.** Effect of noise pollution.

| Gender | Concentration Disturbance (%) | Annoyance (%) | A headache (%) | Stress (%) | No Problem (%) |
|---|---|---|---|---|---|
| Male | 6 (3.5) | 25 (14.7) | 0(0) | 0(0) | 0 |
| Female | 12 (7.1) | 112 (65.9) | 0(0) | 7(4.1) | 8 (4.7) |
| Total | 18 (10.6) | 137 (80.6) | 0(0) | 7(4.1) | 8 (4.7) |

**Table 8.** Effect of noise pollution between gender.

Using Cramer's V test: 0.189 $p>0.01$ we found that there is no significant association between gender and problems due to noise solution.

| Level | Concentration Disturbance (%) | Annoyance (%) | A headache (%) | Stress (%) | No Problem (%) |
|---|---|---|---|---|---|
| Undergraduate | 17 (10) | 100(58.8) | 0(0) | 5(2.9) | 6(3.5) |
| Postgraduate | 1(0.6) | 37(21.8) | 0(0) | 2(1.2) | 2(1.2) |
| Total | 18(10.6) | 137(80.6) | 0(0) | 7(4.1) | 8(4.7) |

**Table 9.** Effect of noise pollution between student levels.

From Cramer's V test: 0.153 ($p>0.01$) we found that the association between student level and problems due to noise pollution is not statistically significant.

## Discussion

In the present study, we found that 96.5% of the students in dental faculty UKM KL campus experiencing noise pollution mostly at the time between 10 am to 2 pm (65.3%). While 51.1% aware there are rules regarding noise pollution but none of them ever lodge any complaint or consult the administration to address the issue.

The major source of noise in dental faculty UKM KL campus are vehicles (75.3%) followed by people (19.4%) which are similar to the findings by Basner et al. As per finding by Basner et al. in 2014 noise can cause non-auditory (general) health effects. Our study found out that 80.6% of the students were annoyed by noise pollution and 10.6% reported they are experiencing concentration disturbance.

As reported by Salame et al noisy conditions have direct negative effects on learning. And according to the National Institute for Occupational Safety and Health noise also affects people's health by increasing general stress levels which may lead to other conditions such as hypertension and migraine headaches.

There are 7 students or 4.1% reported there stressed due to noise pollution. Annoyance, concentration disturbance, and stress will give a bad influence to students around the campus area.

## Conclusions

The findings of this study show that majority of students aware of the presence of noise pollution in dental faculty UKM KL Campus.

The vehicle is the major source of noise in dental faculty UKM KL Campus. Since thevehicle is the first causes of noise pollution that found in this campus area, so in the future may need new regulations in term of vehicle limitations for preventive measure.

Here, annoyance is the main general effects of noise pollution on dental faculty UKM KL Campus, followed by concentration disturbance.

## Declaration of Interest

The authors report no conflict of interest and the article is not funded or supported by any research grant.

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