

# Evaluating the Urban Acoustic Environment Through Mobile Monitoring: Are Campus Noise Levels Within Safe WHO Standards?

Shanzay Asif, Rubina Sadaat, Unaiza Naufil, Syed Masab, Tahreem Tanweer, Sidra Shahid  
Bahria University, Pakistan | National University of Sciences and Technology, Pakistan

## INTRODUCTION

Noise pollution has become one of the most significant environmental problems in urban and semi-urban areas. Prolonged exposure to high levels of noise can lead to hearing loss, sleep disturbances, reduced concentration, stress, and cardiovascular issues. In educational institutions, noise can negatively affect student performance, communication, and overall well-being.

### WHO Noise Standards

≤ 55 dB | ≤ 40 dB  
☀️ daytime | 🌙 nighttime

## OBJECTIVES

- To measure and record noise levels around the campus at different times of the day (morning, afternoon) using a free mobile decibel meter app.
- To compare the collected noise data with WHO recommended noise exposure limits and assess whether campus noise levels are within safe standards.

## METHODOLOGY



### Study Design

Cross-sectional observational study from September 2025 to October 2025



### Study Setting

A Private University in F-8 sector of Islamabad, Pakistan



### Sample Size

Noise measurements on 10 purposively selected locations representing major activity zones.



### Data Collection

Data were recorded during the morning (08:00 to 10:00) and afternoon (03:00 to 15:00).



### Instrument

Measurements were taken using the Decibel Meter: Sound dB Level application

## [RESULTS Section]



### CRITICAL FINDING

Campus noise levels EXCEED WHO safety standards

Morning: 66.9 dBA | Afternoon: 71.3 dBA  
(WHO guideline: ≤55 dBA)

DATA TABLE

Location	Morning (dBA)	Afternoon (dBA)	Δ	Main Source
Main Gate	73.2	78.5	5.3	Traffic/students
Library Exterior	58.4	63.8	4.4	Conversations
NC Block Corridor	68.6	71.5	2.9	Student chatter
Dean's Café	76.9	83.1	6.2	Crowds/food area
Parking Area	72.4	75.8	3.4	Vehicles/horns
Gymnasium	56.2	61.0	4.8	Indoor activity
Outdoor Sitting	52.7	57.3	4.6	Minimal activity
Fatima Hostel	63.8	67.1	3.3	Student gatherings
Main Road	79.5	84.2	4.7	Traffic/honking
Admin Entry	66.0	69.5	3.5	Staff movement

### Key Observation:

4.4 dBA increase | 84.2 dBA

83.1 dBA | 78.5 dBA  
Afternoon readings consistently exceeded morning levels at ALL locations, with an average increase of 4.4 dBA.

## NOISE SOURCES

### Primary Noise Sources Identified



Vehicular Traffic



Human Activity



Cafeteria Operations



Movement Patterns

## DISCUSSION

### Noise Levels Exceed Safe Limits

Average noise ranged from 66.9 dBA (morning) to 71.3 dBA (afternoon), significantly surpassing the WHO's recommended 55 dBA daytime limit.

### Sources and Hotspots

Human activity and vehicular movement were the primary drivers, with afternoon peaks near the Café, Main Road, and Main Gate.

### Broader Context

The findings reflect a wider challenge across Pakistani educational institutions, where campuses in high-traffic urban areas face persistent noise pollution throughout the day.

## CONCLUSION

- ✓ Campus noise levels exceed WHO limits, risking student health and concentration.
- ✓ Afternoon peaks from traffic and activity demand urgent noise management.
- ✓ Traffic control, green buffers, and awareness can improve the campus environment.

## RECOMMENDATIONS

- Designate quieter areas with signage encouraging low noise behavior.
- Restrict vehicle access during peak academic hours.
- Introduce green barriers such as trees, hedges, or shrubs around noisy areas which can help absorb and diffuse sound.
- Raise awareness among students and staff about the health and mental impacts of prolonged noise exposure.
- Use sound absorbing materials in corridors and open areas to reduce echo and noise transmission.

## KEY REFERENCES

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