

Traffic Noise Analysis at Road Side Hospitals during Peak Hour Traffic Flow

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Abstract

Noise pollution is the intense sound that may affect the normal living of the human being. Exposure to high level of noise may cause severe stress on the nervous and auditory system. Thus to prevent such exposure the Central Pollution Control Board (CPCB) has established a permissible limit for noise level. Exceeding that permissible limit may affect the ailing people inside the hospital. The paper basically deal with the measurement of the sound pressure level in the silence areas using the instrument SC260 both inside and outside the hospital, also quantifying the volume of vehicles across the roads of hospitals during peak hours. The paper precisely studies the pros and cons of each hospital for controlling the noise pollution and also giving the best pre-eminent measure to control the noise pollution inside the hospitals. The volume of vehicle is also analyzed to scrutinize the effect of vehicle volume on the sound pressure level inside the hospital.

1. Introduction

Noise pollution is the excessive noise that may harm the activity or balance of human or animal life. The source of most outdoor noise worldwide is mainly caused by machines and transportation systems, motor vehicles, aircraft, and trains. Noise pollution is mostly effecting the infirm which are mostly the heart patients and patients with sleeping problems. It can also lead to high blood pressure which gets incorporated due to sleeping problems and hypertension. Mostly the infirm people in the silence areas got affected due to noise. The government has provided a permissible limit for the silence areas but scarcely any hospital in India maintain that level set by the government where a silence area is the area comprising not less than 100 meters around the hospital.

Indoor noise is caused by machines, building activities, music performances, and especially in some workplaces. There is no great difference whether noise-induced hearing loss is brought about by outside (e.g. trains) or inside (e.g. music) noise. Both effect the people specially the sick ones. On proper mitigation measures provided the sound level can be reduced to some extent.

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High noise levels can contribute to cardiovascular effects in humans, a rise in blood pressure, and an increase in stress and vasoconstriction, and an increased incidence of coronary artery disease. Even though we damn care about the noise pollution and giving it the least importance but it should be given sincere efforts just like air and water pollution. Not only in human being in animals, it can increase the risk of death by altering predator or prey detection and avoidance, interfere with reproduction and navigation, and contribute to permanent hearing loss. So different measures have been taken in silence areas to reduce the noise level as close to the permissible limit.

2. Materials and Methods

2.1 Locations Identifications

We have involved five hospitals in our study .So their location identification are:

S. No.	Hospital	Location
1.	Rajiv Gandhi Cancer Institute and Research Center	Institutional Area, Rohini, New Delhi
2.	Baba Sahib Ambedkar Hospital	Bhagwan Mahavir Marg, Rohini, New Delhi
3.	Rithala Hospital	Bawana Rd, Rohini, New Delhi
4.	Bhagwan Mahavir Hospital	Pitampura, New Delhi
5.	Saroj Hospital and Heart Institute Hospital	Madhuban Chowk, Rohini East, New Delhi

2.2 Data Collection

2.3. Methods

The sound pressure level was measured at each hospital during peak hour traffic flow. Sound Level Meter (Model SC 260) was used to take the data points. The experimental study was conducted both inside and outside the hospitals. The results were obtained in peak hours of morning between 9:00 A.M. to 9:30 A.M. and in the evening between 6:00 P.M. to 6:30 P.M. The observation was taken in an interval of one minute. Finally the comparison of result of each hospital and proper preventive measures has been provided for all hospitals mentioned in this paper.

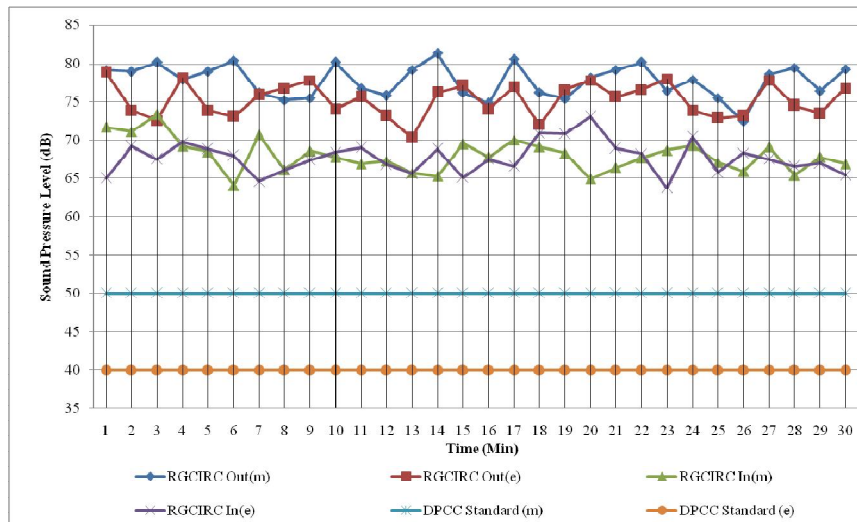
The volume of vehicles on the adjacent road was determined by switching the ten megapixel camera on video recording mode simultaneously with the traffic noise measuring instrument and then counting the cars every minute. The overall effect of the volume of vehicles and other factors is finally stated in the conclusion.

3. Result and Discussion

3.1. Noise level in both indoor and outdoor for rajiv gandhi cancer institute and research center

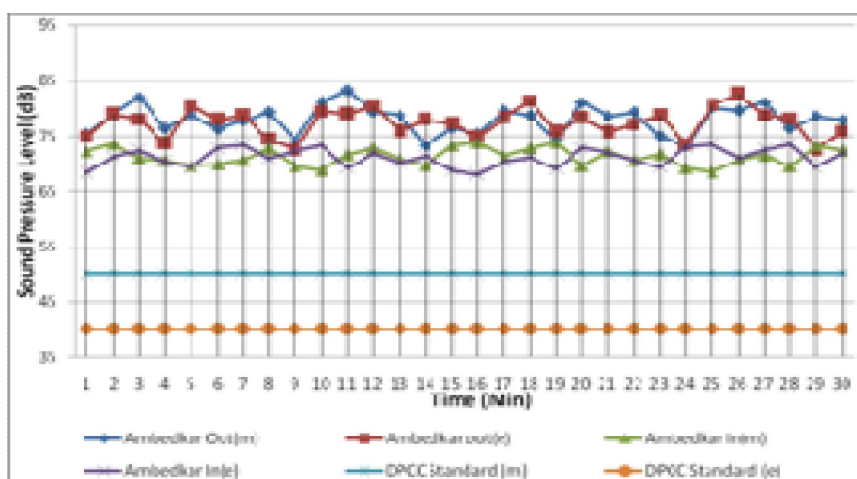
In the above graph we have presented the sound pressure level in both indoor and outdoor of the rajiv Gandhi cancer institute and research center hospital and compare with the standard permissible limit of sensitive areas according to Delhi pollution control committee and found a great variation from the standard permissible limit even though being a private hospital with immense measures taken to protect it from noise pollution like having high boundary walls and acoustic provided for different noise measuring machines

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3.2. Noise level in both indoor and outdoor for Dr. Baba Sahib Ambedkar hospital

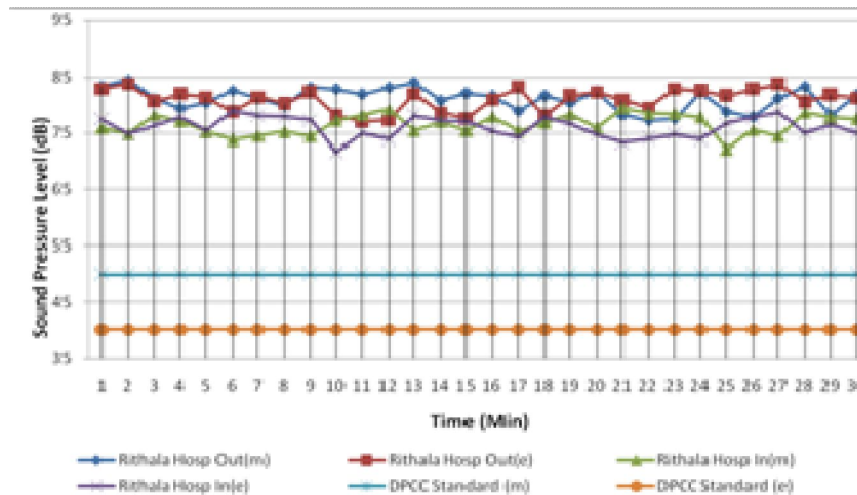
In the above graph we have presented the sound pressure level in both indoor and outdoor of the Ambedkar hospital and compare with the standard permissible limit of sensitive areas according to Delhi pollution control committee and found a great variation from the standard permissible limit. Being a government hospital not enough measures have been taken to protect noise pollution. Not even proper measures have been taken for the patient to protect them from this high noise level. They are using the generators and other devices without proper acoustic enclosures.



3.3. Noise level in both indoor and outdoor for Rithala hospital

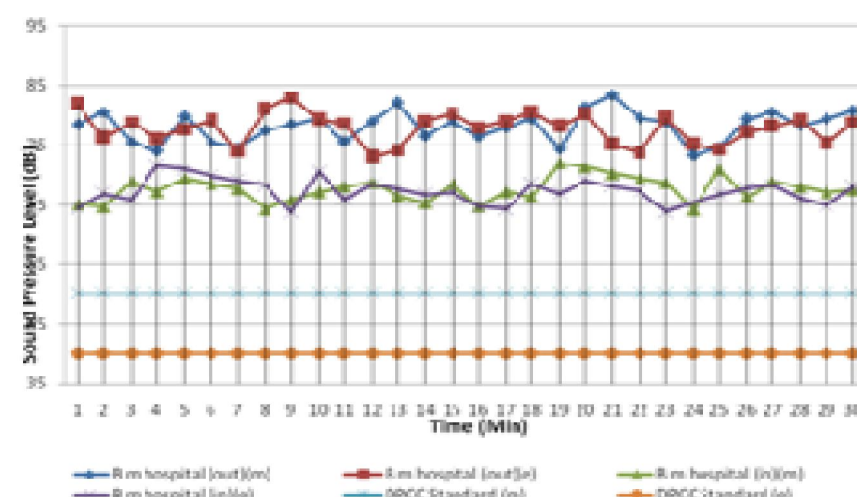
In the above graph we have presented the sound pressure level in both indoor and outdoor of the Rithala hospital and compare with the standard permissible limit of sensitive areas according to Delhi pollution control committee and found a great discrepancy from the standard permissible limit. The hospital reading has come indistinguishable the same in both indoor and outdoor because it is along the road side with having no fencing and no proper measures have been taken to create any discrepancy between indoor and outdoor noise level. They are using the generators and other devices without proper acoustic enclosures.

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3.4. Noise level in both indoor and outdoor for Bhagwan Mahavir Hospital

In the above graph we have presented the sound pressure level in both indoor and outdoor of the Bhagwan Mahavir hospital and compare with the standard permissible limit of sensitive areas according to Delhi pollution control committee and found a great variation from the standard permissible limit. Being a government hospital not enough measures have been taken to protect noise pollution. Not even proper measures have been taken for the patient to protect them from this high noise level. They are using the generators and other devices without proper acoustic enclosures. Very less part of the hospital is under green cover. There is no construction for any kind of sound barrier.

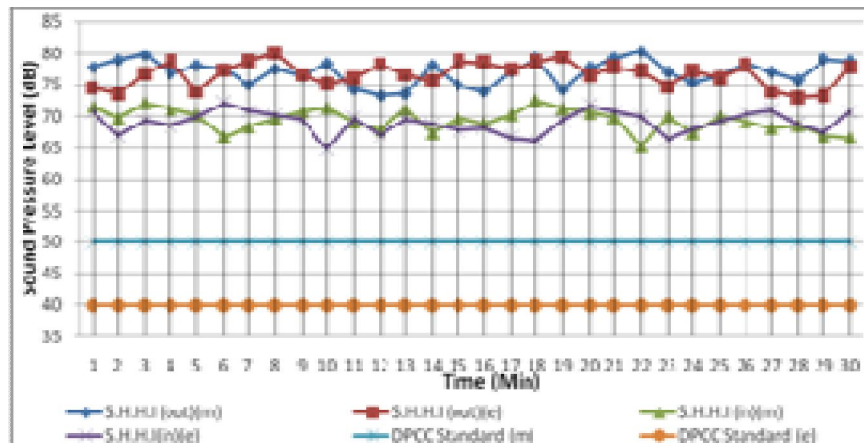


3.5. Noise level in both indoor and outdoor for Saroj Hospital and heart institute hospital

In the above graph we have presented the sound pressure level in both indoor and outdoor of the Saroj Hospital and heart institute hospital and compare it with the standard permissible limit of sensitive areas according to Delhi pollution control committee and found a great variation from the standard permissible limit even though being a private hospital with immense measures taken to protect it from noise pollution like having high boundary walls

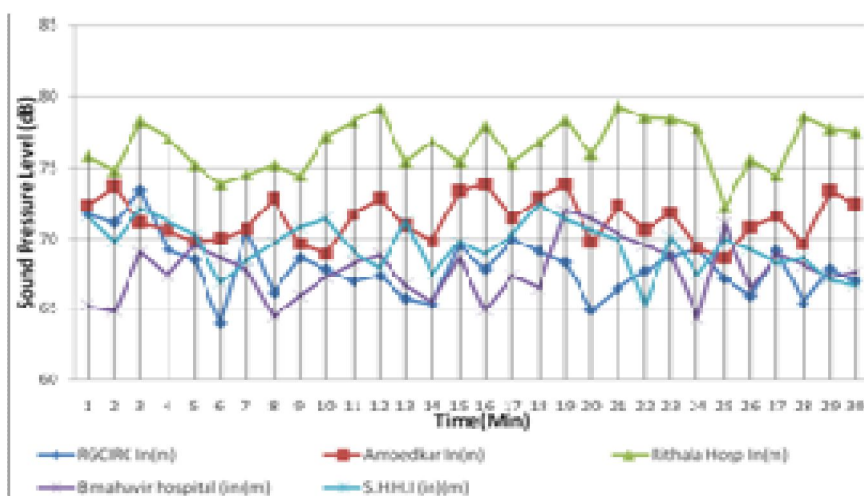
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and acoustic provided for different noise measuring machines. But here it is having the least noise level compare with the other hospitals in both morning and evening time because of some measures like More than 33 % of total area under green cover, Dust scavenging plant (reduce 5 to 6 dB noise) like Azardirachta indica (Neem), Polyalthia longifolia (Ashoka) ,Callistemon citrinus (Bottle Brush) ,Termanilia catappal (Jangal Badam) ,Terminalia arjuna (Arjun) are grown here.

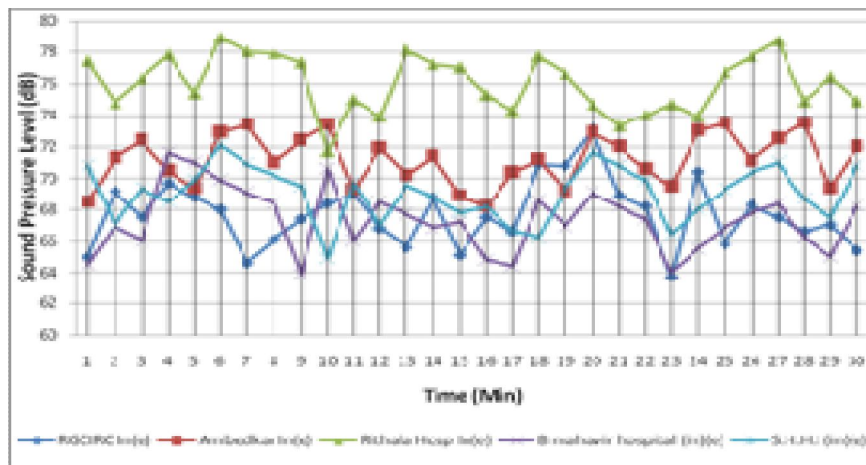


3.6. Comparison of morning noise level comparison of five hospitals

In the graph shown above we have analogize the readings of the five hospitals and found that the private hospitals dispense comparatively more measures to protect the infirm from the noise pollution with respect to the government hospitals. We have represented the comparison of noise level inside the hospital near the corridors, main hall and find the noise pressure level to be higher than the maximum permissible limit depicted by the Delhi pollution control board. Private hospitals like Rajiv Gandhi cancer institute and research center and Saroj Hospital and heart institute hospital are taking few measures to protect them from the immense noise pollution but others are rarely have taken any measures to protect from noise pollution.



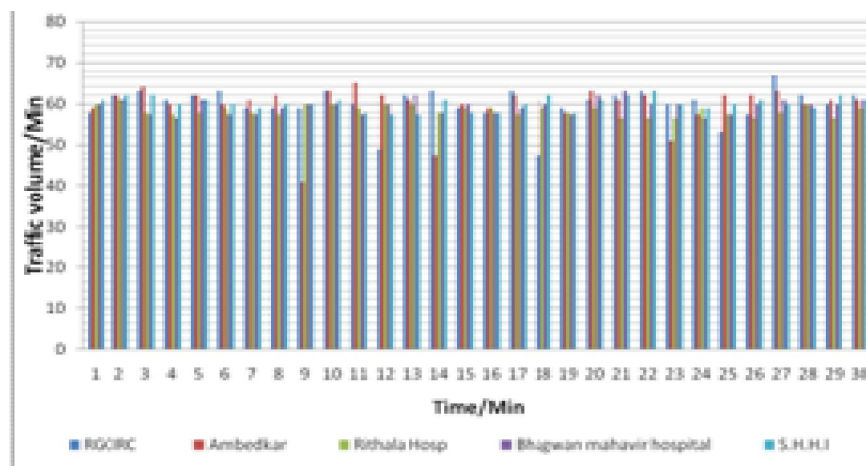
3.7. Comparison of evening noise level comparison of five hospitals



In the graph shown above we have meet up with the similar kind of observation for the hospitals as if in the morning hours though the readings are not as much in the morning hours but in the same way with respect to hospitals. We have represented the comparison of noise level inside the hospital near the corridors, main hall and find the noise pressure level to be higher than the maximum permissible limit depicted by the Delhi pollution control committee. Private hospitals like Rajiv Gandhi cancer institute and research center and Saroj Hospital and heart institute hospital are taking few measures to protect them from the immense noise pollution but others are rarely have taken any measures to protect from noise pollution.

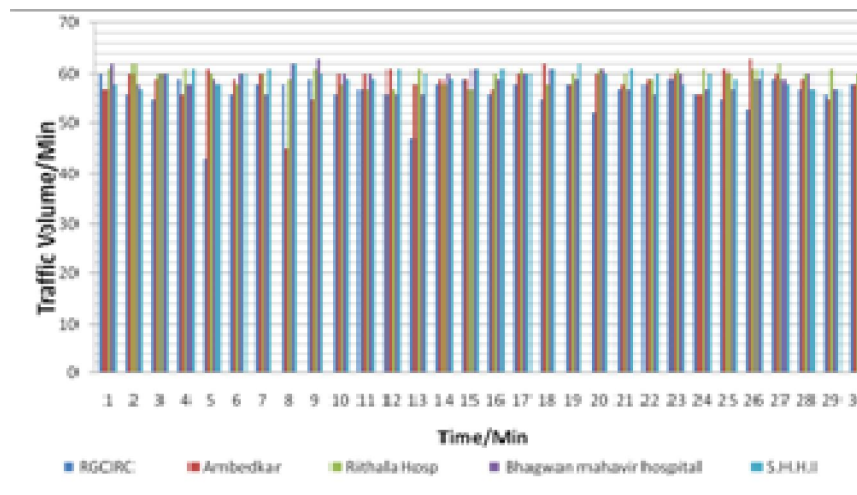
3.8. Comparison of volume of vehicles of five hospitals in morning

In the above bar graph, the volume of vehicles outside each of the following sensitive areas has been plotted at every minute till 30 minutes and compare them with each other in the morning hours between 9:00 am to 9:30 am .This has been concluded that hospitals along the main road having higher volume of vehicle have higher noise level inside the hospital but few hospitals even on along the roads having lesser noise pressure level inside the hospitals because of some special provision provided like higher fencing and sound barriers are provided to protect from noise pollution.



3.9. Comparison of volume of vehicles of five hospitals in evening

Similarly in the evening also the volume of vehicles seem to be very high and on an average it is around 60 vehicles per minute but hospitals like Rajiv Gandhi cancer institute and research center and Saroj Hospital and heart institute hospital have implied measures like fencing and sound barriers lead to lesser sound level inside the hospital.



4. Conclusion

From the results we have come to a juncture that the hospitals having measures like reducing the amount of sound energy released by the noise source, limiting of the vehicle speeds, Alteration of roadway surface texture, Limitation of heavy vehicles, use of traffic controls that smooth vehicle flow to reduce braking and acceleration, and tire design, Revised operating procedures, equipment redesign, enclosures, acoustical shields and barriers, Personal protective equipment, use hearing protection (e.g., ear plugs, ear phones) ,planting of Dust scavenging plant (reduce 5 to 6 dB noise) like Azardirachta indica (Neem),Polyalthia longifolia (Ashoka) ,Callistemon citrinus (Bottle Brush) ,Termanilia catappal (Jangal Badam) ,Terminalia arjuna (Arjun) have been able to better cope up with the increasing noise pollution inside the silence areas with comparison to others. Though reaching the permissible limit seems to be very difficult for the hospitals but by implying all these techniques the hospitals are able to reduce the noise level by around 10-15 decibels.

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