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Assessment of Sound Pollution in Butwal Sub- Metropolitan City, Rupandehi, Nepal

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Abstract

Sound pollution in recent times has been considered as one of the significant problems that impact the quality of life worldwide. This paper analyzes the sound level in different locations in Butwal sub-metropolitan city. The traffic sound level in Butwal was observed at 16 major chowks of Butwal city three times in a day i.e morning, day and evening time, in all the monitoring stations. The sound level was measured in the morning at 7 to 9 am, in the afternoon at 1 to 3 pm and in the evening at 5 to 7 pm. The instrument was operated for 5 minutes at each monitoring station. From the observation, the highest level of sound was observed in Bus Park & Puspalal Park and Basecamp i.e. 83 dB, the second highest was observed in Golpark Bhudkichowk i.e. 82 dB, and the third highest was recorded from finance chock old Buspark Palpa Buspark i.e. 85 dB. Similarly the lower level of noise among the monitoring stations was recorded at Hatbazar area i.e. 76 dB, the sound level of Yogakoti, Chauraha, Hatbazar was observed less than 80 dB and it was observed more than 80 dB at Finamne chowk, Buspark, Puspalal park, Palpa Buspark, Golpark, Kalika chowk, Basecamp, Milonchowk, Bhudkichowk, Old Buspark, Traffic Chowk, Laxminagar chowk and Durga mandir chowk. From the observation it was found that the noise level of most of the places in Butwal sub-metropolitan city was high especially in daytime.

Keywords : Sound Level, Traffic Sound Level db, Intolerable, Sound Meter.

I. Introdudtion

Urbanization in recent decades in developing economies has given rise to various environmental challenges, with noise pollution standing out prominently. Noise, characterized as unwanted, unpleasant, and annoying sound, has become an unwelcome phenomenon. Sound turns undesirable when it disrupts regular activities or compromises the quality of life. Noise, as a disturbing or harmful auditory element, detrimentally affects hearing, induces stress, disrupts concentration, and diminishes work efficiency. This environmental pollutant is on the rise, propelled by advancements in commercial, industrial, and social activities.

Noise pollution, characterized by unwanted and excessive sound that adversely impacts living beings, is often attributed to technological sources. The world's major cities grapple with escalating sound pollution challenges, driven by factors such as dense populations, high levels of

transportation, congestion, and the proliferation of commercial and industrial activities (Chauhan, 2008). This auditory disturbance is a direct outcome of the rapid pace of urbanization and industrialization. Undeniably, it stands as a significant impediment to the quality of life in urban areas globally (Ozer et al., 2009).

The sound level of Kathmandu City was studied by Gautam in 1999. His study has indicated that the sound level in Kathmandu valley is livable in most of the chowks and urban centers (Gautam 1999). However, the sound level of Butwal, one of the important urban centers in Nepal, has not been measured scientifically till now so far in my knowledge.

The Kathmandu valley, the capital city of Nepal is one of the most populated urban areas and is one of the noisiest cities in the world. The road traffic noise level in Kathmandu was recorded as 75-85 db. in front in Amrit campus, 80-90 db in front of Trichandra campus, 80-90 db. in Bir hospital area 85-100 db., 82-98 db. in Putalisadak area, 80-99 db. in Lazimpart area and 82-100 db. in Jhochhen area (Khadaka 2016).

II. Literature Review

Sound differs from man to man, place to place sound is different in different areas. The major sources of noise are mode of transportation, industrial, constructions, activities, social/religious activities, electric appliances etc. Sound pollution is measured in decibel (dB) units. According to the WHO, continuous exposure to sound pollution with more than 80 dB could cause heaving problems and adversely affect the nervous system. For instance, exposure to noise pollution entails adverse, accumulative and direct effects on humans such as detrimental to hearing disturbance on the cardiovascular system, nervous system and the endocrine system (Munzel et.al, 2018).

In Nanjing, China, the sound level is recorded at 105 dB, surpassing other notable cities such as Rome at 90 dB, New York at 88 dB, Mumbai at 82 dB, Delhi at 80 dB, and Kathmandu at 75 dB (Kaushik and Kaushik, 2006). These decibel measurements provide a glimpse into the diverse auditory landscapes and varying levels of ambient noise in these urban centers. The Kathmandu valley, the capital city of Nepal, is one of the most populated urban areas and is one of the noisiest cities in the world. The road traffic noise level in Kathmandu was recorded as 75-85 dB in Ratna Park, 90-95 dB in Bir hospital area, 85-100 db., 82-98 dB in Putalisadak area , 80-99 db. in Lazimpat area and 82-100 db. in Jhochhen area (Khadaka, 2006). Typically, indoor sound levels are recommended to stay within the range of 45-55 dB for a tranquil living environment. External noise in residential areas should be limited to 75-85 dB to ensure a peaceful surrounding. Medical professionals advise that sound levels in industrial settings should not surpass 90 dB to safeguard the well-being of workers. Any sound level exceeding 100 dB is considered harmful to human health, emphasizing the critical need to control and minimize excessive noise exposure for the overall welfare of individuals (Rishi Singh, March 22, 2006 Kathmandu).

Sound is measured in decibels. There are many sounds in the environment, from resulting leaves (20 to 30 decibels) to a thunderclap (120 decibels) to the wail of a siren (120 to 140 decibels) .

Sounds that reach 85 decibels or higher can harm a person's ears, sound sources that exceed this threshold include familiar things, such as power lawn mowers (90 decibels) , subway trains (90 to 115 decibels) and loud rock concerts (110 to 120 decibels) .

Noise pollution is not just an annoyance; it poses a significant health risk. Elevated noise levels have been linked to cardiovascular issues and an increased incidence of coronary artery disease in humans. Moreover, sound pollution can be a catalyst for mental health problems. Areas characterized by high levels of noise often witness a higher rate of admissions to mental health facilities, underscoring the profound impact that excessive noise can have on individuals' psychological well-being. Addressing and mitigating sound pollution is crucial not only for the sake of environmental quality but also for the overall health and mental wellness of communities (Abey Wickrama, 1969).

There are different negative effects of high level sound to our health and environment. It causes mental stress, frustration, task interference, irritability, sleep interference, communication problems, damage of aircrafts, habit of talking loudly, temporary hearing loss and finally permanent hearing loss etc. Kathmandu is the over populated city in Nepal and the researches have indicated that the sound level in Kathmandu valley is intolerable in most of the chowks and urban centers (Gautam, 1999). Rupandehi, Butwal is the one important urban center in Nepal. The sound level of the city has not been measured scientifically till now so far in my knowledge. Therefore this study will help to find out the problems caused by traffic noise in the city.

Sound pollution is regarded as an important agent of health problems and more people are becoming deaf and it is also regarded as the slow agent of death in both developed and developing countries and it is no way harmful than any other types of pollution.

III. Methodology

The researcher, in this article, deals with most of the procedures adopted for the fulfillment of the statement. It includes research design, population and sampling, tools, validation, data collection procedure, data analysis and interpretation of the study.

The methodology used in this study is both qualitative and quantitative in nature. This study is based mainly on quantitative and descriptive design. Therefore, primary and secondary data were collected from various sources. For the help of area and sampling, the researcher chooses Rupandehi district Butwal sub-metropolitan city province-5 of Nepal. It is the main five of one most populated city of Nepal. Among them 16 major areas are involved with my research observations. The study only focuses on how and in what way the sound /noise pollution situation of Butwal city.

1. Research Design: This study has been conducted in descriptive or analytical design
2. Sampling Method: Purposive sampling method has been adopted in this study.
3. Data Collection: Sound level meters were used to collect objective data on noise levels in 16 different locations.

Materials and methods

In order to analyze the level of sound in Butwal sub-metropolitan city. The special focus was given to the traffic noise while generating primary information in this research. Within Butwal city 16 monitoring stations (Chowks) were selected for the measurement of sound level. Then a portable sound meter was operated to measure the level of sound in different places under the standard conditions.

In each station the observation was taken three times in a day i.e. 7 to 9 am, 1 to 3 pm and 5 to 7 pm. The instrument was operated for 5 minutes in each monitoring station. The maximum and minimum reading was taken with the help of a sound level meter in each station in respective time periods.

Finally the data and information have been analyzed and interpreted with the help of tables and graphs.

IV. Result and Discussion

Table 1

The minimum, average and maximum level of Butwal sub-metropolitan city observed during field survey noise level in db

S.N	Area (chowks)	Min	Ave	Max
1	Yogikuti	64	70	79
2	Kalika chowks	62	69	80
3	Chauraha	66	76	79
4	Basecamp	55	67	83
5	Finance chowks	67	72	86
6	Milan chowks	65	73	83
7	Bus park	66	73	83
8	Bhudaki chowks	66	73	82
9	Puspalal Chowks	66	73	83
10	Old Buspark	61	70	85
11	Hatbazar area	61	67	76
12	Traffic Chowks	43	74	81
13	Palpa buspark	63	70	81
14	Laxminagar chowks	57	65	80
15	Golpark	40	66	82
16	Durgamandir area	40	70	82

Source – Field Survey, 2022

The sound level of the different chowks of Butwal city was measured and it was found against the international standard of 45 dB in most of the places. For most people, following environmental sound levels would be satisfactory.

Table 2

Noise Level Standard of Different Areas in Butwal

S.N	Area	Mini.	Ave.	Maxi.
1	Residential area	40	68	82
2	Hospital area	66	73	82
3	Commercial area	67	74	83

Source-Field Survey, 2022

Table 3

Noise level standard of Nepal (2069)

S.N.	Area	Noise level dB	
		Day time	Night time
1	Silent zone	50	40
2	Industrial area	75	70
3	Rural residential area	45	55
4	Urban residential area	55	40
5	Business area	65	55
6	Mixed residential area	63	40

Source : Nepal Rajpatra, kartik 13,2069

The noise level in different parts of the city shows the variation in the monitoring stations. A field survey was conducted from March 2 to March 20, 2022 to measure the noise level of different 16 monitoring stations. During the monitoring time, it was found that the peak level of sound was produced by pressure horns, loud speaking old vehicles among the various responses of increasing noise level in Butwal sub-metropolitan city, the number of road vehicles has been steadily increasing.

According to the information given in Nepal book year, 1996 the sound beyond 60dB is harmful, 80 dB impairs hearing capacity and continuous exposure to 100 dB or more for 8 hours causes permanent damage to the hearing faculty. From the above observation of sound level in Butwal city it was found that the average sound level was more than 65 dB in most of the monitoring stations. Butwal city is one of the most important destinations in Nepal. The average noise level of new buspark, Puspalal Park, Bhudki chowk and Milon chowk also 73 dB similarly the highest level of noise was observed in New Bus park Puspalal park, Base camp and Milan Chowk i.e. 83 dB, the second highest level of noise was observed in Golpark, Bhudki Chowk and Durga Temple area and the third highest was recorded from Finance chowk, Palpa buspark area, old buspark and Traffic chowk i.e.81 dB and other monitoring stations it was observed more than 75 dB.

From the observation it is evident that the noise level was observed higher in busy areas. The noise level was observed in lower parts of the city. The practice of controlling noise level was implemented in Butwal City. To some extent the declaration of Horn restricted area is one of the good examples of it.

V. Conclusion

The traffic noise level of Butwal sub-metropolitan city was measured by mobile sound meter. The level of sound was found higher than that of international stranded in monitoring stations. The sound levels of monitoring were found higher in day and obesity time. The major reason behind the higher level of noise during day and earning time is the number of road vehicles the road traffic has increased in day and evening time. During the study it was produced by pressure horn, loudspeaker, poorly maintained vehicles and the horn that was used by traffic police during the management of traffic systems in the major chowks. In this research work the sound level in most of the monitoring stations was found higher than that above mentioned levels. Therefore during the day and evening time most of the pedestrians including shoot going children have suffered from the high level of sound in the city.

In this study, it was found that the higher level of noise was observed in most of the monitoring stations. The level of sound was found to be more than 70 dB in all the monitoring stations. Therefore, strong rules and regulation towards the pressure horn and maintaining damaged roads will help to reduce the sound pollution. In this aspect, the public and government should be aware about the increasing level of sound pollution. Otherwise, it enhances the condition of human hearings as well as other adverse impacts.

VI. Recommendations

In this study it can be concluded that the level of sound that was observed in different monitoring stations revels. That it may cause negative impacts on the health of people and environment so that following recommendations are suggested in order to control the level of sound in Butwal sub-metropolitan city.

- Old vehicles produce a higher level of sound, so they should be removed from the main city area.
- Pressure horns should be banned, and the traffic personnel also should not blow their siren loudly.
- Loudspeakers, pressure horns, cassette players, etc should be banned from the main city area.
- School children and other people who walk through the major roads should use cotton balls into their ears.
- Public awareness should be given to the concerned people.
- The concept of urban forestations should be implemented on each side of the highway and roads.
- The government should formulate the standard traffic noise level.

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