



Noise Pollution: A Public Wellbeing Challenge

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ABSTRACT

Noise pollution is becoming a big challenge in daily life affecting the wellbeing of people and the quality of life. Excessive noise seriously harms human wellness and interferes with people's daily activities at school, work, home and during leisure time.

The objective of the study was to assess the impact of noise on human health. A total 515 individuals from different wayside Government Offices, Private Organizations and Commercial Business Centers on both sides of busy roads of the city were interviewed for attitudinal responses by using the questionnaire.

A relationship was developed between different traffic noise parameters and its harmful impact on work competency and efficiency of individuals. Statistical analysis was also carried out between measured and predictive values of the percentage of highly annoyed group of individuals. The subjects claimed that there were children and senior citizens in their houses who were more prone to noise pollution and noise was affecting them badly and was changing their behaviour.

The study indicated that the problems of Headache, Hypertension and Stress had been more severe as compared to the problem of Irritation and Insomnia and these were affecting more severely to persons having other health concerns. They were of the view that awareness and guidance to general public must be provided to safeguard the health related challenges.

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Keywords: Noise Pollution; Health; Stress; Headache

Introduction

Noise Pollution is a Big Public-Wellbeing Crisis. Noise pollution is a pervasive and often overlooked environmental issue that profoundly affects public wellbeing in communities worldwide. In recent years, the detrimental effects of noise pollution on public wellbeing and increased the attention of researchers, policymakers and advocacy groups alike. This study aims to probe into the complex interplay between noise pollution and public wellbeing, exploring the various dimensions of this pressing challenge and elucidating potential avenues for mitigation and intervention. A sound becomes unwanted when it either impedes the normal activities or disrupts or diminishes a person's quality of life. Noise pollution is becoming a big challenge in daily life affecting the health of people and the quality of their life equally. Excessive noise seriously harms human wellbeing and interferes with people's daily activities at school, work, home and during leisure time. According to the World Health Organization (WHO, 2018) exposure to levels of noise exceeding safe limits (anything over 50 decibels), can be detrimental to hearing and has the risk of contributing to high blood pressure, strokes and even heart attacks. In fact when the body is exposed to high

levels of noise, it reacts by releasing stress hormones and keeping the body in a perpetual level of tension. Long-time exposure to loud sounds may result in side-effects such as irritation and anger, lack of concentration, interrupted sleep and hearing-related damage such as tinnitus. The human ear feels pain at 120-140 decibels and for that reason; we tend to protect our ears with our hands when listening to sounds in or above that decibel range. Due to decades of progress and increasing vehicles volume, the noise killed the quiet and calm character of The City Beautiful-Chandigarh. The objective of the study is to assess the impact of noise on human health.

Methodology

A total 515 individuals from different roadside Government Offices, Private Organizations and Commercial Business Centers on both sides of busy roads of the city were interviewed for attitudinal responses by using the questionnaire. A relationship was developed between different traffic noise parameters and its harmful impact on work competency of individuals. Statistical analysis was also carried out between measured and predictive values of the percentage of highly annoyed group of individuals.

Results and Discussion

515 subjects had undergone questionnaire survey to study the various aspects of Noise Pollution viz. major sources of noise, time of noise, scales of noise, problems they are facing due to noise, health implications and noise affecting their work efficiency, in their respective areas. The subjects belonged to different age groups of (Table-1), Gender (Table-2), Educational Qualifications (Table-3).

Table-1

Age Group					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 20 years	53	10.3	10.3	10.3
	20-40 years	294	57.1	57.1	67.4
	40-60 years	106	20.6	20.6	88.0
	Above 60 years	62	12.0	12.0	100.0
	Total	515	100.0	100.0	

Table-2

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	201	39.0	39.0	39.0
	Female	314	61.0	61.0	100.0
	Total	515	100.0	100.0	

Table-3

Educational qualification					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Disclosed	16	3.1	3.1	3.1
	Matric	15	2.9	2.9	6.0
	10+2	86	16.7	16.7	22.7
	Graduate	124	24.1	24.1	46.8
	PG	208	40.4	40.4	87.2
	Doctorate	66	12.8	12.8	100.0
	Total	515	100.0	100.0	

The subjects claimed that there were children and senior citizens in their houses (Tables-4a, 4b and 4c) who were more prone to noise pollution and noise was affecting them badly and was changing their behaviour.

Table-4: Children/Senior Citizens in House					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	162	31.5	31.5	31.5
	Yes	353	68.5	68.5	100.0
	Total	515	100.0	100.0	
Table-4b: Number of Children in Family					
		Frequency	Percent	Valid Percent	Cumulative Percent

Valid	0	269	52.2	52.2	52.2
	1	57	11.1	11.1	63.3
	2	122	23.7	23.7	87.0
	3	45	8.7	8.7	95.7
	4	22	4.3	4.3	100.0
Total	515	100.0	100.0		

Table-4c		Number of Senior Citizens in Family			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	242	47.0	47.0	47.0
	1	133	25.8	25.8	72.8
	2	135	26.2	26.2	99.0
	3	3	.6	.6	99.6
	4	2	.4	.4	100.0
	Total	515	100.0	100.0	

Table-5 depicts the sources of noise in the residential areas. 414 (80%) claimed that maximum noise comes from small vehicles in their area while 372 (72%) claimed that people visiting their area were making noises and 500 (97%) were affected by noise from animals especially dogs and cats. Residents of Chandigarh observe less noise from Marriages Places and Religious Places as town observe stringent rules of plying of loud speakers etc.

Table-5 Sources of Noise		Count	Column N %
Noise from Small Vehicles	No	101	20%
	Yes	414	80%
Noise from Big Vehicles	No	211	41%
	Yes	304	59%
Residents starts noisy work early in the morning	No	124	24%
	Washing Utensils	188	37%
	Washing Clothes	203	39%
	Tractors	0	0%
Do people who visit your area make noise	Can't Say	54	10%
	Yes	372	72%
	No	89	17%
Noise from Animals	No	15	3%
	Yes	500	97%
Dogs	No	209	41%
	Yes	306	59%
Cats	No	274	53%
	Yes	241	47%
Chicken	No	514	100%
	Yes	1	0%
Birds	No	510	99%
	Yes	5	1%
Monkeys	No	513	100%
	Yes	2	0%
Marriage Places	Yes	154	30%
	No	336	65%
	Don't Know	19	4%
	Missing Data	6	1%
Religious Places	Yes	206	40%
	No	277	54%
	Don't Know	17	3%
	Missing Data	15	3%
Construction activity in your area	Yes	246	48%
	No	230	45%
	Don't Know	34	7%
	Missing Data	5	1%
Household items	Yes	259	50%
	No	208	40%
	Don't Know	44	9%
	Missing Data	4	1%
Others (Fireworks, loud music etc.)	Yes	364	71%
	No	116	23%

	Don't Know	20	4%
	Missing Data	15	3%

69 (13%) and 199 (39%) subjects felt irritation as severe and major problem respectively due to noise; 67 (13%) and 185 (39%) subjects had headache as severe and major problem respectively due to noise. 52 (10%) and 141 (27%) subjects had hypertension as severe and major problem respectively due to noise; 61 (12%) and 216 (42%) subjects had Insomnia as severe and major problem respectively due to noise; 39 (8%) and 200 (39%) subjects had stress as severe and major problem respectively due to noise. (Table-6).

Table-6 Problems Due to Noise		Don't Know	Severe Problem	Major Problem	Minor Problem	No Problem
Problem - Irritation	Count	9	69	199	198	40
	Row N %	2%	13%	39%	38%	8%
Problem - Headache	Count	3	67	185	159	101
	Row N %	1%	13%	36%	31%	20%
Problem - Hypertension	Count	15	52	141	141	166
	Row N %	3%	10%	27%	27%	32%
Problem - Insomnia	Count	19	61	216	84	135
	Row N %	4%	12%	42%	16%	26%
Problem - Stress	Count	11	39	200	118	147
	Row N %	2%	8%	39%	23%	29%

A Median Test when applied to the problems of noise depicted that each and every age group consisted of affected as well as unaffected subjects by the problems due to noise pollution viz Irritation, Headache, Hypertension, Insomnia and Stress. (Table-6a). For example- in case of problem of irritation, median value had been found to be 2.000 which reflected Minor problem as per scale. In case of Irritation and Age (Less than 20 years) 25 subjects were affected and 28 subjects were unaffected; (20-40 years) 133 subjects were affected and 161 subjects were unaffected; (40-60 years) 51 subjects were affected and 55 subjects were unaffected; (Above 60 years) 29 subjects were affected and 33 subjects were unaffected.

Table-6a Frequencies		Age Group			
		Less than 20 years	20-40 years	40-60 years	Above 60 years
Problem - Irritation	> Median	25	133	51	29
	<= Median	28	161	55	33
Problem - Headache	> Median	6	62	19	14
	<= Median	47	232	87	48
Problem - Hypertension	> Median	18	96	34	18
	<= Median	35	198	72	44
Problem - Insomnia	> Median	21	134	44	20
	<= Median	32	160	62	42
Problem - Stress	> Median	17	86	33	11
	<= Median	36	208	73	51

Table-6b Test Statistics ^a	Problem Irritation	Problem Headache	Problem Hypertension	Problem - Insomnia	Problem - Stress
N	515	515	515	515	515
Median	2.000	3.000	3.000	2.000	3.000
Chi-Square	.294	3.256	.388	4.023	4.291
df	3	3	3	3	3
Asymp. Sig.	.961	.354	.943	.259	.232

Table-6b clearly indicated that the problem of Headache, Hypertension and Stress had been more severe as compared to the problem of Irritation and Insomnia. Hence, no significant association had been found in age and problems due to noise. There was no evidence to the fact that either younger or older people get affected more due to noise than the other age groups. All age groups shared similar degree of problems due to noise.

Table-6c Frequencies		Gender	
		Male	Female
Problem - Irritation	> Median	91	147
	<= Median	110	167
Problem - Headache	> Median	36	65
	<= Median	165	249

Problem - Hypertension	> Median	55	111
	<= Median	146	203
Problem - Insomnia	> Median	80	139
	<= Median	121	175
Problem - Stress	> Median	52	95
	<= Median	149	219

Table 6C tried to establish association between problems due to noise and gender of the subjects. The idea is to check if male, female responded differently to the problems faced due to noise. It was observed that in case of problem of irritation and insomnia, more of the male respondents had indicated higher degree of problem severity, while in other cases; affected male respondents had been less. Similar results had been there in case of female respondents too. Thus, it could not be established that male or female respondents felt different degree of severity of problems due to noise.

Table-6d Test Statistics ^a	Problem-Irritation	Problem Headache	Problem Hypertension	Problem Insomnia	Problem Stress
N	515	515	515	515	515
Median	2.000	3.000	3.000	2.000	3.000
Chi-Square	.117	.605	3.579	1.000	1.155
df	1	1	1	1	1
Asymp. Sig.	.732	.437	.059	.317	.283
Yates' Continuity Chi-Correction Square	.063	.441	3.223	.826	.950
df	1	1	1	1	1
Asymp. Sig.	.801	.507	.073	.363	.330

a. Grouping Variable: Gender

Table-6d helped to test the significance of association discussed in table 6C regarding gender and problem due to noise. Chi Square values had been insignificant in all cases of problems due to noise. Hence, no association had been found. Thus, it could be generalized that there was no difference in male and female subjects related to the intensity of problem of noise felt.

Table-6e Frequencies		Educational qualification				
		Matric	10+2	Graduate	PG	Doctorate
Problem - Irritation	> Median	8	45	59	88	33
	<= Median	7	41	65	120	33
Problem - Headache	> Median	3	15	26	40	14
	<= Median	12	71	98	168	52
Problem - Hypertension	> Median	5	26	36	67	28
	<= Median	10	60	88	141	38
Problem - Insomnia	> Median	7	34	53	87	32
	<= Median	8	52	71	121	34
Problem - Stress	> Median	6	25	39	53	19
	<= Median	9	61	85	155	47

Table-6e presented data related to problem faced due to noise and educational qualification of subjects. The idea behind this exercise was to assess if the level of problem perceived due to noise was different in selected groups based on their educational qualification. It was visible that all the subjects felt more of irritation and insomnia and less of Headache, Hypertension and Stress.

Table-6f Test Statistics ^a	Problem - Irritation	Problem - Headache	Problem - Hypertension	Problem - Insomnia	Problem - Stress
N	499	499	499	499	499
Median	2.000	3.000	3.000	2.000	3.000
Chi-Square	3.298	.528	3.859	1.416	2.452
df	4	4	4	4	4
Asymp. Sig.	.509	.971	.425	.841	.653

Grouping Variable: Educational qualification

Table-6f further tested the significance of relationship between educational qualification and various problems due to noise. Chi-square values in all cases had been found to be insignificant. Thus no relationship could be established between educational qualification and problems due to noise. Be it matric pass or post graduate/doctorate, all the respondents had faced similar intensity of the problem of noise.

The subjects were inquired about 10 different statements (Table-7) to know their perspective about the noise. 478 (93%) subjects wanted to do something to make environment noise free. 382 (74%) faced the problem of lack of concentration due to emanating noise. 368 (71%) preferred quietness over noise. Approximately same number of people admitted that noises were natural part of environment. 444 (86%) admitted that they

were not able to ignore high levels of noise. 364 (71%) were found themselves not able to adjust to the continuously rising levels of noises. 371 (72%) felt that they found themselves helpless when they were not able to get rid of noise. 319 (62%) felt that inadequate rules were adding to the increasing noise levels.

515 individuals were interviewed using a questionnaire for attitudinal responses in Chandigarh. Age distribution of the subjects was: 17% 20-30 years, 60% 31-40 years and 22% 41-50 years.

The actual statistical estimation of the noise pollution levels in all areas of Chandigarh had brought about the cause and the extent of noise pollution existing presently. The noise pollution levels, more than the recommended permissible limits had been observed. The increasing rate of noise pollution was causing adverse impacts on human health such as Irritation, hypertension headache, insomnia and stress. Noise-induced hearing loss was also detected on audiometric tests among traffic personnel in Malaysia (Thomas et al, 2007). Auditory morbidity is a serious issue which should not be neglected. It can lead to miscommunication, accidents, loss of livelihood, etc. It can be prevented or greatly reduced by periodic audiometric check-ups, ear protection, and awareness training. Studies have also reported hypertension to be associated with noise exposure. Another study observed that residential proximity to high traffic and traffic noise predisposed to higher blood pressure and hypertension. (Fuks et al, 2011). A study conducted in Denmark observed increase in systolic blood pressure per 10 dB(A) increase in 1 year mean road traffic noise levels. (Sorensen et al 2011).

In a study across Europe, the relation between noise annoyance and medically diagnosed illness was assessed. People who were annoyed by neighbourhood noise over a long time were found to be at higher risk for cardiovascular disease, depression, and migraine. People who were persistently annoyed by traffic noise were found to be at higher risk for respiratory health problems. Lower risk of annoyance-induced illness in older persons was suggested to be due to being concealed by senility. Emotional stress triggered by noise was suggested to play a role in the respiratory problems in children (Niemann et al, 2006).

A study conducted in Orissa found that, though people experienced noise-induced symptoms such as headache, bad temper, hearing problem, loss of concentration, and sleep disturbance, they were unaware of the ill-effects of noise on health. Noise pollution creates negative emotions of annoyance in the people. (Patel et al, 2006 and Banerjee and Chakraborty 2006) Residents living near roadways reported frequent irritation (52%), hypertension (46%), and loss of sleep (48.6%) due to noise pollution. Sleep is disturbed when indoor noise levels are above 30 dB, and 45 dB for sleeping outdoors. After-effects of sleep disturbance include headache and inability of concentrate in one's work and irritability (Agarwal et al, 2011).

Conclusion

This study had explored the multifaceted impact of noise pollution on public wellbeing and highlighted the pervasive nature of noise pollution and its significant consequences on various aspects of individuals' lives. The findings underscored the importance of addressing noise pollution as a critical public wellbeing challenge. This study emphasized the urgency of implementing equitable policies and interventions to mitigate the impact of noise pollution and promote wellbeing for all. It is the need of the hour to identify the health effects of noise and to provide awareness and guidance to safeguard the wellbeing to prevent irritation, hypertension, headache, cardiovascular disease, stress, and insomnia.

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