

ORIGINAL ARTICLE

Noise Related Health Issues among Residents of High Traffic Flow Areas of Rawalpindi and Islamabad

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ABSTRACT

Objective: To determine noise related health issues prevailing in the residents of high traffic flow areas of Rawalpindi and Islamabad.

Study Design: Cross sectional study.

Place and Duration of Study: High traffic flow residential areas of Rawalpindi and Islamabad from 15th May to 18th October, 2015.

Materials and Methods: A cross-sectional study was carried out from 15th May to 18th October, 2015. A total of 352 respondents in the age group 25-65 years from high traffic flow residential areas of Rawalpindi and Islamabad were selected through non-probability convenience sampling technique. A structured closed ended questionnaire was administered and the collected data was analyzed through SPSS version 22.

Results: Among the various findings of our study, difficulty in sleeping was a significant problem (87%), irrespective of the age of respondents. The annoyance (69%), stress (63.4%), easy fatigability (61.4%) and poor digestion (60.5%) were also significant predicaments owing to excessive noise exposure. The residents complained that noise was interfering with their speech (58.2%) and reducing their productivity leading to difficulty in concentrating on a task (55.1%) and reduced task performance (52.3%).

Conclusion: The current study revealed that there are certain health issues attributed to noise, posing a major threat to the health of community and gradually worsening the burden of non-communicable diseases.

Key Words: Health Issues, High Traffic Flow, Noise Pollution, Residents.

Introduction

In an ever changing environment, a new man-made epidemic breed, a pernicious agent of many physiologic and psychological ailments as it grows, hailed by many theorists as "slow agent of death", the environmental noise devours its prey as time courses forward.^{1,2} It is a significant problem all over the world especially in urban territories.² Environmental noise particularly high traffic noise is increasing day by day in urban areas over the period of past few years. Noise health effects are the health consequences of elevated sound levels.³ Increased traffic noise alone is harming the human health and interferes with people's daily activities at school, at work, at home and during leisure time.⁴ Noise exposure has been known to induce auditory and non-auditory effects.⁵ It can disturb sleep, can cause cardiovascular, autonomic and other psychological

and physiological effects including reduce performance and provoke annoyance responses and changes in social behavior.^{5,6}

An insight into noise pollution in our opinion is a daunting combination of many factors. The formidable wrath of poverty has influenced migration of individuals inspiring a shift from rural to urban areas.⁶ This shift has not only lead to noise pollution but serves as a nidus for various other complexities and has proved rather grave instead of being bounteous.⁷ Population explosion and overcrowding has led to congestion of residential and commercial areas in its vicinity and this in turn postulates and dictates rise in traffic; deemed by some theorists as a "forerunner and a preposterous cause of noise pollution".⁸

At least one million healthy life years are lost every year from traffic related noise in the western part of Europe.⁹ Most of the areas, particularly the urban side, are subjected to unacceptable noise conditions due to construction, manufacturing, traffic and recreational activities.¹⁰ The road traffic noise is another source of noise nuisance in urban areas of Pakistan; the situation is getting alarming with increase in traffic density on city roads.⁹⁻¹¹ There is no

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specific and detailed legislation to deal with the emerging dilemma of noise nuisance in urban areas of Pakistan, no national survey has been conducted to assess the noise level in cities and no national standards for prescribing noise limits for residential areas, industrial areas, commercial areas or silence zones.¹²⁻¹⁴

There has been a lapse of effort to glean sufficient information on the health hazards caused by noise^{15,16} therefore, this study was conducted to determine associated health issues, primarily to highlight the importance of a possible linkage between noise pollution and ill health and provide a growing evidence of effects of noise on community health. The objective of this study was to determine noise related health issues prevailing in the residents of high traffic flow areas of Rawalpindi and Islamabad.

Materials and Methods

A cross sectional study was conducted in high traffic flow residential areas of Rawalpindi and Islamabad from 15th May to 18th October 2015. The present study focused on road traffic noise therefore air traffic noise, railway stations, people living near railway tracks and industrial area were all excluded from the study. Occupational and household noise exposures also ruled out. A total of 352 respondents in the age group 25-65 years from these localities were selected through non-probability convenience sampling technique. The sample size was calculated by WHO sample size calculator. For the purpose of noise exposure assessment, a structured closed ended questionnaire was administered, mainly dealt with duration of residential status and health effects of noise pollution from road traffic noise. The persons were interviewed for auditory and non-auditory effects including annoyance, sleeplessness, interference with communication and other harmful effects. Informed consent was taken from the respondents explaining them the purpose of this study and confidentiality of data was ensured. The collected data was analyzed using SPSS version 22. Standard descriptive and analytical statistics were used to analyze the data. Frequency distributions were calculated. Chi-square test was used to ascertain the association between qualitative variables and p-value less than 0.05 was considered significant.

Results

The mean age of respondents in this survey was 35.4 years with a standard deviation of ± 10.2. The majority (65.3%) spends 9 hours daily in high traffic flow areas and 58.8% lived for more than 4 years or more in their noise affected residential areas. Among various findings of our study, difficulty in sleeping was a more prevalent problem showing magnitude of the effect of noise has on the sleep alone, affecting respondents of all ages.

The annoyance, stress, easy fatigability and poor digestion were also considerable predicaments owing to noise exposure. The residents complained that ambient noise was interfering with their speech, provided a barrier for proper communication and reducing their productivity leading to difficulty in concentrating on a task and reduced task performance. The people experienced trouble in hearing, buzzing noise in ears and difficulty in understanding spoken words. They also complained of headache and palpitations but to a lesser extent, the findings being presented in figure 1.

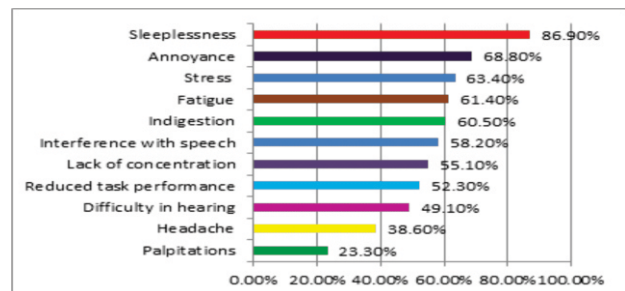


Fig 1: Frequency of health issues caused by noise

The problems faced during sleeping or primary sleep disturbances were frequent awakening, the most significant finding, followed by difficulty falling asleep, waking too early, alteration in sleep stages especially reduction in REM sleep and uncomfortable sensations in the body as shown in figure 2.

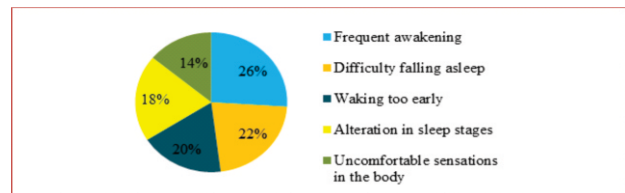


Fig 2: Problems faced during sleeping due to noise

It was appreciated that sleep disturbance prevails in all age groups and this finding was statistically highly significant (table 1).

Table I: Frequency of sleep disturbances in all age groups

Age group (Years)	Sleeplessness at night		p-value
	Yes n(%)	No n(%)	
25 - 35	75(21.3)	14(3.9)	0.000
36 - 45	69(19.6)	11(3.1)	
46 -55	77(21.8)	9(2.5)	
56 - 65	89(25.2)	8(2.2)	

It was also found that participants having exposure to noise for a longer duration with an increment in the time span spent every year, the participants experienced more health issues related to noise. The maximum frequency of health issues was observed among those who spend 9 hours or more daily at high traffic flow areas, as observed with gradually increasing years spent in the high traffic flow residential areas(table 2).

Table II: Health issues related to duration of exposure at high traffic flow areas

Time spent in noisy areas (hours)	Years of residence	Annoyance		p-value
		Yes n(%)	No n(%)	
3-4	1	0(0)	3(0.8)	0.019
5-6	2	21(5.9)	5(1.4)	
7-8	3	63(17.8)	53(15)	
>9	>4	157(44.6)	50(14.2)	
		Interference with speech communication		0.000
3-4	1	1(0.2)	2(0.5)	
5-6	2	6(1.7)	20(5.6)	
7-8	3	64(18.1)	52(14.7)	
>9	>4	174(49.4)	33(9.3)	
		Sleeplessness at night		0.007
3-4	1	3(0.8)	0(0)	
5-6	2	23(6.5)	3(0.8)	
7-8	3	107(30.3)	9(2.5)	
>9	>4	193(54.8)	14(3.9)	
		Difficulty to concentrate		0.027
3-4	1	1(0.2)	2(0.5)	
5-6	2	9(2.5)	17(4.8)	
7-8	3	55(15.6)	61(17.3)	
>9	>4	129(36.6)	78(22.1)	
		Stress and easy fatigability		0.002
3-4	1	1(0.2)	2(0.5)	
5-6	2	7(1.9)	16(4.5)	
7-8	3	51(14.4)	62(17.6)	
>9	>4	137(38.9)	64(18.1)	
		Hearing impairment		0.000
3-4	1	0(0)	3(0.8)	
5-6	2	5(1.4)	21(5.9)	
7-8	3	51(14.4)	65(18.4)	
>9	>4	125(35.5)	82(23.2)	

Discussion

This study was conducted to reveal existing status of potential health effects caused by exposure to noise. The study found that there are certain adverse health effects that can be linked to exposure to traffic noise. Excessive noise seriously harms human health. Noise can be perceived as being abhorrent by some individuals, which may not pose the same impact on others in the respective vicinity.⁶ The results of the study indicate that persons residing in high traffic flow areas and exposed to noise pollution showed sleep disturbance, annoyance, fatigue, difficulty in hearing, stress, lack of concentration, reduced task performance and poor digestion.^{9,10}

Our study suggested that the most significant health issues related to noise exposure were sleeping problems at night and annoyance, a finding consistent with other studies.^{7,9,10} Uninterrupted sleep is known to be a prerequisite for good physiological and mental functioning of healthy individuals in the present study it was proved that individuals were suffering from sleeplessness due to noise.¹⁰ When sleep disruption becomes chronic the results are long term effects on health and wellbeing.^{11,12}

Studies conducted internationally, suggests that there was a significant relationship between noise annoyance at night and sleeping problem, moreover there is no association between noise and cardiovascular problems, these results were similar to our research.¹⁵⁻¹⁸ In another study it has been reported that majority of the respondents was suffering by frequent irritation, fatigue, and lack of sleep due to noise pollution, the results comparable to our research findings.¹⁹ An important finding of the present study was indigestion or poor digestion suffered by majority (60.5%) of the participants, inconsistent with other studies.^{9,10,19} This finding can be explained by the fact that environmental factors like noise can increase the levels of stress hormones in the body causing hyperacidity and alteration in gastrointestinal motility.

Noise pollution also assumed to hasten and exaggerate the development of latent mental disorders including anxiety, mood changes, nausea, headache, neurosis, psychosis and behavioral changes.¹⁹ Our findings showed noise impairs task performance at school and work, increases errors

and decreases motivation, initially causing concentration lapse, poor understanding and progressively leading to decreased efficiency at work.¹⁹ Hearing loss is a key feature observed in other researches in comparison.^{5,9,10,19} The problem of experiencing trouble in hearing was most likely due to the direct effect of long and continuous exposure to noise, causing sensor neural hearing loss. Early detection of symptoms could yield better prognosis and a definitive treatment strategy could be formed.¹⁹

The assessment of road traffic noise by noise dosimeter (sound meter) was done in a study done in Iran but in our study new technological gadgets could not be used to suffice adequate sound measurement which could have effectively yielded masterful results.²⁰ Ignorance or lack of education had been a prime cause to hamper positive results although the symptoms perceived were mostly directing towards particular disease process. This was observed when people highlighted they were suffering from health problems but could not invariably correlate the disease process to noise pollution.²¹

Since there had been inadequate knowledge on the subject of health hazards of noise pollution as highlighted by our research; the main crux of the problem lies in the fact that general public does not appreciate this problem and do not perceive noise pollution to have negative effects on health due to lack of awareness and ignorance.²¹

Conclusion

The current study concluded that certain health issues are especially attributed to noise pollution posing a major threat to the health of community and gradually worsening the burden of non-communicable diseases. The most significant findings were sleep disturbance, annoyance, stress, fatigue, indigestion, headache, hearing problems and inefficient daily activities. Health education measures should be directed to highlight noise pollution as a public health issue and raise awareness among general public in order to reduce the consequences of noise on human health.

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