

Original Research Article

Knowledge and perception regarding the prevention of traffic noise pollution among students of North Karnataka

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ABSTRACT

Background: Noise pollution is an insidious and underestimated environmental threat, that poses diverse health risks such as sleep disturbances, cardiovascular ailments, impaired work and academic performance, hearing impairments, and mental health issues. Understanding student's awareness, perspectives, and attitudes toward traffic noise pollution and its health impacts is crucial. Objective was to evaluate the knowledge and perceptions of students towards traffic noise pollution.

Methods: The present study was conducted in Vijayapura during August and September 2023, this cross-sectional study involved 304 students. A self-administered questionnaire was used to assess the existing knowledge and perceptions regarding traffic noise pollution prevention among students of north Karnataka.

Results: Among 304 studied participants, 56.3% were females and 43.8% males. Knowledge analysis that revealed 63.5% with good understanding, while 23% had good perception towards traffic noise pollution. Chi-square analysis showed that knowledge correlated significantly with age ($p=0.010$), favoring those over 20 years. Gender did not show a significant impact on knowledge ($p=0.453$). Perception showed age-related significance ($p=0.037$) but gender showed no significant influence on perception ($p=0.721$).

Conclusions: The study highlighted positive knowledge levels about traffic noise pollution due to its often-overlooked nature. However, only a small portion exhibited favorable perceptions. This highlights the necessity for focused interventions, especially among the younger generation, to address traffic noise pollution effectively. Consistent education and reinforcement of traffic rules could induce positive change in the health and safety of society.

Keywords: Awareness, Knowledge, Perception, Students, Traffic noise pollution

INTRODUCTION

In the contemporary world, noise pollution poses a persistent environmental threat originating from a diverse array of sources, exerting a substantial impact on the environment.¹ Notably, noise pollution is regarded as the third most detrimental aspect of urban environments. While the inconveniences stemming from noise have been acknowledged for a considerable time, it has only

recently gained prominence as a crucial consideration in the realm of transportation planning with environmental implications.²

In recent times, traffic-related noise pollution has emerged as a pressing issue, largely attributed to historical shortcomings in urban planning. In the past, residential homes, schools, offices, hospitals, commercial hubs, and other communal structures were frequently

situated in close proximity to the main roads within municipalities, often lacking adequate soundproofing or buffer zones.³

In India, transportation rates are escalating, and the vehicular population is rapidly expanding, exacerbating environmental degradation due to traffic noise. The Central Pollution Control Board (CPCB) plays a vital role in monitoring noise levels at designated monitoring stations in major Indian cities.⁴ The assessment of sound pressure, a fundamental measure of air vibrations generating sound, is conducted on a logarithmic scale employing decibel (dB) units, given the broad spectrum of sound pressure perceivable by humans.⁵ Presently, the National Ambient Noise Monitoring Network (NANMN) has established 70 continuous monitoring stations, with ten stations in each of the seven identified cities: Mumbai, Delhi, Kolkata, Bangalore, Chennai, Lucknow, and Hyderabad.^{4,6}

Noise pollution ranks among the significant environmental pollutants encountered in daily life, bearing direct implications for human health. Noteworthy studies conducted by Sakhvidi et al and Sorensen et al affirm that traffic noise serves as a substantial risk factor for conditions such as diabetes and stroke.^{7,8} Furthermore, individuals working as traffic police in noisy environments during extended shifts face a substantial risk of developing noise-induced hearing loss (NIHL).⁹ It is important to note, however, that knowledge, awareness, and attitudes regarding the effects of noise and the use of ear-protective devices remain relatively low.

Hence, this study was dedicated to examining the awareness and perceptions of students in the north Karnataka population concerning traffic noise pollution.

METHODS

Study design

A cross-sectional survey using semi-structured questionnaires was conducted in Vijayapura during August and September 2023 through in-person interviews.

Inclusion and exclusion criteria

Students from various educational backgrounds above 18 years and those who consented were included in the study. Students who were not present on the day of interview and those who did not consent were excluded from the study.

Ethical clearance

The ethical clearance was obtained from the ethical clearance department of the BLDE (DU) Shri B. M. Patil Medical College Hospital and Research Centre, Vijayapura.

Sample size

The anticipated proportion of good knowledge regarding the effects of noise pollution on human health 56%, the study would require a sample size of a minimum of 265 with 95% level of confidence and 6% absolute precision.⁶

Data collection

This cross-sectional study involved 304 students of different colleges. A questionnaire was created in form of an online form (Google form) and distributed via social media, such as WhatsApp and e-mail. A semi-structured questionnaire was used to assess their existing knowledge, attitudes, and perceptions regarding traffic noise pollution prevention. All questionnaires were made in English and then explained in the local language (Kannada).

Statistical analysis

The data obtained was entered in a Microsoft Excel sheet, and statistical analysis was performed using a statistical package for the social sciences (version 20). Association between categorical variables was analyzed using the Chi-square test. P value less than 0.05 was considered statistically significant.

RESULTS

In this study, a total of 304 students were enrolled. The distribution of participants by gender revealed that 56.3% were females, while 43.8% were males. Age-wise analysis demonstrated that 13.8% of the participants were between 17-20 years old, while the majority, 86.2%, were between 20-30 years old.

Table 1: The socio-demographic details of study cohort.

Basic characteristics	No. of students	Percentage
Age (years)		
<20	42	13.8
>20	262	86.2
Gender		
Female	171	56.3
Male	133	43.8
Residence		
Rural	70	23.0
Urban	234	77.0
Educational status		
Allied health sciences	30	9.9
Engineering	76	25.0
Medical	175	57.6
Other graduation	23	7.6
Total	304	100.0

Regarding the participants' residences, the majority resided in urban areas, accounting for 77% of the total, while 23% lived in rural areas. When examining the educational background of the participants, it was found that the largest group were medical graduates (57.6%),

followed by engineering graduates (25%), allied health sciences graduates (9.9%), and other graduates (7.6%). The socio-demographic details are summarized in Table 1.

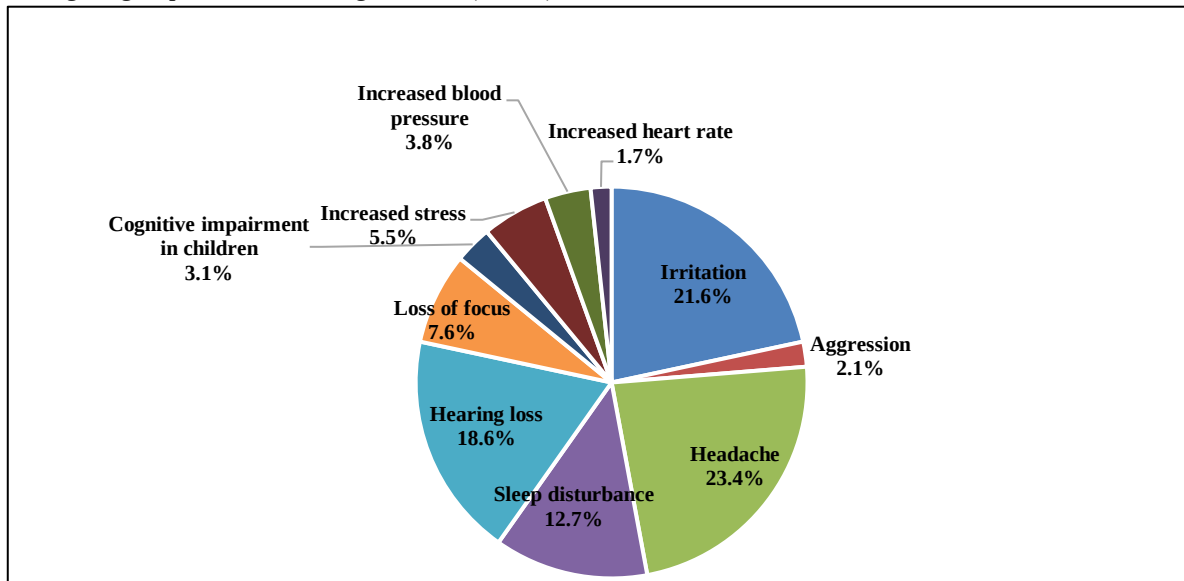


Figure 1: The frequency of effect of noise pollution on human health in the present study cohort.

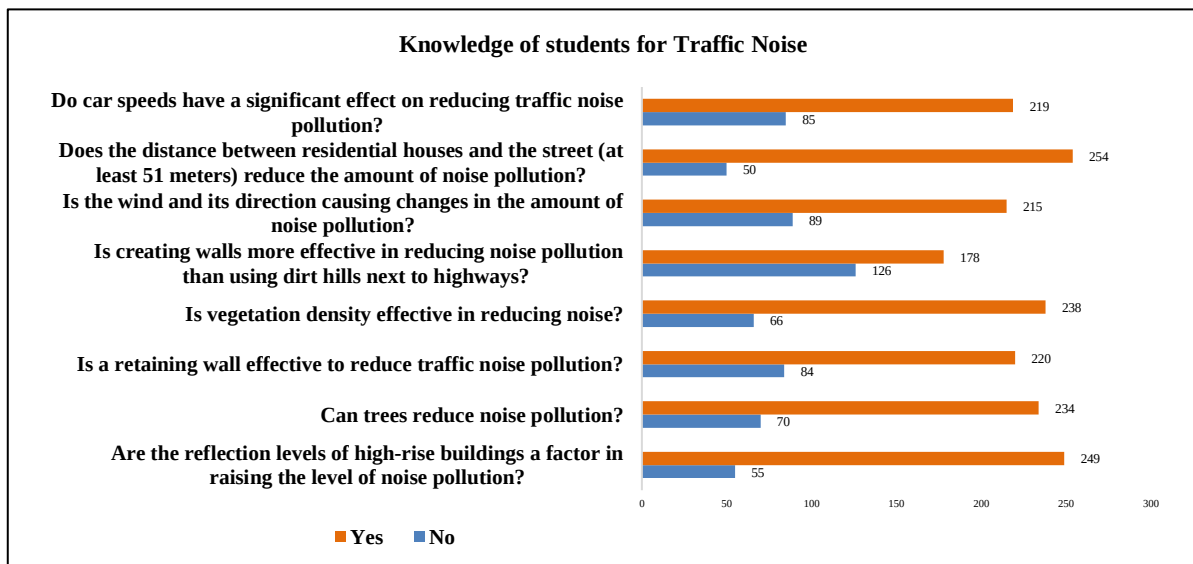


Figure 2: Frequency outcome of knowledge and prevalence in the present study.

The study assessed the participants knowledge of various aspects of noise exposure and its effects, as well as their perceptions, as shown in Figure 1 and 2. Participants were categorized into three groups: poor (score <50), average (score 50-75), and good (score >75) based on their knowledge and perception regarding traffic noise pollution. The highest percentage of participants (63.5%) fell into the "good" knowledge category, followed by the "average" and "poor" categories. Interestingly, for perception, the highest number of participants were in the "average" category, followed by "poor" and "good" as given in (Table 2).

Table 2: Association of knowledge and perception of the study participants.

	Knowledge		Perception		χ^2 test
	N	%	N	%	
<50 (poor)	32	10.5	109	36	p=0.001*
50-75 (average)	79	26.0	125	41	
>75 (good)	193	63.5	70	23	
Total	304	100.0	304	100.0	

*Statistically significant.

The study also examined the relationship between residence and the total scores of perceptions among participants. The urban area had the highest number of participants in the “average” category with scores 50-75, followed by the “poor” and “good” categories while the

rural area had the highest number of participants in the “poor” category showing the significant association. The educational status of participants was found to have a significant association with perception scores, as shown in (Table 3).

Table 3: Education status wise distribution of these scores.

Residence versus total score in perception	Total score (perception) (%)			Total (%)	Chi square test	P value
	<50 poor	50-75 average	>75 good			
Urban	75 (32)	103 (44)	56 (24)	70 (100)	6.540	0.038*
Rural	34 (48.6)	22 (31.4)	14 (20)	70 (100)		
Total	116	71	117	304		
Educational status versus total score in perception						
Medical	47 (26.9)	77 (44)	51 (29.1)	175 (100)	19.472	0.003*
Engineering	40 (52.6)	25 (32.9)	11 (14.5)	76 (100)		
Allied health sciences	11 (36.7)	14 (46.7)	5 (16.7)	30 (100)		
Others	11 (47.8)	9 (39.1)	3 (13)	23 (100)		
Total	109 (35.9)	125 (41.1)	70 (23)	304 (100)		

*Statistically significant.

Table 4: Association of knowledge and perception with age and gender.

	Knowledge (%)			Total (%)
Age (years)	<50 poor	50-75 average	>75 good	
<20	10 (31.3)	10 (12.7)	22 (11.4)	42 (13.8)
>20	22 (68.8)	69 (87.3)	171 (88.6)	262 (86.2)
Chi-square and p value	$\chi^2=9.204$	P=0.010*		
Gender				
Male	17 (53.1)	36 (45.6)	80 (41.5%)	133 (43.8)
Female	15 (46.9)	43 (54.4)	113 (58.5%)	171 (56.3)
Chi-square and p value	$\chi^2=1.664$	P=0.453		
	Perception			Total
Age (years)	<50	50-75	>75	
<20	21 (50)	17 (40.5)	4 (9.5)	42 (100)
>20	88 (33.6)	108 (41.2)	66 (25.2)	262 (100)
Chi-square and p value	$\chi^2=6.583$	P=0.037*		
Gender				
Male	51 (38.3)	53 (39.8)	29 (21.8)	133 (100)
Female	58 (33.9)	72(42.1)	41 (24)	171 (100)
Chi-square and p value	$\gamma^2=0.655$	P=0.721		

*Statistically significant.

Furthermore, chi-square analysis was conducted to assess the relationship between knowledge and perception with age and gender. The results indicated that knowledge was significantly associated with age ($p=0.01$), favoring those over 20 years of age. Gender did not significantly impact knowledge ($p=0.453$). Perception showed a significant difference with age ($p=0.037$), favoring those over 20 years, while perception was not significantly affected by gender ($p=0.721$) as shown in Table 4.

DISCUSSION

Numerous studies have established a strong association between noise annoyance and various aspects of mental

health, including intellectual health, anger, disappointment, dissatisfaction, depression, anxiety, distraction, tension or fatigue, and sleep disturbances.¹⁰ In the context of the present study conducted in the north Karnataka region of Karnataka, India, an assessment was made regarding the knowledge and perception of traffic noise pollution among students. The results revealed that students exhibited a relatively higher level of knowledge regarding the adverse effects of noise pollution on human health, with headaches (22.4%), irritation (20.7%), hearing loss (17.8%), and other issues being the most commonly identified problems. A study conducted among Malaysian medical students reported similar findings, with the highest percentage of respondents identifying

noise-related health effects, albeit with variations in specific concerns.¹⁰

The elevated levels of noise and associated frustration in the studied region can be attributed to various factors, including poorly maintained and overcrowded roads, frequent horn usage, inadequate traffic management, and road infrastructure issues. Furthermore, insufficiently timed stops at public transit stations contribute to increased traffic congestion.⁵

To categorize the participants knowledge and perception of noise pollution, the study employed a scale ranging from 1 to 100, resulting in three categories: good, average, and poor. Notably, a majority of the participants (63.5%) demonstrated good knowledge regarding noise pollution. However, a significant proportion displayed a poor perception (36.5%) regarding measures to mitigate noise pollution. Consistent with previous research, road traffic noise was identified as one of the most annoying sources of noise.¹¹

Enhancing knowledge and creating an optimal educational environment for students emerge as critical tasks for policymakers. Raising awareness about ongoing noise pollution issues, improving vehicle designs to reduce noise emissions, and constructing effective infrastructure to minimize traffic-related noise are key strategies to mitigate the adverse effects of noise pollution. Constant efforts are needed to explore and implement strategies that minimize the impact of noise pollution, ultimately enhancing public health.

This study provides valuable insights into the knowledge and perception of young individuals regarding noise pollution. The findings offer a foundation for targeted educational initiatives and awareness campaigns aimed at addressing this often-neglected environmental issue and fostering positive societal changes.

Although the study involved 304 students, the sample may not be representative of the entire student population in north Karnataka or other regions, limiting the generalizability of the findings. Additionally, by focusing solely on students, the study excludes other significant segments of the population who might be affected by traffic noise pollution, such as working professionals, elderly people, or children below 18 years.

CONCLUSION

The study has shed light on the positive knowledge levels regarding traffic noise pollution, which is particularly encouraging given the often-overlooked nature of this issue. However, a notable concern has emerged from the findings: only a small portion of the participants exhibited favorable perceptions toward addressing this problem. This highlights the pressing need for targeted interventions, especially among the younger generation, to effectively tackle the issue of traffic noise pollution.

Schools and colleges emerge as pivotal platforms for implementing such interventions. By providing consistent education and reinforcing traffic rules, we have the potential to induce positive changes in the health and safety of our society. It is imperative that we take proactive steps to raise awareness and foster a more responsible and considerate approach to noise pollution, ultimately benefiting the well-being of our communities.

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