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Research Article

Assessment of Potential Health Risk Due to Traffic-Induced Sound Pollution: A Study in Khulna City, Bangladesh

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ABSTRACT

Background: Sound pollution has been emerging as a leading nuisance for urban dwellers all over the world. This study was conducted in some busiest traffic junctions of the Khulna metropolitan city of Bangladesh to reveal the impact of sound pollution on urban dwellers.

Methods: The questionnaire survey was conducted using a probability selective sampling procedure and different age groups of respondents were chosen from the five busiest traffic junctures. The necessary associations were discovered using ross-tabulation, Pearson's Chi-square with Cramer's V coefficient, and binary logistic regression analysis.

Results: Maximum respondents (95%) were found to be affected by several health issues (physical and psychological) due to the current level of road-traffic sound pollution. During the daytime, 98% of respondents claimed the high density of vehicles as a key factor. Meanwhile, 92% of them marked the buses [(χ^2(2, n=140)=27.404, p<.0.001) with Cramer's V coefficient of 0.44] as the most sound generating source. The respondents spending more time in the noisy places were found to have approximately 1.354, 1.311, and 1.221-times higher risk of hypertension, bad temperament, and irregular heartbeat problems, respectively than those who did not report. Notably, hearing loss issues were significantly more common among respondents from various age groups [odds ratio (OR): 1.045, 95% CI: 1.012-1.079].

Conclusion: Traffic sound pollution is harmful to human health. This study suggests that increasing awareness among people along with taking administrative measures would be effective to diminish the sound pollution problem.

Keywords: sound pollution, traffic, health risk, perception, Bangladesh

INTRODUCTION

In the last few decades, modern technology has given rise to several types of pollution. It is now widely acknowledged that developing countries are experiencing severe environmental problems and destructions that were unknown even 20 or 30 years ago. Sound pollution is now an orthodox environmental threat. It is defined as an unwanted or offensive sound that unreasonably intrudes into a person's daily activities. In other words, any sound could also be noise if circumstances cause it to be disturbing. Sound pollution can be defined as regular exposure to high sound pressure levels which can have an unpleasant effect on humans. Noise is considered one of the most common hazards worldwide. According to the World Health Organization (WHO), sound pollution is the third most serious environmental pollution, after air pollution and water pollution in Bangladesh (Hasnat et al., 2018; Muhit and Chowdhury, 2013). Rapid urbanization, transportation, and industrialization can increase people's exposure to health-related risk factors and impair their quality of life (Gong et al., 2012).

There are some research works on sound pollution, especially in the main noisy traffic points of the metropolitan area (Oguntunde et al., 2019; Sultana et al., 2020; Uddin et al., 2018). Many factors contribute to higher sound levels. For transportation purposes, a large number of vehicles are seen on the road and making the area more vulnerable in terms of sound pollution and also harmful to those involved. Sound pollution on city streets can be caused mainly by the hydraulic horns of vehicles employed by buses, trucks, and scooters on the crowded urban roads which are dangerous for citizens (Sperling, 2018). Sound pollution can be often caused also by

construction activities (Rahman et al., 2022), industrial activities, and miking on the crowded streets (Uddin et al., 2018).

It is a serious environmental risk factor that causes adverse effects both on human health and the surrounding environment (Giles-Corti et al., 2016). In general, a pattern of exposure to any source of noise that produces high enough levels can result in temporary hearing loss. Prolonged exposure to the noise of a certain frequency pattern reduces hearing capacity and affects sleep and working performance. Sound can initially affect sleep, and create annoyance disrupt conversation (WHO, 2011). In addition, sound pollution can cause annoyance and aggression, hypertension, high-stress levels, hearing loss, sleep disturbances, and other harmful effects (Davis and Cornwell, 2008; Hahad et al., 2018).

In Bangladesh, sound pollution could be a major risk. Immeasurable people in Bangladesh face several health risks due to sound pollution. Recent studies have shown that noise levels are higher at different points in the city center of Magura (Das et al., 2018), Chittagong (Uddin et al., 2018), Sylhet (Das and Basak, 2020), Khulna (Sultana et al., 2020), Mymensingh (Hasan et al., 2021), and Dhaka (Parvin, 2021). It is becoming an unreasonable intervention to slowly but surely impose human well-being, health (physical and psychological), and quality of life (Islam et al., 2015; Masoudzadeh et al., 2017, Oguntunde et al., 2019; Sultana et al., 2020).

Khulna is the third-largest city in Bangladesh. Geographically it is located in the south-western part of Bangladesh. It is located between 22° 12’ to 23° 59’ north latitude and 89° 14 ‘ to 89° 45’ east longitude. The district has a total area of 4,389.11 km^2 while the Khulna City Corporation has a total area of 64.78 km^2. It has a population of 751.23 thousand, which was 515 thousand in 1981 (BBS, 2011). So, the population in this area is growing. Multidimensional work is being done in some areas of Khulna city. The sound pollution level (noise level) is beyond the DOE standard here. It increases the potentiality of sound pollution and which harms the environment and can be a worrying health risk (Sultana et al., 2020).

Therefore, it is necessary to conduct a preliminary study for understanding the perception and attitude of individuals in the sound polluted areas regarding causes, consequences, and coping approaches to traffic-induced sound pollution. It may contribute to academic knowledge and be helpful to government officials in determining the policies to address this serious environmental issue at the local level.

The current study provides an idea about the perception and attitude of urban dwellers at the sound pollution as well as their health condition with the suggestions of urban dwellers to reduce sound pollution at major traffic intersections in Khulna Metropolitan City in Khulna district, Bangladesh.

MATERIALS AND METHODS

Study Area

For this study, five main roads and traffic junctions (Gollamari, Sonadanga, Shibbari, Notunrasta, and Dakbangla) of Khulna Metropolitan City were selected (**Figure 1**).

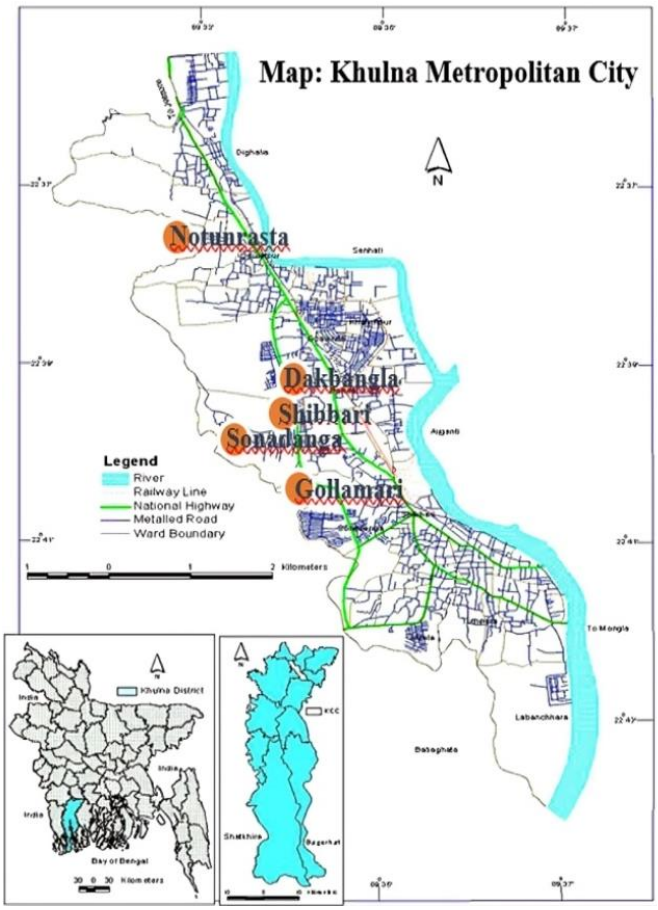

Figure 1. Location of the study area

Most of the selected areas are crowdie and noisy places due to traffic, recreational, religious activities, and so on.

Sampling Procedure and Data Collection

In this study, a probability selective sampling procedure was used to collect the primary data based on the random selection of the study area. At first in each traffic circle of the study area, reconnaissance survey was conducted to get reliable information regarding the study area. Then secondary data were collected from various sources. The preliminary survey was conducted for three months by a structured questionnaire that was relatively simple and technically easier to understand. This can provide information about people’s attitudes toward sound pollution for exploring the health issues related to it at the traffic junctions.

A total of 140 respondents from various age groups were selected to conduct the questionnaire survey. The questionnaire includes the demographic profile of the respondents, major sources of sound pollution in those areas, different types of problems they experienced due to sound pollution, and so on.

Statistical Analysis

A non-parametric test was used for data analysis because the data did not find to be normally distributed. Binary logistic regression analysis was explored to assess the impact of numerous factors on the susceptibility to health effects related to sound pollution that respondents reported. Here, gender, age, types of respondents, and their placement for several

hours in the noisy environment were considered independent variables. Respondents were asked whether they faced the problems due to sound pollution using intimate questions (yes/no). Each of these categorical variables was subjected to recoding from their original coding for instance no=0 and yes=1 which was considered as the dependent variable in the analysis. The odds ratio (OR) and 95% confidence interval (CI) were calculated and the significance level was established at $p<0.05$ for the statistical analysis (Pallant, 2020).

To better recognize whether there is an association between categorical variables, such as the characteristics of the sample, the causes, and degree of annoyance, period of sound exposure as well as diverse categories of problems reported by them due to sound pollution were discovered by using crosstab and Pearson's chi-square test with $\alpha=.05$. All the collected data were analyzed using IBM SPSS (statistical package for social sciences) statistics version 20 and Microsoft Excel 2010 version.

RESULTS

Profile of the Respondents

The respondents (10% female and 90% male) were chosen to conduct the survey. As the study area was roads and traffic junctions, male respondents were more available and it was easier to get a response from men than women. The age of the respondents was classified into three categories where 18% of the respondents were young (under 25 years), 21% middle-aged (25-35 years), and 61% old (>35 years). Respondents were selected who were mostly placed in noisy environments (8±3.24 hours per day) and exposed to sound pollution. In particular, a minimum of 70 general people and 70 shopkeepers were taken from the study area. Both literate (90%) and illiterate (10%) people were found on the roadways.

Perception of Respondents Regarding the Reasons for Sound Pollution in the Study Area

There are many reasons for sound pollution worldwide. However, the survey captures the views of the respondents and the results of people's perceptions about the root cause of sound pollution are presented in **Figure 2**.

Maximum respondents (98%) claimed an increasing number of vehicles as the foremost cause of sound pollution. 78% of respondents marked the growing population and 32% claimed the hydraulic horn used for no reason as the major reason for sound pollution.

In **Figure 2**, it is also shown that 6% of people claimed poverty as the reason for sound pollution. According to the respondents, they had migrated from rural areas to cities for searching for work because of their poverty.

They chose to improve their livelihood and drive different types of vehicles for their subsistence which leads to severe sound pollution in urban areas.

Perception of Respondents on Sources That Create Annoyance in the Study Area

From the analysis, the vehicles were found to be one of the main sources that create more annoyance (**Figure 3**).

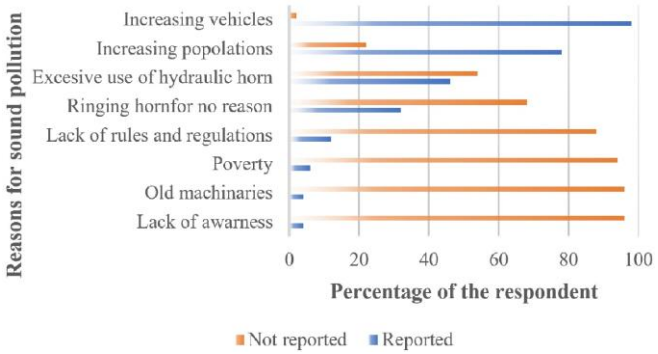

Figure 2. Respondent's perception about the reason for sound pollution

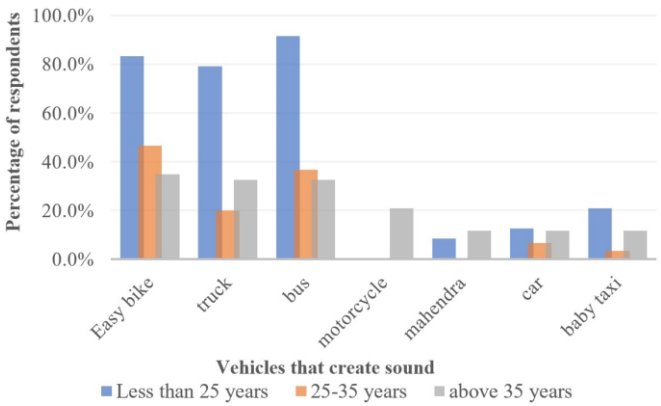

Figure 3. Vehicles that create annoyance

According to people's perception, the noise is harmful in the study area and every day they experienced different types of vehicles that make noise. These variables were measured by the verbal answers of the respondents. According to their answers, it was observed that maximum respondents blamed the vehicles (**Figure 3**) and the crowd of people at those places as the major sources of sound pollution.

From the survey, most of the respondents reported any two or three vehicles that created annoyance at the same time. It was found that 92%, 84%, and 79% of the respondents (<25 years old) in the study area marked the bus easy bike, and truck, which made it even more annoying (**Figure 3**).

Pearson's Chi-square test showed significant association between respondents' age (<25 years) and the vehicles; buses [$\chi^2(2, n=140)=27.404$, $p<.0.001$], trucks [$\chi^2(2, n=140)=22.502$, $p<.0.001$], and easy bikes [$\chi^2(2, n=140)=17.762$, $p<.0.001$], that create more annoyance with Cramer's V coefficient of 0.44 for bus, 0.4 for truck, 0.36 for easy bike indicating the strength of association between the variables is medium to large particularly.

Perception of Respondents on the Degree of Annoyance in the Study Area

In **Figure 4**, the degree of annoyance was presented according to the respondents' perceptions. It was obtained that during the day, most respondents (96%) who were young (<25 years old) experienced high levels of noise in selected areas.

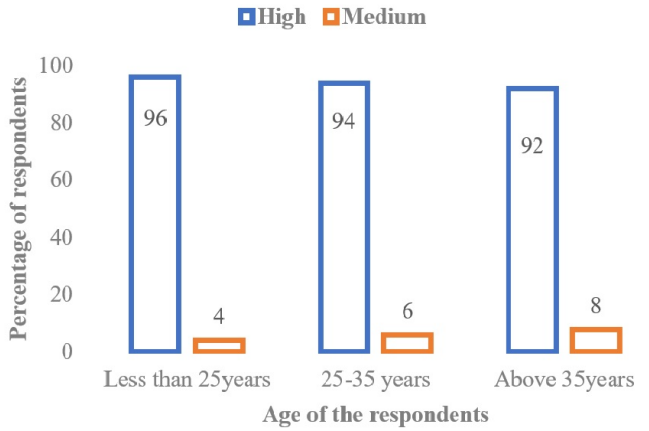

Figure 4. Degree of annoyance (daily basis) according to respondents' perception

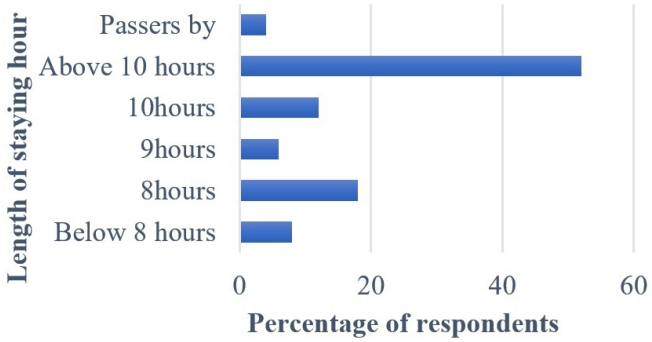

Figure 5. Length of staying hour in the noisy environment

But Pearson's Chi-square test shows that there is no statistically significant association between them ($p>0.05$). Also, 8% of respondents (>35 years old) informed it as a medium. But according to the interview, everyone said that sound pollution is creating some problems.

Period of Sound Exposure

Figure 5 represents that the highest number (52%) of respondents who stayed in noisy areas for 10 hours were exposed to sound pollution.

Results also showed a significant association is present between respondent type (mostly the general people) and the duration of stay in the noisy area (above 10 hours) [($\chi^2(5, n=140)=21.89$, $p<0.05$), with Cramer's V coefficient of 0.39].

Problems Faced by the Respondents

The study found that a large number of respondents in Khulna city were affected on different scales due to sound pollution (**Figure 6**).

They suffered not only physical problems but also a variety of physiological problems (**Figure 6**), especially those who were aged (>35 years) respondents [$\chi^2(5, n=140)=11.623$, $p<0.05$) and Cramer's V coefficient of 0.29]. All the young (under 25 years of age) respondents reported irregular heartbeats as a problem they faced due to sound pollution whereas about 96% of them experienced conversation disturbances in a noisy environment. About 83% of aged (above 35years) respondents experienced high blood pressure problems due to sound pollution. Some other problems were

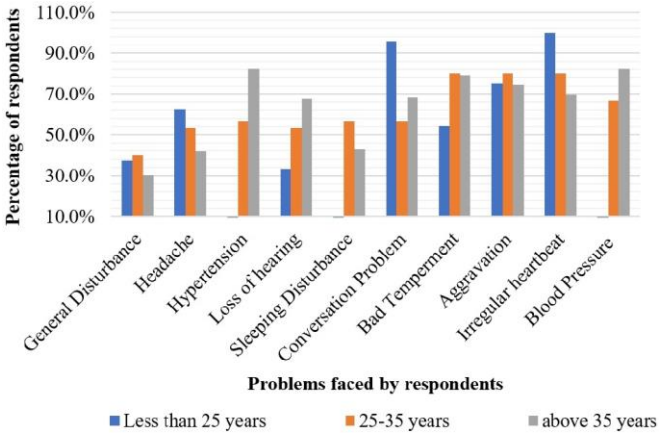

Figure 6. Problems faced by respondents due to sound pollution

also reported by the respondents (**Figure 6**). The social survey found that these problems varied with the level of education ($p<.005$). Uneducated respondents mentioned similar problems suffered by educated respondents. But at the same time, they mentioned some problems that were not relevant to sound pollution and were off the list of questionnaires such as eye problems, etc.

Physical and Physiological Problems

People suffered from a variety of health issues as a result of sound pollution, including both physical and psychological effects. **Table 1** shows the findings of a binary logistic regression model that was used to assess the impact of different parameters that respondents reported in relation to sound pollution problems. Independent variables in the model included gender, age, respondent types, and time spent in a noisy environment. The entire model, including all predictors, was statistically significant, showing that it could distinguish between respondents who reported and did not report several problems such as general disturbance [$\chi^2(4, n=140)=9.930$, $p<.05$], hypertension [$\chi^2(4, n=140)=43.577$, $p<.05$], loss of hearing [$\chi^2(4, n=140)=13.183$, $p<.05$], sleeping disturbance [$\chi^2(4, n=140)=26.172$, $p<.05$], conversation problem [$\chi^2(4, n=140)=13.449$, $p<.05$], bad temperament [$\chi^2(4, n=140)=27.393$, $p<.05$], aggravation [$\chi^2(4, n=140)=20.218$, $p<.05$], irregular heartbeat [$\chi^2(4, n=140)=14.505$, $p<.05$], blood pressure [$\chi^2(4, n=140)=52.444$, $p<.05$], headache [$\chi^2(4, n=140)=8.36$, $p>.05$].

The independent variables did not significantly contribute to the model for the general disturbance and conversation problem. However, as shown in **Table 1**, only two of the independent variables (staying hours and age) made a statistically significant contribution to the model for bad temperament, while only one of the independent variables (staying hours) made a statistically significant contribution to the model for irregular heartbeat status.

According to binary logistic regression analysis, the strongest predictor of hypertension, bad temperament, and irregular heartbeat problems is 'staying hours in a noisy environment'. When all other parameters in the model were controlled for, the respondents who reported spending more time in noisy areas had roughly 1.354, 1.311, and 1.221times higher levels of hypertension, poor temper, and irregular heartbeat disorders, respectively. When correcting for other

Table 1. Binary Logistic Regression model predicting the likelihood of reporting various traffic noise-induced psychological and physiological health problems

Variables		B	*S.E.*	Wald	df	*p*	*OR*	95% CI for OR	
								Lower	Upper
Hypertension	Gender	-.325	.849	.147	1	.702	.722	.137	3.813
	Respondent type	-1.784	.698	6.525	1	.011	.168	.043	.660
	Staying hour	.303	.096	9.895	1	.002	1.354	1.121	1.636
	Age	.105	.021	24.633	1	.000	1.111	1.066	1.158
Bad temperament	Gender	-20.51	9804.26	.000	1	.998	.000	.000	.000
	Respondent type	-1.089	.713	2.334	1	.127	.336	.083	1.361
	Staying hour	.271	.101	7.243	1	.007	1.311	1.076	1.596
	Age	.059	.020	8.672	1	.003	1.061	1.020	1.104
Loss of hearing	Gender	-.033	.622	.003	1	.958	.968	.286	3.278
	Respondent type	.643	.541	1.411	1	.235	1.902	.658	5.496
	Staying hour	-.102	.080	1.619	1	.203	.903	.772	1.057
	Age	.044	.016	7.374	1	.007	1.045	1.012	1.079
Irregular heartbeat	Respondent type	-.399	.717	.310	1	.578	.671	.164	2.737
	Staying hour	.199	.100	3.935	1	.047	1.221	1.002	1.486
	Age	-.021	.020	1.142	1	.285	.979	.941	1.018
Sleeping disturbance	Gender	3.021	1.15	6.848	1	.009	20.513	2.135	197.123
	Respondent type	-1.701	.614	7.675	1	.006	.183	.055	.608
	staying hour	.047	.084	.313	1	.576	1.048	.890	1.234
	Age	.068	.020	11.853	1	.001	1.070	1.030	1.112
Aggravation problem	Gender	20.039	10493.9	.000	1	.998	.000	.000	.000
	Respondent type	1.389	.587	5.603	1	.018	4.012	1.270	12.677
	staying hour	-.312	.097	10.288	1	.001	.732	.605	.886
	Age	-.002	.020	.008	1	.929	.998	.961	1.037

Note: *OR*: Odds ratio; CI: Confidence interval; *S.E.*: Standard error

covariates in the model, the odds ratios of.168 (<1) and.336 (<1) indicate that different types of respondents (general and shopkeeper) were 0.168, 0.671, and 0.336 times less likely to report having hypertension, irregular heartbeat, and bad temperament problems, respectively. The proportion of explained variation in the binary regression model is defined by computed Cox & Snell and Nagelkerke R square values.

Overall, the model correctly classified 84.3% of the cases and explained between 26.7% (Cox & Snell R square) and 36.7% (Nagelkerke R square) of the variance in Hypertension status. Three of the independent variables (staying hours, age, and respondent types) made a statistically significant contribution to the model for the hypertension problem, as shown in **Table 1**. Similarly, the model explained around 9% (Cox & Snell R square) and 12.1% (Nagelkerke R square) of the variance in hearing loss status and correctly identified 65% of the cases.

Furthermore, the Cox & Snell R square equaled 17.1% for sleeping disturbance, 9.2% for conversation problems, 17.8% for bad temper, 13.4% for aggravation, 9.8% for irregular heartbeat, and 31.2% for high blood pressure in terms of variance explained by the model. For sleeping disturbance, conversation problems, bad temperament, aggravation, irregular heartbeat, and high blood pressure, the Nagelkerke R square equaled 23.1%, 13.1%, 26.3%, 20.1%, 14.9%, and 43.0%, respectively, and correctly classified 70%, 70.7%, 75%, 76.4%, 79.3%, and 82.9% of the cases.

Table 1 shows that for hearing loss problems, only one independent variable (respondent age) and for blood pressure issues, two independent factors (age and respondent type) made a statistically significant contribution to the model. This means that respondents of different age groups (strongest predictor) are around 1.045 and 1.157 times more likely to report the hearing loss and blood pressure concerns, respectively, controlling all other covariates in the model.

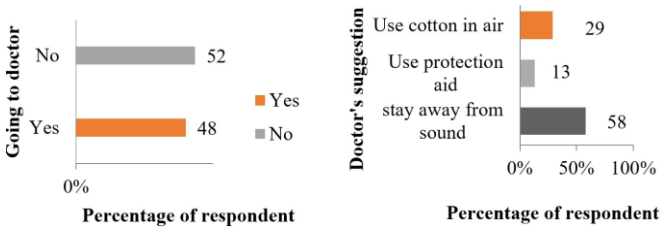

Figure 7. Distribution of respondents who visited to doctor last year

As indicated in **Table 1**, for the sleeping disturbance and aggravation problems, only three independent variables (age, gender, and respondent type) and two (staying hours and respondent type) made a statistically significant contribution to the model. for reporting the sleeping disturbance problem was gender. For the aggravation problem, the strongest predictor was respondent types. This indicates that respondents of different genders are about 20 times more likely to report sleep disturbances and 4.012 times more likely to report aggravation. Meanwhile, controlling for other factors in the model, different types of responders are 0.183 times less likely to report having a sleeping disturbance.

Respondents Visited to Doctor Last Year

Figure 7 shows that 48% of respondents went to the doctor for a variety of issues, whereas 52% did not.

The results show that there is no statistically significant association between the respondents' age and their doctor visits (p>0.05). It also presents, that doctors advised the

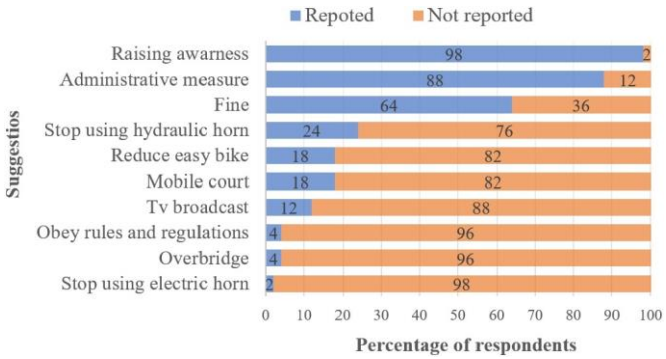

Figure 8. Respondent's perception regarding the ways to reduce sound pollutiontion

majority (58%) of respondents to stay away from the sound and to use cotton in the ears (29%) for the related problems.

Ways to Reduce Sound Pollution

Respondents had expressed their suggestions to reduce this sound pollution problem. Most people (98%) recommended raising awareness among all people and taking administrative measures (88% of respondents) to improve the sound pollution situation. 64% and 24% of people advised imposing fines and banning hydraulic horns, respectively. Most people (98%) recommended raising awareness among all people and taking administrative measures (88% of respondents) to improve the sound pollution situation. 64% and 24% of people advised imposing fines and banning hydraulic horns, respectively. About 4% of people are advised to follow the rules and regulations and use bridges for heavy vehicles that make more noise (**Figure 8**).

DISCUSSION

This study reflects the perception of the urban dwellers of Khulna city regarding potential health risks due to traffic-induced sound pollution. It is observed that respondents with various age groups, gender, respondent types, and staying hours in a noisy environment were all significant predictors of noise-related health issues. Several studies were conducted in different metropolitan areas of Bangladesh to evaluate the causes and effects of sound pollution on human health (Haq et al., 2012; Hoque et al., 2013; Islam et al., 2015; Jahan et al., 2016; Rahman et al., 2016; Sultana et al., 2020; Uddin et al., 2018).

People in Bangladesh have claimed vehicles as the main cause of this sound pollution (Mamun, 2018). This study found that different types of vehicles on the roadway are the main cause of sound pollution in the study area. An earlier study showed that motor vehicles are the main source of high levels of noise (Aftab et al., 2007; Carrier et al., 2016; Clark and Paunovic, 2018; Hoque et al., 2013; Rahman et al., 2022; Sultana et al., 2020). The uncontrolled traffic across the metropolitan area is responsible for creating sound pollution in Dhaka city (Bint and Rahman, 2011). In Khulna Metropolitan City, increasing vehicle is the main reason for creating sound pollution (Sultana et al., 2020). From this study, it is observed that about 92% of respondents claimed vehicles (mostly 'bus') as the main source of sound pollution in the study area and most people of different age groups have been bothered by prolonged noise exposure.

WHO further states that the world's population (over 5%) suffers from hearing problems, speech impairment, decreased productivity, hypertension, hearing impairment, health disorders, sleep disturbances, cardiovascular effects, and fatigue (Singh and Davar, 2017; WHO, 2011). It is also found that irritation, nausea, temporary hearing loss, headache, insomnia, palpitations, nervousness, high blood pressure, and stress were the harmful effects of noise exposure (Islam et al., 2015; Rahman et al., 2016). This study further illustrates that respondents in the study area also had higher health risks due to traffic-induced noise. The findings of this study revealed that younger respondents reported the possibility of being affected by sound pollution-related health problems (conversation problems and irregular heartbeat problems) whereas aged respondents were less likely to be affected. Another study found similar findings that young people were highly annoyed by traffic-induced noise and more likely to experience related problems (Rahman et al., 2022). Additionally, another study showed that the aged person reported a variety of problems that were not reported by the respondents of other age groups (Carrier et al., 2016; Singh and Davar, 2017), which is also similar to this study.

A study has also shown the effects of sound pollution on exposed people. Survey results indicated the fact that 85% of people were annoyed by traffic noise, and about 90% of people reported that traffic-induced noise is the main cause of headaches, high blood pressure, dizziness, and fatigue. People with higher education are much more aware of the health effects of traffic-induced noise. The study found that most respondents were unaware of the health effects of sound pollution and did not adopt proper strategies to address the problem (Pathak et al., 2008). This research result found that the problems related to sound pollution significantly varied with the education level of the respondent ($p<.005$).

People were suffering not only from hearing problems but also from various physical and physiological problems due to high levels of sound pollution (Masoudzadeh et al., 2017).

Analysis from this research work also indicates that the respondents who spent more time in the noisy places had significantly experienced hypertension, bad temperament, and irregular heartbeat problem. A previous survey was conducted in different areas of Khulna Metropolitan City which showed that the respondents were mostly affected by annoyance, headache, and hearing loss for regular exposure to traffic-induced noise (Sultana et al., 2020). Another study reveals that according to their verbal answers, those who experience loud sounds for most of the day must be significantly affected by high blood pressure, mood swings, blood pressure, hearing loss, sleep disturbances, and anxiety problems. The residents living in noisy areas were found to have 2.25 times higher risk of noise levels (Gilani and Mir, 2021).

The alteration or modification of the source and the transmission path may help to diminish the sound reaching the receiver and the effect of the sound pollution problem. Another way is to use personal protective equipment in noisy

areas, which can be effective to reduce the noise effect on human health (Davis and Cornwell, 2008). From this study, it is found that the majority of respondents were advised by the doctors to stay away from the noisy area and to use cotton in their ears, and use protective aid for the problems.

A study recommended the banning of hydraulic horns, training the drivers, and regular monitoring of sound levels to regulate sound pollution in Dhaka city (Hoque et al., 2020). The results of this survey revealed that most respondents suggested raising awareness among all people, administrative measures, imposing fines, and prohibiting hydraulic horns by following government rules and regulations as a solution to this serious problem. Few respondents recommended the use of over-bridges for vehicles that make more sound to control the sound pollution problem.

All the research papers show that sound pollution is becoming a thoughtful problem in urban areas and the problem of sound pollution in Khulna Metropolitan City is getting worse and needs to be controlled as early as possible. Until people change their perceptions and develop a mindset of obeying traffic rules, whatever strategy the government adopts will not work properly. Furthermore, it is suggested that a collaborative strategy should be implemented by the authorities to ensure proper distribution of knowledge regarding the causes and negative effects of sound pollution, precautionary measures, and ways of combating serious health problems. In this sense, public health and disaster management authorities may work collaboratively. Media can also be utilized to deliver knowledge to the public about community-level sound pollution management policies. An awareness program among mass people and noise exposures should be raised to sustainably minimize the risk of sound pollution on human health.

CONCLUSION

Nowadays, one of the most well-known environmental problems is sound pollution. Many factors contribute to generating high sound stress levels. Increasing population density is provoking a higher number of vehicles on the road that's ultimately causing noise pollution in Khulna city. Sound pollution causes a range of health problems in urban dwellers including hypertension, hearing loss, sleeping disturbance, bad temperament, and aggravation problems. Increasing awareness, using modern technology, effective traffic management, administrative measures, and formulating a plan to promote public awareness would be helpful to sustainably alleviate this alarming problem.

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