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Effect of Noise Pollution on Patients in Hospitals and Health Clinics of Mymensingh Sadar Upazila

Md. Mahbobour Rahman[1], Md. Aslam Ali[1], Rehana Khatun[1], and Riffat Ara Zannat Tama[2]

[1]Department of Environmental Science,
Bangladesh Agricultural University, Mymensingh-2202, Bangladesh

[2]Department of Agricultural Economics,
Bangladesh Agricultural University, Mymensingh-2202, Bangladesh

ABSTRACT: The study was conducted to investigate the effect of noise pollution on patients' health condition and the levels of noise pollution at different times in some selected hospitals and health clinics of Mymensingh Sadar Upazila. An instrument (Digital Multipurpose Environment Meter) was used for the measurement of sound level. A questionnaire survey was used to collect the patient's opinion & their knowledge on noise pollution and probable health effect. From the study, it was observed that the daily average sound levels measured inside the hospitals during pick hours were between 99.7 dB (highest) and 65.6 dB (lowest) and that was between 102.9 dB (highest) and 99.3 dB (lowest) at outside of the hospital which was beyond the recommended level (20 – 35 dB) of World Health Organization (WHO). Among the private hospitals, the highest noisy point was observed at Uposom private clinic, Patgodam (103.3 dB) and the least noisy was Liberty hospital, Maskanda (81.2 dB). Majority of respondent were affected by irritation, nausea, temporary hearing loss, headache, sleeplessness, palpitation, nervousness, hypertension, mental stress, speech interference, due to noisy condition which ultimately affected patient's overall health condition. It was observed that the study areas noise pollution was the major problems on patients. So, policies should be needed in nationally to prevention of noise and local steps should be needed to maintain the rules for avoiding the noise pollution of patients' safety.

KEYWORDS: Sound pollution, measurement of sound, effect, health condition, Prevention of noise.

1 INTRODUCTION

Noise is all around us. Noise is described in terms of loudness (intensity) and pitch (frequency) and noise exposure is measured using a logarithmic decibel (dB) scale. It is an unavoidable part of our daily lives and has increasingly become a major burden on the quality of lives. Noise pollution is defined as an unwanted sound that poses a threat to a person's health and well-being.

There are many vulnerable groups of people who are affected by noise pollution such as the young, elderly, and the hospitalized patients. Young children are unable to protect their hearing and rely on their parents to keep them from constant exposure. Similarly, the elderly may not have the capabilities to protect their hearing if they are disabled by mental or physical illness. Patients in the hospital are not safe from the effects of noise as well. Patients who are in the hospital especially for orthopedic surgeries may be exposed to loud instruments during a procedure although they are not protected from it while under anesthesia. Public gathering, visitors, mobile phone, trolley are the main sources of sound pollution in the hospitalized patients.

Noise pollution has numerous health effects, e.g., elevated blood pressure, noise-induced hearing loss, sleep disorders, annoyance and irritability. In addition, working performance is also affected by noise pollution. The Occupational Safety and

Corresponding Author: Md. Mahbobour Rahman

Health Administration (OSHA) recommended hearing protection in the workplaces if there is exposure to noise greater than 5 dB for eight hours or more causes potential of permanent hearing loss (OSHA, 1983).

In Bangladesh noise pollution (also termed as sound pollution) is a major health hazard. In fact, due to noise pollution millions of people in Bangladesh are exposed to a number of health risks such as deafness to heart attack (Banglapedia, 2004). On city streets noise pollution can be caused by hydraulic horns of vehicles, microphones and cassette players. The hydraulic horns used by buses, trucks and scooters in the crowded city/town streets are dangerous for human being.

Noise also interrupts sleep in hospitalized patients, some of whom are particularly vulnerable to sleep disruption. Patients at high risk of having their sleep disturbed by noise include children, very low birth weight infants, pregnant women, anxious individuals, the elderly, and residents of long-term care facilities. The WHO recommends that for good sleep, background sound levels should not exceed 30 dB (A), with individual sounds no greater than 45 dB (A).

1.1 STATEMENT & JUSTIFICATION OF THE STUDY

It is well established now that the noise is a potential hazard to health, communication, working places and enjoyable social life. Noise is becoming an indefensible interference imposition upon student's education, comfort, health and the general human's quality of life. The major effects of noise to the patients in the hospitals include: serious headache, concentration loss, insomnia, irritation, sleep disturbance, loss of efficiency, temporary hearing loss, deafness and interfere with verbal communication. Noise may also reduce working efficiency and work output (Abel, 2008).

The World Health Organization (WHO) recommends average noise levels are no more than 35 dBA in rooms where patients are treated or observed and no more than 30 dBA in ward rooms, although a recent landmark study showed that no hospital noise results published since 1960 meet these guidelines (Berglund *et al.,* 1999). The noise normally occurring inside rooms is often referred to as "background noise." In hospitals, background noise can result from a variety of sources including air-conditioning systems, medical devices such as respirators, and occupant sounds such as conversation. Impulsive noises, or very loud, short duration events, are also commonly found in hospitals (eg, doors slamming, metal-to-metal contact, and alarms).

There is no specific research finding on sound effects on hospital patients in Mymensingh district. Therefore, the research was undertaken to investigate the present status of sound pollution and its effects on patients at different times in some selected hospitals and health clinics of Mymensingh Sadar Upazila.

2 MATERIAL AND METHODS

2.1 DESCRIPTION OF THE STUDY AREA

Research study area is in Mymensingh Sadar Upazila. Mymensingh is an old district of Bangladesh in Dhaka division. Road distance from Dhaka city to Mymensingh district is 193 Kilometers. Its bounded by Gazipur district in South side, Garo Hills and Indian State of Meghalaya in North side, Kishoreganj and Netrokona district in East side and Jamalpur, Tangail and Sherpur district in the West side. Mymensingh district consists of 12 Upazilas, 10 municipalities (Pourashava), 146 Union Parishads and 2709 villages. Its area is 4363.48 Sq. Km. Population (according to census of 2001) : 44,89,726 (Male: 22,97,302 ; Female: 26,92,424), Density: 1200 per Sq. Km. Number of Voters: 29,16,711 (Male Voter: 14,42,698; Female Voter: 14,74,013), Literacy rate: 39.10%.

2.2 DATA COLLECTION

For this study, both questionnaire survey and direct measurement of sound level data were used.

2.3 QUESTIONNAIRE SURVEY

To obtain information, a questionnaire was prepared to co-respond all aspects. Interviewing method was applied to collect information. Some hospitals and clinics in Mymensingh sadar were selected purposively. A questionnaire was prepared to incorporate all the aspects required for the information. Survey samples were divided into four groups i.e. patients, visitors, nurses and others. Data were collected from several patients, visitors, nurses and some general public randomly in the hospital wards and corridors by following questionnaire.

a) Direct measurement

The noise meter was used for getting the noise data level in the selected locations which helped to understand the actual scenario of noise pollution level of those areas. The researcher also discussed with doctors and nurses about noise pollution in the hospitals at several places in Sadar Upazila. Secondary data were collected from different offices, internet and various related reports and thesis.

b) Noise data reading by the noise level meter

The 4 in 1 digital Multi-Function Environment Meter has been designed to combine the functions of Sound Level Meter, Light Meter, Humidity Meter, and Temperature Meter. It is an ideal Multi-Function Environment Meter Instrument with scores of practical applications for professional and home use. The Sound Level function can be used to measure noise in factories, schools, offices, airports, home, etc., checking acoustics of studios, auditoriums and hi-fi installations.

2.4 SPECIFICATIONS OF THIS INSTRUMENT

A) Display: Large 1999 counts LCD display with function of Lux , x10 Lux, ºC, ºF, %RH and dB, A & dB ,C & dB, Lo & dB, Hi & dB, MAX HOLD, DATA HOLD indication.

B) Low battery indication: The "BAT" is displayed when the battery voltage drops below the operating level.

C) Measurement rate: 1.5 times per second, nominal.

D) Sound level Measurement range:

A LO (low) – Weighting: 35-100 dB

A HI (High) - Weighting: 65-130 dB

C LO (low) – Weighting: 35-100 dB

C HI (High) - Weighting: 65-130 dB

Resolution: 0.1 dB

E) Measuring procedure of Sound Level

1. Function Switch will have to "dB" position.
2. The meter will be removed and face the microphone to sound source in a horizontal position.
3. Select button will be pressed: Selects A & dB, C & dB, Lo & dB and Hi & dB.
4. A, C-weighting curve will be kept nearly uniform over the frequency range from 30 to 10 KHz, thus giving an indication of overall sound level.
5. The fast response will be suitable to measure shout bursts and peak values form sound source.
6. The sound level will be displayed.

2.5 MEASUREMENT OF NOISE POLLUTION

Sound is usually measured with microphones and they respond (approximately) proportionally to the sound pressure, p. Now the power in a sound wave, all else equal, goes as the square of the pressure. (Similarly, electrical power in a resistor goes as the square of the voltage.) The log of the square of x is just 2 log x, so this introduces a factor of 2 when we convert to decibels for pressures. The difference in sound pressure level between two sounds with p_1 and p_2 is therefore:

$20 \log (p_2/p_1)$ dB = $10 \log (p_2^2/p_1^2)$ dB = $10 \log (P_2/P_1)$ dB

where again the log is to base 10.

So if we read of a sound pressure level of 86 dB, it means that

$20 \log (p_2/p_1) = 86$ dB

where p_1 is the sound pressure of the reference level, and p_2 that of the sound in question. Divide both sides by 20:

$\log (p_2/p_1) = 4.3$

$p_2/p_1 = 10^{4.3}$

4 is the log of 10 thousand, 0.3 is the log of 2, so this sound has a sound pressure 20 thousand times greater than that of the reference level (p_2/p_1 = 20,000). 86 dB is a loud but not dangerous level of sound, if it is not maintained for very long.

From above it is clear that the decibel is a ratio. So, when it is used to give the sound level for a single sound rather than a ratio, a reference level must be chosen.

A sound level meter is an easy piece of equipment to use. The unit will have a built in microphone to capture the sound and an easy to read. Display screen will show the decibels. It will need to set the meter to the type of sound wave we want to measure. Type A is for noise level which measures frequencies 500-10,000 Hz. Type A is the area of greatest sensitivity to the human ear. Type C measures sound level of music and are 32-10,000 Hz. Usually it will start with the highest range which is 120 mb then move the range downward until we see significant deflection of the needle.

2.6 DATA PROCESSING, ANALYSIS AND INTERPRETATION

The collected data have been processed, analyzed and interpreted for final presentation of the thesis. The analyzed data are presented through tabular and graphic form. Final report has been prepared in the form of a thesis by using the result of the analyzed information in accordance with objectives of the study.

3 RESULTS AND DISCUSSION

The findings of the study and necessary interpretations are presented in this chapter according to the objectives of the study.

Noise pollution was measured in some selected hospitals and clinics in Mymensingh Sadar for observing the “effect of noise pollution on patients”. It was found that no hospital and clinics were established in well planned to protect from the noise. Hospital ward and clinics were not protected from the outside noise pollution. Most of the hospitals and clinics are established besides the highway considering the communication facilities but the noise problem was not considered.

Table 3.1 shows the ranking of noise pollution at different locations. According to ranking, among the 28 locations, 18 were ranked as A – most noisy places. Of these, Uposom private clinic, Patgodam near Bridge point is the most polluted location where noise level is 103.3 (dB) and Green life hospital and diagnostic centre near Chorpara point 103.0 (dB) ranked as second. These locations are near highways and turning points. But hospitals are the most important places that must be sound protected. It has been found that the private hospitals are very much crowd and Govt. hospitals are in better position in terms of noise pollution in Mymensingh. Among the hospitals (Government and private), the pollution is most at Uposom and Green life hospital; whereas in the ward number of MMCH is (99.7 dB) and Cholera unit of SKH level (97.3 dB). No significant difference was found among the eighteen locations.

Table 3.1: Noise level in front of some selected hospitals and clinics in Mymensingh Sadar (Average peak hour's data only: 10:00 AM to 2:00 PM and 5:00 to 7:00 PM).
(BY DMRT Method)

Mymensingh Sadar			
Sl No	**Location**	**Mean Noise level (dB)**	**Rank Order**
1	Uposom private clinic, Patgodam	103.3	AB
2	Green life hospital and diagnostic centre	103.0	AB
3	Outdoor, MCCH	102.9	AB
4	Niramoy hospital, Bhatikesor	102.2	AB
5	Hospital gate MMCH	102.2	AB
6	Front of Emergency MMCH	102.1	AB
7	Rajdhani Hospital, (Pvt) Bhatikasor	101.2	AB
8	Safeway diagnostic centre and hospital, Chorpara	100.3	AB
9	Popular diagnostic complex, Chorpara	100.1	AB
10	Sodesh hospital (pvt.), Sarda Ghosh road	99.8	ABC
11	Ward 9, MMCH	99.7	ABC
12	Paricharza hospital, Shehora	99.5	ABC
13	Physical medicine unit, MMCH	99.4	ABC
14	Momenshai nursing home, J.C Guha road	99.4	ABC
15	Corridor, MMCH	99.3	ABC
16	Fatema nursing home, Kalibari road	99.2	ABC
17	Labor ward, MMCH	98.9	ABC
18	Cholera unit (SKH)	97.3	ABC
19	Ward 18, MMCH	93.9	BC
20	CCU, MMCH	93.6	BC
21	Ward 12, MMCH	92.8	BC
22	Ward 15, MMCH	92.1	BC
23	Ward 6, MMCH	92.0	BC
24	Kalazor Unit, SKH	89.2	BC
25	Liberty hospital, Maskanda	81.2	CD
26	Ward 3, MMCH	79.2	CD
27	CCU (Shisoo) MMCH	65.6	CD
28	Healthcare Centre, BAU	45.8	D

Among the study sites, six locations are ranked as B. Ward number 18 and CCU in MMCH are noisier than the four other locations (Ward 12, 15, 6 of MMCH and Kalazor unit of SKH). But B ranked locations is significantly less noisy than rank A.

Three locations are ranked as C. Liberty hospital, Maskanda, ward number 3 and CCU (Shisoo) in MMCH. Rank C is less noisy than ranked B.

A single point healthcare centre of BAU as ranked D and D locations are less noisy than C location.

Table 3.2: Noise levels of some selected points in the government hospitals. (peak hour's data only: 10:00 AM to 2:00 PM and 5:00 to 7:00 PM)

Government hospitals			
Sl No	**Location**	**Mean Noise level (dB)**	**Rank Order**
1	Outdoor, MCCH	102.9	AB
2	Hospital gate MMCH	102.2	AB
3	Emergency Gate of MMCH	102.1	AB
4	Ward 9, MMCH	99.7	AB

5	Physical medicine unit, MMCH	99.4	AB
6	Corridor, MMCH	99.3	AB
7	Labor ward, MMCH	98.9	AB
8	Cholera unit (SKH)	97.3	AB
9	Ward 18, MMCH	93.9	BC
10	CCU, MMCH	93.6	BC
11	Ward 12, MMCH	92.8	BC
12	Ward 15, MMCH	92.1	BC
13	Ward 6, MMCH	92.0	BC
14	Kalazor Unit, SKH	89.2	BC
15	Ward 3, MMCH	79.2	CD
16	CCU (Shisoo) MMCH	65.6	D
17	Healthcare centre, BAU	45.8	D

The presented noise level in Table 3.2 (Government hospitals) showed that there is not significant different of noise level in the ranked number one to next eight. Among these locations, the highest number of noise levels are Outdoor, MCCH (102.9 dB), Hospital gate MMCH (102.2dB), Emergency gate (102.1dB), Ward number nine (99.7 dB) and Corridor (99.3 dB) respectively in Mymensingh medical college hospital.

Outdoor is the most crowd and noisy area of MMCH. The outdoor unit is near the road and huge number of patients comes to this unit from various places of Mymensingh and other surrounding districts (Sherpur, Jamalpur, Netrocona). They come to the hospital with their relatives by auto-tempo, tempo, rickshaw and other transport. They make a line for getting the ticket and create mass gathering in the room and also shouting and talking by mobile phone loudly. Also representatives from various companies have come to the hospital by using motorbike and make a noise in the hospital area.

Another noisy point of hospital is the hospital gate. Hospital gate is near on the highway road. Many cars and people gather here and make traffic jam in the road. The sound from vehicle, vehicular horn and sound from other public activities make huge noise in front of hospital gate and polluted the hospital environment by crating noise.

The third noisy point is emergency gate in hospital. The patients have come to the hospital by using ambulance and make a siren loudly when reach in the hospital area. The visitors also run from one place to another for getting best services and sometimes they angry with others, make a quarrel and create noise. Also the road is very near of this point and outside noises directly involve in making noise in this area. Ward number nine is another noisy point (4^{th} position) in MMCH. In this ward, the accidental patients and other orthopedic patients are admitted here and patients are not getting the seat and they put their seat in the floor and corridors. Always the patient shouting in the room for their pain and the visitors are also creating crowd. The visitors come to this ward for looking their relatives. Their talking, mobile ringing, mobile call and their harassments for also make noise in this ward. This ward is near the highway road and on the emergency unit of this hospital. Therefore, it is the noisiest ward in the hospital. The fifth ranked location is cholera unit of SKH. SKH is also near the highway and many buses, trucks, tempos, autos, motorbikes run besides the hospital and these transports use hydraulic horn. Sounds are directly entered to the hospital and making the area noisy. Among the government hospitals, SKH hospital (Cholera unit 97.3 dB and Kalazor unit 89.2 dB) are less noisy than MMCH hospital.

In the Mymensingh medical college hospital, ward number three and CCU (Shisoo) ward is the least noisy. Ward no. 3 is the paying bedded room and more than eighteen patients cannot admit in this ward. There is no patient in the floor and no access to public gathering. It is in the ground floor and the outside vehicular horn and noise cannot disturb because the boundary wall of hospital protect the noise.

The least noise is found in the CCU (Shisso) of the Mymensingh Medical College Hospital. This unit is very restricted and no one can enter into this ward without permission. The room is well protected and the outside noise cannot disturb easily.

Among the hospitals, the lowest ranked level is Health care centre of BAU (45.8 dB). This location is silent and restricted; outside patients never create gathering here. This healthcare centre is 20 meters distance from the road and heavy transports do not run in this road. Only environment friendly auto run in this road. Most of the cars, buses, trucks, auto tempos and other transports are run through Jabbar point (Noise level 99.7 dB) of BAU. But healthcare centre of BAU is 300m far from the Jabbar point. So vehicle sound cannot reach from Jabbar point to healthcare centre.

Table 3.3: Noise level of some private hospitals in the Mymensingh Town (only external noise and peak hour's data was considered: 10:00 AM to 2:00 PM and 5:00 to 7:00 PM)

Private hospital and clinics			
Sl No	**Location**	**Mean Noise level (dB)**	**Rank Order**
1	Uposom private clinic, Patgodam	103.3	AB
2	Green life hospital and diagnostic centre	103.0	AB
3	Niramoy hospital , Kistopur	102.2	AB
4	Rajdhani Hospital, (Pvt) Bhatikasor	101.2	AB
5	Safeway diagnostic complex & hospital, Chorpara	100.3	AB
6	Popular diagnostic centre limited, Chorpara	100.1	AB
7	Sodesh hospital (pvt) ltd, Sarda Gosh road	99.8	AB
8	Paricharza hospital, Shehora	99.5	AB
9	Momenshai nursing home, J.C Guha road	99.4	AB
10	Fatema nursing home, Kalibari road	99.2	AB
11	Liberty hospital, Maskanda	81.2	B

Table 3.3 shows, among the private hospitals, the noisiest is Uposom private clinic 103.3 (dB), located at Patgodam near the bridge point. In the bridge point, many transports gather together because it is the most important turning point of Mymensingh. Dhaka to Sherpur, Jamalpur, Netrocona and Mymensingh to kishorgonj and Tangail district are directly connected of this point. This point is four way roads. Heavy, light and other noises are created by transports and make huge traffic. When traffics are made, the standing cars make horn, rickshaw puller make bell, tempos and autos make sound willingly without any reason and also traffic police make whistle to control the traffic and patients of Uposom hospitals is directly affected by the outside sound. Green life hospital & diagnostic centre 103.0 (dB) near Chorpara point. Chorpara point is four way road as same as the bridge point. Also in Chorpara ambulance, tempos, mahendros, many private cars, autos, and buses are standing here for getting the special trip and sound from the transport, miking, advertisement and other announcements sound make huge noise and sound spread around the side and patients of Green life hospital & diagnostic centre and other hospitals in soundings of Chorpara are directly affected by the outside sound.

According to ranking, the Liberty hospital (81.2dB) is less noisy than the other 10 private hospitals. There is no public gathering besides or near the Liberty hospital, front side is closed and outside noise does not enter directly into the hospital. So the patients comparatively feel free in this hospital though the noise level (81.2 dB) crosses the acceptable limit. Most of the private hospitals are settled on focusing the Mymensingh Medical College Hospital considering the availability of patients, doctors and the communication facilities.

Table 3.4: Location effects on private clinics in the Mymensingh Town (Pick hour's data only: 10:00 AM to 2:00 PM and 5:00 to 7:00 PM)

Mymensingh town only			
Sl No	**Location**	**Mean Noise level (dB)**	**Rank Order**
1	Patgodam Traffic Point (Bridge)	111.3	A
2	Chorpara Traffic point	106.7	AB
3	Ganginarpar Traffic point	105.7	AB
4	NatunBazr Traffic point	104.4	AB
5	Masknada bus stand	103.0	AB
6	Trishal bus stand	102.5	AB
7	Town hall traffic point	102.4	AB
8	Tangail bus stand	101.2	AB
9	Tajmohol	100.2	AB
10	Jabbar point, BAU	99.7	B
11	Wapda Point	99.5	B

The available information in the table 3.4 shows that the most severe problem of sound pollution as top of the ranking order followed by the next. The top five levels of the following locations: Bridge point 111.3(dB), Chorpara point 106.7(dB), Ganginarpar point 105.7(dB), Natun Bazar Point 104.4(dB), Maskanda bus stands 103.0(dB). It was found that the highest level of noise in the Patgodam Bridge point is 111.3(dB) and second highest in the Chorpara point is 106.7(dB). Third rank is in Ganginarpar point and fourth ranking position is in Natun Bazar point. Between these two points, more gathering point is Ganginarpar and noise level is higher than Natun bazar.

4 DISCUSSION

Among the 28 locations, noise level of 25 locations is above 79.2 dB and lowest two locations are 65.6 dB (CCU Shisoo ward MMCH and 45.8 dB Healthcare centre of BAU). Highest level of noise is 103.3 dB in the Uposom health clinic near Bridge point and the lowest level of noise is 45.8 dB in health care centre of BAU.

In the Medical college hospital Mymensingh, the highest level of noise at outdoor is 102.9 dB and 2nd highest level of noise at hospital gates is 102.2 dB. The lowest noisy point is 65.6 dB in the CCU (Shisso). Among the private hospitals, the highest noisy place is Uposom private clinic, Patgodam (103.3 dB) and the least noisy is Liberty hospital, Maskanda (81.2 dB).

According to the DOE, the perfect sound condition for Bangladesh is 45 dB for the daytime and 35 dB for the night in peaceful areas like hospitals, clinics, offices. On the other hand, the United States Environmental Protection Agency (USEPA) recommended guideline values for continuous background noise are 45 dB during the day and 35 dB at night in patient rooms. World Health Organization (WHO) also recommended guideline values for continuous background noise in hospital patient rooms are 35 dB, with nighttime peaks in wards not to exceed 40 dB (Berglund *et al.,* 1999). According to the Noise Control Act of Taiwan, the background noise limit for a medical institution is 50 dB at daytime and 40 dB at nighttime. The survey of DOE shows that noise pollution has increased in different hospitals of Dhaka City. The survey indicates that at Bangabandhu Sheikh Mujib Medical University 82 dB during day and 74 dB at night, at Dhaka Medical College Hospital 80 dB during the day and 69 dB at night, at Mitford Hospital 76 dB during the day and 73 dB at night and at Shishu Hospital 72 dB during the day and 69 dB at night. The study shows the lowest level of sound condition in Mymensingh Sadar is 45.8 dB which cross the recommended level of sound. So, considering the actual acceptable limit of noise level all the selected places are noisy in Mymensingh Sadar Upazila.

Ulrich and Zimring (2004) indicated that many studies reported high noise levels in most hospitals in the USA. The reviewed articles summarized two general sources of noise in hospitals. First one is the noises from paging systems, alarms, bedrails, telephones, staff voices, ice machines, pneumatic tubes and roommates. Second one includes the surfaces of the floors, walls and ceilings hospitals which usually are hard and reflect sound rather than absorb it. In the study areas, internal noise sources are visitors' crowd, gathering, patients crying telephones ringing, banging, trolley, fan, talking (staffs, nurses) and the outside sounds are heterogeneous with a significant load of heavy vehicles like trucks and buses, miking in various purposes, political meeting, advertisement and other social activities. Another cause of noise is traffic. Traffic management is inadequate for smooth flow of vehicles in the study area. Many drivers do not follow the traffic signals and drive the car uncontrolled. This helps to increase noise pollution. The sensitive locations like hospitals are not identified by "No-Horn" or "Silence Zone" signboards. In the absence of wide road, all the vehicles including the heavy ones have to pass through the narrow inner town roads and generate the huge noise. So noise is everywhere in Mymensingh Sadar.

5 SUMMARY AND CONCLUSION

5.1 SUMMARY OF THE FINDINGS

Hospital noise is a serious issue potentially linked to several types of negative reactions in patients. The present study was undertaken to determine the present status of noise pollution and its effect on patients at different times in the selected hospitals/clinics of Mymensingh Sadar Upazila.

Majority of the respondents (35%) were primary educated on the other hand HSC 23%), SSC 21%, other 12% and 9% respondents were university educated. Majority of them (62%) had not idea about noise pollution and 38% had the idea about noise pollution. Majority of the respondents (51%) had low and 8% had medium awareness level about noise pollution. It was observed that 73% respondents never consulted with anybody and 27% consulted with others about noise pollution. Seventy eight percent (78%) respondents had no idea about the rules and regulations and 22% of them know about the rules and regulations. Fifty seven percent (57%) respondents commented that noise pollution was not related to economic loss and the rest 43% commented that it was related to economic loss. There are two peak noise exposure time was identified within the time period of before afternoon 10 am to 12 pm (206 respondents) and evening peak time was 5 pm to 7 pm (203

respondents). Among the respondents, 78% had no idea and 22% had the idea about rules and regulations of noise pollution. Most of the respondents mentioned five types of problems were highly felt such as irritation (255), speech interference (248), lack of concentration (230), sleep disturbance (229) and temporary hearing loss (219).

Majority of the respondents were given their opinions about noise induced health hazards: headache, nausea, palpitation, nervousness/hypertension, mental stress, increased blood pressure, bad temperament/irritation, deafness/tinitus, loss of sleep/ insomnia, felt heat inside the body.

It was found that the private hospitals were very much crowd and Govt. hospitals were in better position in terms of noise pollution in Mymensingh.

In the Medical college hospital, Mymensingh, the highest level of noise at outdoor (102.9 dB), 2nd highest level of noise was in the hospital gates (102.2 dB) and the lowest level of noisy point was CCU (Shisso) (65.6 dB). Among the private hospitals, the highest noisy was Uposom private clinic, Patgodam (103.3 dB) and the least noisy was Liberty hospital, Maskanda (81.2 dB).

5.2 CONCLUSION

It was observed that the internal noise sources of the hospitals and health clinics were visitors' crowd, gathering, patients crying, telephones ringing, trolley, fan and the outside sounds were heterogeneous with a significant load of heavy vehicles like trucks and buses, miking in various purposes, political meeting, advertisement and other social activities. Another cause of noise was traffic jam. Traffic management was inadequate for smooth flow of vehicles in the study area. Many drivers did not follow the traffic signals and drive the car uncontrolled. This helped to increase noise pollution. The sensitive locations like hospitals were not identified by "No-Horn" or "Silence Zone" signboards. On the other hand location effects were the key factors on private clinics in the study areas. It was found that from Maskanda to Patgodam bridge point many private hospitals were established besides the roadside like umbrella. In opposite of Mymensingh medical college hospital, many high rise building were built on Dhaka Mymensingh highway road for private hospitals commercially. So, all the outside noises including vehicular horn were disturbed to the patients. It should be needed to settle the hospital/clinic 50 meter distances from the road and roadside portion must be sound protected. It was observed that the study areas noise pollution was the major problems on patients. So, policies should be needed in nationally to prevention of noise and local steps should be needed to maintain the rules for avoiding the noise pollution of patients' safety.

5.3 RECOMMENDATIONS FOR POLICY IMPLICATION

Local policies on noise seem inadequate in the prevention of annoyance, disturbance of the peace, and noise related physical effects. There is an obvious need for increased efforts to enforce more policies so that fewer people will be adversely affected by noise. The following steps can be taken for noise control:

- Implementation of regulations prohibiting use of hydraulic horns, as well as stopping import and marketing of hydraulic horns used by motor vehicles.
- Reduction of noise level in the hospitals and other important places by adopting engineering control methods which include regulation of spacing between source of noise and receiver.
- Establishment of new houses, schools, college and hospitals away from noisy areas/highways.
- Introduction of underground transportation system to reduce the level of noise by reducing the existing surface transport system.

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