

**EDITORIAL**

**DIWALI-FIRE CRACKERS AND DEAFNESS**

**Abstract:** Environmental sound level at Diwali was assessed along with noise level of various fire crackers. Noise level went up by 16 dB but the noise emitted by fire crackers came down in an open area by 40 dB except of Lari Bombs, a positive result by joint efforts of public awareness and Pollution Control Deptt.

**Key words:** Diwali, fire crackers, deafness, noise pollution.

In last decade noise pollution has gone up in metros in India. Noise level above 50 dB may interfere with sleep leading to psychosomatic changes and higher level of sound level may interfere with social and educational activities. Noise pollution may be a causative factor of cluster headache, migraine, peptic ulcer or speech defect. God is kind enough that Dipawali is a festival of a day extending not more than three days, when noise pollution goes up drastically. Fortunately sound emitted by firecrackers has gone down significantly in recent years, however it is a concern in Indian perspective. Maximum permissible noise level

**MAXIMUM PERMISSIBLE NOISE LEVEL**

| Time Limit | Exposure Permitted in India | Recommendations of NIOSH & CDC |
|------------|-----------------------------|--------------------------------|
| 8 HRS      | 90dB                        | 85dB                           |
| 4 HRS      | 95dB                        | 88dB                           |
| 2 HRS      | 100dB                       | 91dB                           |
| 1 HR       | 105dB                       | 94dB                           |
| 30 MIN.    | 110dB                       | 97dB                           |
| 15MIN.     | 115dB                       | 100dB                          |

**Table-I**

is depicted in table I. Various studies have been conducted in past to assess the effect of impulse noise in teenagers<sup>1-4</sup>. But now with changing trend of fire crackers further study was a need, hence this study was conducted to reassess the noise level, its effect on hearing threshold shift and other ill effects.

**MATERIAL & METHOD**

With CIRRUS-CR 831 Sound Pressure Level Meter sound level was measured in Capital of India at ten different places of Delhi a day before Diwali and on the day of Diwali in evening and night, both readings were compared. Different types of the fire crackers were ignited and their sound level was

**COMPARATIVE STUDY OF FIRE CRACKERS**

| Fire crackers  | Average reading (in dBA at 3 m.) |                    |
|--|----------------------------------|--------------------|
|  | 2000                             | 2004               |
| 1. Small Bombs   | 120 dBA                          | 80 dBA             |
| 2. Multiple small bombs explodes simultaneously \ Lari Bombs | 140 dBA                          | 105 dBA to 170 dBA |
| 3. Large Bombs   |                                  |                    |
| i. Round ones  | 150 dBA                          | 110 dBA            |
| ii. Cylindrical ones   | 155 dBA                          | 115 dBA            |

**Table-II**

measured. All the firecrackers were blasted/ fired on concrete floor in an open area at I.T.O. areas (I.M.A.Head Quarter) and multiple readings were noted at 3 meter distance in open air as per Govt. Norms and readings were recorded. Volunteers were checked for hearing and interogated before and after firing the fire crackers (tableII).

**RESULTS**

The sound level has gone up significantly on the day of Diwali which was alarmingly high

even otherwise on pre Diwali day also. Average recording on pre Diwali day was 61.93 dB and on Diwali day 77.07 dB (Table IV). The hearing threshold shift was average 13.2 dB in volunteers affected. The average sound emitted by fire crackers was within tolerable limits except of chain fire crackers (Lari) which could reach up to 170 dB (Details shown in table II). On query volunteers expressed headache, buzzing (tinnitus) and pain in ear (Details shown in table III).

### DISCUSSION

Though sound emitted in blasts, fire arms and in industrial areas is usually taken care of by using sound muffs and/or ear plugs, but Diwali is a celebration and a distinct pleasure is achieved by youngsters in firing them from nearby which can lead to shift of hearing threshold. Noise emitted by fire crackers (140-160 dB)<sup>3</sup> was almost equal to fire arms 145 dB

### HAZARDS OF IMPULSE NOISE

| Sign & symptoms in volunteer               | Volunteer without sound protectors | Volunteer with ear plugs/muffs |
|--|------------------------------------|--------------------------------|
| Tinnitus                                   | 4                                  | -                              |
| Sense of Fullness                          | 3                                  | -                              |
| Pressure in the ear                        | 3                                  | 1                              |
| Pain in ear                                | 2                                  | -                              |
| Hearing loss                               | -                                  | -                              |
| Headache                                   | 1                                  | 1                              |
| Disturbed sleep                            | 1                                  | -                              |
| Nausea                                     | 1                                  | 1                              |
| Vomiting                                   | -                                  | -                              |
| Audio- recording (hearing threshold shift) | 4                                  | -                              |

Table-III

### NOISE LEVEL IN DELHI

| Place              | On Diwali   |              |              | Pre Diwali day | Standard limit |
|--------------------|-------------|--------------|--------------|----------------|----------------|
|                    | 2000        | 2003         | 2004         |                |                |
| AIIMS Crossing     | 82          | 76           | 64           | 60             | 55             |
| Lajpat Nagar       | 74          | 89           | 74           | 66             | 55             |
| New Friends Colony | 76          | 90           | 75           | 57             | 55             |
| East Arjun Nagar   | 78          | 81           | 83           | 71             | 55             |
| Conuaght Place     | 80          | 74           | 73           | 54             | 65             |
| India Gate         | 88          | 69           | 67           | 54             | 50             |
| Mayur Vihar        | 84          | 81           | 87           | 67             | 55             |
| Raja Garden        | 80          | -            | 80           | 52             | 55             |
| Peetampura         | 84          | -            | 82           | 59             | 55             |
| Model Town         | 80          | -            | 82           | 52             | 55             |
| Patel Nagar        | -           | 73           | 79           | 78             | 65             |
| Kamla Nagar        | -           | 76           | 79           | 69             | 55             |
| Dilshad Garden     | -           | 80           | 80           | 56             | 55             |
| I.T.O              | -           | 77           | 74           | 72             | 65             |
| <b>MEAN</b>        | <b>80.6</b> | <b>78.73</b> | <b>77.07</b> | <b>61.93</b>   | -              |

Table-IV

from carbine, 155 dB from a rifle at the ear of gun- man which is definitely injurious to ear. Fortunately the noise levels by fire crackers are constantly declining in last five years (table IV).

In previous studies the sound emitted was 120-150 dB which has significantly gone down in our study. It may be due to Delhi Government's preventive action and awareness about its

harmful effects. The deleterious effect of Diwali has been studied at large by Gupta & Vishwakarma in a perspective study at Aligarh and a cross sectional study of Pre and Post

to stop its use by public at large on festival and social occasions while large public shows may be arranged by societies and Govt.

Toy Pistol<sup>4</sup>, Hobby motor<sup>9</sup>, music box should be investigated for their sound level and warning should be printed on them.

#### NOISE LEVELS FROM TOYS<sup>9</sup>

| Baby toys     | Mean<br>L <sub>eq</sub> A | Max<br>dB A | Octband of<br>Max SPL, kHz |
|---------------|---------------------------|-------------|----------------------------|
| Telephone     | 75.5                      | 76.3        | 10.0                       |
| Music Box     | 70.3                      | 78.3        | 2.5                        |
| Fire crackers | 122                       | 162         | 1.0                        |
| Cap Guns      | 99                        | 153         | 2.5                        |
| Hobby Motor   | 112                       | -           | 3.2                        |

Table-V

exposure hearing status was done<sup>2</sup>. Study demonstrated a temporary threshold shift in 2-5 %, and lasting even more than a month in 1-3.5%. The fire cracker emitted sound of 130-190 dB (mean 150 dB) which has gone down, on an average of 40 dB reaching almost to safe distance in open area except multiple/Lari bomb in our study. Hearing threshold shift has also been recorded by Ward and Glorig, Guido F. Smoorenberg, and by Axelsson etal in guinea Pigs<sup>5-7</sup>. Though we have not studied effect of toy pistol<sup>4</sup> but a definite risk has been observed by P.A. Hellstran etal by cap guns as children play even for days or months altogether, (Table V). Gupta D. has also observed noise level up to 140 dB at 50 cm. distance by toy weapons.

#### CONCLUSION

Though noise level has not reduced much but it a decling trend (Table IV). Though noise pollution by fire crackers in term of hearing has gone down but its effect at large is still significantly noted. There is no marking on fire crackers regarding safety precaution and noise level. Lari bomb (chain) should be banned. A definite deleterious effect of fire crackers is there, hence government should take initiation

- M.K. TANEJA, EDITOR

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