



## EFFECTS OF IMPULSIVE NOISE EXPOSURE ON HEARING LIFESTYLE

## Medical Science

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## ABSTRACT

The person who is exposed to very loud sound may also experience along with hearing loss other problems like ringing in the ear, difficulty understanding speech in noisy environment, and intolerance to loud sound. The loud sound over-stimulates delicate hearing cells, leading to the permanent injury or death of the cells. The study included 40 people who were victims to sudden and loud noise exposure from the blast that occurred in one of the temples in Kerala. Each person was given a questionnaire to answer. The questionnaire is divided into four sections like Patient perception, Technology, Reaction of friends and family, and Crowds. Each section was scored separately on a 5 point rating scale that ranges from 0 to 4. The results indicated that there were an overall effect on life style and significant difficulties were found in using technology in day-to-day activities.

## KEYWORDS

Noise, Exposure, Lifestyle

## Introduction

Noise, defined as 'unwanted sound', perceived as an environmental stressor and nuisance. Non-auditory effects of noise can be defined as 'all those effects on health and well-being which are caused by exposure to noise, excluding the impact of noise on hearing sensitivity and the masking of auditory information which takes place due to noise causing communication problems (Smith & Broadbent, 1992). Recent studies have investigated additional mechanisms of NIHL involving delayed or disabled electrochemical transmission of nerve impulses from the hair cell to and along the auditory nerve. Exposure to very loud noise damages the postsynaptic dendrite (where the hair cell transfers electrochemical signal to the auditory nerve) and can rupture dendrite due to overstimulation, stopping the transmission of auditory input to the auditory nerve temporarily. This kind of rupture heals in about a week, resulting in functional recovery of that synapse. In this process of recovery an over-expression of glutamate receptors can result in temporary tinnitus, or ringing in the ears or the damage can persist depending on the severity of the damage and is called as excitotoxicity. Repeated damage at the same synapse may eventually fail to heal; leading to permanent hearing loss (Pujol & Puel, 1999).

Mrena, Paakkonen, Back, Pirvola, and Ylikoski (2004) confirmed that people often think that tinnitus and hearing impairment are naturally occurring phenomena after blast exposure, and if their symptoms resolve they do not seek medical advice. They may have hearing impairment particularly at high frequencies. It is recommended that an either an ENT opinion, or at least an audiometric screening test has to be carried out to rule out hearing impairment on the basis of exposure data only. Symptoms like tinnitus and hearing loss may be permanent problem of a blast injury and their effect on quality of life may be substantial.

## Need of the study:

Any noise exposure either sudden or continuous can damage hearing and lifestyle changes are substantial. But many people ignore this type of problems and no awareness can be given regarding the adverse effects of noise on hearing. Hence there is a need to document the changes in hearing lifestyle in people exposed to sudden environmental noise which was caused due to the explosion of crackers in a temple in Kerala.

## AIM

To check the effect of noise on hearing lifestyle

## Method

A total of 40 people were randomly selected for the study that was exposed to sudden environmental noise from an explosion in a temple

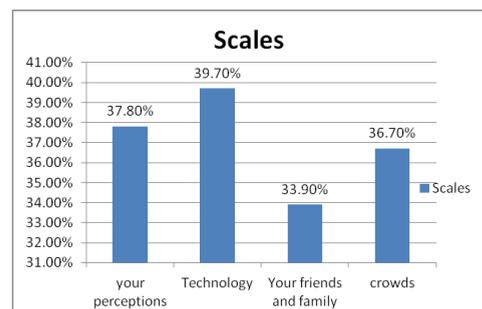
in Kerala. Participants were selected ranging from the ages 15-60 years. They were staying around 1 km from the temple and were present in their houses when the blast occurred. All the participants were recruited based on the inclusion criteria which stated that persons with exposure to sudden environmental noise and had undergone hearing screening test. Persons above 60 years who had hearing problem before the noise exposure and children below 15 years were excluded from the study. Hearing screening was done for all the 40 cases with OAE screener (Otodynamics- otoport SNo 09758). A hearing lifestyle questionnaire from Mountain Audiology Inc. consisting of 24 questions regarding the effects of impulsive noise exposure on four areas on life such as Your Perception, Technology, Your Friends and Family, Crowds was used. The questionnaire was administered to all the participants recruited after obtaining the informed consent. Majority of the participants had a basic qualification and could fill the questionnaire without the help of the clinician. Very few participants filled the questionnaire with the help of the clinician due to their inability to read and write. The obtained data were further taken for statistical analysis to obtain the percentage of QOL.

## Results

All the four sections - Your Perception, Technology, Your Friends and Family, Crowds, have been reported to have a moderate effect on the hearing and lifestyle changes due to exposure of impulsive noise.

Table 1

Percentile scores of obtained responses



Results obtained are as follows;

- 37.80% subjects reported to have an impaired perception of sounds after being victims of impulsive noise attack.
- 39.70% subjects reportedly complained of disturbances while using electronic devices.

- 33.90% subjects claim to have been unable to hear people at normal conversational level, mainly in a noisy situation.
- 36.70% subjects found it difficult to attend social gatherings and to be socially active due to difficulty in perceiving what the other person had spoken.
- The Overall hearing and lifestyle effect was seen to be 36.7%.

From the above results it is clear and evident that sudden/impulsive noise has an adverse impact on hearing and changes in lifestyle are associated with loss of hearing. Although a moderate impact on lifestyle changes and hearing is obtained from the results yet it is imperative from the above findings that a good number of the people were affected from the sudden noise exposure. This study is supported by the findings of Mrena, et al., (2004).

As the focus of the study was to explore the effect of sudden trauma to the auditory system followed by an impulsive sound, the results obtained were astonishing. Many of the subjects were unaware of such type of a hearing impairment until the questionnaire was handed over to them.

The questionnaire aimed to highlight four main aspects of daily living and the results were as follows:

**Your perception-** which included questions regarding understanding speech, perception of sounds- victims were initially unaware of the cause until questionnaire was given; it affected the quality of life to a moderate extent.

**Friends & Family-** which included questions regarding the experiences with friends and family due to difficulty in understanding speech- had difficulty in carrying out conversation at a moderate level.

**Technology-** regarding the usage of electronic devices smoothly- was affected more among the four sections, highest scores obtained in the discomfort of using the devices and moderate impact was seen.

**Crowd-** regarding the ease of conversing in social gatherings- was affected due to the difficulty in discriminating speech sounds in noisy environment. Although few people expressed this problem yet the results were positive.

**Interpretation:** From the above results it is clear and evident that sudden/impulsive noise has an adverse impact on hearing and changes in lifestyle are associated with loss of hearing. Although a moderate impact on lifestyle changes and hearing is obtained from the results yet it is imperative from the above findings that a good number of the people were affected from the sudden noise exposure. Since the selection of candidates for the study was random therefore results do not indicate a higher degree of impact and a small sample size is also another reason.

#### **Conclusion:**

Spreading awareness regarding the dangers of impulsive noises from explosives is an important attribute in the hearing care mission. An Audiologist's mission is not only to provide intervening strategies but to also prevent hearing loss and the impact of noise on life that would result from a preventive source by educating society.

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