



## **EFFECT OF IMPACT NOISE ON PHYSIOLOGICAL PARAMETERS IN FORGING INDUSTRIAL WORKERS**

**Irani FB and Wankhede SG\***

Department of Physiology, MGM College, Aurangabad, Maharashtra India

### **ARTICLE INFO**

#### **Article History:**

Received 18<sup>th</sup> January, 2018

Received in revised form 13<sup>th</sup>

February, 2018 Accepted 15<sup>th</sup> March, 2018

Published online 28<sup>th</sup> April, 2018

#### **Key words:**

Impact noise, forging industry, heart rate, blood pressure

### **ABSTRACT**

**Introduction:** Noise is unwanted sound at wrong time and wrong place. Such noise is found to cause some kind of physical, physiological and psychological harm or stress to body. Excessive noise can result in decrease in productivity, increase in accidents and loss of hearing and effect on physiological and psychological effects. **Method:** A total of 30 workers in study group engaged in forging industries with exposure to impact noise in age group of 28 to 45 yrs and 24 persons not exposed to any impact noise in age group 25 to 45 yrs who have satisfied inclusion and exclusion criteria and have consented to participate in study were enrolled. Each enrolled subjects detailed history and year of exposure to noise and use of protective measures was obtained. They were evaluated by ECG for heart rate and blood pressure measurement. **Result:** There was significant effect on health, there is increase in heart rate and systolic and diastolic blood pressure at 90decibel in study group who are exposed to impact noise for more than five years in forging industries. **Conclusion:** It is always advantageous, economical and effective to identify the noise sources and noise problems and incorporate noise control measures rather than attending problems at later stage.

Copyright©2018 **Irani FB and Wankhede SG**. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

## **INTRODUCTION**

Noise is unwanted sound. It is regarded as an important pollutant of the environment. The noise pollution results in speech communication interference, loss of productivity, hearing impairment and other physiological and psychological effects for the personnel working in various industries<sup>1</sup>. In developing countries like India beside the economical growth and technological changes, the companies are striving for increasing the sales turnover, thus the workers are more stressed for the productivity along with the additional burden of noise exposure<sup>2</sup>. Forging industries of developing countries are lagging far behind in implementing hearing conservation, noise control programmes and occupational health and safety programmes. Workers of hand tool forging units are exposed to the noise levels beyond the permissible limits. Most of operations at different locations generates high noise > 90dB (A) (beyond the permissible limits). The impact produced by a hammer falling on a plate can generated an impulse whose peak level and duration can be varied 140-470 ms<sup>3</sup>. Continuous noise is a noise whose maxima occur more often than once per second. Impulsive noise is assumed to have peaks occurring less often than once a second, and is limited to peak sound pressure levels of 140dB<sup>4</sup>.

Indian factory act -1948 lay down a limit of 90dB (A) for 8h/day but the Indian working hours are 48 /wk which leads to high noise exposure<sup>5</sup>.

Noise has wider ranging ill effects than the effect on hearing. It has undesirable effects on CVS, respiratory, endocrine and nervous system. Noise has become a very important 'Stress Factor' in the environment of man leading to health hazards.

Most of the studies have been carried out in developed countries. Most of the workers in India are illiterate and not aware of hazardous effect of noise on health. Few studies are done in India showing effect of impact noise on physiological parameter like heart rate, and blood pressure in workers, the present study is undertaken to determine the incidence of impact noise on physiological parameters.

## **MATERIAL AND METHOD**

**Study Design:** 30 workers in the age group 28-45 years engaged in forging industries with noise exposure (impact noise) for more than five years were selected and labeled as 'STUDY GROUP'. For comparing and evaluating the effect of impact noise exposure in workers a 'CONTROL GROUP' is selected, which included 24 persons with age 25-45 years not exposed to any impact noise. The various forging industries from which the workers were selected were from Chikalthana and Waluj area in Aurangabad where hammer is used having capacity of >2 tones, which produces impact noise.

\*Corresponding author: **Wankhede SG**

Department of Physiology, MGM College, Aurangabad, Maharashtra India

**Method:** The detailed history of workers was taken. The number of years of exposure to noise. Whether any protective measures were used or not? A detailed personal history of Study group and Control group was obtained to rule out any history of systemic diseases like Diabetes, hypertension.

**Electrocardiogram (ECG) and blood pressure examination:** workers selected are subjected to blood pressure with the help of mercury sphygmomanometer by auscultatory method. The blood pressure is recorded three times and average blood pressure is taken in both the groups. Blood pressure is expressed in mm of Hg. Electrocardiogram is taken on ECG CARDIART 108T machine with lead II.

Heart rate was calculated with formula<sup>6</sup>.

Heart rate =  $\frac{1500}{\text{No of mm in R-R interval}}$

No of mm in R-R interval

## RESULTS AND DISCUSSION

54 subjects (study group, workers exposed to impact noise n-30) and (control group, not exposed to impact noise n-24) were selected.

**Table 1** Comparison of number of persons with the age in groups

Groups	No. of persons examined	Age (range)
Study Group	30	28 to 45

**Table 2** comparison between study and controlled groups blood pressure

Groups	systolic pressure (range) mm of Hg	systolic pressure (average) mm of Hg	diastolic pressure (range) mm of Hg	diastolic pressure (average) mm of Hg
Control Group	90 - 140	122	70 - 90	80
Study Group	90 - 150	130	70 - 98	86

Table – 2 shows that, the blood pressure average for systolic and diastolic is higher in Study group. It is 122/80 in control group where as in Study group it is 130/86 mm of Hg

**Table 3** comparison between study and controlled groups heart rate

	Heart rate per minute (range)	Heart rate per minute (average)
Control group	70 - 88	74
Study group	72 - 90	78

Table -3 shows that in Control group the heart rate average is 74 beats per minute. And in Study group the heart rate average is 78 beats per minute. Compared to Control group, there is increase in heart rate on an average of 4 beats/ minute.

## DISCUSSION

In present study, the effect of exposure to impact noise of 2 tonnes and 8 tonnes hammer is studied. Because of excessive sound probably resulted in increase heart rate. As noise is having a known effect on cardiovascular system.

It has lead to higher readings of systolic and diastolic pressure. Several studies have shown high secretion of vasoconstrictors in urine as a result of being exposed to higher than 90 dB noise levels, which might represent the biological effect of noise exposure on blood pressure<sup>7</sup>. Acute exposure for impact noise 90-100 decibel level increases the catecholamines<sup>8,9</sup> which might have led to an increase in systolic and diastolic pressure.

## CONCLUSION

This study show that long term exposure to impact noise shows the significant effect on health, physiological parameters in forging industrial workers. The value of 90 decibels is obtained for increase in blood pressure and heart rate in forging industrial workers. To prevent further health damage. It is better to avoid further exposure to noise. 1) There should be social motivation, 2) Identify the noise sources and noise problems right in the design and erection stages and incorporate noise control measures, 3) Application of mufflers to machines, 4) Workers are advice to wear ear plugs, 5) suitable legislation to prevent noise pollution and to award compensation for noise trauma. 6) Health education to workers, about the effects of noise on health and related preventive measures.7) hearing protection for all workers exposed to noise louder than 85dB. 8) Workers must be regularly rotated from noisy areas to comparatively quiet post in factories.

## References

1. Wankhede SG, Irani FB 'Effect of impact noise on auditory acuity in forging industrial workers' *Indian Journal of Allied Science.* 1May 2018.
2. Lakhwinder P.S, Bhardwaj A, K.K. Deepak, Bedi Raman. 'Occupational Noise Exposure in Small Scale Hand Tools Manufacturing (Forging) Industry (SSI) in Northern India'. *Industrial Health.* 2009; 47, 432-430.
3. Tremolieres C, Hetu R (1980) Amulti- parametric study of impact noise-induced TTS. *J Acoust Soc Am* 68, 1652-9.
4. OSHA's Noise Standard Defines Hazard Protection, Resource Guide 2000.
5. IS: 7194-(1994) Indian standard, assessment of noise during work for hearing conservation purpose. (First revision) BIS India, New Delhi.
6. Garima Agarwal, Rakesh Kumar. 'Study Parasympathetic Function Tests during Different Phases of Menstrual cycle' 2015; 3(4A): 1619-1623.
7. Smith A.'A review of the non-auditory effects of noise on health'. *Work and Stress.* 1991; 5(1):49-42.
8. Neghab M, Maddahi M, Rajaefard AR. 'Hearing impairment and hypertension associated with long term occupational exposure to noise'. *Iranian Red Crescent Medical Journal.* 2009; 11(2): 160-165.
9. Ising H, Braun C. 'Acute and chronic endocrine effects of noise: review of the research conducted at the Institute for water, soil and air hygiene.' *Noise Health.* 2000; 2:7-24. (PubMed)

### How to cite this article:

Irani FB and Wankhede SG (2018) 'Effect Of Impact Noise On Physiological Parameters In Forging Industrial Workers', *International Journal of Current Advanced Research*, 07(4), pp. 11600-11601.  
DOI: <http://dx.doi.org/10.24327/ijcar.2018.11601.2012>