

# The Effectiveness of Hearing Conservation Program in the Workplace

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## Introduction

Noise induced hearing loss is considered the highest reported problem among workers in the industrial countries, both civilian and military [1-3]. However, Knobloch and Broste [4] argued for the minimization of the problem due to invisibility. The percentage of at-risk employees is significantly high (U.S. Department of Health and Human Services, 1981). The National Institute for Deafness and Other Communicative Disorders (n.d.) reported that 20 million workers were noted to be working under background noise on a daily basis. And the expected loudness level is about 75 dB or higher. However, it is not a new observation, since historically it has been highlighted in the 17th century by Ramazzini. This article provides an overview of the effectiveness of hearing conservation program in the workplace and argues for the benefits of applying the rule to both employer and employee. The advantages could be in terms of economy, health, and safety.

## An overview of Hearing Conservation Program

There have been a number of professional definitions for the hearing conservation program (HCP). American Speech Hearing Association (n.d) defined HCP as the prevention of significant, permanent hearing loss resulting from on-the-job exposure to ototoxic or ototraumatic agents (of which noise is the most common). The purpose of industrial HCP is to protect workers from developing noise-induced hearing loss in the workplace [5,6]. However, other indirect goals could include: reducing non-hearing effects like stress, low attendance rate, and chronic disease [7,8] and reduction of industrial claims [9] which is extremely expensive for noise-induced hearing loss [10].

Audiologists play a significant role in HCP. Lipscomb [5] reported that more than 45% of audiologists have provided some services. This percentage has been increased by 11% after half a decade.

## Essential factors which contribute in an effective HCP

Studying the effectiveness of HCP would help companies select an appropriate source which can be conducted confidently

[11]. Humes [12] cited possible reasons for the ineffectiveness of HCP as in the following:

- a. Inadequate communication and coordination among plat personal involved in HCP.
- b. Onsite personal and corporate headquarters.
- c. Insufficient information used to make HCP decisions.
- d. No meaningful training for hearing protection devices.
- e. Inappropriate selection of HPDs.

On the other hand, Glorig [13] and Fox, Mass, Newby, Royster et al. [14] reported a number of elements for an effective conservation program:

- a. Measurement of work-area noise levels.
- b. Identification of over-exposed employees.
- c. Engineering and administrative controls which would reduce the risk noise.
- d. Provision of personal hearing protection if other controls are inadequate.
- e. Initial and periodic education of workers and management.
- f. Motivating workers to comply with HCP policies.
- g. Initial and periodic hearing levels of workers.
- h. Professional audiogram review and recommendations.
- i. Follow-up program for audiometric changes.
- j. Detailed record for the entire HCP.
- k. Professional supervision of HCP.

Stewart [10] emphasized that any successful program has to cover all components without exception. Prince, Colligan, Stephen, & Bischoff has also recommended similar strategies

to conduct HCP in workplace with emphasize on engineering controls and full assessment of whole hearing conservation program. The Centers for Disease Control and Prevention, (n.d.) has recommended that the Hearing Conservation Program Evaluation checklist is used to assess the effectiveness of HCP. The International Labour office [15] has discussed the definition of workplace; for instance, roads, oil refineries and mobile ones. Clark and Touma [7,16] have discussed some examples of loud noises like gunfire and the banging of metal on metal objects. Here, noise ranges from 100 to 140 dB.

### Different HCP approaches:

Humes [12] illustrated three conservation approaches:

a. First, through engineering, the equipment or devices producing the noise can be redesigned to reduce the sound level generated at the source. The International Labour Office [15] stated that industries should demonstrate their equipment at the minimum loudness level. This approach has been successful according to Yankaskas & Shaw [17]. Mohammadi [18] reported that more than 50% of industries had engineering control strategies used to minimize the noise level. However, there are limitations as to the effectiveness of this approach to hearing conservation. For instance, many military operations are significantly noisy [12]. Noise control has been highlighted by Lipscomb [15] through six strategies. Also, operational control has been illustrated in instances of changing aircraft in a way that reduces the level of noise.

b. The second approach is to target the workers who are at risk of developing noise induced hearing loss by protecting their hearing [12].

c. Thirdly, to design and implement a hearing conservation program, such as educating populations about the hazards of high intensity noise, measuring hearing thresholds of persons on a regular basis and instructing individuals on the use of personal hearing protections devices Miller, Marshall & Heller [19] suggested that Evoked Oto Acoustic Emissions could be a more reliable evaluation than regular audiometer. Ewigman et al. [1] stated that there is no treatment available. However, Muhr Per [20] argued that increasing awareness could be a unique preventable strategy. Ewigman et al. [1] illustrated the importance of education to protecting hearing by wearing hearing protection devices. We can describe any hearing conservation program as an effective one if it achieves the goals established for it [5].

OSHA (2008) outlined the components of HCP as noise monitoring, audiometric testing program, hearing protection, training program and records program. Noise monitoring, which includes time of exposure and the level of intensity, is considered in addition to qualified assessment. Also, a variety of devices have been used like sound level meters and/or dosimeters (OSHA, n.d.). Audiometric testing consists of scheduling the hearing test on an annual basis. OSHA (2008) has emphasized the

importance of providing a quick notification for the employee. OSHA (2008) also recommended supplying workers with free HPDs and having them trained. Moreover, initial training should be covered as a part of employment orientation.

Keeping a record of noise exposure measurements, hearing results for the workers, and facility to access the record if needed is also highly recommended. Mohammadi [18] has indicated the important of keeping noise at the same level in work place. Not to mention that, the percentage of at high risk companies remaining at a constant loudness level are low from 38%-63%.

ASHA (n.d.) encouraged the audiologist to follow essential steps in providing a good HCP which could include: assessment of loud noise, minimizing the noise level in the workplace, ensuring that workers are able to master using hearing protection devices and regular hearing check-up and follow up and organizing an education session about the consequences of noise on hearing and health. In addition to record keeping and evaluating the efficacy of the program, Ewigman et al. [1] concluded that the level of awareness and attitude toward prevention among fire fighters was improved. They also show a willingness to use HPDs. They has shown that the percentage of workers who have been educated about using hearing protection devices have been increased by 65%. The correlation between HCP and noise induced hearing loss claims was being highlighted by Mohamadi [18] and Grainger (n.d) who has pointed out the consequence of if the company did not apply a HCP assuming assuming that the rate of claimming among noise induced poulation is high.

### Conclusion

Even though the prevalence of noise-induced hearing loss in high [21], among employees working with background noise, it is a preventable phenomenon [20]. Hearing conservation programs will be responsible for at least reducing the complication of noise exposure on hearing through a well-structured demonstration of the hearing conservation program. The effectiveness of applying the program would also reduce non audiological consequences [22]. For the program to be effective Lipscomb [5], the program could include the audiologist, industrial hygienist, manager, and worker. A list of successful criteria for hearing conservation programs has been discussed. An overview by ASHA provides a guideline for audiologists who conduct a hearing conservation program. In summary, the hearing conservation program has advantages for both workers and companies in terms of hearing, prevention, safety and other relevant factors [23-33]. The evaluation of any hearing program should be considered as the first priority in safety and management in work place.

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