International Journal of Industrial Ergonomics 43 (2013) 512–517

Contents lists available at SciVerse ScienceDirect

International Journal of Industrial Ergonomics

journal homepage: www.elsevier.com/locate/ergon

Hearing protection in industry: Companies' policy and workers' perception

Annelies Bockstael [a,*], Lieve De Bruyne [b,1], Bart Vinck [b], Dick Botteldooren [a]

[a] Ghent University, INTEC, Research Group Acoustics, Sint-Pietersnieuwstraat 41, B-9000 Gent, Belgium
[b] Ghent University, Department of Oto-rhino-laryngology and Logopaedic-Audiologic Sciences, De Pintelaan 185, 2P1 B-9000 Gent, Belgium

ARTICLE INFO

Article history:
Received 15 March 2012
Received in revised form
17 August 2012
Accepted 20 August 2012
Available online 21 September 2012

Keywords:
Noise-induced hearing loss
Occupational noise exposure
Personal hearing protectors
Questionnaires
Safety climate

ABSTRACT

Personal hearing protectors are widely used to prevent occupational noise-induced hearing loss. These devices have to be worn both correctly and consistently while exposed to noise, therefore substantial research has been devoted to barriers and opportunities associated with effective hearing conservation.

The current paper focuses on the company's hearing conservation approach to identify from a practical point of view major policy aspects that can stimulate effective hearing conservation and are also feasible within a real industrial context. In four companies from different branches of industry, surveys have been carried out among safety advisors and workers to asses the companies' hearing conservation program from both perspectives and relate it to reported use of hearing protectors.

The findings highlight the benefits of strict policy: reported consistent wearing is much higher in the establishment where actual control and even sanctions are in place. Workers' risk perception of noise levels at the work floor is also found to be important, but less associated with final use than the safety culture. Finally, the safety climate reported by safety advisors corresponds closely to the workers' perception, suggesting that (adequate) policy making can get really through to daily working routines. These findings stress once more the managements' responsibilities *and* opportunities to create a healthy occupational environment.

Relevance to industry: As stated in this abstract, the current findings are very relevant for industry because they identify the major influential factors for use of hearing protection at the work floor. This way, the results can serve as a base and inspiration for focused hearing conservation programs, improving the prevention of noise-induced hearing loss with effective efforts.

© 2012 Elsevier B.V. All rights reserved.

1. Introduction

The possible adverse effects of excessive noise exposure on hearing have been well-established (Śliwinska-Kowalska and Kotylo, 2007; Nandi and Dhatrak, 2008). To prevent occupational noise-induced hearing loss, collective measures can be taken to reduce the overall noise level at the work floor (Bies and Hansen, 2003; Crocker, 1997). Hearing protection is only used when these interventions are insufficient or unfeasible. The European Directive 2003-10-EC (2003-10-EC) states that hearing protection should be available when noise exposure over an 8-h working day ($L_{Aeq,8h}$) equals or exceeds 80 dB(A), for $L_{Aeq,8h}$ from 85 dB(A) their use is compulsory.

Despite these regulations, occupational hearing loss persists (Mrena et al., 2008). In this regard extensive evidence shows that workers do not always wear their protectors correctly and consistently while exposed to noise (Nélisse et al., 2011). Here, *consistency* is crucial, since intermittent or irregular use (largely) compromises the actual attenuation (Neitzel and Seixas, 2005).

Training priorities for implementing effective hearing conservation must be established after determining the factors that substantially influence actual use of personal hearing protection on the factory floor (Stephenson et al., 2011). Morata et al. (2001) cite interference with communication, interference with job performance, comfort issues and self-perception of hearing condition. Based on Stephenson (2009) this list can be extended with convenience, cost and safety culture/climate. Other researchers stress the importance of risk perception (Arezes and Miguel, 2008) and self-efficacy (Lusk et al., 1994). In general, three major categories of variables can be distinguished (1) knowledge about the

* Corresponding author. Tel.: +32 9 264 99 96; fax: +32 9 264 35 93.
E-mail address: annelies.bockstael@intec.ugent.be (A. Bockstael).
[1] Present address: Artevelde University College, Bachelor of Audiology, Voetweg 66, B-9000 Gent, Belgium.

0169-8141/$ – see front matter © 2012 Elsevier B.V. All rights reserved.
http://dx.doi.org/10.1016/j.ergon.2012.08.009

risk of noise exposure in general and possible harmfulness of exposure levels at the work floor, (2) attitudes, beliefs and feelings with respect to personal hearing protectors and (3) perceived safety climate and subjective norm.

Several health intervention programs have been proposed to ensure that the conditions listed above are fulfilled and hearing protection at the work floor is promoted, see for instance Lusk et al. (1994), Stephenson and Stephenson (2011). Although final use is vested with the individual employees, it is clearly the employers' responsibility to create a work climate where correct and consistent wearing of hearing protection is no less than a matter of course. The main question is to what extent the company's policy is able to actually influence an individual's thoughts and attitudes with respect to noise exposure and hearing conservation.

To address this issue, self-reported use of hearing protectors and workers' attitudes, feelings and beliefs have been investigated in four different companies. These data are complemented with interviews of the respective safety advisors and the general descriptions of noise and safety climate. The goal is to see how individual use varies between companies and to link this to the working/safety climate as seen by both employers and employees.

2. Material and methods

2.1. Test sample

Twelve companies with seat in the Flemish part of Belgium have been contacted, all known to have elevated levels of noise exposure. Four agreed to participate, others mostly stated that hearing conservation was a too sensitive subject. The included establishments all operate in an international context but fall under different branches of industry. Company A with 38 workers comes from the food industry, Company B is an establishment of a firm working in metal industry (61 workers), Company C with 110 workers operates in packaging and Company D (40 workers) is part of a power company. Throughout each company exploratory 1-min L_{Aeq} noise levels have been measured with a hand-held Brüel & Kjær type 2250 noise-level meter.

Within each company, questionnaires have been distributed among the Dutch-speaking workers actually exposed to noise, stressing that participation was voluntary and anonymous. A collection box was put in a central space where workers could deposit their copy. Questionnaires that had been filled in clearly wrongly or inconsistently have been excluded. Additionally, people with an overall valid questionnaire who failed to fill in their noise exposure and/or use of hearing protectors have been excluded because despite the careful selection of companies and possible participants within the establishments, there is no complete certainty that those people fall within the research scope. Final response rates then are 26% for Company A, 33% for Company B, 34% for Company C and 52% for Company D, yielding to 88 completed and valid questionnaires.

Apart from the employees' survey, the safety advisor of each company has been orally interviewed by asking nine open questions about the interpretation of hearing conservation as stipulated by the Belgian law B.S. 15.2.2006. This includes selection, training and availability of personal protectors, the company's policy on imposing their use, audiometric testing and assessment of noise exposure.

2.2. Questionnaire for employees

To the workers a written questionnaire has been distributed. The majority of the questions are a Dutch translation of the 20-item Noise at Work Questionnaire by Purdy and Williams (2002) and are to be answered on a 5-point Likert-scale. The four subgroups of influential factors originally covered (perceived benefits from hearing protection, disadvantages and interfering aspects for wearing hearing protectors, risk-perception and self-efficacy) are complemented with the categories 'safety climate and policy' and 'comfort and efficiency' (Hsu et al., 2004; Arezes and Miguel, 2002), leading to a 31-item questionnaire. In addition, questions related to age, professional experience and noise exposure are included. The whole questionnaire is prefaced by a written explanation of the study's purpose and practical instructions.

The survey consists of *positively* and *negatively* formulated questions – i.e. where agreement expresses respectively use-enhancing or use-interfering feelings, believes and attitudes – to establish a fairly neutral questionnaire (Jansen et al., 2004). Beforehand, the complete survey has been distributed both among a review panel and workers from another company (not related to nor included in the final selection of companies) to allow validity and consistency assessment (Platteau, 2008).

For analyses, answers on 'negative' questions have been recoded so that agreeing *always* reflects a more positive attitude with respect to hearing conservation. Furthermore, questions are grouped based on the three major categories of influential variables (see Section 1), namely (1) risk assessment with (1.a) general knowledge on noise exposure and hearing loss and (1.b) specific risk assessment of noise exposure at their work floor; (2) workers' attitudes, feelings and beliefs with (2.a) general beliefs about hearing protectors' protective capacities, (2.b) practical experiences related to the use and comfort of hearing protectors, (2.c) perception of safety and speech signals while wearing protectors, (2.d) self-efficacy concerning health and hearing loss prevention, (2.e) self-efficacy in noise control at the work floor; and finally (3) safety climate with (3.a) perceived safety policy pursued by the company and (3.b) perceived safety climate from peers' behavior.

By taking into account all the questions in a specific category, frequency tables for the answers 'totally agree', 'agree', 'disagree', 'totally disagree' and 'no opinion' have been calculated per participant for each of the eight influential factors listed above (1.a to 3.b). If a person has mostly answered (totally) agree – i.e. adding the answer rate for 'agree' and 'totally agree' – to all the questions in that particular group, his final judgment on that specific factor is called *agree*. When the opposite is true, the label *disagree* is set. Finally, the answer is called *inconclusive* when a person has mostly chosen 'no opinion' or when (totally) agree and (totally) disagree have been chosen just as much.

To address noise exposure during a typical working day per participant, the reported number of hours worked in noise per day is divided by their total number of daily working hours. Similarly, the duration of hearing protector use is compared to the length of the work shift. Based on this last number, a dichotomous variable for continuous use is derived. The use of hearing protectors is said to be *continuous* on a daily basis when the ratio between reported use and reported exposure time equals one – i.e. reported use covers the *whole* noise-exposure-time – or *not continuous* for ratios lower than one.

2.3. Statistical analysis

Analysis of variance (ANOVA) and logistic regression are carried out with the statistical software R. Dependent and independent variables vary in function of the separate research questions at hand and are listed in the respective Result sections. The independent variables included in the different statistical models are a-priori manually selected based on literature (see Section 1) to investigate which variables – known to influence workers' attitude to hearing protection – can or can not be related to the companies'

Download English Version:

https://daneshyari.com/en/article/1096030

Download Persian Version:

https://daneshyari.com/article/1096030

Daneshyari.com