



Beliefs and attitudes among Swedish workers regarding the risk of hearing loss

Eva B. Svensson, Thais C. Morata, Per Nylén, Edward F. Krieg & Ann-Christin Johnson

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Eva B. Svensson*†
Thais C. Morata‡
Per Nylén§
Edward F. Krieg‡
Ann-Christin Johnson*||

*National Institute for Working Life,
Program of Technical Hygiene, Umeå,
Sweden,

†Unit of Technical Audiology,
Department of Clinical Neuroscience,
Karolinska Institutet, Danderyd,
Sweden,

‡National Institute for Occupational
Safety and Health, Division of
Applied Research and Technology,
Cincinnati, OH, USA,

§National Institute for Working Life,
Department of Work and Health,
Solna, Sweden,

||Karolinska Institutet, Centre for
Hearing and Communication
Research, Stockholm, Sweden

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Creencias y actitudes concernientes al riesgo de hipoacusia entre trabajadores Suecos

Abstract

The beliefs and attitudes regarding the risk of hearing loss and their impact on hearing protector use were investigated among Swedish workers. A questionnaire, developed by the US National Institute for Occupational Safety and Health (NIOSH), was used. The study objective was to assess workers' attitudes towards using hearing protection devices (HPDs) and to enhance the ability of workers to protect themselves from occupational hearing loss. Ninety-five per cent of the respondents were aware that loud noise could damage their hearing, 90% considered that a hearing loss would be a serious problem, and 85% believed that HPDs could protect their hearing. However, lower percentages of workers always used the HPDs when they were noise-exposed. Fifty-five per cent of the workers indicated that they could not hear warning signals when using HPDs, and 45% of the workers indicated that they considered HPDs to be uncomfortable. These issues must be addressed to make HPD use more effective.

Sumario

Se investigaron las creencias y las actitudes concernientes al riesgo de hipoacusia, y su impacto en el uso de protectores auditivos entre los trabajadores suecos. Se utilizó un cuestionario desarrollado por el Instituto Nacional de Seguridad y Salud Ocupacional (NIOSH) de los Estados Unidos. El objetivo fue conocer las actitudes de los trabajadores hacia el uso de dispositivos de protección auditiva (HPD) e incrementar la habilidad de los trabajadores para protegerse de la hipoacusia ocupacional. Noventa y cinco por ciento de los que respondieron sabían que el ruido intenso podía dañar su audición, 90% consideraban que la hipoacusia constituiría un problema serio y 85% creían que los HPD podían proteger su audición. Sin embargo, un bajo porcentaje de los trabajadores utilizan todo el tiempo los HPD cuando se exponen a ruido. El 55% de los trabajadores indicaron que consideraban los HPD incómodos. Deben tomarse en consideración estos puntos para mejorar el uso de HPD.

Noise is a prevalent occupational hazard and it is a significant environmental contaminant. It damages the auditory system. The noise conditions necessary to induce hearing impairment vary greatly among individuals. Living with a hearing loss is, in many respects, like living with a chronic illness: it never goes away, and it usually gets worse (Lusk, 1997; Carmen & Uram, 2002). Hearing aids may be prescribed to amplify sound, but they do not restore the perceived sound quality to its former state. Noise-induced hearing loss (NIHL) can negatively affect personal safety and quality of life for affected individuals, as well as for those interacting with them (Gasaway, 1985; Berger, 2000a). Héту et al (1994) found that noise-exposed workers were not aware of the major consequences of occupational hearing loss, particularly the experience of negative self-image and communication difficulties within the family.

In 1968, the Swedish Trade Union Confederation mailed an occupational health hazard questionnaire to almost 4000 workers. Noise was considered the second most common health hazard in the workplace by 41% of the respondents who rated the noise as hazardous (Bolinder et al, 1969). In 1999, the Swedish Work Environment Authority considered noise to be the fourth

most common work-related hazard in Sweden. It affected 29% of men ($n = 609\,000$) and 16% of women ($n = 320\,000$), who said that they were exposed to occupational noise that was so loud they could not converse in a normal voice for at least one-quarter of their time at work. When these figures were compared to those of 1989, the results were the same for men, but the number of affected women had increased somewhat (Swedish National Board of Occupational Safety and Health, 2001).

According to the Work Environment Act in Sweden (Swedish National Board of Occupational Safety and Health, 1992), there are general safety regulations.

- First, the work should be planned and conducted so that exposure to noise of employed persons is reduced to the lowest practical level, with regard to technical development and the possibilities of limiting the noise exposure.
- Second, measures should be taken to reduce the exposure if noise exposure exceeds the following values: equivalent sound level during an 8-h working day of 85 dB(A) (including any impulsive sound); maximum sound level (except for impulsive sound) of 115 dB(A); peak sound level of 140 dB(C). The

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Eva B. Svensson
Unit of Technical Audiology,
Department of Clinical Neuroscience, Karolinska Institutet,
Blå vägen, hus 15, S-182 30 Danderyd, Sweden
E-mail: eva.b.svensson@ens.ki.se

employees should also be informed that noise exposure exceeds the limit values, as well as of the measures taken to reduce the exposure. Information should also be supplied concerning the risks of hearing impairment as a result of the noise exposure, and concerning the need to wear hearing protectors when the limit values are exceeded.

- Third, employees who have a hearing impairment that could be made worse and who are engaged in noise-generating activities should be offered other employment with low noise exposure.
- Additionally, if a person working at a noise-generating activity must communicate with others for safety reasons, measures should be taken to make this possible.

In the absence of engineering or administrative controls to eliminate hazardous noise exposures, hearing protection devices (HPDs) are recommended to reduce the effects (Franks et al, 1996). HPD use in noisy environments is essential both at work and during free-time activities when the noise is loud enough to damage one's hearing. Consequently, it is of great importance that those who need to use HPDs learn how to wear them properly.

In the workplace, HPDs are often adopted as the only means for controlling noise exposure. This strategy, if not carefully implemented, can obstruct the success of hearing loss preventive efforts (Berger 1980a,b, 2000b; Royster & Royster, 1990; National Institute for Occupational Safety and Health, 1998), as illustrated in a recent review of hearing conservation practices in Scandinavia: although HPD manufacturers indicated that sales of hearing protectors had increased substantially during the past decade, Barrenäs et al (1998) found that the occurrence of NIHL had also increased. The authors argued that if the HPDs had been used effectively, the opposite trend should have been seen.

On the other hand, it was found in a retrospective cross-sectional study in the Swedish county of Östergötland that the trend towards a decreasing frequency of NIHL during the 1970s and 1980s continued into the 1990s. According to Johansson & Arlinger (2001), a possible explanation for the improvement could have been increased HPD use coupled with less exposure to noise during previous military service. The study indicated that awareness of noise-induced occupational hearing loss had improved. However, hearing conservation programmes were still advocated, because hearing threshold levels among males employed in two of the studied occupations continued to be poorer than expected in relation to age (Johansson & Arlinger, 2001).

Comfort is an important issue when the use of HPDs is being considered. Therefore, different types of HPD should be made available to populations who are noise-exposed. However, offering comfortable HPDs to everyone at a job site does not ensure that noise-exposed workers will use them (Stephenson & Merry, 1999; Morata et al, 2001). In the workplace, education and training should be the central components of a hearing loss prevention programme and they should cover issues that are relevant to HPD use.

Several reasons why an occupational reliance on HPDs can fail to prevent hearing loss have been known for years, and they include discomfort, interference with hearing speech and warning signals, incorrect use with other safety equipment, deterioration, and abuse (Berger, 1980a,b; Helmkamp, 1986). Prevention of NIHL requires early adoption of certain behaviours that are

compatible with future health benefits. Diverse psychological and health models have been investigated that relate to a person's decision to wear or not wear HPDs (Zohar et al, 1980; Lusk et al, 1998, 1999; Hallberg, 1998). Workers are typically not motivated to do anything about noise, because NIHL occurs gradually, is not visible, and has an uncertain time-course. People who develop NIHL are usually unaware that their hearing has been affected until the loss is quite significant. Previous studies have shown that adults tend to underestimate rather than overestimate hearing loss (Purdy & Williams, 2002). A useful health promotion model to predict future HPD use was derived from a social learning theory that explains behaviour regarding the promotion of health (Lusk & Keleman, 1993).

Taking all of the above variables into consideration, our objective in the present study was to evaluate workers' attitudes and beliefs associated with hearing loss prevention and to identify those that could have an impact on HPD use in the workplace.

Methods

Study population

Thirteen Swedish manufacturing companies were invited to participate in the present study, and 11 of them accepted. The two non-participating companies did not differ from those studied with regard to noise levels. The companies that agreed to participate varied in size from five to 500 employees. Participants were selected and invited to participate in the study based on their exposure conditions. The study group consisted of 154 workers from fibreglass products companies, 78 noise-exposed workers selected from three companies in the metal products manufacturing industries, and 81 presumably non-exposed workers randomly chosen from the metal products manufacturing industries and a mail distribution terminal. In total, 313 subjects were included in the study: 278 (89%) men and 35 (11%) were women. One hundred and thirty-seven (44%) subjects were exposed to excessive noise levels above 85 dB(A) time-weighted average (TWA), while 176 (56%) were not exposed to noise above 85 dB(A) TWA, based upon noise measurements done at the time of the investigation.

Noise measurements

Noise exposure was assessed by personal exposure measurements made with the use of noise dosimeters (Brüel & Kjær 4436). The dosimeters stored the maximal sound level every second (fast time-weighting, 3-dB exchange rate). The microphone was mounted on the worker's right lapel and pointed upwards. The time of collection varied between 2.5 and 12 h (mean 7.6 h). During a walk-through survey, background noise levels were measured with a direct-reading Brüel & Kjær 2218 sound level meter and a 1/2-inch Brüel & Kjær 4165 microphone mounted on an extension rod.

Questionnaire

Data were collected through a questionnaire on work history, medical history, occupational and non-occupational exposures, and lifestyle factors. In this questionnaire, several questions addressed noise and HPD use in the present work situation, as well as in the previous two most recent workplaces. Many questions concerned noise that could have affected hearing in past military service or during free-time activities and the personal protection used. The research group mailed the questionnaires to

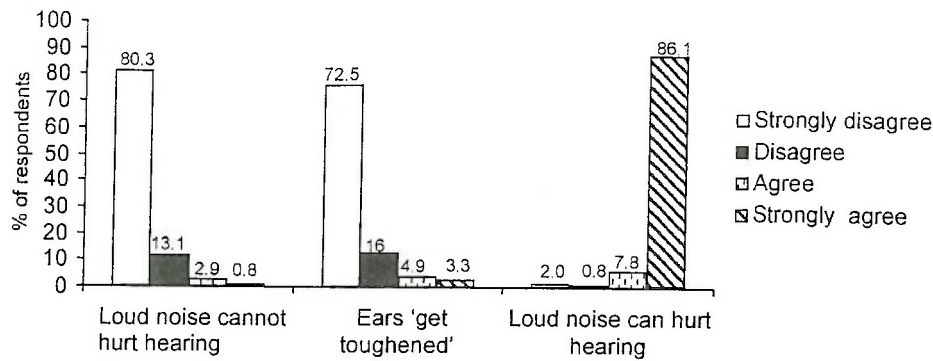


Figure 1. Workers' attitudes and beliefs regarding hearing loss prevention in the content area of *susceptibility* ($n = 313$); percentages of workers who gave the answer 'strongly disagree', 'disagree', 'agree', or 'strongly agree', respectively.

participants 1–2 weeks before visiting the company. The participants were instructed to return the questionnaire at the time of the visit. During the visit, interviewers examined the questionnaire with each subject to check for invalid answers or unanswered questions. Part of the questionnaire was 'Beliefs about Hearing Protection and Hearing Loss' (see below).

The questionnaire, 'Beliefs about Hearing Protection and Hearing Loss', used in the study and an included form had been developed several years earlier by the US National Institute for Occupational Safety and Health (NIOSH) (Stephenson & Merry, 1999) (NIOSH contract no. 211-93-006). It surveyed workers' attitudes, beliefs and behavioural intentions regarding hearing loss prevention and consisted of 31 questions, which were subdivided into eight content areas:

1. Perceived susceptibility to hearing loss
2. Perceived severity of consequences of hearing loss
3. Perceived benefits of preventive action
4. Perceived barriers to preventive action—comfort
5. Perceived barriers to preventive action—important sound muffled
6. Behavioural intentions (future, present and past behaviours)
7. Social norms
8. Self-efficacy

Whereas the original questionnaire had a five-point scale, the present study relied on a four-point scale: respondents checked whether they (1) strongly agreed with, (2) agreed with, (3) disagreed with or (4) strongly disagreed with each question. The alternative fifth choice—'neither agree nor disagree'—was omitted when the questionnaire was translated into Swedish (see Appendix).

Testing the auditory system

During the visit to the company, the studied workers also underwent a large battery of hearing tests (Morata et al, 2002). Pure-tone thresholds were measured with the fixed-frequency Békésy method for both ears, at the frequencies 1, 2, 3, 4, 6 and 8 kHz. Each audiogram was evaluated for hearing loss. The audiogram was considered to be normal if thresholds did not exceed 25 dB HL (hearing level) at any tested frequency. If the HL was greater than 25 dB at one or more of the frequencies 3, 4 or 6 kHz (as in NIHL cases), or if the thresholds were poorest in this frequency range, the audiogram was considered to indicate high-frequency hearing loss. A non-occupational category was

included to account for those hearing losses ($HL > 25$ dB) that could not be attributed to occupational factors (either conductive or severe unilateral hearing losses and hearing losses not having the high-frequency configuration).

Analysis

One-way analysis of variance was used to test for differences between groups of participants in the content areas. The level of statistical significance was $p < 0.05$.

Results

The results are presented for each survey content area, and this is followed by an analysis of the responses by noise exposure and hearing ability of the participants.

As can be seen from Figure 1, a large majority of the workers indicated that noise could damage hearing, while 10% of the respondents indicated that one might get used to noise.

The content areas of *perceived severity of consequences of hearing loss* and *perceived benefits of preventive action* had questions such as 'I think it would be a big problem if I lost my hearing' or 'If I wear hearing protection, I can protect my hearing'.

Most of the respondents 'strongly agreed' that losing hearing would be a problem (Figure 2). Sixty per cent of the respondents 'strongly agreed' that HPDs could protect one's hearing.

In the *behavioural intentions* and *self-efficacy* content areas, almost one-quarter of the respondents answered such questions as 'I wear hearing protectors whenever I work around loud noise' or 'I know when I should use hearing protectors' by saying that they did not always use HPDs, although most had earlier answered 'noise could hurt' and 'a hearing loss would be a problem' (Figure 3). About 10% of the respondents did not know when to use HPDs.

The survey results on *perceived barriers to preventive actions*, having statements such as 'hearing protectors are uncomfortable to wear' or 'It will be hard to hear warning signals if I am wearing hearing protectors', indicated an even distribution of those who 'agreed' and 'disagreed' that it would be hard to hear warning signals and uncomfortable to wear HPDs (Figure 4).

When the respondents were subdivided according to noise exposure levels (below and above 85 dB(A) TWA), five content areas showed mean responses that differed significantly among the groups: the *consequences of hearing loss*; HPD comfort issues

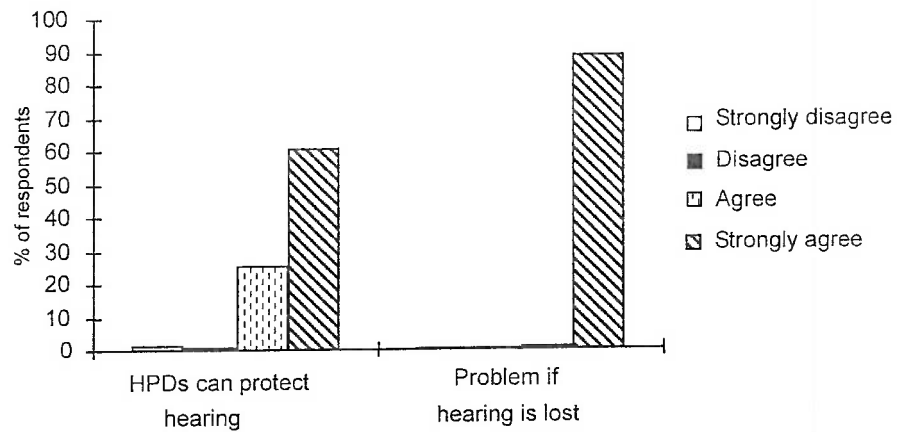


Figure 2. Workers' attitudes and beliefs regarding hearing loss prevention in the content area of *benefits and consequences* ($n = 313$); percentages of workers who gave the answer 'strongly disagree', 'disagree', 'agree', or 'strongly agree', respectively.

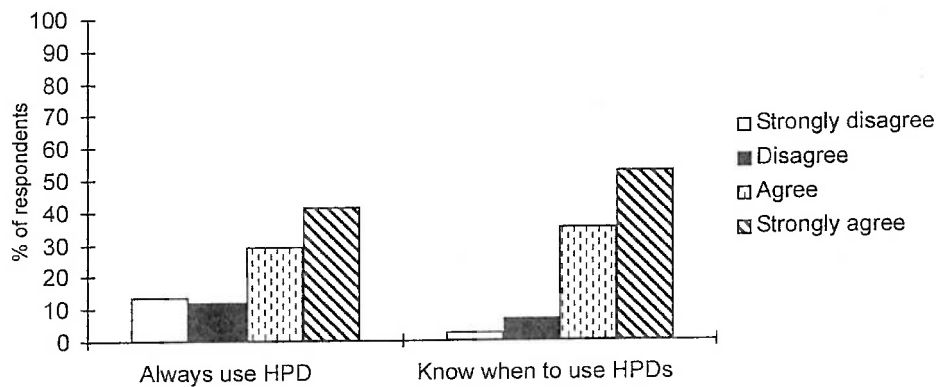


Figure 3. Workers' attitudes and beliefs regarding hearing loss prevention in the content area of *behaviour and self-efficacy* ($n = 313$); percentages of workers who gave the answer 'strongly disagree', 'disagree', 'agree', or 'strongly agree', respectively.

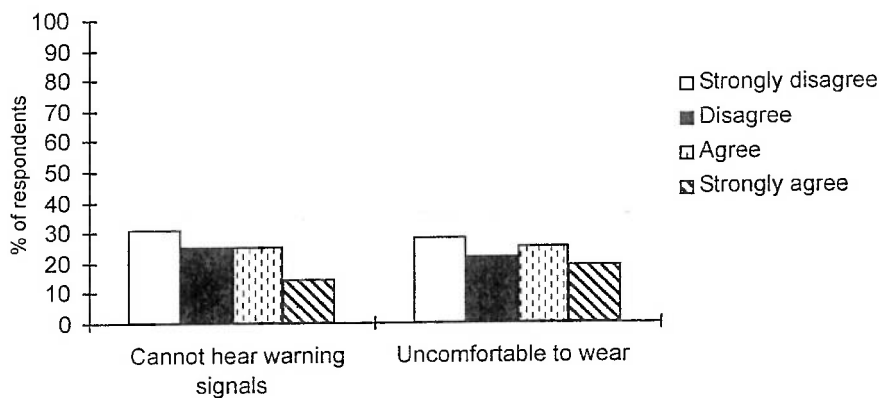


Figure 4. Workers' attitudes and beliefs regarding hearing loss prevention in the content area of *perceived barriers* ($n = 313$); percentages of workers who gave the answer 'strongly disagree', 'disagree', 'agree', or 'strongly agree', respectively.

(*barriers to preventive action*); frequency of intent to use HPDs (*behavioural intentions (present)*); perceived attitude among their co-workers (*social norm*); and knowledge of how to use HPDs (*self-efficacy*). Among those not exposed to noise (levels below 85 dB(A)), a larger percentage than of those working in noise

'strongly agreed' that a hearing loss would be a serious problem. More non-exposed workers than those working in noise thought that HPDs would be uncomfortable to wear (those working in noise probably had experience in using HPDs). More workers among those who were noise-exposed had increased their

Table 1. Workers' attitudes and beliefs related to hearing loss prevention (mean responses) according to noise exposure ($n = 313$)

<i>Survey content area</i>	<i>Noise < 85 dB(A)</i>	<i>Exposure > 85 dB(A)</i>	<i>p-Value</i>
Susceptibility to hearing loss	3.6	3.6	NS
Consequences of hearing loss	3.7	3.5	0.05
Benefits of preventive action	3.4	3.4	NS
Barriers to preventive action: comfort	2.4	2.1	0.05
HPDs muffle important sounds	2.5	2.7	NS
Behavioural intentions: future	3.2	3.3	NS
Behavioural intentions: present	2.2	2.8	0.001
Behavioural intentions: past	2.7	3.2	0.01
Social norms	2.2	2.7	0.001
Self-efficacy	2.5	2.9	0.001

4 = strongly agree; 3 = agree; 2 = disagree; 1 = strongly disagree. NS, not significant.

Table 2. Workers' attitudes and beliefs related to hearing loss prevention (mean responses) according to their hearing classification ($n = 313$)

<i>Survey content area</i>	<i>Normal hearing</i>	<i>High- frequency loss</i>	<i>Other hearing loss</i>	<i>p-Value</i>
Susceptibility to hearing loss	3.6	3.6	3.4	NS
Consequences of hearing loss	3.7	3.5	3.6	NS
Benefits of preventive action	3.4	3.3	3.4	NS
Barriers to preventive action: comfort	2.4	2.1	2.3	NS
HPDs muffle important sounds	2.8	2.5	2.0 ^a	0.01
Behavioural intentions: future	3.2	3.3	3.1	NS
Behavioural intentions: present	2.4	2.5	2.8	NS
Behavioural intentions: past	2.8	3.1	3.0	NS
Social norms	2.3 ^a	2.6	2.7	0.01
Self-efficacy	2.6	2.7	2.6	NS

4 = strongly agree; 3 = agree; 2 = disagree; 1 = strongly disagree. NS, not significant; HPD, hearing protection device.

^aGroup data are significantly different from those of the other two groups.

duration of HPD use by the beginning of the study compared to previous years. This same group more commonly said that their co-workers should use HPDs or that they thought it would be beneficial if their co-workers used HPDs. Finally, the noise-exposed respondents had better knowledge than the non-exposed respondents on how to fit and wear HPDs (Table 1).

In Table 2, the participants are subdivided into those with normal hearing ($n = 147$; 47%), those with a high-frequency loss, as defined in 'Testing the auditory system' above ($n = 128$; 41%), and those with some other type of hearing loss ($n = 22$; 7%). In two of the content areas, responses differed significantly among the groups. More respondents in the normal-hearing or high-frequency hearing loss groups thought that HPDs muffled important sounds when their responses were compared to the groups with other types of hearing loss. With regard to social norms, the groups with hearing losses 'agreed' that their co-workers used and thought it was beneficial to use hearing protection.

When we looked at the correlations among age, hearing classification, and issues of HPD use, we observed that older workers with normal hearing were the ones who most often reported that they found HPDs uncomfortable. Those who were older

and had types of hearing loss other than high-frequency loss were more afraid of the consequences of having a hearing loss. Those who were older and exposed to noise less than 85 dB(A) were the least afraid of the consequences of a hearing loss.

Discussion

In this study, we examined the beliefs and attitudes of workers with regard to hearing loss prevention, and in particular the ways in which these beliefs affect employee use of hearing protection. There have been relatively few prior studies on beliefs and attitudes with regard to hearing loss prevention in relation to noise exposure, hearing ability, and age.

In the group of Swedish workers from the manufacturing sectors and one mail distribution terminal, 95% of the respondents were aware that loud noise could damage their hearing, 90% considered that a hearing loss would be a serious problem, and 85% believed that HPDs could protect their hearing. However, lower percentages of workers used the HPDs 'always' when noise-exposed. Fifty-five per cent of the workers indicated that they could not hear warning signals when using HPDs, and 45%

of the workers indicated that they considered HPDs to be uncomfortable.

Hétu et al (1994) found that awareness of the main consequences of hearing loss was generally lacking. The majority of their subjects believed that noise was more tolerable when one already had a hearing loss, and one out of five believed that hearing would be recovered when they were no longer being exposed to noise. If the most devastating consequences of NIHL are unknown to a major segment of at-risk workers who have not yet developed hearing loss, noise will not be perceived as a damaging environmental factor and little will be done to prevent overexposure.

According to Helmkamp (1986), a majority of respondents (58.5%) gave the answer 'no reasons' for not always wearing hearing protection. This finding was corroborated in a similar study by Hickson et al (1995), who found that 17.7% gave 'no reasons' for not wearing hearing protection.

Williams et al (2004) investigated a rural Australian population, dividing them into two groups of subjects: both groups underwent conventional pure-tone audiometry, but one also underwent otoacoustic emission testing. All subjects completed a self-report questionnaire immediately before, and at 6 weeks and 12 months, after hearing testing. The authors hypothesized that if more relevant and detailed information was supplied to workers, their awareness of and preventative action against hazardous noise might increase proportionately. The results showed that the workers had more positive attitudes towards noise and hearing loss prevention after hearing testing. However, the hearing tests had no significant impact on HPD use, which is the easiest way in which an individual can reduce personal noise exposure.

It has been recommended that a variety of styles of HPD should be provided, so that workers can select a device based on comfort, ease of use and handling, and impact on communication (Casali & Park, 1990; Royster & Royster, 1990; Franks et al, 1996). Moreover, each worker should receive individual training in the selection, fitting, use, repair and replacement of HPDs (Gasaway, 1985; Royster & Royster, 1990; Franks et al, 1996). In the studied companies, workers had a limited number of HPD alternatives to choose from and did not receive special training on HPD use, care and maintenance.

Among the *perceived barriers* reported by workers on HPD use was interference with sounds that workers wanted to hear. This complaint was more common in workers with normal hearing and workers with high-frequency hearing loss than in those with other types of loss. These findings suggest that when the studied companies selected HPDs, management did not take into consideration what effect the HPD had on verbal communication or the ability to detect certain machinery or warning sounds. Historically, in the selection of HPDs, emphasis has been placed on hearing protector attenuation, even to the exclusion of other qualities that are just as necessary for effective HPD use (National Institute for Occupational Safety and Health, 1998). Companies often seek the device that offers the highest attenuation, even in circumstances when only a few decibels of attenuation is needed. It is conceivable that the devices selected by the studied companies *overprotect* the ear.

Helmkamp (1986) found that 25.2% of subjects gave the answer 'need to listen for other sounds/communicate', and in the group of workers investigated by Hickson et al (1995), 20.9% answered the same. According to Hickson et al, 25.3% stated that their workplace noise was fluctuating, or that they (13.9%)

were not in a noisy environment. One can presume that workers who judged their workplace as having 'fluctuating noise' or as 'not a noisy environment' were the most likely to jeopardize their hearing by underestimating the risk of NIHL.

In the present study, age was significantly related to several of the studied outcomes, including the perception of hearing loss as a problem and finding HPDs uncomfortable. Workers' HPD use and perceptions of noise exposure and hearing loss have been investigated previously. Lusk et al (1998) and Morata et al (2001) found in their studies that bivariate analyses identified significant differences in mean use of HPDs by age, years of employment, and trade group. These authors recommended that HPD use and exposure levels, demographics and trade group membership should be considered when hearing conservation programmes are being designed (Lusk et al, 1998; Morata et al, 2001).

Our survey has proved useful in identifying areas to be explored in hearing loss prevention initiatives and areas that need to be addressed when the content of education and training programmes is being considered. As recommended by Stephenson & Merry (1999), the questionnaire used in this study could be given to workers prior to and after training to evaluate whether attitudes and behaviours regarding hearing loss prevention had been influenced and to assess programme effectiveness.

The design of a hearing conservation programme should take into account the misrepresentation of inconsistent HPD use. The true attenuation that is given by a certain HPD can be evaluated only if it is used 100% of the time. However, one must be aware that when workers say they 'always' use HPDs, they might not mean exactly 100% of their working time (Toppila et al, 1998). On the other hand, McCullagh et al (2002) found in their validation of observed and self-reported HPD use that these two types of surveys were highly correlated (0.89). Their results suggest that self-report is an appropriate measure of HPD use.

An effective hearing conservation programme can do more than prevent hearing loss. It can improve the wellbeing of employees; it can also improve the quality of production and may reduce the incidence of stress-related disease. With the right approach, a training HDP programme could even be a vehicle for improving labour-management relations. Getting the support of noise-exposed workers for this task is essential (Suter, 1986; Royster & Royster, 1990; Franks et al, 1996).

According to Herberg & Schroeter (1984), Dias & Andrea (1997), De Joy (1994), and Williams et al (2004), some elements must be simultaneously present if worker support for an NIHL programme is to be achieved. The goal must be described in a convincing way, and appropriate information needs to be available. There must be a desire and willingness among the employees to initiate a change. Most of the non-wearers require a learning process, including elements such as 'hearing protection makes sense', 'noise is perceived as annoying', and 'hearing protectors must be worn persistently and continuously'. The learning process must aim at getting workers used to wearing HPDs so that putting them on becomes second nature in noisy environments. Workplace 'safety culture' is also essential. Even the best-designed hearing conservation programme will be unsuccessful if employees perceive that management places little importance on the wearing of HPDs. The participation of supervisors and managers will reinforce the importance of hearing conservation within the organization. One key person should be responsible for the hearing conservation programme.

Acknowledgments

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Mention of the name of any company or product does not constitute endorsements by the NIOSH.

Appendix: Beliefs about hearing protection and hearing loss

Date _____

ID _____

Occupation _____

Age _____

Please read each item and circle the number which best describes your opinion about the statement. Remember, there are no right or wrong answers! We are interested in your opinions.

		<i>Strongly Agree</i>	<i>Agree</i>	<i>Disagree</i>	<i>Strongly Disagree</i>	<i>Content area</i>
1.	I think earmuffs put too much pressure on my ears.	1	2	3	4	Perceived barriers to preventive action: comfort
2.	I believe I know how to fit and wear earplugs.	1	2	3	4	Self-efficacy
3.	I do <i>not</i> intend to wear hearing protectors when I am around loud tools or equipment.	1	2	3	4	Behavioural intentions; future behaviours
4.	Most of my co-workers wear hearing protectors when they work around loud noise.	1	2	3	4	Social norms
5.	I think I can work around loud noise without it hurting my hearing.	1	2	3	4	Perceived susceptibility to hearing loss
6.	I think wearing hearing protectors every time I am working in loud noise is important.	1	2	3	4	Perceived benefits of preventive action
7.	I think earmuffs make my head sweat too much.	1	2	3	4	Perceived barriers to preventive action: comfort
8.	I wear hearing protectors whenever I work around loud noise.	1	2	3	4	Behavioural intentions; present behaviours
9.	Hearing protectors are uncomfortable to wear.	1	2	3	4	Perceived barriers to preventive action: comfort
10.	My co-workers don't wear hearing protectors when they work in loud noise.	1	2	3	4	Social norms
11.	I'm not sure how to tell when earplugs need to be replaced.	1	2	3	4	Self-efficacy
12.	Losing my hearing would make it hard for people to talk to me.	1	2	3	4	Perceived severity of consequences of hearing loss
13.	I believe that my ears can eventually 'get toughened' to noise, so they are less likely to be damaged by it.	1	2	3	4	Perceived susceptibility to hearing loss
14.	I know when I should use hearing protectors.	1	2	3	4	Self-efficacy
15.	I think it will be hard to hear warning signals (like back-up beeps) if I am wearing hearing protectors.	1	2	3	4	Perceived barriers to preventive action: muffle important sounds
16.	I believe exposure to loud noise can hurt my hearing.	1	2	3	4	Perceived susceptibility to hearing loss

		<i>Strongly Agree</i>	<i>Agree</i>	<i>Disagree</i>	<i>Strongly Disagree</i>	<i>Content area</i>
17.	I am convinced I can prevent hearing loss by wearing hearing protectors whenever I work in loud noise.	1	2	3	4	Perceived benefits of preventive action
18.	I think my hearing is being hurt by exposure to loud noise at work.	1	2	3	4	Perceived susceptibility to hearing loss
19.	Hearing protectors limit my ability to hear problems on the job site.	1	2	3	4	Perceived barriers to preventive action: muffle important sounds
20.	I don't think it would be such a big handicap to lose part of my hearing.	1	2	3	4	Perceived severity of consequences of hearing loss
21.	If I wear hearing protection, I can protect my hearing.	1	2	3	4	Perceived benefits of preventive action
22.	I know how to tell when an earmuff needs to be replaced.	1	2	3	4	Self-efficacy
23.	Wearing hearing protectors is annoying.	1	2	3	4	Perceived barriers to preventive action: comfort
24.	Most of my co-workers think it is a good idea to wear hearing protectors in hazardous noise.	1	2	3	4	Social norms
25.	If co-workers asked me, I would be able to help them wear hearing protectors correctly.	1	2	3	4	Self-efficacy
26.	I don't think I have to wear hearing protectors every time I am working in noise.	1	2	3	4	Perceived susceptibility to hearing loss
27.	I can't hear problems with my tools and machinery if I wear hearing protectors.	1	2	3	4	Perceived barriers to preventive action: muffle important sounds
28.	I believe that daily exposure to loud machinery and tools will eventually damage my hearing.	1	2	3	4	Perceived susceptibility to hearing loss
29.	I think it would be a big problem if I lost my hearing.	1	2	3	4	Perceived severity of consequences of hearing loss
30.	I plan to wear hearing protection when I work near loud noises.	1	2	3	4	Behavioural intentions; future behaviours
31.	On my current job, I seldom wear hearing protectors when I work around loud noises.	1	2	3	4	Behavioural intentions; past behaviours
COMMENTS:						

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