Original Research Study – For a copy of the full text go to the NZ Research in ECE Journal, Vol.12, 2009. Published by ChildForum. From June this will article will also be available online at the research network members' section of www.childforum.com

The Hearing Status and Exposure to Noise of Early Childhood Centre Staff

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Key words: Noise exposure, noise induced hearing loss, hearing threshold levels

Abstract

A study investigated the sound exposure that children and teachers receive in childcare centres. During this study, requests for concurrent work to evaluate the hearing acuity of the teachers resulted in a small extra study. Personal sound exposures were measured on 73 teachers in early childhood education centres and compared to the prescribed levels for workers in the health and safety in employment legislation. Twenty eight teachers in part-time (sessional) centres and 45 teachers in all day centres were tested over one working day. One staff member of a sessional centre and five of those in all day centres received noise exposures well in excess of the 100% maximum daily sound exposure permitted in the workplace. Standard hearing tests were conducted on a small group of 20 teachers including young adults through to those nearing retirement. There was a noticeable increase in noise- induced hearing loss as age increased with significant loss evident in the older participants. The paper argues that if this study has transferability across this teaching population, then potential hearing loss from noise exposure is of concern for early childhood teachers.

Introduction

Noise exposure levels and resultant health issues of teachers have become of increasing concern in early childhood centres. This was demonstrated during the consultation process conducted by the Ministry of Education in the revision of early childhood centres legislation where a number of respondents identified noise levels as an issue which needed to be addressed (Pairman, personal communication, 30 October 2004). Occupational hearing loss is always of concern in noisy work environments. New Zealand has adopted widely used international criteria for noise exposure in the workplace. Regulation 11 of the Health and Safety in Employment Regulations 1995 requires an employer to take all practicable steps to ensure no worker is exposed to sound pressure levels greater than:

- An A-frequency weighted time-average level over an 8-hour working day of 85 dB (LAeq 8h = 85 dB) or equivalent. This can be expressed as 100% dose
- A peak level (Lpeak) of not more than 140 dB

A peak level can be regarded as a shock wave of less than one second in duration which is generated by a sudden impact such as a door being slammed.

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Noise in Early Childhood Centres and How Safe is the Level of Noise?

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Abstract

This paper reports on a section of the findings from a larger study on noise in early childhood centres. The level of noise experienced by 45 staff and 155 three to five years-old children in 32 early childhood centres was recorded. The data showed that more than a quarter of children and one sixth of the teaching staff, received dosages in excess of the maximum daily sound exposures permitted for employees under the health and safety in employment legislation. Some activities and equipment were found to be especially noisy, indicating that controls on the level of noise for these were needed. This included some music sessions from amplified music and the use of percussion instruments such as claves. Major construction work carried out in the vicinity of centres generated noise that could be harmful to children and staff.

Introduction

The *New Zealand Health and Safety in Employment Regulations 1995*, require employers to take all practicable steps to prevent employees from being exposed to excessive noise, which is set at the time average level (L_{Aeq}) of 85 dB for an eight hour working day - a daily noise dose (DND) of 100 percent. The DND is a combination of the averaged noise levels received and time exposed to them expressed as a percentage of the maximum noise exposure permitted in industry. If a DND exceeds 100 percent then this is in excess of what is permitted in the legislation, and it is potentially harmful.

Data from animal experiments suggests that children may be more vulnerable in acquiring noise induced hearing loss than adults (World Health Organization, 2005). Children must be assumed to be more sensitive to high-noise levels than adults. The World Health Organisation (2005) recommends a maximum time average level of 55 dB in school and early childhood centre playgrounds.

Picard and Bradley (2001) suggest that when children are required, because of high noise-to-speech ratios, to have more concentrated attention and intensive focus on their work, it is the youngest children who will experience the greatest negative impact of this. They explain that young children are less able to take advantage of language context effects, which occur in conditions of low speech predictability. This specifically applies to speech recognition in noise. In addition they suggest that increased efforts of coping in such learning environments may cause children to divert resources from their working memory to the speech recognition process.

Original Research – *For a copy of the full text go to the NZ Research in ECE Journal, Vol.10, 2007. Published by ChildForum. From June 2010 this article will also be available online in the research network members' section at www.childforum.com*

"A Kind of Serene Feeling Washing Over the Centre": Perceptions of Staff and Trained Observers Regarding the Use of Background Music to Improve the Auditory Environment in an Early Childhood Centre Setting

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Abstract

Noise in early childhood settings can reach potentially harmful levels. Carefully planned background music was introduced to help reduce activity generated noise in one preschool in New Zealand. This paper presents one aspect of the study – the impact of the music as perceived by trained observers and staff at the preschool. The study employed a small 'n' (ABCB) design. Over four non-consecutive weeks observers measured the perceived level of noise under baseline, 'background music', 'no music', and 'background music' conditions. Staff were also interviewed about any changes they might have noticed. Background music was believed to have assisted in creating an auditory environment which is likely to be conducive to positive social interaction and learning. Findings suggest that management of music is also crucial. Staff in preschool settings might benefit from the support music therapists can offer in planning and implementing a programme of background music to reduce noise levels during specific periods of the day, in their centres.

Key Words: Background music; preschool noise; teacher learning

Background

Noise in early childhood centres has been shown to reach levels that have the potential to cause harm to young children (McLaren & Dickinson, 2003; Picard & Bradley, 2001). In a large scale study undertaken by the authors, carefully planned background music was introduced to help reduce activity generated noise in one preschool in New Zealand. Measures for the larger study included readings from fixed Sound Level Meters, individual sound doseBadges worn by staff and children, event sampling by trained observers, and semi structured interviews with staff. Comparisons were made with the data collected by the sound level meter to that collected by the trained observers (McLaren, Rickson, Jones, & Dickinson, 2006). No correlation was determined between the two data sets, which reaffirms that the human perception of noise/sound with factors such as annoyance, pleasantness or the special characteristics of sound such as timbre which affect the human perception, cannot easily be quantified by sound pressure level measurements. This paper reports on one aspect of the study - the outcomes as perceived by the trained observers and the staff who were interviewed.