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Original Article

Educating teenagers about hearing health by training them to educate children

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The British Society of Audiology



The International Society of Audiology



Abstract

Objective: We investigated the change in hearing-health behaviour amongst teenagers trained to deliver the Dangerous Decibels programme to younger children. **Design:** The Dangerous Decibels programme uses a two-stage process to train 8–12 year-old children to protect their hearing from noise: (1) a team of experts train ‘Educators’ who (2) give classroom training to children in schools. Training teenagers as Educators may add a second level of benefit if teenagers internalize the hearing-health messages that they present and thus protect their own hearing better. They were assessed before training, immediately after, and three months later (after all had presented the classroom training) using a questionnaire. In addition, a focus group was conducted with a subgroup of the Educators to assess their subjective experience. **Study sample:** We trained 44 Educators aged 14–17 years. **Results:** Results were generally positive: there were significant and sustained improvements in knowledge, self-reported behaviour, and perceived supports towards protecting hearing, and trends but not significant changes in attitudes or perceived barriers to hearing protection. **Conclusions:** Providing training to teenagers had benefits beyond the delivery of training to younger children, but improvements in the delivery model may increase the uptake and impact on the teenagers.

Key Words: Health promotion; noise-induced hearing loss; teenagers

Noise-induced hearing loss (NIHL) may occur due to high-level sound. It results from damage to the inner ear, particularly the hair cells of the cochlea (Neal et al, 2015; Spoenclin, 1971) and the spiral ganglion (Kujawa & Liberman, 2009). Though it is more commonly reported in adults, NIHL in children and adolescents may occur, and in developed countries around 15% of school-aged children have hearing loss attributable to noise exposure (Harrison, 2008). The injuries which cause NIHL are thought to be permanent, so damage in childhood would be expected to contribute to the rate of adult hearing loss, and thus prevention is desirable. Furthermore, adolescents and young adults are exposed to dangers of hearing loss through recreational noise, and evidence from young adults suggests that it is possible to change self-reported behaviour around loud sounds (Keppler et al, 2015).

The health promotion literature on the avoidance of NIHL suggests that methods such as lectures, pamphlets, and videos, are less effective than hands-on training requiring active participation (Burke et al, 2006). Review of hearing health promotion approaches for children found that it was important to explain auditory mechanisms, causes of hearing loss, the effects of noise exposure on

hearing, warning signs of NIHL, and specific strategies for hearing protection (Folmer et al, 2002). Three basic strategies: turning volume down, walking away from hazardous sources of sound, and the use of hearing protection devices, were suggested (Folmer et al, 2002).

The ‘Dangerous Decibels’ programme was developed to include the areas identified above, and was shown to be effective in changing knowledge, attitudes, and intended behaviours regarding noise and NIHL in children (Martin et al, 2013). It has also been established that improvements were sustained over three months in children aged about ten years, but the improvements in attitudes and intended behaviours decayed after three months in teenaged children (Griest et al, 2007). On the other hand, it has been demonstrated that the Dangerous Decibels programme is effective for younger children when delivered to them by teenagers (Martin et al, 2013).

Hearing-health promotion is difficult in teenagers: a campaign that consisted of four 45-minute sessions with lectures, multimedia presentations, group work, hands-on exercises, and role-playing did not influence teenagers (Weichbold & Zorowka, 2003). On the

Abbreviations

ANOVA	Analysis of variance
NIHL	Noise-induced hearing loss

other hand, it has been shown that learning can be enhanced through the act of teaching others (Fiorella & Mayer, 2013). Based on this, we hypothesized that teenaged school pupils taught to present the Dangerous Decibels programme to younger children would internalize the messages they delivered and thereby improve their own hearing-health behaviour around noise. The first aim of this study was to test whether the hearing-health behaviour and motivation of teenagers would improve after being trained and delivering the Dangerous Decibels programme. Ecological approaches to health promotion appear to be most effective (McLeroy et al, 1988) because they address health behaviour at multiple levels (interpersonal, intrapersonal, organizational, community, policy). The principle underlying the ecological model is that changes in health behaviour are best brought about by influencing people from all of these levels at once. The Dangerous Decibels programme tries to do this, and the second aim of the research was to assess the extent to which this was successful.

Method*Participants*

Participants were teenaged pupils aged 14–17 from two schools in moderate socioeconomic areas in Auckland City, New Zealand. The schools were approached and key teachers who expressed an interest in their school's involvement in the Dangerous Decibels programme were established. These teachers then sought volunteers from within their schools. In total, 67 students volunteered and all were included in the research, however only 44 (36 female and eight male) completed all assessments and were included in the final analysis (Response rate: 66%). Of the 44 participants, 20 were of New Zealand European ethnicity, two Maori, one Cook Island Maori, one Tongan, five Chinese, nine Indian, and six of 'other' ethnicity.

Six (four female, two male) of the participants also participated in a focus group session. Again, these were volunteers obtained via the key teachers.

Ethical approval was obtained from the University of Auckland Human Participants Ethics Committee (Ref: 2013/9850).

Questionnaires

A questionnaire was developed by adapting previously used questionnaires, the Dangerous Decibels assessment of knowledge, attitudes, and behaviour (Griest et al, 2007), and a questionnaire designed to assess barriers and supports to good hearing protection behaviour in the workplace (Reddy et al, 2012). The questionnaires contained five subscales related to NIHL (Table 1): (1) Knowledge - six questions; (2) Attitudes - three questions; (3) Behaviour - two questions; (4) Supports to hearing protection behaviour were assessed with the statement: 'If you do wear earmuffs or earplugs in loud, noisy situations, it is because...' followed by a list of nine possible reasons and an option to indicate 'other' reasons; (5) to hearing protection behaviour were assessed with the statement 'If you don't wear earmuffs or earplugs in loud, noisy situations it is

because...' followed by a list of eight possible reasons and an option to state 'other' reasons. There were also questions about noise exposure in the year prior to the questionnaire, and ethnicity. The questionnaires were four pages long, had 21 questions and took approximately 10 minutes to complete. The questions on behaviour varied slightly in the post-training session since the participants were not likely to have had exposure to noise since they were trained. Prior to training and at the three-month follow-up, we asked respondents about their behaviour around loud sound, whereas the post-training assessment asked about their intended behaviour.

Procedure for the quantitative study

Educator training was given to the participants over two days, with the first day including training about how to present the Dangerous Decibels classroom programme (called 'Listen Up!' In New Zealand), a 45-minute interactive session covering basic hearing-health messages, acoustics, anatomy and physiology of the ear, hearing loss, the experience of hearing loss, sound levels, self-efficacy with hearing protection equipment, and interpersonal hearing-health promotion (Griest et al, 2007). The training took a total of four and a half hours, and consisted of lectures by university-educated personnel with backgrounds in audiology, hearing science, health promotion, and occupational safety and health as well as demonstration of the classroom programme. The second day of training required the participants to present the classroom session to the researchers and other participants who gave them feedback, correction, and encouragement about their presentation. The questionnaires described above were administered at the start of the first day of training and at the end of training.

After training, participants were encouraged to visit local primary and intermediate schools and teach the classroom session to 8–12 year-old pupils, which they normally did in pairs. Arrangements were made between teachers and staff of the Pindrop Foundation so that the participants were allowed approximately 45 minutes with each class to deliver the Dangerous Decibels programme. Participants were given time out of class and transport to schools by their teachers and by staff from the Pindrop Foundation. The follow up questionnaires were administered approximately three months after training, which was also after all participants had delivered the classroom session themselves.

Procedure for the focus group

Three months after training, a focus group was conducted with six of the participants. Open-ended questions were asked with the intention of exploring experiences and discussing informative feedback about the training and presenting process. The focus group had a semi-structured format, was independent of the questionnaire, and took one hour to complete. It was conducted in a classroom during a lunch break.

The following prompts were used for the focus group discussion:

- (1) What would you say that you liked about the programme training?
- (2) What would you say that you didn't understand or feel could have been done differently?
- (3) In what way do you feel you have improved your own NIHL awareness?

Table 1. Scales included in the questionnaire and items on which they were based. Knowledge, attitudes, and behaviour items had sets of possible answers (often ‘True, False, Not sure’) from which participants could choose one option. Supports and barriers scales also included options to list ‘other’ supports or barriers to good hearing-health behaviour.

Scale	Question number	Item
Knowledge	8	Hearing a very loud sound even one time can cause you to lose some of your hearing
	9	Sounds measuring _____ and over are damaging to human hearing.
	10	Sounds that are too loud can damage the hair cells of the inner ear causing hearing loss.
	11	Hearing loss caused by loud sounds is something people over age _____ may have.
	16	Which of the following types of sound can be loud enough to damage hearing?
Attitude	17	Which of the following are good ways to protect your hearing when you are around loud sound?
	12	Having a hearing loss is not a big deal
	13	People who listen to loud music a lot don't seem to have a hearing loss, so I don't have to worry about getting a hearing loss.
Behaviour	18	It is important for me to protect my hearing from loud sounds by wearing ear muffs or earplugs
	14	If I go to a loud, noisy event, such as a concert, I will wear earmuffs or earplugs
Supports	15	If I go to a loud, noisy event and my friends are not wearing earmuffs or earplugs...
	6	If you do wear earmuffs or earplugs in loud, noisy situations, it is because:
	a	Someone tells you to
	b	You are doing something noisy
	c	Other people around you are doing something noisy
	d	You want to protect your hearing
	e	You are annoyed by the noise
	f	Your friends remind you to wear them
	g	You are following the rules
	h	You have received training to wear them
Barriers	7	If you don't wear earmuffs or earplugs in loud, noisy situations it is because:
	a	You are not clear about when you should wear them
	b	You can't hear properly when you are wearing them
	c	You can't communicate properly with others when you are wearing them
	d	They are uncomfortable
	e	You are used to loud noise
	f	Your friends often don't wear them
	g	Your friends find it funny when you wear them

- (4) Are you using hearing protection devices or engaging in any hearing protection strategies?
 (5) How did you find presenting the programme to the younger students?

These questions served as a starting point for the focus group discussion. The interview was recorded using a digital voice recorder and then transcribed by the interviewer who also coded the interview data according to themes (see Data analysis subsection below).

Data analysis

Analyses of the quantitative data were conducted using five repeated-measures ANOVAs (for knowledge, attitudes, behaviour, supports, and barriers). The three scores recorded on each scale over time (pre-training, post-training, three-month follow-up) were treated as the repeated measures. The assumption of sphericity in the data was assessed using Mauchley's test, and where the data departed from this assumption, the Huynh-Feldt correction was applied.

For the focus group data, conventional content analysis and a qualitative coding strategy was used to identify common themes throughout the responses, and quotes were assigned to each. Conventional content analysis aims to describe a phenomenon without having preconceived themes, instead allowing themes to emerge from raw data (Hsieh & Shannon, 2005). Our approach to the data was to search for emergent themes driven by our

consideration of the transcripts on one hand, while also considering the five levels (intrapersonal, interpersonal, organizational, community, and policy) of the ecological model (McLeroy et al, 1988) on the other.

Results

Exposure

There had been widespread exposure to potentially dangerous noise sources in the year prior to administration of the first questionnaire, especially amplified music via headphones (Figure 1).

Furthermore, 20 (45%) of the 44 participants indicated that they had been exposed to sounds which were loud enough to make their ears hurt or ring, only 23% said that they had not, and 32% were unsure.

Knowledge

There was an improvement in knowledge score after training and this was sustained at the three-month follow-up ($F(2,86) = 5.740$, $p = 0.005$; Figure 2).

Attitudes

There was no improvement in attitude towards noise and hearing protection ($F(2,86) = 0.507$, $p = 0.518$; Figure 3).

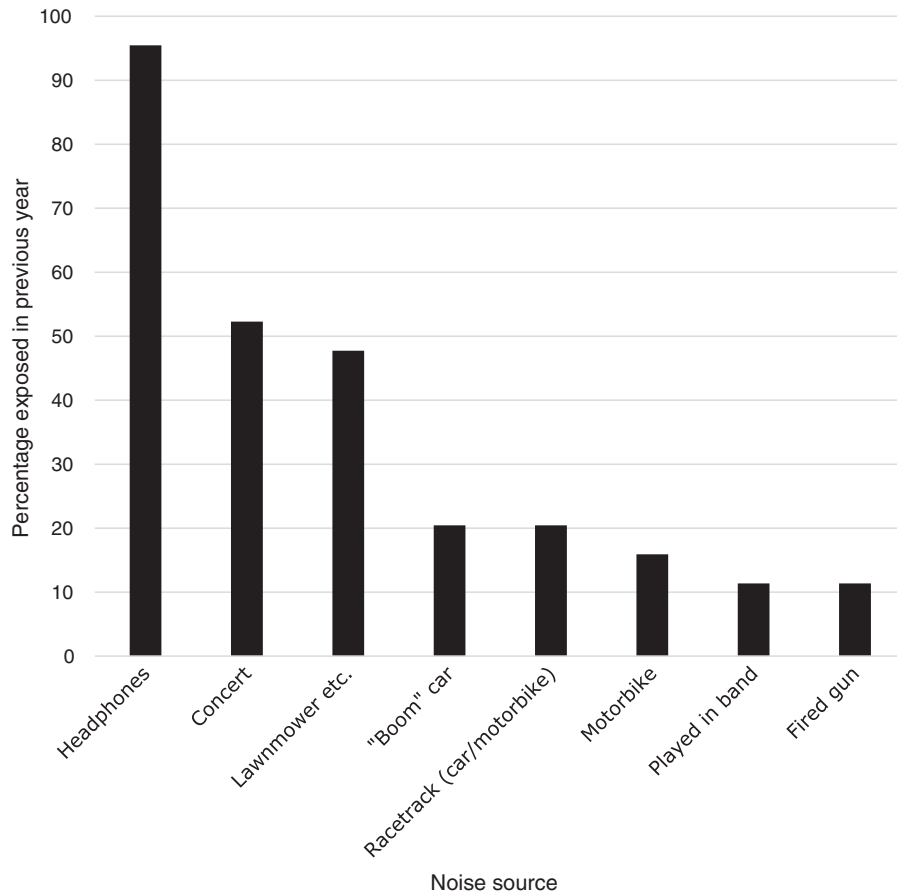


Figure 1. Percentage of participants exposed to common sources of noise.

Behaviour

Self-reported behaviour improved after training and the improvement was sustained over three months ($F(2,86) = 22.621$, $p < 0.001$; Figure 4).

Supports

The perceived supports to good hearing-health behaviour increased after training and this increase was sustained over three months ($F(2,86) = 14.345$, $p < 0.001$; Figure 5).

Barriers

The perceived barriers to good hearing-health behaviour did not change after training ($F(2,86) = 0.827$, $p = 0.428$; Figure 5). In addition to the supports and barriers to good hearing protection included in the questionnaire (Table 1), participants included several responses in the 'other' options available for the Barriers scale. Prior to training (when participants were given earplugs), five mentioned not having any as a barrier to their use, and one did not believe that it was necessary. After training, one participant still claimed not to have any, and one still believed that it was unnecessary. At the three-month follow up, four participants mentioned not having hearing protection when they needed it, either through having forgotten them or because they had not anticipated being exposed to high-level sound.

Focus group results

Five themes were identified, and these were mapped to four levels of the ecological model: Being trained and personal development (intrapersonal level), delivering training (interpersonal level), organization of the programme (organizational level), and community / social pressure (community level).

ON BEING TRAINED

Participants reported having enjoyed undergoing the two-day training session: 'I enjoyed it, learned quite a lot', and that they had indeed learned from the training: 'I thought it was quite a lot of info, but by the way that they described it, I understood it'. On the other hand, they reported having struggled, given the large amount of information presented in a relatively short time: 'Maybe if it was like the same amount of time but spread out over more days so that maybe it wasn't as intense ... it was quite a lot of information to get a hold of', and 'you learn something then you just go on to the next thing, you sort of forget it that you learned'.

Participants also found value in giving the presentation during training: 'I like the fact that after we were told how to present it we got to go present it in front of like a teacher and another group, because if we hadn't done that I wouldn't have had the confidence to go to all the schools'.

There was some criticism of the depth included in the training: 'You didn't necessarily need the stuff that he taught you, because

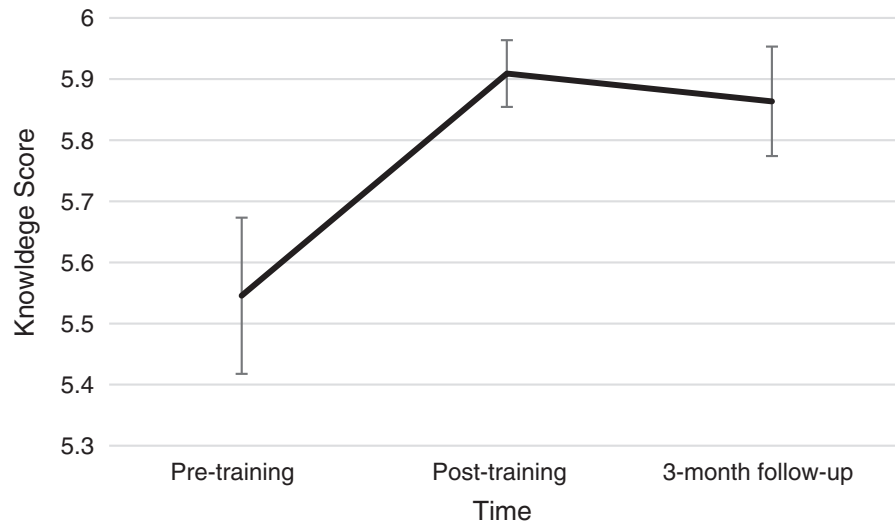


Figure 2. Mean knowledge score pre-training, post-training, and three months later. Error bars represent one standard error of the mean.

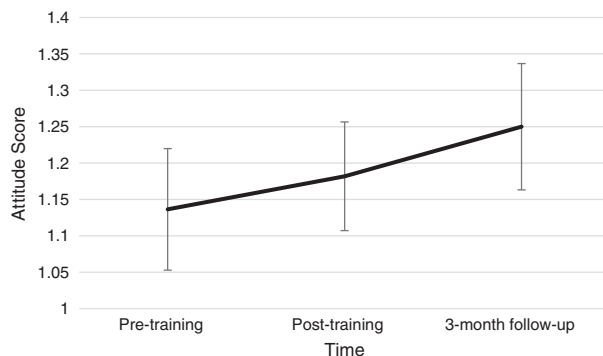


Figure 3. Mean attitude score pre-training, post-training, and three months later. Error bars represent one standard error of the mean.

a lot of it the kids wouldn't understand', however they also perceived the rationale behind giving it: 'It's good to have background knowledge, so that then you actually knew what you were talking about and could expand on what you were saying'.

ON PERSONAL DEVELOPMENT

The participants believed that their own attitudes towards noise and NIHL had changed as a result of the training 'I'm more worried about losing my hearing', 'I'm not listening to music that loud', 'Because I do music so I'm always around sounds practicing, I usually don't put the amp on too loudly...' and 'Yeah, I do use hearing protection because I play the drums down stairs when I'm practising at my house'

ON DELIVERING TRAINING

We had encouraged the participants to present in pairs or small groups on the basis that we hoped it would give them more confidence and support from their peers and prove easier to manage. This was sometimes the case: 'It was good because I wasn't by myself... it was good because I could like rely on them and stuff' but there were also reports that the teamwork aspect often

broke down: 'They really didn't know what they were doing... they had no idea what they were talking about, so I kind of had to do the whole presentation by myself, and apparently it was fabulous so that's great', 'one of them knew everything to say and he just did the whole thing himself and the other one knew absolutely nothing, so me and one we just kind of did nothing while one of them did all of it...' and 'Yeah I did nothing in mine... we just stood aside and they just made us do nothing...'

The training was focussed around a resource pack with a modular series of sub-presentations, and each of these had a cue card to remind the presenters of what to say and do within that module. Participants reported liking this structure: 'I was kind of nervous about it but like I kind of forgot what to say, like I knew what to say, but... so it was good like having the pack, that folder', and 'Yeah but I found that what was really good about the packs, was the fact that it had the cue cards, so I followed the cue cards the whole two times I went and it was the best thing that could have been in there, I liked that the most'.

The participants generally got on well with the younger children to whom they presented: 'The intermediate students were very energetic and were always asking very weird questions... it was really funny, and the second time I went to primary school and they weren't as energetic, but they still got involved' but some reported that the slightly older, intermediate school children (aged 11–12), were less interested than the younger (aged 8–10) primary school children: 'I found that the primary school kids were way more interested in what you had to say but the intermediate kids didn't really care'.

ON ORGANIZATION OF THE PROGRAMME

One of the difficulties for the schools and our group is organizing the teenaged educators into the primary schools. This means that there will inevitably be delays and elements of confusion in arrangements, leading to fewer or poorer quality experiences for the participants: 'The only thing that could have made it better is maybe if we like got to go one more time, for people who only went twice', 'but the second time it was... really unorganized and confusing for us', 'I think we could have maybe gone into the schools a bit quicker

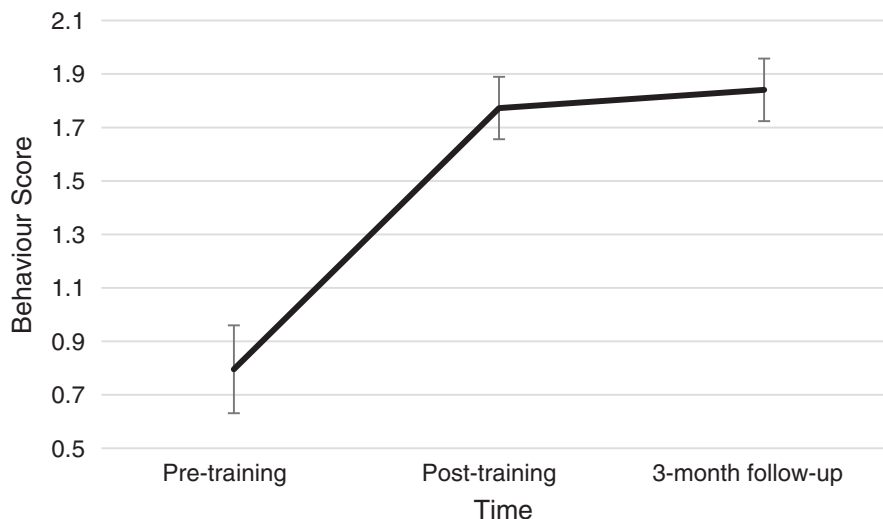


Figure 4. Mean behaviour score pre-training, post-training, and three months later. Error bars represent one standard error of the mean.

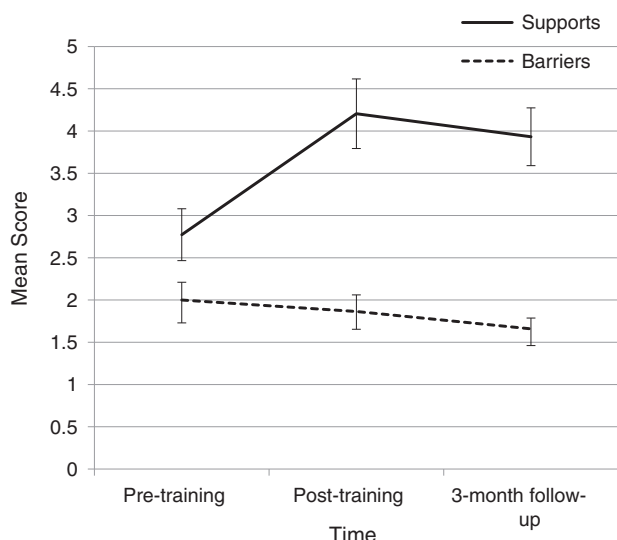


Figure 5. Mean scores for perceived supports and barriers to good hearing-health behaviour pre-training, post-training, and three months later. Error bars represent one standard error of the mean.

too because there was quite a long period of time we weren't doing anything', and 'I'm pretty sure I actually forgot about it I'm just like oh! I'm still doing that? I just completely forgot about it'.

ON COMMUNITY/SOCIAL PRESSURE

Furthermore, they appeared to have learned to encourage others around them to protect their hearing too: 'I told my mum that she shouldn't be water blasting without hearing protection', and 'My dad says put the amp in and turn it up really loud, and I go 'Dad! I don't wanna break my ears so just keep it down...,' and

'I tell my friends who didn't do the training to be careful... so I tell them again and again, and they get annoyed with me, but they get over it...'

On the other hand, participants were keenly aware of social pressures on themselves: 'But also if you don't want to look like a dork, but like I have long hair so I can cover earplugs', 'I probably would wear (earplugs) but without a cord, because the cord is like oh' and 'I think it's just mostly around how you look around people, wearing hearing protection... if you can't see it, I'd definitely wear it then I'd put my hair down'.

Behaviour at a music concert is under particularly strong community pressure given the devil-may-care image associated with amplified music. Given the age and urban social milieu of the participants, responses around this were particularly interesting. Not surprisingly, responses were mixed. Some thought they would not protect their hearing: 'Yeah but I probably wouldn't use (hearing protection) at concerts, I've been to some since I've had the training, haven't really used them', 'No, I guess because you're paying for it, you want the full experience'. Others were judicious: 'Depending how loud it is... and the type of music... like when there was a heavy metal band playing', 'Yeah, I'll probably start bringing them (to concerts) and see'. While others would certainly use protection: 'If I did go to a concert and I knew that it was gonna be quite loud or I knew there was gonna be a heavy metal band there, I would definitely bring them and wear them'. Of course, some also struggled with the fundamental difficulty of being human: 'Yeah I brought them... because I was gonna take them (to a concert) but then I forgot them'.

Discussion

We hypothesized that that teenaged school pupils taught to present the Dangerous Decibels programme to younger children would internalize the messages they delivered and thereby improve their own hearing-health behaviour around noise. We assessed this quantitatively using adaptations of two existing instruments, which had been used to assess the effectiveness of hearing-health training in younger children (knowledge, attitude, and behaviour; Griest et al, 2007) and in workplaces (supports and barriers; Reddy et al, 2014). We also conducted a focus group to obtain qualitative data pertaining to the hypothesis and to get some evaluation of the

programme from the teenaged participants' perspective. Quantitative data showed significant and sustained improvements in teenagers' knowledge, self-reported behaviour, and perceived supports towards protecting hearing; and trends, but not significant changes, in attitudes or perceived barriers to hearing protection. Qualitative data showed that the training was perceived as good and the experience was largely positive but that improvements would be possible, in particular to the presentation of the training and the organization of teenagers into primary schools. Furthermore, consideration of the findings from the perspective of the ecological model for health promotion, the results imply that four of the five levels were involved, and further discussion of this will be given below.

The mean Knowledge score improved after training, and changed little between the post-training assessment and the three-month follow-up. Knowledge does not, in itself, guarantee improvements in health behaviour, but provides a mechanism for change and is a component at the intrapersonal level of health promotion.

Self-report of Behaviour improved after training, and was again maintained at the follow-up three months later. Behaviour was assessed in terms of both personal and interpersonal levels, and this finding is particularly pleasing, pointing as it does to the primary outcome of the training. Of course, the measure is only self-reported, and may therefore be contaminated by social desirability bias.

Mean attitude score did not change significantly after training. The scale used to assess attitude was based on only three items which were not very discriminatory between participants. Virtually all participants indicated that they had positive attitudes prior to training, so there was little opportunity for change in this scale. The questions, which were designed for younger children, might be revised for a teenaged group which may be expected to have absorbed some ideas about attitude to noise and hearing loss from their schooling.

Perceived supports to good hearing-health behaviour increased after training and was maintained three months later. The use of Supports as a proxy for behaviour is based on the idea that people perceive their hearing-health behaviour to be driven by conflicting barriers and supports (Reddy et al, 2012); by increasing supports and reducing barriers at different levels of the ecological model, the behaviour should follow (Reddy, 2014). After training, certain Supports: 'You want to protect your hearing', 'Your friends remind you to wear them', 'You are following the rules', and 'You have received training to wear them' increased most. The large change towards wanting to protect hearing appears to support the idea that the Attitudes measure was not effective for this age group. The two supports related to receiving training and friends reminding you may reflect the strength of conducting training in a group of peers. It was surprising that 'following the rules' increased to such a large extent, since there were no enforced rules around the programme, but it may reflect the rule-dominated environment in which school-children exist and the sense that 'rules' may be interpreted to refer to the 'right' way to behave.

The Barriers score (total barriers endorsed) did not decrease significantly. One explanation is that, while the intervention included guidelines on when to protect hearing, it did not address the other barriers such as discomfort, lack of communication, friends not wearing hearing protection, etc. (see Table 1). This was borne out by secondary analysis which showed that the main decrease in Barriers after training was for 'You are not clear about

when you should wear them'. Other barriers actually increased slightly post-training, possibly because participants who had not previously used hearing protection equipment could now appreciate its negative aspects. It may be that training should focus on ways to overcome these barriers such as communication strategies and using different styles of equipment which allows users to find those which are comfortable for them.

The ecological model describes influences on health behaviour on five levels (intrapersonal, interpersonal, organizational, community, and policy), and our qualitative findings suggested that, from the perspective of the participants, the intervention was perceived on four of these. Intrapersonally, participants reported learning and understanding the material. They reported positive interpersonal interactions with the younger children, but mixed interactions with their peer educators, an unexpectedly negative finding. On the other hand, they also reported positive interpersonal interactions in the area of noise and hearing protection with families and friends. At an organizational level, the participants mostly perceived what happened when schools were not organized well to receive them, or when there were long delays between training and going out to primary schools, though of course the organizational support for the programme was present but did not provoke comment when it worked well. Organization is difficult, given the conflicting requirements of the schooling system and the need for high-quality health promotion; this finding supports the need to provide strong infrastructure to a programme such as this. At the community level, it is clear that there are still many challenges to attempts like this to promote good hearing health, and the participants' comments about hiding earplugs and their disinclination to wear them in public testify to this. In all, the qualitative findings provided evidence that the programme was working well, but also that there is room for improvement.

The qualitative findings were also useful from the perspective of programme design and evaluation. Programme evaluation helps determine if the stated goals and objectives are accomplished and provides a basis to improve programme design (Simons-Morton et al, 2012). The findings of this study provide useful feedback for improvements in content and delivery which could further strengthen the programme.

Issues with the convenience sample used must be acknowledged. Statistical power was not an issue given that one would seek reasonably large effect sizes for a programme like this to be regarded as successful, and effects were detected. On the other hand, it cannot be said that the sample was truly representative of New Zealand secondary school pupils. All were from two urban schools of moderate socioeconomic status, had volunteered to take part in the programme, and most were girls. Nonetheless, there is no strong reason to suppose that findings like these would not occur in other groups of volunteer teenaged school pupils. In support of this, the pattern of our participants' noise exposure (Figure 1) was similar to that of a larger group of American teenagers (Griest et al, 2007).

There were other limitations. The study design relied upon self-report from a single group trained and followed-up over three months. A control group would have allowed us to exclude the possibility that the group improved for some reason other than the programme. A longer follow-up term would inform us of the effectiveness of the training over a longer period. Behaviour was assessed using self-report pre-training and at follow-up, and self-report of intended behaviour at the post-training assessment. These measures may well be confounded by desirability bias. On the other

hand, our other four measures of knowledge, attitudes, supports, and barriers while more likely to be accurate must be acknowledged to have unknown relationships to actual hearing-health behaviour.

Effect sizes may be improved by improvement of training approaches and/or by improving the measurement instruments. The lack of effect for attitude change may be improved by developing an attitudes scale which is more discriminative for a teenaged group, but also by improving the level of focus on attitude change in the training. On the other hand, the lack of effect in the Barriers to good hearing-protection behaviour appears to depend on issues which would be harder to address. The features of hearing protection equipment which lead to barriers such as discomfort or forgetting your earplugs are intrinsic, so reducing them is difficult. Training may be improved by considering strategies to mitigate this type of barrier: for example, showing participants a wider range of equipment to address comfort issues, or making a point of training people to take earplugs wherever you go to reduce the likelihood of forgetting them.

The viability of the programme is important to establish. At this stage, the organization is resource intensive and the Educator training requires a team of highly-trained professionals to deliver it, which presents difficulties in terms of the scale of the programme. Research into a more sustainable and up-scalable version of the programme is desirable. In conducting such research, a focus on retaining quality and effect strength and sustainability is crucial.

This study has shown that involvement in the delivery of a hearing-health promotion programme benefitted a group of teenaged school-children. There were clear effects supporting the hypothesis that being involved in training younger children about hearing-health produced benefits for teenagers' hearing-health. Positive changes in outcome measures after training were preserved over three months, and this was likely due to the effect of conducting the training boosting the messages in the minds of the participants, a feature which previous research in this area has shown to be important (Martin et al, 2013). Findings were interpreted according to the ecological model for health promotion, and were of practical use in terms of development of the intervention programme. Future research into developing the programme to be better targeted to teenaged educators may further improve its effectiveness.

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