

A survey investigation of the effects of music listening on chronic pain

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ABSTRACT Research interest into alternatives to analgesic medication has grown substantially during the past two decades. Moreover, a number of studies have provided empirical evidence that music listening, and in particular listening to our own preferred music, may provide an emotionally engaging distraction capable of reducing both the sensation of pain itself and the accompanying negative affective experience. The current study is a survey of 318 chronic pain sufferers, which aimed to (i) give a detailed description of the music listening behaviour of this group and relate this to experience of pain and quality of life, and (ii) indicate the numbers who consider music listening to be part of their pain management and investigate their perceptions of the benefits.

Results indicated distraction and relaxation to be the most frequently perceived benefits of music reported by participants. Both frequent music listening and a perception of music as personally important were further found to relate to higher quality of life. Also, personal importance of music was significantly related to listening to help pain. These findings suggest beneficial effects of music listening to long-term pain.

KEYWORDS: *chronic pain, distraction, gender, musical preference, quality of life*

Introduction

Research interest into alternatives to analgesic medication has grown substantially during the past two decades, with increasing studies from psychological, medical and music therapy perspectives suggesting music listening to be a non-invasive technique capable of affecting the sensation of pain itself and the emotional consequences of the experience (Mitchell,

sempré :

2002). 'Audioanalgesia' therefore may be particularly useful both in conjunction with normal treatment and in situations where medication is less effective, not desired or not allowed sufficient time to take effect (Whipple and Glynn, 1992). From the perspective of health professionals, further benefits of music listening as a therapeutic technique are the universal cross-cultural appeal (McCaffery, 1992), easy availability and minimum inconvenience (Zimmerman et al., 1989), low cost (Miakowski, 1996) and safety and lack of side effects (McCaffery, 1992).

The theoretical basis for the efficacy of music in pain relief reported in much of the recent work relates primarily to the gate control theory of pain (Melzack and Wall, 1965), the first multidimensional model to highlight the possibility of pain modulation by cognitive and emotional processes. This model, therefore, allowed the evolution of a wider range of pain management techniques, many of which centre on the two mechanisms of distraction of attention and perceived control. In line with 'limited capacity' models of attention (Shiffrin, 1988) which suggest our attentional resources to be finite, it is proposed that a distracting outside task will reduce resources able to be allocated to pain (McCaul and Malott, 1984). In particular, recent research has focused on emotionally engaging stimuli to capture attention most strongly, decreasing the adversity of the painful stimulation and promoting relaxation (Leventhal, 1992; Robinson, 1998).

Music is therefore proposed as an everyday stimulus which is particularly effective in capturing and holding attention and engaging our emotions (MacDonald et al., 2003). As the focus of much early research into musical emotions, a substantial knowledge now exists of the specific musical structures which engage our attention and elicit emotion (Carlton and MacDonald, 2004; Krumhansl, 1997). Such theories of engagement recognized that patterns of sounds and movement in a piece lead to a build up of tension and suspense when our expectations of how it will proceed are interrupted (Meyer, 1956), with an emotional release then felt upon resolution. More recent work such as that of Sloboda (1991) has attempted to identify the specific structures used during the most intensely emotional moments of a piece, naming these 'intrinsic' sources of emotion – those from within the musical patterns themselves.

These structural features alone, however, cannot be seen as producing a full emotional reaction, the response to them therefore being referred to as 'proto-emotion' by Sloboda and Juslin (2001). Recognition within psychology of music of the cultural and personal significance of music to the listener as equally important has, however, brought a clearer understanding of how full emotions may be elicited through music (Panksepp and Bernatzky, 2002). That people can experience very different emotional reactions to the same music or even changed reactions between listenings can only be explained by external factors giving emotional meaning to the music (MacDonald and Miell, 2000). Two further 'extrinsic' sources therefore make

an important contribution: the 'iconic' resemblance of music to emotional tones, particularly in speech; and the 'associative' context we are reminded of when listening, that is, our personal memories and meanings connected with the music (Sloboda and Juslin, 2001).

This wider perspective has led to increased awareness in particular of how we use music deliberately to bring about desired emotional change (Hargreaves et al., 2002; Sloboda and O'Neill, 2001). Some everyday goals of music for emotional self-regulation found in a study by deNora (1999) were 'calming down', 'getting in the mood' for an activity and 'getting out of a bad mood', with participants appearing fully aware of which music they 'needed' in different situations. Music may then be unique in the way we use it as 'self-administered emotional therapy' (Sloboda, 2003: 42).

The second potential mechanism in the efficacy of music listening for pain relief is our 'perceived control' over the experience, the belief in the ability to respond in a way which will decrease the aversiveness of the event (Skevington, 1995). Research findings now link perception of control to wide-ranging aspects of adjustment and quality of life in chronic pain patients such as lower level of disability and disruption of activity (Haythornthwaite et al., 1998) and decreased mood disturbance (Pellino and Oberst, 1992). Having an intervention such as music listening that can be used at any time to distract from pain and relieve anxiety, therefore, may alter the meaning of the sensation and promote a sense of independence and coping ability (Brown et al., 1989). This may be particularly useful within the unfamiliar hospital environment (Magill-Levreault, 1993) and has been likened in effect to patient-controlled analgesia (Beck, 1991).

Despite the recent growth in the number of clinical research studies investigating audioanalgesia, however, results to date appear to be mixed. The majority of such studies have presented music chosen in advance by researchers for its presumed pain relieving and relaxing qualities, known as 'anxiolytic music' (MacDonald et al., 2003). Nilsson et al. (2003), for example, found instrumental music played to hernia and varicose vein patients undergoing surgery to correspond with lower pain intensity, but with no related effects on nausea, fatigue and anxiety. Cadigan et al. (2001) further found 30 minutes of relaxing music to reduce blood pressure, respiration rate and psychological distress, but with no corresponding reduction in pain perception.

As discussed, however, our level of involvement with a piece of music is dependent upon complex interaction between many personal, social and cultural issues. Many of these factors, including familiarity, past associations and personal meanings will be absent in music chosen by others (Thaut and Davis, 1993). In a small number of studies, therefore, participants have been asked to listen to their own preferred music, suggested to enhance involvement and emotional engagement with the stimulus (MacDonald et al., 2003). Koch et al. (1998), firstly, found use of patient-controlled analgesia

and sedatives during urologic procedures to be reduced when accompanied by preferred music listening. MacDonald et al. (2003) then found foot surgery patients to feel significantly less anxiety when listening to preferred music but with no corresponding effect on pain intensity ratings. Hysterectomy patients, despite having undergone a more complex medical procedure often involving more severe and lasting pain, reported no differences in anxiety or pain. It was suggested that a social bond arose from the similarity within this group of patients, which may have provided sufficient emotional support to override the need for solitary music listening.

However, recent reviews of the audioanalgesia literature (Good, 1996; Mitchell and MacDonald, in press) have revealed methodological flaws, incomplete reporting of theory and methods and a lack of objective measurement, decreasing confidence in many of the findings. The literature as a whole remains fragmented, with studies covering a broad spectrum of clinical conditions that appear to be of an opportunistic nature rather than building up to form a comprehensive picture. The role of individual differences such as gender in potential efficacy of the intervention, despite being a major focus of pain research during the past decade, has further been largely unacknowledged in previous research. The current work therefore began with controlled experimental trials using standardized methodology and measurement in order to provide a firm basis for clinical application in future. In particular, laboratory-induced cold pressor pain was used as a method suggested to mimic effectively the effects of chronic conditions (Edens and Gil, 1995).

In the first study (Mitchell and MacDonald, in press) participants' preferred choice of music from their own collection was compared to a white noise control and to a pre-selected anxiolytic piece previously rated as 'most relaxing' in a pilot study. When listening to their preferred music, both male and female participants tolerated the painful stimulation for significantly longer and reported feeling significantly more perceived control over the pain than in both white noise and anxiolytic music conditions. Interestingly, anxiolytic music did not significantly increase tolerance when compared to control. It was only in female participants, however, that ratings of pain intensity were found to be significantly lower in the preferred music condition than both other conditions.

A second study (Mitchell et al., 2006) then compared preferred music to distracting stimuli found effective in the previous work: mental arithmetic as a cognitive distraction, and a humorous audiotape as an emotionally engaging distraction. This study found preferred music listening in both males and females to result in significantly increased tolerance of the painful stimulation than the mental arithmetic task, and significantly greater perceived control rating than humour. Ratings of pain intensity did not significantly differ between conditions. Therefore, listening to a favourite choice of music appeared the most effective strategy in combining distraction with enhanced perceived control.

The positive effects of preferred music listening on tolerance, perceived intensity of pain and perception of control over the experience reported in the two current experimental studies bring into question whether these effects would be present in pain of long-term duration; for example, if the distracting effect of music would still be perceived as a useful intervention in pain that is constant. As short-term experimental pain in healthy participants is unable to mimic the complexity of the experience of chronic pain (Standley, 1991), a study of the perceptions of pain sufferers would furthermore give an indication of possible wider-ranging effects of music which should form part of future research.

Perceptions of the usefulness of music listening as a treatment for pain have only been included in two previous studies: first in a questionnaire administered to hospitalized cancer patients by Fritz (1988), who found music to be suggested as an effective non-invasive method of pain relief; and second in a survey of music therapists by Michel and Chesky (1995). This survey found that 41 percent of therapists used music specifically for pain relief in their practice, most often combining anxiolytic music with the patient's preferred music within the programme. As alternative interventions for pain relief are, however, usually self-initiated rather than suggested by health professionals (Ferrell and Schneider, 1988), an investigation of music listening patterns and perception of music as a useful aid for relief of the chronic pain experience appears necessary.

Previous survey investigation of music listening and its perceived benefits has mostly centred around adolescents (Gantz et al., 1978; North and Hargreaves, 1999; North et al., 2000). The findings by North et al. (2000) that one of the main factors in music listening is 'to fulfil emotional needs', incorporating 'stress/tension release' and 'to get through difficult times', are of interest when considering possible benefits to pain patients. This highlights the fact that investigation of the effects of music listening on the pain experience must incorporate not only the pain sensation itself but also the possible wide-ranging effects on a pain sufferer's quality of life. Quality of life in relation to health, encompassing physical, psychological, social and spiritual wellbeing, is a relationship which has only recently been explored in pain research and remains an area of debate (Ferrell, 1995). As it conveys the multidimensional effects chronic pain can have, however, it is recognized as an essential inclusion in pain assessment (Becker et al., 1997).

The survey reported in this article, therefore, develops the findings of the two previous experimental studies in a clinical context, aiming specifically to (i) reveal the music listening patterns of chronic pain sufferers and relate these to experience of pain and quality of life, and (ii) give an indication of the number of sufferers using music listening as part of their pain management and investigate their perceptions of the effects of the intervention.

Method

PARTICIPANTS

The questionnaire was mailed to 850 patients who had registered within the previous year with a Glasgow hospital pain clinic, a multidisciplinary clinic specializing in treatment and management of chronic pain. A total of 318 completed questionnaires were returned, a response rate of 37.4 percent. All responses were anonymous.

QUESTIONNAIRE DESIGN

The questionnaire was structured into four sections:

- (i) *Demographics*: Ascertained age, gender, marital status and educational attainment of respondents.
- (ii) *Pain Rating Index of the McGill Pain Questionnaire* (Melzack, 1975): A widely used standardized scale. Ratings take the form of a total score and two main subscale scores measuring 'sensory' (10 questions) and 'affective' (5 questions) pain experience specifically.
- (iii) *Short-Form World Health Organisation Quality of Life Scale* (WHOQOL-BREF, UK version) (WHOQOL Group, 1998): Provided a profile of 26 areas of respondents' quality of life. The 'pain and discomfort' facet of the WHOQOL has been shown to have high reliability (Skevington, 1998) and is particularly suitable for use with chronic pain sufferers due to its good association with the affective pain subscale of the MPQ (Skevington, 1995).
- (iv) *Music listening questionnaire*: The fourth section of the questionnaire was developed firstly to assess music listening patterns. Questions on frequency of music listening, perceived reasons for listening to music, ability to play an instrument and personal importance of music were included.

Questions on listening frequency, 'How often do you listen to music?' and 'On average, how many hours per day do you spend listening to music?' are taken from the questionnaire used in an adolescent music listening survey by North et al. (2000). Respondents were then asked to give an agreement rating between 0–10 for 13 reasons why they listen to music. Categories of 'to enjoy the music', 'to be creative/use my imagination', 'to relieve boredom', 'to help me get through difficult times', 'to express my feelings/emotions' and 'to reduce loneliness' are also taken from North et al. (2000). 'To get me in a mood I want to be in', 'to set the mood when I'm with others' and 'helps me perform activities I would normally find boring' are taken from Gantz et al. (1978). Further pain-related categories of 'helps me perform activities I would normally find difficult' and 'to help with my physical pain' were added.

The final questions in the music listening section of the survey then

allowed respondents to comment freely on whether they feel that music has helped in coping with any other aspect of illness and whether pain has ever stopped their ability to play a musical instrument.

PROCEDURE

Ethical permission for the survey was granted by West Glasgow Hospitals NHS Trust Ethics Committee. A list of names and addresses were then supplied from the Pain Clinic Database. A total of 850 questionnaires were posted over a period of one month with stamped addressed envelopes for return and a letter of explanation attached. All completed questionnaires were returned within four months.

Results

Due to the substantial size of the full survey results, this section will highlight the main findings on music listening behaviour, quality of life and the perceptions of the respondents of how music helps pain and illness.

DEMOGRAPHICS

Respondents were 198 females (62.3%) and 114 males (35.8%). A further six respondents did not specify their gender. The mean age of the respondents was 53.9 years ($SD = 14.9$), with a range of 24–90 years. The mean age of female respondents was 54.4 ($SD = 15.4$) with a range of 24–90 years, and the mean age of males was 53 years ($SD = 13.9$) with a range of 29–88 years.

The majority of respondents were married ($n = 180$, 56.6%) or single ($n = 38$, 11.9%); 175 (55%) were educated to secondary school level and 126 (39.6%) to college or university level.

PAIN INTENSITY LEVELS

PRI scores were calculated as total score (maximum 78), sensory subscale score (groups 1–10, maximum 42) and affective subscale score (groups 11–15, maximum 14). The mean total PRI score for all respondents was 27.1 ($SD = 15.1$). The mean sensory pain score was 15 ($SD = 8.8$) and the mean affective pain score was 3.7 ($SD = 3.5$).

Pearson Product-Moment Correlation tests found significant negative correlations between age and overall PRI score ($r = -.193$, $p < .001$, 2-tailed) and sensory pain subscale score ($r = -.269$, $p < .001$, 2-tailed). No significant correlation was found between age and affective pain score. The total and sensory ratings of pain were therefore greater in participants of a younger age.

A $2 \times 2 \times 6$ MANOVA with three dependent variables (sensory, affective and 'rest of' PRI scale, together adding up to total PRI score) was carried out on effect of gender, marital status and education level. A significant effect of gender on affective pain score was found ($F(1, 254) = 4.86$, $p < .05$).

QUALITY OF LIFE RATINGS

Each of the 26 individual questions on the WHOQOL scale was coded on a 5-point scale, making the maximum total quality of life score of 130. The mean WHOQOL score for all respondents was 75.7 (SD = 17.6). Scores ranged from 32 to 120.

A Pearson test found a negative correlation approaching significance level between age and WHOQOL score ($r = -.109$, $p < .06$, 2-tailed). A 2 x 6 x 2 MANOVA was carried out on the effect of gender, marital status and education level on quality of life score. A significant main effect was found for education level ($F(2, 274) = 5.46$, $p < .01$).

CORRELATION BETWEEN PAIN INTENSITY AND QUALITY OF LIFE

Pearson correlation tests found significant negative correlations between total PRI score and total WHOQOL score ($r = -.220$, $p < .001$, 1-tailed), sensory pain subscale score and total WHOQOL score ($r = -.112$, $p < .05$, 1-tailed), and affective pain subscale score and total WHOQOL score ($r = -.304$, $p < .001$, 1-tailed). Lower overall pain rating and affective pain rating in particular were therefore found to be related to greater quality of life.

FREQUENCY OF MUSIC LISTENING

This was answered in two ways by respondents: on a five category rating scale and as an estimate of number of hours spent per day.

TABLE 1 *Frequency of music listening by category (%)*

	All respondents frequency	Females frequency	Males frequency
Not very often	16.0 ($n=51$)	16.7 ($n=33$)	15.8 ($n=18$)
Some days	24.5 ($n=78$)	22.7 ($n=45$)	26.3 ($n=30$)
Most days	31.4 ($n=100$)	32.8 ($n=65$)	28.9 ($n=33$)
Once a day	11.0 ($n=35$)	10.6 ($n=21$)	12.3 ($n=14$)
Often as possible	16.0 ($n=51$)	16.2 ($n=32$)	15.8 ($n=18$)
No response	0.9 ($n=3$)	1.0 ($n=2$)	0.9 ($n=1$)

The greatest percentage of female (32.8%) and male (28.9%) respondents can be seen in Table 1 to listen to music 'most days'. More than a quarter (27%) of further respondents listen to music once a day or more.

The number of hours spent listening to music per day ranged between 0–21 hours. In order to obtain a normal distribution of scores, the data of the five participants reporting 11 or more hours listening per day were omitted from further analysis involving the 'hours spent listening' variable. The mean number of hours spent listening each day to music was then 2.5 (SD = 2.2) with a range of 0–10 hours. No significant differences were found between the genders, however a Pearson correlation found a significant

positive correlation between age and hours spent listening to music, ($r = .173$, $p < .01$, 2-tailed). As age of respondents increases, therefore, more time is spent listening to music.

IMPORTANCE OF MUSIC

Respondents rated the importance of music in their lives and their perception of how important music is to them compared to the average person on four category scales.

TABLE 2 Importance of music and importance compared to average person (%)

Importance	Frequency	Importance compared to average	
			Frequency
Not at all	11.9 (n=38)	Less	30.5 (n=97)
A little	31.8 (n=101)	Same as	44.7 (n=142)
Quite	37.1 (n=118)	Little more	16.0 (n=51)
Very	16.7 (n=53)	Much more	4.4 (n=14)
No response	2.5 (n=8)	No response	4.4 (n=14)

Table 2 shows that most respondents ($n = 118$, 37.1%) rated music as 'quite important' in their lives and of the same level of importance as the average person ($n = 142$, 44.7%).

REASONS FOR LISTENING TO MUSIC:

Ratings between 0–10 were given by respondents for each of the 13 reasons suggested for listening to music. Mean ratings are shown in Table 3 (SDs in brackets).

TABLE 3 Reasons for listening to music (SDs)

	All respondents Mean	Females Mean	Males Mean
To enjoy music	8.3 (2.1)	8.5 (2.1)	8.2 (2.2)
Be creative	4.0 (3.2)	4.2 (3.3)	3.6 (3.1)
Relieve boredom	5.9 (3.2)	5.9 (3.3)	5.9 (3.1)
Difficult times	5.4 (3.6)	5.8 (3.6)	4.7 (3.5)
Relieve tension	6.4 (3.3)	6.7 (3.2)	6.1 (3.4)
Express emotions	5.0 (3.5)	5.4 (3.4)	4.3 (3.4)
Reduce loneliness	4.3 (3.6)	4.4 (3.8)	4.1 (3.3)
Mood change	5.0 (3.5)	5.3 (3.5)	4.6 (3.4)
Help boring activities	5.2 (3.4)	5.8 (3.3)	4.4 (3.3)
Help physical activities	3.7 (3.4)	4.3 (3.6)	2.7 (2.9)
Mood in company	4.9 (3.3)	5.1 (3.4)	4.7 (3.3)
Feel relaxed	6.8 (3)	6.8 (3.1)	6.7 (2.9)
Help with pain	4.0 (3.8)	4.4 (3.9)	3.3 (3.6)

Among all the respondents, 'to enjoy the music' was most highly rated as the reason for music listening, with a mean of 8.3 out of 10, followed by 'to make me feel more relaxed' and 'to relieve tension and stress'.

One-way ANOVAs between the genders found females to rate music 'helping with activities I would normally find physically difficult' significantly higher than males ($F(1, 258) = 15.21, p < .001$). Females also rated significantly higher on 'to express my feelings and emotions' ($F(1, 256) = 6.23, p < .05$), 'to help with activities I would normally find boring' ($F(1, 260) = 10.58, p < .01$) and 'helping through difficult times' ($F(1, 257) = 5.95, p < .05$). 'To help my physical pain' was lastly rated significantly higher in females ($F(1, 265) = 4.98, p < .05$).

A Spearman's Rank Order correlation found a significant positive correlation between importance of music to a respondent and their rating of using it to help with pain ($r = .299, p < .001$, 2-tailed), and between personal importance of music compared to average and rating of using it to help pain ($r = .235, p < .001$, 2-tailed).

FREQUENCY OF MUSIC LISTENING AND QUALITY OF LIFE

A Pearson correlation found a significant positive correlation between total score on the WHOQOL scale and frequency of music listening ($r = .262, p < .001$, 2-tailed).

A series of Spearman's Rank Order Correlations investigated frequency of music listening and the individual aspects of quality of life measured by the WHOQOL. Frequency of music listening was firstly significantly positively correlated with respondents' own 5-point rating of their quality of life ($r = .225, p < .001$, 2-tailed) and with having no or less need for medical treatment ($r = .118, p < .05$, 2-tailed). It was then found to be significantly positively correlated with enjoyment of life ($r = .249, p < .001$, 2-tailed), finding life meaningful ($r = .209, p < .001$, 2-tailed) and having more energy ($r = .156, p < .01$, 2-tailed). Significant positive correlations were lastly found between frequency of listening and feeling able to perform activities ($r = .164, p < .01$, 2-tailed) and never or seldom feeling depressed ($r = .183, p < .001$, 2-tailed).

PERSONAL IMPORTANCE OF MUSIC AND QUALITY OF LIFE

A significant positive correlation was found by Pearson correlation test between total score on the WHOQOL scale and personal importance of music ($r = .242, p < .001$, 2-tailed). Importance of music compared to average was also found to positively correlate with overall quality of life ($r = .112, p < .05$, 2-tailed).

A series of Spearman's Rank Order correlations then found importance of music in a respondent's life to be significantly positively correlated with their 5-point rating of quality of life ($r = .227, p < .001$, 2-tailed), and the need for no or less medical treatment ($r = .143, p < .05$, 2-tailed). Importance of

music again significantly positively correlated with enjoyment of life ($r = .256, p < .001$, 2-tailed), finding life meaningful ($r = .182, p < .01$, 2-tailed) and having more energy ($r = .152, p < .01$, 2-tailed). Significant positive correlations were then found with satisfaction with sleep ($r = .164, p < .01$, 2-tailed), ability to perform activities ($r = .127, p < .05$, 2-tailed) and never or seldom feeling depressed ($r = .120, p < .05$, 2-tailed).

Level of importance of music compared to the average person was further significantly positively correlated with respondents' own 5-point rating of their quality of life ($r = .187, p < .001$, 2-tailed), enjoyment of life ($r = .171, p < .01$, 2-tailed), satisfaction with sleep ($r = .139, p < .05$, 2-tailed) and ability to perform activities ($r = .127, p < .05$, 2-tailed).

OPEN RESPONSE SECTION

How music helps pain

Eighty-five respondents (56 female, 26 male, 3 unspecified gender) chose to comment on how music has helped their pain. These respondents had a mean age of 53.2 and were mostly educated to university level (62.7%). The total, sensory and affective PRI scores of these respondents did not significantly differ from those who did not complete this question.

The focus of each response was coded into one of 10 categories. Table 4 gives examples of each category and shows the frequencies of these responses.

TABLE 4 *How music helps pain – categories and frequencies of responses (%)*

Category	Example	Frequency All	Frequency Female	Frequency Male
Relaxation	'Nature sounds/songs/music are soothing to me, enabling me to relax. Listening to music enables me to chill out/ calm down, and it helps me every time.'	45.9 (n=39)	50.0 (n=28)	34.6 (n=9)
Distraction	'When listening to classical music, particularly a piece I know well, I can get so mentally involved in the music that I can be oblivious of everything, including my pain.'	47.1 (n=40)	41.1 (n=23)	65.4 (n=17)
Sleep	'I put on a tape when I have to lie down due to my illness and this puts me to sleep, this can be for five or six hours, depends on how ill I am.'	5.9 (n=5)	7.1 (n=4)	3.8 (n=1)

Continued

TABLE 4 *continued*

Category	Example	Frequency All	Frequency Female	Frequency Male
Coping	'I listen to a lot of music which involves meditation, which helps me to cope.'	3.5 (n=3)	5.4 (n=3)	0 (n=0)
Mood	'I find certain types of music can completely change your present mood should you need cheering up.'	11.8 (n=10)	4 (n=8)	3.8 (n=1)
Stress/tension reduction	'Music helps decrease the feeling of anxiety often accompanying severe pain.'	4.7 (n=4)	1.5 (n=3)	3.8 (n=1)
Breathing	'Helps with breathing, focus.'	1.2 (n=1)	0.5 (n=1)	0 (n=0)
Pleasant memories	'Favourite music reminds me of happy times and friends.'	4.7 (n=4)	7.1 (n=4)	0 (n=0)
Exercise	'Pop music helps with vigorous exercise.'	7.1 (n=6)	3 (n=6)	0 (n=0)
Concentration	'Soft meditation type music helps me focus on tasks and things I want to do.'	2.4 (n=2)	0.5 (n=1)	0 (n=0)

Among female respondents, relaxation was found to be the most frequent (50%) benefit stated of music listening in relation to pain, followed by distraction, discussed by 41.1 percent. In males, however, distraction was the focus of 65.4 percent of responses and relaxation 34.6 percent.

Type of music

Forty-five participants chose to describe the music they find useful. The types named are shown below in Table 5.

TABLE 5 *Types of music named*

Classical	12
Pop	11
Relaxation	6
Rock	4
Country	4
Easy listening	3
Big Band	2
Scottish	1
Folk	1
Dance	1

Out of the 45 respondents, 13 named specific artists they find most beneficial, e.g.

I tend to listen to three particular artists during the night when I can't sleep – Peter Gabriel, Kate Bush and Sophie B. Hawkins.
If after work I'm feeling tired or a wee bit stressed, I put on a CD low and sit and listen and it helps me calm down therefore the pain doesn't get any worse – nearly every night, mostly Ronan or Westlife – not too noisy, good to listen to.

Two respondents further described music that for them must be avoided:

I find that the RIGHT kind of music helps me. Rock/rap/silly pop is unhelpful to listen to.
Music is 'popular' but has to avoid songs which include a heavy thump-thump beat.

Two respondents suggested that for them the specific type varies according to needs:

Type of music listened to varies with the way I feel at the time.

and one suggested lyrics alone are useful:

When my pain is very bad I try and remember the words of songs I don't know very well, so most times it helps take my mind off the pain quite a bit.

One respondent suggested effective music for her was a style she had not previously considered:

I discovered recently the opera singer Andrea Bocelli, transformed relaxation time/pain relief considerably, for surprising choice of music I would never have considered before. Complete contrast to other taste in music but seems to help me forget painful symptoms.

How music helps illness

Fifty-seven of these respondents (41 female, 14 male, 2 unspecified gender) also chose to comment on how music has helped other aspects of their illness. The focus of each response was again coded into one of 10 categories, shown in Table 6.

In considering benefits of music to other aspects of illness, distraction and relaxation were again seen as the greatest advantages, followed by positive effects on depression and mood. Relief of depression was seen as a benefit among a greater percentage of males (28.6%) than females (12.2%), whereas alleviating loneliness was discussed by 12.5 percent of female but no male respondents.

TABLE 6 *How music helps illness – categories and frequencies of responses*

Category	Example	Frequency All	Frequency Female	Frequency Male
Relaxation	'Music helps to relax me and I listen every night in bed to music to help me fall asleep.'	19.3 (n=11)	22.0 (n=9)	14.3 (n=2)
Distraction	'When I was in hospital it takes your mind off the other aspects of having illness.'	22.8 (n=13)	17.1 (n=7)	28.6 (n=4)
Depression	'My friend died a few months ago and to listen to a certain tape helps me cope with it. This helps me with depression.'	15.8 (n=9)	12.2 (n=5)	28.6 (n=4)
Coping	'I only know music helps me cope with everyday life.'	10.5 (n=6)	2.0 (n=4)	14.3 (n=2)
Mood	'Can lift my spirits especially if I sing along!'	19.3 (n=11)	3.5 (n=7)	21.4 (n=3)
Loneliness	'I play music to feel less lonely as I don't get out much.'	8.8 (n=5)	12.2 (n=5)	0 (n=0)
Anxiety	'Relaxation tape with classical music has helped with anxiety.'	7 (n=4)	7.3 (n=3)	7.1 (n=1)
Thankfulness	'It makes me realize how lucky I am to be able to hear and enjoy it.'	8.8 (n=5)	9.8 (n=4)	7.1 (n=1)
Animation/ activity	'Helps me to be animated – even stretching/moving to music helps.'	1.8 (n=1)	2.4 (n=1)	0 (n=0)
Boredom	'Helps pass the time and relieve boredom.'	5.4 (n=3)	2.5 (n=1)	14.3 (n=2)

Effect of pain on playing a musical instrument

Twenty-three respondents chose to comment on the effect pain has had on their ability to play an instrument.

A majority of 17 respondents reported problems due to the position required to play or hold the instrument:

When sitting on a piano stool which has no back my back pain becomes very painful.

I have osteoarthritis which causes pain in my hands when playing, also in my hips and legs when playing the organ pedals.

Two further respondents reported the problem as pain 'spoiling my concentration' and 'taking away my inclination to play'.

One respondent reported that the pain was not made better or worse by playing the piano, and one was still able to play as the cello is played whilst sitting. Only two respondents reported finding playing an instrument beneficial:

Playing instruments helps to take my mind off pain and relax.

I play the chanter every day to learn a new tune, and if I do that I feel I have achieved something. It does I suppose take the pain away as you are concentrating on something else.

Discussion

The current survey under investigation gives a detailed picture of the music listening patterns and preferences of a sample of long-term pain sufferers. Perceptions of the beneficial effects music has on everyday life with chronic pain give an insight into the possible usefulness of the method in longer-term pain, whilst considering the interactions with the intensity and nature of the pain and various aspects of quality of life.

The 318 respondents to the survey encompassed a range of ages from 24–90 years and various levels of education. Due to the greater prevalence of many clinical pain conditions among females (Berkley, 1997; Unruh, 1996), the greater number of responses from females was to be expected. The survey firstly examined the intensity of the respondents' pain, finding that within this sample, age was negatively correlated with overall pain rating and rating of sensory pain. That younger respondents report greater levels of pain is in line with the findings of a previous survey by Bassols et al. (2002); however, contrary to previous findings of greater severity of pain reported by females (Unruh, 1996), the ratings given on the PRI by male and female respondents were not found to significantly differ. Only rating of affective pain significantly differed, with females using more emotion-based descriptors of the experience.

The next section of the survey, examining quality of life, found considerable variation among respondents. Despite younger respondents having earlier reported being in higher levels of pain, a negative correlation approaching statistical significance was found between age and quality of life. No corresponding difference was found between the genders, however, and quality of life was found to be significantly higher among university-educated respondents. In examining the relationship between pain level and quality of life, it was found that higher level of pain on the total PRI and both the sensory and affective subscales correlated with lower overall quality of life score. This was to be expected, as previous studies have suggested severe chronic pain patients to have among the lowest health-related quality of life scores of all medical conditions, due to the multidimensional nature of the problem (Romano and Turner, 1985).

Investigation of the music listening behaviour of this population began with listening frequency, finding that frequency of music listening and

number of hours spent listening per day were both high, with three quarters of respondents listening 'most days' or more often and for an average of 2.5 hours. Males and older respondents were found to spend more time listening. Overall, most respondents rated music listening as 'quite' important in their lives, with a greater percentage of females rating 'very important' despite males spending more hours listening during the day. When comparing themselves to others, however, almost half of the respondents believed music to be of an average level of personal importance to them, and a further third 'less so'.

When asked the reasons why they listen to music, 'to enjoy it' was, as might be expected, given the highest mean rating by respondents. Some gender differences were observed, however, with females rating the reasons of helping with difficult times, expressing feelings and emotions, helping with boring or physically difficult activity and helping pain significantly higher. High mean ratings were given by both genders for relieving tension and feeling relaxed. When comparing these ratings to those given by adolescents for pop music listening in the study by North et al. (2000), it can be seen that ratings for 'to enjoy the music', 'to be creative', 'to express emotions' and 'to reduce loneliness' were similar among the two groups. As might be expected, however, pain patients rated the reason of 'relieving tension and stress' more highly.

Interestingly, personal importance of music and level of importance compared to the average were both positively correlated with rating of listening 'to help pain'. Listening to music specifically for the purpose of relieving pain, therefore, may be more likely among those to whom music is of greater personal importance. In a previous survey by Fritz (1988), hospital patients were also found to self-initiate the use of music for therapeutic purposes. However, the current results suggest that in particular it may be those who perceive music as very important to them who will initiate use and find it effective.

Also of particular interest was the finding that music listening appears to be related to quality of life among pain sufferers. Higher frequency of listening and personal importance of music were both firstly found to relate to a higher overall quality of life rating. The individual aspects of the WHOQOL scale then revealed that respondents who listen frequently to music and perceive it as important rate themselves as having a higher quality of life and less need for medical treatment. They were also found to enjoy life more, find it more meaningful, have more energy, be able to perform daily activities more easily and feel depressed less often.

In the last section where respondents were given the opportunity to give an open response regarding any perceived benefits of music listening to their pain or general illness, distraction and relaxation were named most often as benefits of music listening. This is of particular interest due to the previous proposal that distraction may only be effective for short time periods, and

therefore not of benefit in chronic pain (McCaul and Haugtvedt, 1982). As little research has been carried out into the ability of music to distract from chronic, lasting pain, the current investigation is therefore the first to suggest distraction through music listening can be of benefit in the longer term, an aspect which now requires more detailed clinical study with comparison made of effectiveness for different levels of pain intensity.

The types of music specified by 45 of these respondents were from a broad spectrum of styles, ranging from classical and pop as the most frequently named to specific styles such as big band, easy listening and Scottish music. Detailed description of particular artists was also given by 13 of the respondents. This is of particular interest within the context of preferred music listening for pain relief, as it appears some consideration has gone into selecting the music in accordance with their needs. Two respondents, in line with deNora's (1999) work, specifically stated that their selections change in relation to what they perceive their needs to be at the time. Furthermore, references to engagement relating to the memories associated with the music, i.e. 'it is a distraction as a song can take you back to a certain time or memory', reinforce the proposal that associative factors outside the music itself play a crucial role in its therapeutic efficacy. That remembering lyrics alone is a useful intervention is also of interest as the effects of lyrical/non-lyrical music has been largely unacknowledged in previous research.

Comments on perceived benefits of music listening to illness in general again named distraction most often in relation to hospital atmosphere and general ill feeling. Benefits of emotional engagement to music for longer-term pain were then highlighted which would not have become apparent in the short-term induced pain of the experimental studies, such as uplifting of mood, coping with depression, anxiety and boredom and provoking of feelings of thankfulness. Although outside the focus of the current work, these aspects require further future investigation as possible benefits of music listening for chronic pain patients.

Respondents were lastly able to comment on any effects pain has had on their ability to play a musical instrument. Nineteen respondents reported that their pain now makes it difficult for them to maintain a suitable playing position and to concentrate, with only two respondents reporting a beneficial effect of playing music on their pain. Although some previous research has examined physical pain resulting from the playing of a musical instrument, any beneficial effects to existent pain remains an area requiring much future research.

Within a sample of sufferers of pain of this duration and intensity, therefore, the current findings suggest a beneficial effect of music listening to overall quality of life with chronic pain, with respondents who listen to music more frequently and perceive it is personally important enjoying life more, having more energy and ability to perform activities, and feeling depressed and in need of medical treatment less often. Pain sufferers, and in particular

females, were found to listen to music specifically for the purpose of helping with difficult times, boring and physically difficult activities and pain.

Important implications for future research can further be derived from the findings. In particular, some indication is given that differences in potential efficacy of the intervention may exist in relation to gender, age and personal importance of music, none of which have formed part of previous audioanalgesia investigation. These are variables which could be incorporated relatively easily into future clinical and experimental research, and may be an important aid to clinicians in identifying those to whom the intervention may be particularly beneficial. Our own future work will therefore continue to investigate the application of preferred music listening in the experience of both clinical and experimental pain. These studies together will build the basis for future audioanalgesia studies with the clear theoretical and methodological standards required to have an impact on clinical practice.

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