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## **Participants' experiences of music, mindful music, and audiobook listening interventions for people recovering from stroke**

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## Abstract

Existing research evidence suggests that both music listening and mindfulness interventions may have beneficial effects on mood and cognition post-stroke. This mixed-methods study, nested within a pilot randomised controlled trial investigating the feasibility and acceptability of combining music listening and brief mindfulness training post-stroke, explored study participants' experiences of engaging in the interventions. Fifty six stroke survivors, who had been randomised to receive an 8-week intervention of mindful music listening ( $n=15$ ), music listening ( $n=21$ ) or audiobook listening ( $n=20$ , control) using self-selected material, participated in a post-intervention individual semi-structured interview with a researcher not involved in their intervention delivery. Interview questions focused on affective, cognitive and physical experiences. Data were coded and analysed using thematic analysis.

Across groups, listening was associated with positive distraction from thoughts and worries. Mindful music listening was most strongly associated with relaxation and concentration, improved attentional control and emotion regulation as well as enjoyment. Music listening was most strongly associated with increased activity, memory reminiscence and improved mood. In addition, participants provided valuable feedback on intervention feasibility and acceptability. The findings suggest that the interventions were feasible and enjoyable for people recovering from stroke.

Clinical trial registration: UK Clinical Research Network (UKCRN, ID 18019); clinicaltrials.gov (NCT02259062).

Keywords: mindfulness; music; rehabilitation; stroke; qualitative

## Introduction

Stroke is one of the leading causes of long-term disability worldwide [1]. Cognitive impairment is common post-stroke, with 61% of stroke survivors reported to have cognitive impairment 10 years post-stroke [2]. Emotional problems including depression and anxiety are also prevalent post-stroke, with up to 50% experiencing depression within five years [3]. Cognitive impairment and mood problems impact upon functioning in everyday life, independent of physical problems [3,4] and are an important target for rehabilitation. Stroke also has an impact on social participation with 67% stroke survivors reporting their leisure activities having been negatively affected post-stroke [5]. Finding the best way to improve cognition and understanding how best to come to terms with the long-term consequences of stroke have been identified as the top research priorities by stroke survivors [6].

Evidence relating to interventions for cognitive and mood disorders post-stroke is sparse and inconclusive. However, initial evidence has indicated that music-based interventions may be beneficial [7,8]. Särkämö et al. [9] reported greater improvements in attention, verbal memory and mood after daily music listening for eight weeks following middle cerebral artery stroke, compared to listening to audiobooks or treatment as usual. The mechanism by which music listening may improve recovery is not clear. Särkämö et al. argued that music may affect brain plasticity and found greater increases in grey matter volume for the music listening group compared to controls [10]. An

alternative mechanism is that daily music listening enhances the control of attention and mood, with associated benefits on other cognitive domains including memory.

Mindfulness meditation based interventions are now well-established for the treatment of depression, anxiety and stress [11]. Control of attention and emotion regulation are central to mindfulness practice and there is emerging evidence that meditation may change the structure and function of brain regions associated with attention, emotion and self-awareness [12] though uncertainty regarding the precise mechanism remains. We speculated that music listening may share a common mechanism of action with mindfulness meditation and that the effect of music listening may be enhanced if combined with mindfulness training. Our pilot randomised controlled trial, MELLO (Measuring the Effect of Listening for Leisure on Outcomes after stroke), examined the feasibility and acceptability of a mindful music listening intervention, standard music listening, and audiobook listening. Participants were interviewed about their experience of engaging in the interventions, their perceived acceptability and usefulness as part of this nested study. Results from outcome measures related to cognitive, emotional and functional assessments carried out at three and six months post-stroke will be reported elsewhere.

Previously Forsblom et al. [13] reported that in the Särkämö study [9], music listening was specifically associated with better relaxation, increased motor activity, and improved mood, whereas both music and audiobook listening provided refreshing stimulation and evoked thoughts and memories about the past' (p.229). More recently, Hewitt et al. [14] also reported that music listening had positive benefits, being relaxing, stimulating and a means of passing time. We investigated whether participants in the MELLO trial reported similar experiences, and in particular whether the experience of mindful music listening differed from those in the other groups.

## Methods

### *Participants*

A total of 58 participants with ischemic stroke completed the post-intervention three-month follow-up assessments in the MELLO trial, of whom 56 were interviewed as part of this study (music listening n=21, mindful music listening n=15, audiobook n=20). Participant characteristics are reported in Table 1. Two participants were unable to be interviewed in the available timeframe. Participants were recruited from acute stroke units within Greater Glasgow and Clyde, UK between January 2015 and January 2016.

Participants who had completed at least one intervention session, regardless of whether they completed the intervention, and were still in the study following the 3-month follow-up neuropsychological assessments, were interviewed.

### *Intervention*

Participants were randomised to receive an eight-week intervention of either music listening, mindful music listening or audiobook listening commencing approximately one month post-stroke. Participants were asked to listen to their material daily for an hour using iPod Nano's (7<sup>th</sup> Generation, Apple Inc), and to keep a daily listening diary during the intervention phase. Mindful music listening involved doing one of two brief (five minute) mindfulness exercises (Body Scan and

Following the Breath) immediately prior to listening to self-selected music each day. The Body Scan involved paying attention to different parts of the body, starting from the feet and gradually moving up, all the way to the head while noticing any sensations and relaxing into them without judging them. Following the Breath exercise involved focusing attention onto the breath, noticing sensations and times when the mind wanders without judging, and gently guiding one's focus back onto the breath. At the end of both exercises, participants were asked to move onto listening to their chosen music, now focusing their attention on the music. If they were to notice any thoughts or sensations arising, they were to allow them to pass at their own pace, and to gently bring their attention back to the music. The other two conditions involved listening to either self-selected music or audiobooks. Both the music and audiobooks were based on participant's own preference, from any genre to maximise positive effect on mood. Music was with or without lyrics. No psychological self-help or mindfulness books were allowed in the audiobook group. Participants were not instructed to use the music in any particularly way nor were they instructed to set a goal for their listening experience (e.g. improving mood). All interventions followed a manual designed by the study team. Listening material was updated weekly by an assistant psychologist who visited participants at their place of residence.

### ***Post-intervention Interviews***

The post-intervention interviews were carried out in single visits by two female and one male psychology graduates (MM, JEa, MMC) who had not been involved in delivering the intervention for the interviewee. All were trained to conduct the interviews using a manualised protocol. Participants were informed prior to consenting to participate in the trial that they would be interviewed about their experience of the intervention by a different researcher from the person delivering their intervention. Whenever possible, interviews were carried out within two weeks of the three-month follow up assessment visit.

Participants initially completed a bespoke eight-item questionnaire assessing perceived acceptability and usefulness of the intervention followed by a semi-structured interview focused on the broader experience of the intervention and participation in the trial. The questionnaire (see Table 1) assessed aspects related to appointments, mp3 player use, listening frequency and duration, enjoyability and relevance of the intervention to the participant and their recovery, using a 5 point Likert scale with lower ratings indicating a more favourable outcome. In addition, a leisure activities questionnaire (supplement) assessing engagement in leisure activities including music listening, audiobook listening relaxation/mindfulness/meditation during the first three months post-stroke was completed.

An interview manual with questions and prompts covered the following topics: experience of the intervention overall (positive and negative), effects on mood, attention, concentration, memory or thinking, physical experience, and how the intervention fitted in with participant's overall stroke recovery. Participants in the mindful music listening group were asked to describe their experience of doing the brief mindfulness exercises. All participants were free to add anything they felt that was relevant to their experience.

Interviews were audio-recorded and transcribed verbatim by the researcher who carried out the interview. Data were analysed using Braun and Clarke's six-stage framework for thematic analysis[15]. The transcripts were coded using NVivo (QSR International). The initial coding and

identification of emerging themes was done by MMc and discussed with a small group (BC, JEv). Whilst themes could emerge from any aspect of participants' experience, a particular focus was on the extent to which participants felt the intervention impacted on aspects of mood or cognition. Quotes for each emerging theme were reviewed and themes/subthemes further refined until consensus on themes and subthemes was achieved between researchers (MMc, JEv, SB). Reporting is consistent with COREQ[16].

## Results

### *Intervention feasibility rating scale*

Ratings from the intervention feasibility rating scale are summarised in Table 2 with a detailed breakdown of ratings provided in the supplement.. Across groups, the majority of the participants (94.6%) found the appointments convenient (Scores 1 (very) or 2 (fairly) convenient), 73.3% found that it was feasible to listen to their material every day, for at least an hour. The majority of participants (85.7%) also found the material enjoyable and 76.8% reported the player to be easy to use. Just over half (60.8%) felt that the intervention was relevant to their situation, and a similar proportion (60.7%) felt that the intervention had contributed to their recovery. There were no significant differences between the groups on any of these ratings ( $p>0.05$ ). However, participants in the music listening group (71.4%) indicated that they were significantly more likely ( $p<0.001$ ) to continue listening after the intervention ended and to benefit from it in their everyday life compared to the mindful music (46.7%) or audiobook group (15%) groups.

### *Engagement in listening activities during intervention*

All those in the interview sample commenced listening at home following hospital discharge. One individual was readmitted briefly, and reported listening while at hospital. The median number of treatment visits completed by the interview sample was 8 (IQR 6, 8) for the mindful music group, 6 (IQR 6, 8) for the music group and 8 (6.5, 8) for the audiobook group. Self-reported frequency of listening activities in the first 3-months after stroke is reported in Table 3. A detailed breakdown of listening frequency is provided in the supplement. Consistent with allocation to group, all groups listened to their allocated material significantly more frequently compared to the other groups. The type of music selected by the two music groups differed with classical music being the most commonly chosen genre in the mindful music group and pop in the music listening group. The most commonly selected genres of audiobooks were fiction and crime.

### *Qualitative interviews*

The mean interview length was 26 mins (SD 12.00). Apart from one telephone interview, the interviews were conducted face to face in participants' homes with 57% of the interviews carried out within two weeks of the 3-month follow-up assessments. Four main overarching themes emerged from the data that were relevant across all of the intervention groups, although the number of people expressing thoughts relating to each them differed between groups. The four main themes were: 'positive impact on mood', 'feeling relaxed', 'positive impact on cognition' and 'increased activity during and after listening'. Subthemes were identified within the positive impact on cognition theme ('memory reminiscence', 'focus/concentration', 'improved attentional control') and

within the positive impact on mood theme ('positive distraction', 'enjoyment/uplifting', 'improved emotion regulation', and 'improved mood outside listening').

#### *Themes emerging from the qualitative interviews*

The main overarching themes are presented below with associated subthemes. Illustrative quotes are provided. A summary of theme frequency distribution across groups, reflecting the proportion of participants in each group who made comments related to each theme, is presented in Figure 1.

#### **1. Positive impact on mood**

Some participant comments reflected a positive impact on mood whilst listening, providing a positive distraction from worries, being enjoyable and lifting mood. Some also commented on the impact on mood outside of listening, improving the ability to regulate emotion and contributing to a more general improvement of mood.

##### ***Positive distraction***

Participants from all groups expressed that listening provided positive distraction from thoughts and worries (Fisher's exact p= 0.742):

*"it allows you to relax and not worry about certain things, at the time and gives you time off from worrying about things" (20225, music)*

*"I found it helped me a lot, it actually took away the fear of another stroke" (20231, mindful music)*

*"it stopped me sitting and thinking feeling sorry for myself, you know, it gave me a purpose" (10203, audiobooks)*

##### ***Enjoyment and uplifting mood***

Participants from all groups reported the listening to be enjoyable, though this was most frequent in the music groups. (Fisher's exact p= 0.013) In addition, both music groups (48% music, 40% mindful music) also referred to music lifting their mood, something that was less common in the audiobook group (5%) (Fisher's exact p= 0.005).

*"I enjoyed the mindfulness. As I say it gave me that focus to listen to the music"*  
*(10219, mindful music)*

*"I would put it on and it sort of lifted my mood listening to it, yeah. Changes your thoughts" (10206, music)*

##### ***Managing emotion.***

Across groups (Fisher's exact p= 0.347) participants referred to improvements in managing emotions (e.g. stress/anger) outside of time they were actually listening (mindful music 60%; music 48%; audiobooks 35%).

*...the good thing with this intervention is it helped me chill more and, you know, think long term. Think of the big picture and think about how to get there, without going in all guns blazing....so this has helped me calm down a lot... the anger is still there but its controlled. This has helped me control it]" (20209, mindful music)*

### **Mood outside listening**

A small number talked about mood being better generally (mindful music 13%; music 33%; audiobooks 15%, Fisher's exact p= 0.325).

*"She says [partner] you're singing everyday though now. I didn't notice but she said I was whistling and singing all the time, so that was a positive thing or well y'know people don't do that unless they are in a good mood" (20226, music)*

## **2. Relaxation**

Most participants (87%) in the mindful music group reported listening to be relaxing compared with just over half (55%) in the music listening group and approximately a third (35%) of those in the audiobook group (Fisher's exact p= 0.008).

*"[The mindfulness] was relaxing me" (10213, mindful music)*

*"I found it wonderful. I found it made me very contented and relaxed, that's what it did most of all" (20206, music)*

Some made reference to listening in bed as a means of preparing for sleep, or to aid falling asleep:

*"I usually did it in the evening and before I went to sleep, and it helped me go to sleep" (10226, mindful music)*

*"It was the greatest sleeping pill in the world, they should give you that in the hospital" (10209, audiobooks)*

## **3. Positive impact on cognition (focus/concentration, attentional control and reminiscence)**

### **Focus/concentration**

Participants across all groups (Fisher's exact p= 0.080), but particularly the mindful music (80%) and audiobooks (60%), indicated that having something to focus on, or concentrate on, was positive, often related to having something purposeful to do:

*"Being off [work] I had all this, not spare time, but I had all of this time and I had something.... I could do. Obviously family and things, but obviously the books...was just for me" (10222, audiobooks)*

Some participants in the mindful music group indicated that the mindfulness exercises influenced the way that they listened to music:

“Enjoyed the mindfulness. As I say, it gave me that focus to listen to the music” (10219, mindful music)

“The mindfulness was, well be mindful and right, now you can start listening to your music and I did listen to it in a different way” (30203, mindful music).

Several referred specifically to positive aspects of concentrating on listening (perhaps in part linked to distraction discussed above):

*“It forces you to sit down and concentrate one on one with the music, you and Shubert are in the room together” (10226, mindful music)*

Some, particularly in the mindful music group, reported feeling that their concentration improved, whilst listening but also outside of listening.

*“Certainly helped me in terms of concentration and, obviously you have a tendency to be quite tired after a stroke and....I definitely felt as if my stamina improved and certainly my ability to concentrate improved throughout” (20224, mindful music).*

### ***Improved attentional control***

Primarily those in the mindful music group (53%), talked about learning to be better at noticing that their mind had wandered, or drifted, and bringing it back to the music (Fisher's exact p= <0.001). These comments seemed to reflect the idea of being better at controlling attention.

*“[I] found it very difficult because my mind did keep going off. It kept going off in different directions, thinking about this, thinking about that. But the mindfulness tape had said you know always bring it back, don't worry about it, don't beat yourself up about it, just bring your thought processes back to, you know doing the body thing or back to the music, and I found that was okay. Latterly, I found that my thought processes didn't wander too far. Initially, they might have wandered off for some time and I was thinking about all sorts of stuff. But gradually, I would think by the end of the eight weeks the, you know, the mind wandering off didn't last as long. It was coming back more quickly to the eh, to the music” (20221, mindful music)*

*“I think there are times with the breathing exercises where they say, if you're starting to drift off, just think about your breathing again, so I was able to use that...because I might be listening to quite a challenging piece of music, so you might find yourself drifting off and then you go, ok let's go back to your breathing and so it would enable you to get back into the piece of music...” (20224, mindful music)*

### ***Memory reminiscence***

Some participants in both music groups reported listening bringing back positive memories from the past (music 24%, mindful music 20%). This was not reported in the audiobook group (Fisher's exact p= 0.048).

*"The music took me back to whenever I'd think of things you know, things I'd forgot you know. Memories of me from the music, you know... So it kind of helped it, it brought back memories" (10202, music)*

*"I can drift into music and remember what I was doing" (30203, mindful music)*

#### **4. Increased activity**

All groups referred to engaging in some form of activity either during or after listening, but this was slightly, although not significantly, more common for the music group (Fisher's exact p= 0.122). Activities typically reported were leisure activities (e.g. walking, singing, gardening), household chores (e.g. dusting, cooking, ironing) or rehabilitation (physiotherapy exercises). Focusing just on comments relating to engaging in activities after listening, around 20% of the mindful listening group and around 14% of the music group indicated that listening lead to increased activity after listening.

*"I thought aye alright, I've got new music to listen to rather than just lounge about here. I said, I'll take a walk" (20207, music)*

*"It just gave you that wee urge to do something. To do wee things you know. Even just make food, you know it gave you that wee urge to go and get on with something" (20206, music)*

A small number of participants in the audiobook group but not in either music group felt listening prevented them from being active:

*"I'm told to get up and walk about, get as much exercise as I felt I could cope with, sorta countered by the fact you're sorta sitting, sitting reading books. I never, I never at any time tried going for a walk and listened to the book" (10211, audiobook)*

#### **Other comments**

Some of the other comments related to contribution to recovery, importance of personalisation, as well as participants' feelings about randomisation with preferences in all directions. Illustrative quotes are given in Table 4.

#### **Discussion**

The findings indicate that engaging in listening interventions was predominantly a positive experience and provided positive distraction from thoughts and worries. This theme was expressed by participants in all groups in similar proportion. Like Forsblom et al [13], music listening was associated with lifting mood as well as increased engagement in other activities during and after listening. Lifting of mood is consistent with findings that music has been shown to activate brain reward centres including the ventral striatum [17,18]. Stroke survivors, carers, and clinical staff have highlighted that time outside of therapy may be underexploited or wasted [19]. Stroke survivors engaging in physical rehabilitation have also reported feeling bored and highly value engagement in physical activity [20]. Our findings indicate that music listening increased engagement in other

activities, and offered something positive to focus on. Music listening was also reported to evoke memories from the past in both music groups, which was not observed in the audiobook group. This contrasts with Forsblom et al who reported similar levels of memory reminiscence in their audiobook and music groups.

Mindful music listening seemed to be specifically related to increasing relaxation and concentration, enjoyment and improved emotion regulation, but most uniquely to what we characterised as improved attentional control. It is perhaps not surprising that participants in the mindful music group commented spontaneously about this more because control of attention (the idea of noticing your mind wandering and gently bringing your attention back to either the mindfulness exercise or the music) was a core component of the instructions for the mindful music intervention. Nevertheless it was encouraging that this aspect of the mindful music listening was reflected in their comments, suggesting that this core idea had been understood and implemented by at least some participants. Some mindful music group participants also commented on having better emotion regulation, and were more able to control anger in challenging situations. Classical music was the most commonly chosen genre of music in the mindful music group. Given its tendency to be non-vocal and different in its musical features compared to pop music, the most commonly chosen genre in the music only group, it is possible that relaxation may have been facilitated through participants' music selection. Alternatively, relaxation may have been facilitated through the use of mindfulness techniques given that listening to preferred music while using a mindfulness technique has been reported to be more relaxing than listening to preferred music alone [21]. The precise mechanism by which mindfulness interventions may benefit people with physical or psychological conditions is not yet clear [22] and our intervention was very brief compared to standard mindfulness based stress reduction [23] or mindfulness based cognitive therapy [24]. Our focus was on one component of mindfulness programmes, that of attentional control, which we speculated could be beneficial in managing worries that may arise following stroke and in improving attention and concentration that may be impaired following stroke. Mindfulness-based music therapy has recently been shown to enhance mood and attention in women with breast cancer receiving adjuvant chemotherapy [25, 26]. Further work is needed to determine whether mindful music listening can reduce likelihood of developing anxiety/depression and improve attention post-stroke, but the comments from our participants are promising.

Ratings from the feasibility questionnaire indicated the interventions were feasible and enjoyable for the majority of participants. A small number across groups found it not to be feasible to listen daily or for an hour every day. The precise 'dose' of listening that may be beneficial is not known. Future studies need to investigate whether a minimum therapeutic amount can be established, though this may show considerable inter-individual variation. The leisure questionnaire showed that only those in the allocated groups were listening to audiobooks and doing some form of relaxation, mindfulness or meditation, but people from all groups reported listening to music regularly. This is not surprising, though what is not clear from these data is how people were listening (e.g. sitting and attending to the music or just having it on in the background). The strength of this study was that all but two participants who completed the three month follow-up assessments were interviewed, providing a rich data set for analysis. There are, however, several limitations. The interview was carried out relatively soon after the intervention in order to ensure that the experience was fresh in the minds of participants. This may however limit the extent to which participants could comment on any enduring benefits. Whilst the interview was carried out by a research assistant who had not

delivered the intervention, it is possible that participants wanted to be supportive and may have given an overly positive account of their experience. Interviews were relatively brief, which may have limited the amount of feedback from participants on both positive and negative aspects of participation.

In conclusion, the findings suggest that listening based interventions, including a novel mindful music intervention, are enjoyable for people recovering from stroke. Whilst some aspects of the experience of participating were present across groups (e.g. positive distraction), others seemed more prominent in particular groups, with music listening elevating mood and promoting activity. There were indications that the mindful music intervention promoted attentional control. These findings offer opportunities for addressing stroke survivors' unmet needs related to emotional problems and social participation [5] including satisfaction in leisure activities [27] both within and outside clinical settings given that opportunities for practice and active engagement have been identified as factors enabling stroke survivor to drive their own recovery outside of therapy [19]. The extent to which these interventions impact on cognitive, emotional, or functional recovery after stroke remains to be established.

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## *Ethical approval*

A favourable ethical opinion was obtained from the West of Scotland Research Ethics Committee (14/WS/1089) and research and development (GN13CP462). The study was registered with the UK Clinical Research Network (UKCRN, ID 18019) and clinicaltrials.gov (NCT02259062).

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**Figure legends**

**Figure 1:** Percentage (%) of participants from each group endorsing each theme

**Table 1.** Participant baseline characteristics

		<b>Overall n= 56</b>	<b>Mindfulness n= 15</b>	<b>Music n=21</b>	<b>Audiobook n=20</b>
Age at baseline (years)	Mean (SD)	64.15 (11.65)	65.37 (10.54)	61.52 (10.33)	66.00 (13.65)
Gender n (%)	Male	37 (66.1%)	12 (80.0%)	14 (66.7%)	11 (55.0%)
Years of education	Median (IQR)	11.50 (10.00, 15.00)	12.00 (11.00, 15.00)	12.00 (11.00, 15.00)	10.00 (10.00, 12.25)
SIMD quintile (0% indicates most deprived, 100% least deprived)	0-20%	24 (42.9%)	3 (20.0%)	11 (52.4%)	10 (50.0%)
	20-40%	12 (21.4%)	6 (40.0%)	5 (23.8%)	1 (5.0%)
	40-60%	5 (8.9%)	1 (6.7%)	1 (4.8%)	3 (15.0%)
	60-80%	9 (16.1%)	1 (6.7%)	2 (9.5%)	6 (30.0%)
	80-100%	6 (10.7%)	4 (26.7%)	2 (9.5%)	0
Oxford Stroke Classification	Cortical	36 (64.3%)	9 (60.0%)	13 (61.9%)	14 (70.0%)
	Subcortical (LACS)	20 (35.7%)	6 (40.0%)	8 (38.1%)	6 (30.0%)
If cortical, type	TACS	3 (8.3%)	1 (11.1%)	1 (7.7%)	1 (7.1%)
	PACS	17 (47.2%)	5 (55.6%)	5 (38.5%)	7 (50.0%)
	POCS	16 (44.4%)	3 (33.3%)	7 (53.8%)	6 (42.9%)
Hemisphere	Right	22 (39.3%)	3 (20.0%)	10 (47.6%)	9 (45.0%)
	Left	30 (53.6%)	11 (73.3%)	11 (52.4%)	8 (40.0%)
	Other	4 (7.1%)	1 (6.7%)	0	3 (15.0%)
Recurrence of stroke	First	47 (83.9%)	13 (86.7%)	19 (90.5%)	15 (75.0%)
	Second	9 (16.1%)	2 (13.3%)	2 (9.5%)	5 (25.0%)
MRS	0	4 (7.1%)	4 (26.7%)	0	0
	1	18 (32.2%)	6 (40.0%)	7 (33.3%)	5 (25.0%)
	2	27 (48.2%)	5 (33.3%)	13 (61.9%)	9 (45.0%)
	3	3 (5.4%)	0	0	3 (15.0%)
	4	4 (7.1%)	0	1 (4.8%)	3 (15.0%)

Data are for the interview sample only (n56), and not for the full trial population (n72).

IQR, Inter Quartile Range; LACS, Lacunar stroke; MRS, Modified Rankin Scale 0 (no symptoms at all), 1 (No significant disability despite symptoms), 2 (Slight disability), 3 (Moderate disability), 4 (Moderately severe disability); PACS, Partial anterior circulation stroke; POCS, Posterior Circulation Stroke; SD, standard deviation; SIMD, Scottish Index of Multiple Deprivation; TACS, Total anterior circulation stroke

**Table 2** Median (IQR) intervention feasibility ratings by group

	<b>Overall</b> n=56	<b>Mindfulness</b> n= 15	<b>Music</b> n= 21	<b>Audiobook</b> n= 20	<b>p-value</b>
Overall, how convenient were your appointments (location and time)?	1 (1, 1)	1 (1, 2)	1 (1, 1)	1 (1, 1)	0.488 (K)
Overall, how feasible was it to listen to the material every day during the study?	2 (1, 3)	2 (1, 3)	2 (1, 2)	1.5 (1, 3)	0.847 (K)
Overall, how feasible was it to listen for at least an hour every day?	2 (1, 2.5)	2 (1, 3)	2 (1, 2)	1 (1, 2.5)	0.690 (K)
Overall, how enjoyable did you find the listening material you were given?	1 (1, 1)	1 (1, 2)	1 (1, 1)	1 (1, 1)	0.474 (K)
Overall, how easy did you find using the MP3 player?	1 (1, 2)	1 (1, 3)	1 (1, 1)	1 (1, 2.5)	0.120 (K)
Overall, how relevant did you think the intervention was to your situation?	2 (1, 3)	3 (1, 3)	2 (1, 3)	1 (1, 2)	0.323 (K)
Do you feel the intervention has contributed to your recovery?	2 (1, 3)	2 (1, 3)	2 (1, 3)	1.5 (1, 5)	0.979 (K)
Did you continue to listen for leisure after the end of the intervention or to benefit from it in your everyday life?	3 (1, 5)	3 (2, 5)	1 (1, 3)	5 (3, 5)	<0.001 (K)

IQR, Inter quartile range; K, Kruskal-Wallis test; Feasibility rating scale scores range 0 (Very) – 5 (not at all) with lower scores being more favourable.

**Table 3.** Frequency of self-reported engagement in leisure activities relevant to the study in each group during the intervention phase

Activity	Group Median (IQR)				p-value
	Overall n=56	Mindful music, n=15	Music n=21	Audiobook n= 20	
Relaxation, mindfulness or meditation	0 (0, 3)	5 (2, 5)	0 (0, 0.5)	0 (0, 0.5)	<0.001
Music listening	5 (4, 5)	5 (4, 5)	5 (5, 5)	4 (2, 5)	0.012
Audiobook listening	0 (0, 5)	0 (0, 0)	0 (0, 0)	5 (4, 5)	<0.001

Data are median (IQR) scores on the Leisure Activities Questionnaire 0 (Never), 1 (Less than once per month), 2 (1 – 3 times / month), 3 (1 – 2 times / week), 4 (3 – 4 times / week), 5 (Daily / almost daily); IQR, Inter Quartile Range.

**Table 4.** Other comments related to the experience of engaging in the interventions

<b>Contribution to recovery</b>	<p><i>"I enjoyed listening to it and that and that it made the recovery better. It made the recovery, made, made the recovery easier"</i> (10236, music)</p> <p><i>"It's been fabulous. I've so enjoyed it. It was like a new lease of life"</i> (20206, music).</p> <p><i>"This intervention was able to fit in brilliantly with my stroke recovery. I'll be honest with you, this is the thing that's kept me going"</i> (20209, mindful music).</p>
<b>Process and importance of personalisation of material selection / choosing what and when to listen:</b>	<p><i>"(We) discussed it. I would tell her like books that I liked, authors that I liked and she would find it"</i> (10216, audiobooks).</p> <p><i>"I feel it was positive cause it, I tailored it for myself, my own needs you know. And there was no rules being laid down that you know, you don't, you have to do it this way you have to do it. You know, it was up to myself"</i> (20209, mindful music).</p> <p><i>"I also found that because there was so many different types of music on the tape, it wasn't as if you were listening to the same thing all the time...I found at night I took the classical music and it helped me to relax, and in the morning I would maybe put on Neil diamond people like that and I found it helped me to get up in the morning to get ready for the day"</i> (20231, mindful music).</p>
<b>Feelings about randomisation</b>	<p><i>"I thought about getting books, the audiobooks, so slightly disappointed I didn't get them. But I enjoyed the music, you know"</i> (10202, music).</p> <p><i>"The music with the mindfulness. I guess that that might be more beneficial than either the music or the stories alone because I see that as sort, some sort of, some sort of deliberately designed therapy"</i> (20226, music).</p> <p><i>"If this was a book I would never be able to concentrate"</i> (20229, music).</p> <p><i>"See, if it'd been the books, I'll be honest with you, I probably would have, I would have been like that no, I can't do this sorta thing"</i> (30203, mindful music).</p> <p><i>"I was delighted. Absolutely delighted... I don't think I would have had to concentrate on the music and I knew the concentration was helping me be back to me"</i> (10216, audiobooks).</p> <p><i>"I was disappointed as I am very fond of music"</i> (30207, audiobooks).</p>

