Assessing the relationships between engagement in music and subjective wellbeing.

music, singing and wellbeing

for adults living with diagnosed conditions

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what works
wellbeing

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Executive Summary

Introduction

This is the second of three reports that form the review of wellbeing outcomes of music and singing for adults. This review includes 16 studies of participants with identified health conditions such as stroke, COPD and mental health conditions. We have not included clinical studies of music and singing, including interventions for patients in hospital, where the focus is on clinical outcomes such as pain management or coping with symptoms or hospitalisation. We have included studies with a concurrent comparator (CC) or qualitative studies where it would not be expected to include a comparator.

The methodologies for data extraction, quality appraisal for the studies reported here are the same as for the H1 studies detailed in Volume 1.

Scope of the included papers

The review encompasses data from 1364 participants with identified health conditions in quantitative and qualitative studies from many countries. It encompasses diverse music and singing interventions for young and older adults, with a plethora of wellbeing measures focused on depression and anxiety, quality of life, mood and other specific dimensions such as self-esteem and spirituality.

The studies included evaluation of interventions for younger adults (Bensimon et al. 2008, 2012, Chen et a. 2015; Wu, 2002); and adults living with the effects of stroke (Kim et al. 2011; Tamplin et al. 2013); COPD (Lord et al. 2012; Skingley et al. 2013, see also Morrison 2013), and adults living with a range of chronic conditions (Sun & Buys, 2012, Batt-Rawden (2006, 2011). Two studies examined music therapy interventions in hospice or palliative care settings (Warth et al. 2015; Wlodarczyk, 2007). Five studies examined the effects of music and singing on wellbeing outcomes in older people with identified conditions including depression (Sun et al. 2013), mobility impairments (Chen et al. 2009), hypertension (Bekiroglu et al. 2013) and various conditions (Hays 2006; Haslam et al. 2014).

Summary of key findings

Of the 16 studies reviewed here, 14 show evidence for a range of wellbeing outcomes from music and singing for adults with mental and physical health conditions across the life course. The heterogeneity of the studies and the plethora of measures used makes it difficult to synthesise the findings. Instead, we have presented a narrative review.

Of the 16 studies included in this review there were two high quality studies (both RCTs) and three moderate quality studies, including one quantitative study and two qualitative studies. The remaining 9 studies were judged to be low quality.

In summary, the evidence points to wellbeing outcomes including reduced depression and anxiety in people of all ages. In relation to adults with adults with chronic conditions such as stroke, COPD and cancer, the studies report reduced stress and improved wellbeing across a range of outcomes.

There is high quality evidence that:

Targeted, culturally relevant music interventions can decrease depression in nursing students in a college environment.

Brief music therapy is an effective intervention to support wellbeing of palliative care patients in hospital settings.

There is moderate quality evidence that:

Targeted, culturally relevant music interventions, including playing a musical instrument and singing, can decrease depression in older people with chronic conditions in residential and community settings.

Participants report a wide range of wellbeing benefits from singing including relaxation, distraction, reduction in anxiety, spiritual uplifting and improvements in mood, emotional wellbeing, confidence, enjoyment and a 'feel good factor.'

Participation in a music project can raise participants' awareness of the significance of music in their life. This in turn can have a positive effect on awareness of health and quality of life and can encourage behaviour change.

There is low quality evidence that:

Participation in group drumming can support participants dealing with symptoms of PTSD.

Singing classes are associated with improvements in wellbeing in patients with COPD.

Music therapy has a positive effect on mood in post-stroke patients and may be beneficial for mood improvement with stroke.

Participation in extended (12 months) community singing programmes can improve quality of life and social and emotional wellbeing in adults living with chronic conditions.

Music therapy can contribute to improved spiritual wellbeing in hospice patients.

Music therapy can alleviate anxiety in undergraduate students.

Review Strengths and Limitations

The large number of hits following initial searches and the overlap between clinical and wellbeing interventions means that it is possible that some relevant evidence has not been included in this report. However, we undertook a comprehensive search strategy to identify all existing eligible studies published prior to the search dates. The pre-publication of our protocol on PROSPERO ensures methodological transparency and militates against potential post-hoc decision making which can introduce bias to the process. Dual screening of searches and data extraction and independent quality assessment using GRADE and CERQual criteria ensured a rigorous process.

Taking published studies as the sole evidence increases the potential risk of publication lag, wherein possible important new evidence that has not yet been included in published reports is not identified and included. However, the grey literature review (Daykin et al. 2016b) did include recent unpublished data from studies completed in the last three years.

Implications for practice

There is high quality evidence that targeted, culturally relevant music and singing interventions, including music therapy can enhance mental wellbeing of younger and older people with diagnosed conditions in specific contexts. There is moderate quality evidence that targeted, culturally relevant music and singing interventions can enhance mental wellbeing and decrease depression in older people with chronic conditions in residential and community settings. This reinforces the findings reported in Volume 1, which showed convincing evidence that participatory music and singing programmes can help to maintain wellbeing and prevent isolation, depression and mental ill health in older adult age groups. Further, participants with a wider range of chronic conditions report wellbeing benefits from music and singing, including increased mental wellbeing, quality of life, self-awareness and behaviour change.

There is, therefore, evidence to support the development of policy and continuation of support for music and singing interventions for wellbeing outcomes for people with identified

conditions. However, people respond differently to different singing and music interventions so these need to be carefully designed and targeted in order to maximise wellbeing outcomes for people with identified conditions.

Implications for research

A key challenge for establishing evidence in this field is the breadth and diversity of projects and research approaches. Studies included in this review encompass a wide range of music and singing activities in diverse delivery formats, often delivered in specific settings with particular characteristics. As well as addressing the methodological challenges of quantitative and qualitative research discussed above, situated research is needed to understand the impacts of music and singing in particular contexts.

A systematic review of the wellbeing outcomes of music and singing in adults and the processes by which wellbeing outcomes are achieved.

Volume 2: Music and singing interventions for adults living with diagnosed conditions.

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THE UNIVERSITY OF WINCHESTER

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Introduction

This is the second of three reports that form the review of wellbeing outcomes of music and singing for adults. The first report (Volume 1) reported studies of music and singing with healthy adults (H1) and included studies with a concurrent comparator (CC) or qualitative studies where it would not be expected to include a comparator (Daykin et al. 2016a). This Volume includes studies with participants who are living with diagnosed conditions but not receiving music and singing interventions as part of clinical treatment (H2). A number of studies examined music and singing for people with dementia: these are discussed in Volume 3.

This review includes H2 studies with a concurrent comparator (CC) or qualitative studies where it would not be expected to include a comparator. We have not included clinical studies of music and singing, including interventions for patients in hospital, where the focus is on clinical outcomes such as pain management or coping with symptoms or hospitalisation. The dividing line between healthy and unhealthy populations can be difficult to draw, but in general we have included studies where the focus is subjective wellbeing rather than physical or psychological rehabilitation or symptom management.

The methodologies for data extraction, quality appraisal for the studies reported here are the same as for the H1 studies detailed in Volume 1.

Findings of included papers

A total of 16 H2 studies are included in this volume. Where we more than one paper on the same study we have included these as a single study. A total of 39 H1 studies were included in Volume 1: this brings the total of studies included in the review (excluding dementia) to 55.

Study Participants

This part of the review includes data from 1364 participants in quantitative and qualitative studies from many countries. Participants were selected on the basis of a variety of health conditions including muscular disease, chronic fatigue, anxiety & depression, PSTD, hypertension, neurological disease, cancer, stroke and COPD. This brings the total to 3864 participants in quantitative and qualitative research on music, singing and wellbeing outcomes for healthy adults (excluding dementia, see Volume 3).

Music and singing interventions

The diverse music and singing interventions reviewed in this volume are variously described as music therapy, music listening, music reminiscence, singing classes and choral singing. In this group of studies there was more emphasis on interventions described as music therapy than in the main report of music and singing with healthy adults (Daykin et al. 2016). As with the H1 studies (Volume 1), singing was more commonly reported than was playing an instrument, although two projects reported instruments and two reported drumming interventions.

Wellbeing measures

A plethora of wellbeing measures were used, reflecting diverse approaches to assessing wellbeing in these populations. The measures are grouped into a number of broad areas: depression and anxiety, quality of life, mood and other specific dimensions such as self-esteem and spirituality. In some instances, wellbeing outcomes were included as a subset of overall health assessment encompassing physical and mental health and symptoms. Here we only report on the wellbeing outcomes: we have not reviewed data on biophysical markers or other clinical outcomes. Quantitative wellbeing measures included:

- Hospital Anxiety and Depression Scale (HADS)
- Depression Mood Self-Report Inventory for Adolescence
- Beck Depression Inventory (BDI).
- Zung Self-Rating Depression Scale (SDS)
- Zung Self-Rating Anxiety Scale (SAS)
- Geriatric Anxiety Inventory.
- Beck Anxiety Inventory (BAI)
- Hamilton anxiety scale (HAM A)
- Satisfaction with Life Scale
- York SF-36
- York SF-12
- Singing related quality of life
- Profile of Mood States (POMS-A)
- The Self-Consciousness Scale
- Rosenberg 1965 Self-esteem scale (SES)
- Spirituality questionnaire
- European Organization for Research and Treatment of Cancer (EORTC-QLQ-30)
- Health benefit questionnaire

Wellbeing outcomes reported

No H2 studies reported wellbeing outcomes using the same measure, making it difficult to synthesise the results of these studies. However, one study (Lord, et al. 2012) used measures (POMS, York SF 36) that were also used in studies on music and singing with healthy adults, reported in Volume 1 (Daykin et al. 2016).

As some of the studies used a combination of different outcome measures, it is difficult to group them by outcome. Instead, we have followed a life course approach, as in the main report, and grouped them according to age and, where the intervention targets people with a specific diagnosis, by condition.

Students and young people

Two studies examined music and singing interventions for young adults. Chen et al (2015) undertook a randomised control trial of music for depression in 80 mostly female nursing students in a college in Taiwan. Participants were volunteers who were randomly assigned to a music intervention group and a control group. Participants were assessed using the Depression Mood Self-Report Inventory for Adolescence (DMSRIA) at the beginning of the project and after 10 weeks. The tool contains 20 yes or no questions and asks participants to select the best response based on their own thoughts and feelings within the last 2 weeks. The total score ranges from 0 to 20, with a higher score indicating a higher level of depression. Participants all had scores of 8 or above on the DMSRIA, indicating moderate to high risk of depression at the start of the project. The music listening intervention took the form of 40 minute sessions of Chinese five-element music listening activity led by a researcher at the same time of day twice a week for 10 weeks. The control group maintained their usual activities with no music activity. The music was played on traditional Chinese musical instruments and is described as utilising five tones to regulate the circulation of Chi in the body, strengthen the psychological condition and promote relaxation. The music has a minor mode based on G flat and A flat, a slow tempo and simple harmonic and rhythmic structures. Mean scores at the start of the intervention were 15.52 (music group) and 15.03 (control group). Post project data were available for 71 participants (31 in the music group and 40 in the control group). After 10 weeks, mean depression scores were 09.82 (music group) and 15.53 (control group), a decrease in the music group of just under 6 points that was statistically significant.

The limitations of the study, particularly its use of a convenience sample to recruit participants from the same nursing school, limit its generalizability. The lack of a follow up phase also

weakens its conclusions. Nevertheless, the study points to the effectiveness of a music listening intervention for depressed students in the specific context of a nursing college.

Wu (2002) examined the effects of a 10 week music therapy programme, including music listening and improvisation, in a study of 28 undergraduates (12 male and 12 female) with a diagnosis of depression of University in Taiwan. No significant post treatment differences were reported for depression and self-esteem but for anxiety (assessed using the Self-Rating Anxiety Scale, SAS) significant differences were reported. The music therapy group post intervention mean anxiety scores were 33.75 compared with 40.89 for the control group. Significant differences for anxiety were maintained at two month follow up and depression scores were significantly lower in the music group than the control group at this point (37.38 and 43.37 respectively). The small sample size of this single site study limits its generalisability but the study does show evidence that music therapy can reduce anxiety and depression in undergraduate studies diagnosed with depression in the context of a University environment.

Adults with chronic conditions

There were nine studies reporting wellbeing outcomes in adults with chronic conditions including stroke, COPD and cancer. Several of these studies were primarily concerned with physiological and clinical outcomes: these are not reported here, instead, we focus on reported wellbeing outcomes that were not necessarily primary study outcomes. Hence the findings reported here do not fully reflect the full range of findings from these studies.

Most of the studies included middle age and older adults, with the exception of one qualitative study (Bensimon et al. 2008, 2012), which examined the effects of a music intervention on young adults with PSTD. Interviews were undertaken with 6 men aged 20-23 who took part in a group drumming project: all had experienced traumatic events during military service. The study reports that taking part in group drumming led to some reduction in PTSD symptoms, especially an increased sense of openness, sharing, belonging and connection. The activity also enabled safe release of powerful emotions and regaining a sense of self-control.

Two studies examined music and singing interventions for people living with the effects of stroke. Kim et al (2011) examined the effects of a music therapy intervention on post-stroke patients in a hospital in Korea. The music group consisted of nine volunteer patients and nine matched controls were selected. Both groups received the same rehabilitation therapy while in addition the music group took part in music therapy sessions twice a week for four weeks. The study measured anxiety and depression using the Beck Anxiety Inventory (BAI) and Beck Depression Inventory (BDI). Post intervention scores showed a greater decrease in the music

group than the control group after music therapy, but only the decrease of BDI scores were statistically significant (p=0.048). The small sample size and the lack of random allocation to intervention and control groups weakens the findings. However, the study indicates that music therapy may contribute to reduced depression in stroke patients as part of a hospital rehabiliation programme.

Tamplin et al. (2013) undertook a study of a community choir project for people living with aphasia following a stroke. Participants took part in two hour rehearsals leading to a performance after 12 weeks. Interviews were undertaken with 3 participants and 5 carers. As well as clinical outcomes, interview data were explored. Participants reported increases in confidence, the development of peer support networks and enhanced mood following participation in the choir.

Two studies included participants with a range of chronic conditions. Sun & Buys (2012) examined the effects of a community singing programme in a study of 133 Aboriginal and Torres Strait Islander Australians with chronic diseases in five community health settings in Queensland, Australia. Intervention group participants (62) took part in weekly rehearsals for 12 months. A control group (n=45) received usual care. Post intervention data were available for 45 intervention participants and 27 controls. Wellbeing was assessed using a singing related quality of life tool. Compared with usual care, singing was associated with increases in singing related mental health aspects of QoL and positive affect (p < 0.001 in both instances). In the singing group, there are overall reductions after 12 months in reporting of stressful events, depression level, sense of social isolation, and loneliness, as compared with the control group, although this difference did not reach statistical significance. There were marginally statistically significant reductions in the overall stress score in the singing group, as compared with the control group. Over the intervention period, significant correlations were demonstrated between singing-related QoL and social isolation, loneliness and total stress score. The high drop out rate and the lack of randomisation weaken the findings. However, the study shows evidence that a 12-month community singing program can improve QoL and social and emotional wellbeing in participants with chronic disease that is subject to medical management.

Batt-Rawden (2006, 2011) undertook a qualitative, longitudinal study using action research, ethnography using grounded theory. A CD was designed to instigate participants' narratives and elicit discussion about how music could be used in health. Participants were 9 men and 13 women aged 35-65 with long term illnesses (i.e. muscular disease, chronic fatigue, burnout, anxiety & depression, cancer or neurological disease). Data from repeat interviews suggested that taking part in the project resulted in an increase in self-awareness and self-consciousness. Listening to and discussing music was considered to be an important tool in the process of change, sense of agency and self-development, through enhancing wellbeing

and 'wellness', a vital factor in the process of recovery and sustaining quality of life, despite of illness.

Two studies examined the effects of singing on participants with COPD. Lord et al (2012) undertook a randomised controlled trial comparing participation in singing classes with attending a film club in 33 patients with COPD attending respiratory clinics in a UK NHS Trust. 183 patients were invited to take part and of these, 150 declined. The singing group took part in twice weekly classes led by a professional singing teacher for 8 weeks. Film workshops were held once weekly and co-ordinated by a film-studies graduate. Wellbeing was assessed using HADS and SF-36 at baseline and post intervention. Structured post intervention interviews (n=9) assessed participants' perceptions of benefits of the sessions. Wellbeing was assessed using HADS and SF-36 at baseline and post intervention. Both groups showed improvements in the mental component score of the SF-36: singing +9.3(25.3) vs film +4.3(9.0) (p=0.41). Responding to structured interviews, participants reported multiple benefits in terms of general wellbeing including mood and pleasure, social support, achievement and efficacy. The difficulties of recruiting participants, the different frequency and duration of the comparator conditions and the small sample size limit the findings but the study shows evidence that participation in a singing group can improve mental wellbeing in COPD patients attending respiratory clinics in hospital settings.

Skingley et al (2013) (see also Morrison 2013) undertook a feasibility study assessing the impact of a 36 week singing programme for people with COPD and their supporters. Sessions were of 90 minutes duration and were held in community settings for groups ranging in size from 20 to 50 participants. As there was no comparator we have not commented on the quantitative data here, but the study included a nested qualitative component in which detailed feedback was obtained from 97 participants. Data were collected at three time points: baseline, mid-point and end-point. participants reported benefits from singing including relaxation, distraction, reduction in anxiety, spiritual uplifting and improvements in mood, emotional wellbeing, confidence, enjoyment and a 'feel good factor.'

Two studies examined music therapy interventions in hospice or palliative care settings. Warth et al (2015) undertook a randomised controlled study comparing music therapy with relaxation with 84 patients in a palliative care hospital setting in Germany. The mean age of participants was 63.0 and 71.4% were female. The intervention comprised two 30 minute music therapy sessions using voice and improvising with a monochord (a string instrument developed for therapeutic purposes) as well as mindfulness given two days apart. Control group participants were given a mindfulness exercise using headphones. Visual analogue scales (VAS) ranging from 0 to 10 were used at baseline and post intervention to assess relaxation and subjective wellbeing. The study found that self-rated relaxation and wellbeing scores showed significantly greater increases in the music therapy group compared to

the control group (p <0.001 and p = 0.013 respectively). Number-needed-to-treat analysis revealed that for one person to have a favourable outcome it was necessary to administer music therapy to 2.80 (relaxation) and 5.25 patients (wellbeing). The study shows that music therapy is an effective intervention to support wellbeing and relaxation of palliative care patients in a palliative care setting.

Wlodarczyk (2007) compared a 30 minute session of music therapy with a non-music visit of equivalent duration in 10 patients in a hospice facility in the south eastern United States. Participants were aged 47-89. There were 8 females and two males; 9 were Caucasian and one was African American. Patients acted as own controls and were allocated randomly to ABAB or BABA conditions. Spiritual wellbeing was assessed using a questionnaire. Significant improvements were reported in the intervention periods compared with the control periods (p = .01). The very small sample limits the findings but the study shows evidence that music therapy can contribute to improved spiritual wellbeing in hospice patients.

Older people

Five studies examined the effects of music and singing on wellbeing outcomes in older people. Sun et al (2013) used a case control design to examine the effects of 15 months of regular participation in Tai Chi, dancing, playing a musical instrument and singing on depression, quality of life and resilience in older adults of Han Chinese nationality (mean age = 61.9). Participants were 750 people engaged in a Changshu Mind Body Meditation Approach (MBMA) programme who responded to an invitation to participate in a survey. The majority were aged over 50, 80.4% were female and most presented with risk factors for chronic diseases including prevalence of abnormal blood glucose levels. The study combined the MBMA approach, which includes a variety of mindfulness meditation techniques, with cultural activities that were chosen because they are popular and well accepted in China. There were four intervention groups: Tai Chi, dancing, playing a musical instrument and singing. The control group undertook classes in Chinese literacy, history and computing. These classes focused on learning and social interaction opportunities but did not contain a meditative element. Participants chose the activity and once they had selected their preferred intervention, each intervention group participant was matched with regard to their medical condition to a participant in the control group. The intervention and control groups shared similar baseline characteristics, except for the fact that females were more likely to choose dancing and singing over other activities. Health benefit was measured using a 44 item singing questionnaire covering six areas of physical and mental health (executive function, social skill, psychological health, spirituality, physical health and self-esteem). The study also measured resilience and depression using the GHQ 30.

Analysis compared the outcomes for each group and measured effect size differences to estimate the intervention effect. Participants in Tai Chi, dancing and singing groups showed significant differences in all health benefits and resilience outcome data in comparison with the control group. Singing was associated with very significant differences (p<0.001) in all components of the health measure. Mean scores for the singing group for psychological health were 30.75 compared with 28.39 for the control group; for spiritual wellbeing mean scores for the singing group were 35.35 compared with 32.84 for controls, and for self-esteem, mean scores for the singing group were 24.82 compared with 22.19 for controls. Music was associated with significant differences (p<0.001) in psychological health scores (mean = 29.77 compared with 28.39 for controls) but no other significant health effects were found for music. After Tai Chi, singing was associated with the largest effect sizes for health outcomes (d=0.55).

A comparison of intervention effects on the depression scale revealed that depression rates were lower in the music and singing groups than in the control group (7.5% and 10.1% respectively), although the Tai Chi and dancing groups had the lowest depression rate among the four intervention groups. The study shows that music and singing as part of a meditation programme can lead to small but significant improvements in mental wellbeing and resilience and can help to prevent depression among older adults.

Chen et al. (2009) undertook a qualitative study to explore older people's perceptions of a three month programme of weekly group music therapy sessions in a nursing home Taiwan. Participants were 11 females and 6 males with a mean age of 80.5 years. All used wheel chairs and were diagnosed with chronic conditions. Nine participants (52.9%) had not received any formal education, but were able to speak and understand Mandarin. The remaining 47.1% had received primary education. Two major themes emerged from the data: strength derived from the social support and the group dynamic, and enhanced quality of life. The elderly participants described their mood as having changed from mostly depressed to happy and cheerful following the intervention.

Hays (2006) undertook a qualitative study using focus groups and interviews with men and women aged over 60 to explore the role of music in their lives. The sample included professional musicians as well as people involved in amateur music making and general music listening. The study found that music had meaning and importance in many of the informants' lives. The identified themes included wellbeing, connection, independence and spirituality.

Two studies reported no wellbeing outcomes from music and singing. Bekiroglu et al (2013) undertook a randomised controlled trial comparing music therapy with relaxation in 60 older adults with hypertension living in a residential facility in Turkey. Participants were aged 60-89. A total 43% were female and 57% male. Over 70% were in receipt of social security, and

33.3% of intervention group and 30% of control group were illiterate. The music group listened to Turkish classical music while the control group had a relaxation session. The study assessed physiological responses and anxiety using the Hamilton anxiety scale (HAM A). No statistically significant change in HAM-A values was recorded after the intervention. However, the anxiety levels of participants at baseline may not have been sufficiently high enough to respond to music therapy and see a change. The study is limited to a single residential facility and contextual factors may have contributed to the results.

Haslam et al (2014) undertook a randomised controlled trial comparing three different reminiscence activities - story-telling, sharing secular song and sharing religious songs - with 40 older people living in residential facilities, including people receiving assisted care. The mean age of participants was 88.5. Reminiscence sessions took place twice a week for six weeks. The short form of the Geriatric Anxiety Inventory was used to index anxiety. Quality of life was measured using the Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985). The study also measured Religious identity, Identification with reminiscence group and identification with care community. No effects of reminiscence on the health and wellbeing of older people residing in care are reported, although the analysis suggests that the low level of group identification induced by random assignment to interventions could account for this result. The small sample size limits the significance of the findings. Further, the authors note that the sample was composed of people with relatively low levels of anxiety and that this may have limited the effects. Further, it is also possible that song conditions did not engage participants sufficiently to reminisce. Both of these studies suggest that music therapy and music based reminiscence may not produce significant changes in anxiety in older adults with low levels of anxiety.

Table 1: Characteristics of included studies H2 populations

Authors	Participant Description (include protected characteristics)	Music/singing intervention	Numbers of Participants	Wellbeing related outcomes	Wellbeing measures	Study Design	Conclusions	GRADE or CERqual judgement	DOI
Batt-Rawden (2006 and 2011)	Men (9) and women (13) aged 35-65 with long term illnesses (i.e. muscular disease, chronic fatigue, burnout, anxiety & depression, cancer or neurological disease). 13 were in receipt of disability pensions or rehab payments. n2 worked pt. n7 returned to work before the fieldwork. n7 recovered at the end of fieldwork	'Music and health promotion project' - interactive use of CD listening and choosing, intended as 'keepsakes' of the project.	22	The majority of the participants said that their self-awareness and consciousness of the significance of music in their life, and its vital link to health and quality of life, had been raised. The majority of the participants explained how music had contributed to a process of change, self-development or recovery. Music, agency and	Interviews to discover participants' life stories and stories of being well and being ill and to instigate narratives about music's role in supporting health. Eight in-depth ethnographic interviews per person. .	Qualitative, Longitudinal study (2005-2006), action-research, ethnography and grounded theory. The CD was designed to instigate participants' narratives and elicit discussion about how music could be used in health.	Taking part in the project resulted in an increase in self-awareness and self-consciousness. Listening to and discussing music was considered to be an important tool in the process of change, sense of agency and self-development, through enhancing wellbeing and 'wellness', a vital factor in the process of	Moderate	http://dx.doi.org/10.1097/01.mrr.0000210047.09668.4f http://dx.doi.org/10.1177/1403494810393555

and returned to pt or ft work.			recovery: Several participants claimed that this project had inspired them to act socially in different ways, thus contributing to their recovery and healing. Some decided to attend more concerts, some said they would like to create music appreciation groups and others that they would like to be more active in 'musicking' themselves, by taking part in a choir or music group.			recovery and sustaining quality of life, despite of illness.			
Bekiroglu (2013)	Adults aged 60 - 89 with hypertension living in a	Music group listened to Turkish classical music, for 25 minutes a day for 28 days. The control	60 (30 per group)	Data obtained from either the music or the control group	Physiological measures plus Hamilton anxiety scale (HAM A).	Parallel group, randomized controlled	No significant wellbeing outcomes	Low	http://dx.doi.org/10.1016/j.ctim.2013.03.005

	residential facility in Turkey. 43% were female, 57% male. 33.3% of intervention group and 30% of control group were illiterate and over 70% were in receipt of social security.	group had relaxation sessions.		demonstrated no statistically significant decrease in HAM-A values, discarding the possibility that music or resting alone exclusively influences anxiety state of the patients.		trial comparing music therapy with relaxation.			
Benismon et al (2008 and 2012)	6 men (20-23 yrs) who experienced traumatic events during military service and were diagnosed as chronically suffering from PTSD.	Group drumming	6	Some reduction in PTSD symptoms was observed following drumming, especially increased sense of openness, togetherness, belonging, sharing, closeness, connectedness and intimacy, as well as achieving a non-intimidating	Measured subjective wellbeing from interview responses	Case Study	Evidence that drumming can help to deal with a complicated syndrome like PTSD, addressing negative feelings, removing barriers and increasing intimacy among participants. Drumming improvisations brought them	Low	http://dx.doi.org/10.1016/j.aip.2007.09.002 http://dx.doi.org/10.1016/j.aip.2012.03.005

				access to traumatic memories, facilitating an outlet for rage and regaining a sense of self-control.			back to the traumatic event in a protected environment and elicited empathic responses from the group. When the GMT sessions ended, all the participants provided positive feedback about the GMT and its influence on their daily lives.		
Chen (2009)	Wheel chair using residents aged over 65 in a nursing home Taiwan. Participants were 11 females and 6 males, mean age 80.5 years (range = 70—90 years), and all had chronic illnesses. Nine	Group music therapy sessions of one hours duration repeated weekly for 3 months.	17	Two major themes: strength derived from the group dynamic, and enhanced quality of life. The elderly participants described their mood as having changed	Discussion of experiences of group music therapy.	Focus groups	Evidence that music therapy can improve mood in elderly nursing home residents.	Low	http://dx.doi. org/10.1016./j. ctim.2009.03.002

	participants (52.9%) had not received any formal education, but were able to speak and understand Mandarin. The remaining 47.1% had received primary education			from mostly depressed to happy and cheerful.					
Chen (2015)	Mostly female nursing students in a college in Taiwan. Participants were aged 16-20 with Depression Mood Self-Report Inventory for Adolescence (DMSRIA) scores of 8 points or higher.	The music group received 40 min of Chinese five-element music therapy, listening to recorded music twice a week for 10 weeks. The control group maintained their routine lifestyles and activities with no music therapy.	80: 40 in each group. Post project data were available for 31 in intervention group and 40 in control group.	Depression decreased significantly in the music group by just under 6 points (P<0.001).	Depression Mood Self-Report Inventory for Adolescence	Randomized controlled trial	Evidence that Chinese music therapy decreases depression in nursing students in a college environment.	High	http://dx.doi.org/10.1111/ijn.12236

| Haslam et al (2014) | 40 older people living in residential facilities including people receiving assisted care. Mean age 88.5-88.5. | 12 30 minute reminiscence sessions, two per week over six weeks. *Story group* - talking about past memories and experiences with others in the group. *Secular Song Group* participants shared and sang along to popular music from particular decades. *Religious Song Group* –as above but the songs were religious in content. | 40 across three reminiscence groups (14 in story group, 13 in secular song group, 13 in religious song group). | No effects of reminiscence on the health and wellbeing of older people residing in care are reported. Low level of group identification induced by random assignment to interventions may account for this result. | The short form of the Geriatric Anxiety Inventory was used to index anxiety. Quality of life was measured using the Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985) The study also measured *Religious identity, Identification with reminiscence group and identification with care community.* | Randomized controlled trial | No significant wellbeing outcomes reported. | Low | http://dx.doi.org/10.1080/13607863.2013.845871 |
| Hays (2006) | Men and women aged over 60 from various backgrounds, affiliations and exposure to | Music listening, amateur and professional music making. | 15 in focus groups, 38 interviews. | The data showed that music had meaning and importance in many ofthe informants' | Subjective wellbeing as defined by participants | Focus groups and interviews, inductive thematic analysis. | The meaning of music was closely related to the participants' sense of self and identity, | Low | http://dx.doi.org/10.1300/J027v25n03_04 |

	music. Study was in urban and rural locations in Australia. 19 males and 19 females took part in interviews. 14 informants had no musical training, 12 were amateur musicians and 12 were formerly professional musicians			lives. The identified themes included wellbeing, connection, independence and spirituality.			how they experienced emotions, communicated feelings and emotions to others, and ultimately used music as a medium to improve their own wellbeing.		
Kim (2011)	Post-stroke patients, within six months of onset and mini mental status examination (MMSE) score of over 20, who were admitted to the Department of Rehabilitation Medicine of Gangnam	Music group received eight music therapy sessions twice a week for four weeks while nine patients in the control group did not receive music therapy.	18 – 9 in each group.	Results:BAI and BDI scores showed a greater decrease in the music group than the control group after music therapy, but only the decrease of BDI scores were statistically significant	Beck Anxiety Inventory (BAI) and Beck Depression Inventory (BDI). Satisfaction with music therapy was evaluated by a questionnaire.	Intervention and non-random control groups	Evidence that music therapy has a positive effect on mood in post-stroke patients and may be beneficial for mood im-provement with stroke.	Low	http://dx.doi.org/10.3349/ymj.2011.52.6.977

				(p=0.048). Music therapy satisfaction in patients and caregivers was affirmative.					
Lord (2012)	Patients with COPD attending respiratory clinics in a UK NHS Trust.	Singing classes held twice weekly for 8 weeks led by a professional singing teacher. Film workshops were held once weekly and co-ordinated by a film-studies graduate.	150 out of 183 patients who were invited declined to take part. The study included 33 patients (18 in the intervention group and 15 in the comparison group. Complete data were available for 24 participants (13 in the singing group and 11 in the film group)	Both groups showed improvements in the mental component score of the SF-36: singing +9.3(25.3) vs Film +4.3(9.0) (p=0.41). Participants reported multiple benefits in terms of general wellbeing including mood and pleasure, social support, achievement and efficacy.	Physiological measures. Wellbeing was assessed using HADS and SF-36 at baseline and post intervention. Structured post intervention interviews (9) assessed participants' perceptions of benefits of the sessions.	RCT comparing singing classes with film club	Singing classes were associated with clinically important physical improvements while both singing and attending a film club were associated with improvements in wellbeing and were reported as enjoyable by participants.	Low	http://dx.doi. org/10.1186/ 1471-2466-12-69

Skingley (2013) (see also Morrison 2013)	People with varying degrees of severity of COPD who were able to travel to community venues in the South East of England	36 week programme of weekly singing sessions of 90 minutes duration delivered to groups ranging in size from 20 to 50, including supporters (40%). There was a workshop/performance events at the end of each "term." Sessions included time for socialising as well as relaxation, breathing, vocal exercises and singing a varied repertoire. Songs were taught by ear and were sung mainly without accompaniment.	Written feedback from 97 participants was recorded.	No change was detected in the generic mental or physical components of quality of life (SF-12) at the end of the study. However, participants reported benefits including relaxation, distraction, reduction in anxiety, spiritual uplifting and improvements in mood, emotional wellbeing, confidence, enjoyment and a 'feel good factor.'	Self-reported quality of life (York SF-12) and written comments responding to questions about positive and negative experiences. Data collection at the three time points: baseline, mid-point and end-point.	Pre-test, post-test feasibility study with a nested qualitative component. Content and thematic analysis.	Evidence of personal and social wellbeing outcomes from group singing for people with COPD.	Moderate	http://dx.doi.org/10.1080/17533015.2013.840853 (10.1093/Eurpub/ckt123.059)
Sun & Buys (2012)	Aboriginal and Torres Strait Islander Australians with chronic diseases	Weekly rehearsals of two hours duration for 12 months. Classes included warm-up exercises of the body, breathing techniques, and releasing	133 patients recruited. Intervention group: 62 at baseline assessment,	Statistically significant improvements in intervention group compared with controls for	Singing-related QoL questionnaire at baseline and 12 months.	Intervention and control groups	Evidence that a 12-month community singing program improves QoL	Low	http://dx.doi.org/10.1515/ijdhd-2012-010

recruited from five community-controlled health services (CCHSs) in South-East Queensland in Queensland, Australia.	tension, which are then followed by singing rehearsals. Patients were encouraged to practice at home. Control group received usual care.	45 at 12-months. Control group: 71 at baseline, 27 at 12 months.	singing-related mental and physical health aspects of QoL and positive affect ($p < 0.001$ and $p < 0.001$, respectively). In the singing group, there are overall reductions in stressful events, depression level, sense of social isolation, and loneliness, as compared with the control group, although this difference did not reach statistical significance. Over the intervention period, significant positive correlations were			in participants with chronic disease. Furthermore, a relationship was found between improved QoL and social and emotional wellbeing as assessed by stress, social isolation, and loneliness		

				demonstrated between singing-related QoL and social isolation, loneliness and total stress score.					
Sun et al (2013)	Chinese older adults, aged 51-85 (mean 61.9), the majority of whom presented with risk factors for chronic diseases. 34% reported completing junior high-school education and 39.9% reported completing senior high-school education.	Four different meditative programmes experienced over a 15-month period. There were four intervention groups and one control group. The four intervention groups were Tai Chi, latin dancing, playing a musical instrument and singing. Participants in the control group joined the activity groups to participate in classes in Chinese literacy, history and computing.	750 (88.5% of those surveyed)	Participants in TC, dancing and choral singing groups showed significant differences in all health benefits and resilience outcome data in comparison with the control group. The average effect size in the four meditative groups was medium for health benefit outcomes and small for resilience outcomes.The TC group had a large effect size,	Self-completed health benefit questionnaire including wellbeing dimensions: control of negative emotions and anger; social participation; psychological health including stress reduction and relaxation and spiritual health and life purpose, relating to areas of enjoyment, meaningfulness; and self-esteem. Depression measures. The	Case-controlled design. After they had chosen their preferred intervention, each participant was matched with regard to their medical condition to a participant in the control group.	Evidence that meditative programmes using arts are effective in preventing depression and promoting quality of life and resilience among older adults. However, it is clear that the type of intervention should be tailored to the specific needs of the individual. Playing a musical instrument and	Moderate	http://dx.doi.org/10.1080/14623730.2013.842337

| | | | | the singing group had a medium effect size and the dance and instrument groups had small effect sizes in the overall health benefit outcomes. In the resilience measure, there was a medium-level effect in the TC group and a small effect in the dance, instrument and singing groups. There were significant differences in depression scores: all meditative groups had a lower incidence of depression (2.5 – 7.5%) | General Health Questionnaire (GHQ30) study. Resilience scale (Fribor et al. 2003). | | singing can reduce depression symptoms and improve psychological health. | | |

				than the control group (10.1%), and the TC and dancing groups had the lowest depression rate among the four intervention groups.					
Tamplin et al. 2013	Participants in a community choir for people living with aphasia following a stroke	Weekly two hour rehearsal with a performance at 12 weeks	8 (13 for whom baseline quantitative data were collected)	Choir participants reported increases in confidence, the development of peer support networks and enhanced mood.	Interview explored experience of being in a choir	Qualitative: interviews	Evidence that participants report wellbeing benefits from singing in a community choir.	Low	http://dx.doi.org/10.3233/NRE-130916
Warth (2015)	Cancer patients receiving palliative care in hospital in Germany. Mean age = 63.0 (± 13.4) years, 71.4% were female.	Two 30 minute music therapy sessions using voice and improvising with a monochord (a string instrument developed for therapeutic purposes) as well as mindfulness given two days apart. Control group participants were given a mindfulness	84 were recruited. Complete pre and post intervention data were available for 68.	Self-rated relaxation and wellbeing scores showed significantly greater increases in the music therapy group compared to the control group (p <0.001 and p = 0.013	Visual analog scales (VAS) ranging from 0 to 10 were used for subjective assessment of relaxation and general wellbeing, measures were taken at baseline	RCT comparing music therapy and relaxation.	Evidence that brief music therapy is an effective intervention to support wellbeing and relaxation of palliative care patients in an oncology setting.	High	http://dx.doi.org/10.3238/arztebl.2015.0788

		exercise using headphones.		respectively). Number-needed-to-treat analysis revealed that for one person to have a favourable outcome it was necessary to administer music therapy to 2.80 and 5.25 patients (for relaxation and wellbeing respectively).	and post intervention. Differences between sessions 1 and 2 were analyzed using paired sample t-tests. The study hypotheses were tested using analyses of covariance (ANCOVA), with the pre-intervention score as covariate and the post-intervention score as the dependent variable.				
Wlodarczyk (2007)	Hospice patients in a facility in the south eastern United States.	30 minute session of music therapy compared with 30 minute non music visit.	10	Significant improvements in the intervention periods compared with the control periods ((N= 10, d= 1, p = .01). Patient reports of the	Spirituality questionnaire.	Patients acted as own controls, random allocation to ABAB or BABA conditions	Evidence that music therapy can contribute to improved spiritual wellbeing in hospice patients.	Low	http://dx.doi.org/10.1093/jmt/44.2.113

				intervention were positive.					
Wu (2002)	Undergraduate students at I-Shou University, Taiwan. All diagnosed with major or minor depression, anxiety and low self-esteem. 50% male and 50% female.	Two hour sessions of music therapy, including listening and improvisation, repeated once a week for 10 weeks.	28. 24 completed the study.	For the music therapy group mean anxiety scores were 43.25 at pretest, 33.75 at posttest and 33.83 at follow up. For the intervention group mean scores were 41.83, 40.42 and 41.08 respectively. At follow up, significant differences in anxiety (and in anxiety and depression at two months follow up) were found for the music therapy group relative to the control group (P<.01 in both instances).	Zung Self-Rating Depression Scale (SDS) 10-item scale Zung Self-Rating Anxiety Scale (SAS) 20-item scale Self-esteem scale (SES) (Rosenberg 1965) 10-item scale. Measures taken at base line, post intervention and at two month follow up.	RCT comparing music therapy	Music therapy can alleviate anxiety in undergraduate students.	Low	http://doi.org/ 10.2117/psysoc. 2002.104

Table 2 Numerical Results (studies on H2 populations)

Authors (date)	Intervention	Outcome description	Follow up 1		Follow up 2 (if reported)		Comments/Issues
			Intervention Numbers Means (SD) / %	**Control** Numbers Means (SD) / %	**Intervention** Numbers Means (SD) / %	**Control** Numbers Means (SD) / %	
Augé (2015)	90 mins weekly music therapy session x 8 weeks	-Hospital Anxiety and Depression Scale (HADS) -Profile of Mood States (POMS-A) -Quality of Life Survey of the European Organization for Research and Treatment of Cancer (EORTC-QLQ-30) -a valuation numeric scale to measure anxiety, sadness and physical discomfort (11 pt scale: 0 no symptoms, 10 unbearable).	N= 8 HADS: no sig diff. POMS-A: sig variation at the end of each session in almost all variables (tension, fatigue, depression, anger, vigour). Tension presents a higher reduction (p<0.05) and vigour is the only one which presents a negative difference (being the only positive variable). EORTC-QLQ-30: no representative results	N/a (pre post)	n/a	n/a	Low -only 8 female pts (out of 11 initially)
Batt-Rawden (2011)	Musical health promotion (self-	Interviews (8 per person) to discover participants life stories and stories of	Qualitative	Qualitative	n/a	n/a	Low

	selected music on CDs)	being well and being ill and to instigate narratives about musics role in supporting health.					-ungeneralizable sample (SE region in Norway). -may not have been long enough for lifestyle change to happen -Observer effect -12 pts already had an active involvement in music (2 were professional musicians)
Benismon (2010) (also in H1 numerical table)	Weekly MP sessions (a therapeutic tool - people in a group present themselves through musical pieces of their choice and receive feedback from their peers).	-The Purpose in Life test (PIL) (High scores indicate the presence of purpose in life). -The Self-Consciousness Scale (SCS) (from 0 (extremely uncharacteristic) to 4 (extremely characteristic)).	N=24 (11 students, 13 drug abusers) S pts - higher PIL after the procedure. [F(1,24)=13.99, p<0.01, n2=0.37] And higher SCS [F(1,24)=24.75, p<0.001, n2=0.51] DA pts - higher PIL after the procedure [F(1,24)=12.02,p<0.01,n2=0.33]. No diff in SCS, [F(1,24)=1.36,p>0.10,n2=0.05]	N=28 (15 students, 13 DA) S pts – no increase in PL or SCS DA pts - no increase in PL or SCS	n/a	n/a	Moderate -Quasi-experimental
Benismon (2012)	16 x 90 min weekly group music therapy sessions.	interviews	N=6 Qualitative	n/a	n/a	n/a	Moderate -6 pts completes -all young men
Bekiroglu (2013)	Listen to Turkish classical music. 25 min/day x 28 days	-face-to-face Hamilton anxiety scale (HAM-A). Scored on a scale of 0 (not present) to 4	N= 30 -no statistically significant decrease in HAM-A values (mean reduction in	N= 30 -no significant change in HAM-A values (mean reduction in HAMA-	n/a	n/a	Low -baseline anxiety levels may not be sufficiently high

		(severe), with a total score range of 0—56, higher points indicate higher anxiety levels	HAMA-A was 1.63, Student t test, paired, P=0.057). –no difference between the control and the music therapy groups on day 28 (Student t test, unpaired, P=0.084). -The baseline adjusted between treatment group difference was not statistically significant (95% CI 0.82—1.92) (Student t test, unpaired, P=0.501).	A was 0.77 Student t test, paired, P=0.440).			enough to respond to music therapy to see a change. - control was to rest and sit for 25mins/day x 28 which may not be a good comparison
Haslam (2014)	12 30min reminiscence sessions (2/wk x 6 wks) -Story group: focus on talking about past memories and experiences in group. -Secular Song Group: share and sing along with popular music from particular decades. -Religious Song Group– Same as above but songs were religious	-cognition (Self-Administered Gerocognitive Examination (SAGE) -anxiety (The short form of the Geriatric Anxiety Inventory) -Quality of life (Satisfaction with Life Scale)	N= 26 (13 religious, 13 secular) Mean (SD) Religious Sage: pre 0.29 (0.66) post 0.25 (0.86) GAI: pre 0.58 (1.4) post 0.92 (1.3) SLS: pre 3.8 (0.67) post 4.0 (0.62) Secular Sage: pre 0.18 (1.1) post 0.32 (1.1) GAI: pre 0.84 (0.98) post 0.46 (0.87) SLS: pre 4.5 (0.48) post 4.6 (0.37)	N= 14 Sage: pre 0.13 (1.1) post -0.04 (1.0) GAI: pre 0.86 (1.2) post 1.2 (1.7) SLS: pre 3.9 (0.73) post 3.9 (0.89)	n/a	n/a	Low -Small sample size. -Excluded pts with sign levels of emotional and mood disturbance - possible song conditions not engaging participants sufficiently to reminisce.

Chen (2015)	40 min of Chinese five-element music therapy (played on CD in a group, sitting in chairs) 2x wk for 10 wks	Depression Mood Self-Report Inventory for Adolescence (DMSRIA)	N= 40 at start (31 at end) Mean (SD) DMSRIA: pre 15.52 (1.59) post 9.82 (3.87) (paired t-test comparing pre and post p=0.001) covariance between the groups also sig (F[1, 68] = 66.14;P<0.001)	N=40 at start and end DMSRIA: pre 15.03 (1.88) post 15.53 (2.08) (paired t-test comparing pre and post p=0.140)	n/a	n/a	High
Chen (2009)	Music therapy	Qualitative - transcripts of the audiotaped interviews were analysed	Qualitative	Qualitative	n/a	n/a	Moderate Small sample, no control
Kim (2011)	Music therapy	-Anxiety (Beck Anxiety Inventory (BAI)) -depression (Beck Depression Inventory (BDI))	N= 9 Mean (SD) BAI: pre 9.2 (4.0) post 9 (4.3) BDI: pre 14.8 (6.4) post 12.4 (4.6) (decrease in BDI sig p=0.048)	N= 9 BAI: pre 9.2 (4.0) post 9.2 (2.6) BDI: pre 10.9 (2.5) post 11.1 (2.5)	n/a	n/a	Moderate -self selected groups not random -small sample -not blinded
Skingley (2013)	Weekly group singing sessions x 36 weeks	Self-reported QoL	N=97 Qualitative results	n/a			Med/low -self selected group -no control group -response bias
Sun (2012)	Weekly rehearsals: 2 hours long for 12 months. Classes included warm-up exercises of the body, breathing techniques, and releasing tension, which are then	Singing-related QoL questionnaire at baseline and 12 months: Evidence that a 12-month community singing program improves QoL in participants with chronic disease. When the	N = 45 Baseline (SD) / mean change (SE) / p-value **Singing related QoL** 10.33 (8.50) / -6.70 (1.33) / 0.001 **Singing related Positive effect** 23.96 (18.87) / -14.75 (2.96) / 0.001 **Resilience** 3.28 (1.53) / -0.20 (0.27) / 0.47	N = 27 Basel (SD) / m-change (SE) / p-value / p-value [b] **Singing related QoL** 2.57 (5.47) / 1.29 (1.57) / 0.41 / 0.001 **Singing related Positive effect** 6.04 (12.70) / 3.03 (3.65) / 0.41 / 0.001 **Resilience** 2.97 (2.16) / -0.84 (0.43) / 0.56 / 0.42			Low: cannot determine what component of singing is responsible for the observed benefits. a clinical evaluation of the patients was not undertaken.

	followed by singing rehearsals. N = 45 intervention, N = 27 control.	singing group was compared with usual care alone, statistically significant improvements were seen, with increases in singing-related mental and physical health aspects of QoL and positive affect (p<0.001 and p<0.001).	**Social Isolation** 27.90 (17.78) / 4.16 (4.41) / 0.35 **Loneliness** 20.66 (9.05) / 0.32 (3.32) / 0.93 **Stress total score** 2.45 (2.64) / 0.48 (0.47) / 0.32	**Social Isolation** 25.13 (13.04) / 2.88 (3.49) / 0.41 / 0.65 **Loneliness** 24.88 (11.71) / 0.06 (3.49) / 0.99 / 0.26 **Stress total score** 2.97 (2.16) / -0.31 (0.74) / 0.67 / 0.11		Sample size of patients with cardiac disease is small.

| Sun (2013) | Four different meditative programmes experienced regular activity over a 15-month period. There were four intervention groups and one control group. The four intervention groups were Tai Chi, Latin dancing, playing a musical instrument and singing. | Participants self-completed health benefit questionnaires: Playing a musical instrument and singing can reduce depression symptoms and improve psychological health. | Attribute:

Executive function
Social Skills
Psycho health
Spiritual
Physical
Self esteem
Average effect size
Family relationship
Self-efficacy
Social Skills
Friend Support
Planning and goals
Self esteem
Bounce back
Average effect size | Music (N = 98)

74.22 (12.75) / 0.09 effect *d*
31.11 (5.35) / 0.13
29.77 (3.89) / 0.32
33.58 (4.45) / 0.16
9.23 (1.63) / 0.09
22.96 (3.76) / 0.19
0.16
39.54 (4.38) / 0.21
33.37 (4.48) / 0.17
35.72 (5.38) / 0.17
34.16 (3.88) / 0.15
14.08 (1.92) / 0.02
22.96 (3.76) / 0.19
7.05 (1.36) / 0.18
0.15 | Singing (N = 198)

81.74 (12.72) / 0.50
33.85 (4.67) / 0.41
30.75 (3.49) / 0.57
35.35 (3.93) / 0.57
9.97 (1.50) / 0.54
24.82 (3.20) / 0.70
0.55
40.56 (4.10) / 0.02
34.45 (4.40) / 0.07
37.81 (4.85) / 0.21
35.34 (3.49) / 0.155
14.40 (1.95) / 0.14
24.82 (3.20) / 0.70
7.20 (1.15) / 0.308
0.22 | Control (N = 279)
No effect size *d* scores
75.36 (12.71)
31.81 (5.25)
28.39 (4.81)
32.84 (4.88)
9.09 (1.79)
22.19 (4.29)

40.47 (4.56)
34.15 (4.64)
36.68 (5.76)
34.76 (4.22)
14.12 (2.21)
22.19 (4.29)
6.79 (1.57) | Moderate: QoL and resilience were assessed using a self-administered questionnaire, meaning that the results may be somewhat subjective. |

Tamplin (2013)	Weekly two hour choir rehearsal with a performance at 12 weeks	Evidence that participants report wellbeing benefits from singing in a community choir.	Qualitative N = 13 at baseline, 10 at follow up, 9 at 20 week follow up.			Low: small number of participants, and lack of a control group.
Hays (2006)	Music listening, amateur and professional music making.	The meaning of music was closely related to the participants' sense of self and identity, how they experienced emotions, communicated feelings and emotions to others, and ultimately used music as a medium to improve their own wellbeing	Qualitative - 15 in focus groups, 38 interviews			Low
Wlodarczyk (2007)	30 minute session of music therapy compared with 30 minute non music visit.	Spirituality questionnaire: Evidence that music therapy can contribute to improved spiritual wellbeing in hospice patients.	Significant improvements in the intervention periods compared with the control periods ((N= 10, d= 1, p = .01). **Overall mean scores** Music visit: 78.5 Non music visit: 73.95			LOW: small sample, only one short music session.
Wu (2002)	Experimental group provided with 20 hours of music therapy.	Quantitative and qualitative analyses to evaluate effects - Zung Self-Rating Depression Scale (SDS) 10-item scale	N – 12 **Anxiety** Pre: M = 43.25 SD = 4.25 Post: M = 33.75 SD = 8.53 Follow up: M = 33.83 SD = 7.46 **Depression**	N = 12 **Anxiety** Pre: M = 41.83 SD = 5.75 Post: M = 40.42 SD = 4.36 Follow Up: M = 41.08 SD = 5.16 **Depression**		Low – Hawthorne effect. Internal feedback of internal inventory (participants not

		Zung Self-Rating Anxiety Scale (SAS) 20-item scale Self-esteem scale (SES) (Rosenberg 1965) 10-item scale: No significant reduction of depression and self-esteem Some reduction of anxiety	Pre: 45.17 (5.94) Post: 40.42 (6.91) Follow up: 38.50 (6.16) **Self-esteem** Pre: 28.42 (5.46) Post: 33.00 (5.38) Follow up: 33.83 (6.12)	Pre: 42.33 (5.96) Post: 42.58 (7.29) Follow up: 42.25 (5.24) **Self esteem** Pre: 33.83 (6.73) Post: 34.33 (5.84) Follow up: 34.67 (5.77)			wishing to explain no improvement so opted for 'improvement) Limitation to one university
Morrison (2013)	Weekly group singing programme was undertaken over the period September 2011 to June 2012.	*York SF-12: Baseline 65, physical*, r=0.78, mental, r=0.43. Lack of change in their mental health status after the intervention.	N 65; Baseline 65.61 (17.96), End of programme 68.86 (18.99) Mean difference 3.24 (-1.2; 7.68), p value 0.150	No comparator			Low: no control
Warth (2015)	Two 30-minute music therapy sessions using voice and improvising with a monochord (a string instrument developed for therapeutic purposes) as well as mindfulness given two days apart.	Evidence that brief music therapy is an effective intervention to support wellbeing and relaxation of palliative care patients in an oncology setting. Self-rated relaxation and wellbeing scores showed significantly greater increases in the music therapy group compared to the control group (p<0.001 and p = 0.013). There were no	N =42 Before / After / Δ **VAS relaxation (0-10)** 5.72 (1.97) / 7.90 (1.39) / 2.17 (1.47) **VAS wellbeing (0-10)** 5.22 (1.85) / 7.11 (1.70) / 1.88 (1.63) **VAS pain** 2.95 (2.30) / 2.45 (2.10) / -0.50 (1.27) **QoL overall (0-100)** 29.6 (21.3) / 40.4 (20.9) / 10.6 (19.6) **QoL fatigue (0-100)** 87.8 (19.3) / 80.4 (23.2) / -7.41 (20.8)	N =42 Before / After / Δ **VAS relaxation (0-10)** 6.00 (1.54) / 6.98 (1.63) / 0.99 (1.17) **VAS wellbeing (0-10)** 5.64 (1.54) / 6.55 (1.69) / 0.91 (1.60) **VAS pain** 2.89 (2.17) / 2.57 (2.16) / -0.31 (1.34) **QoL overall (0-100)** 23.0 (25.2) / 30.6 (24.4) / 7.54 (23.0) **QoL fatigue (0-100)** 93.7 (13.5) / 91.8 (13.9) / -1.85 (15.1)			Moderate

		significant differences in pain perception between the groups (*p* = 0.53)			
Lord (2012)	Singing classes held twice weekly for 8 weeks led by a professional singing teacher.	Physiological measures. Wellbeing was assessed using HADS and SF-36 at baseline and post intervention. Structured post intervention interviews (9) assessed: Singing classes were associated with clinically important physical improvements while both singing and attending a film club were associated with improvements in wellbeing	Both control and intervention showed significant improvements in the mental component score of the SF-36: **singing +9.3(25.3) vs Film +4.3(9.0) (p=0.41).** There was a significant difference between the response of the physical component score favoring the singing group **+12.9(19.0) vs -0.25(11.9) (p=0.02)**		Low: Difficulties in recruitment: singing may be beneficial to those who believe it to be helpful. Singing group met twice weekly, film group met once weekly. Short singing sessions.

Discussion

Of the 16 studies reviewed here, 14 show evidence for a range of wellbeing outcomes from music and singing for adults with mental and physical health conditions across the life course. The heterogeneity of the studies and the plethora of measures used makes it difficult to synthesise the findings. Instead, we have presented a narrative review. In summary, the evidence points to wellbeing outcomes including reduced depression and anxiety in people of all ages.

In relation to adults with adults with chronic conditions such as stroke, COPD and cancer, the studies report reduced stress and improved wellbeing across a range of outcomes. These include:

- *Personal wellbeing*: mood, enjoyment, pleasure, self-awareness, self-esteem, efficacy, quality of life, happiness.emotional wellbeing.
- *Artistic and cultural dimensions of wellbeing*: achievement, confidence,
- Dimensions of wellbeing related to health conditions: distraction, reduced stress, relaxation and spiritual wellbeing.
- *Social dimensions of wellbeing*: group dynamic, social support, relationships and connection with others.

Qualitative themes

In Volume 1 we identified three dimensions of subjective wellbeing reported in studies. These included *personal wellbeing,* s*ocial wellbeing* and *self-identity.* Similar themes were reported in the H2 studies.

The qualitative findings were:

- Music is often meaningful and important to participants. People with chronic conditions who take part in music and singing projects report personal wellbeing benefits including relaxation, distraction, reduced anxiety, improvements in mood, emotional wellbeing, confidence and enjoyment.

-

- Participants with chronic conditions who take part in music and singing projects experience positive group processes and enhanced relationships, experiencing bonding, sharing and connection with others.

- Music and singing projects can encourage behaviour change, such as attending more concerts and joining groups, which can in turn can lead to improved wellbeing in people with chronic conditions.

- Participation in music and singing projects can lead to increased self-awareness and consciousness of the relationship between music, health and quality of life for people with chronic conditions.

Summary of key findings

There is high quality evidence that:

Targeted, culturally relevant music interventions can decrease depression in nursing students in a college environment.

Brief music therapy is an effective intervention to support wellbeing of palliative care patients in hospital settings.

There is moderate quality evidence that:

Targeted, culturally relevant music interventions, including playing a musical instrument and singing, can decrease depression in older people with chronic conditions in residential and community settings.

Participants report a wide range of wellbeing benefits from singing including relaxation, distraction, reduction in anxiety, spiritual uplifting and improvements in mood, emotional wellbeing, confidence, enjoyment and a 'feel good factor.'

Participation in a music project can raise participants' awareness of the significance of music in their life. This in turn can have a positive effect on awareness of health and quality of life and can encourage behaviour change.

There is low quality evidence that:

Participation in group drumming can support participants dealing with symptoms of PTSD.

Singing classes are associated with improvements in wellbeing in patients with COPD.

Music therapy has a positive effect on mood in post-stroke patients and may be beneficial for mood improvement with stroke.

Participation in extended (12 months) community singing programmes can improve quality of life and social and emotional wellbeing in adults living with chronic conditions.

Music therapy can contribute to improved spiritual wellbeing in hospice patients.

Music therapy can alleviate anxiety in undergraduate students.

Completeness of the included evidence

As we noted in Volume 1, a challenge for this review has been the large number of hits following searches for music and singing interventions that support wellbeing. Further, there is some overlap between the H1, H2 and U populations and also some overlap between music and singing interventions for wellbeing and those that are linked with clinical procedures. In view of these challenges it is possible that some relevant evidence has not been included in this report.

Quality of the included evidence

The application of GRADE and CERQual criteria led to the assessment of studies as low quality, moderate quality and high quality. In relation to quantitative research, the highest grades are given to well-designed studies such as randomised trials where there is consideration of treatment and comparison conditions, intervention fidelity, sampling, attrition, control of cofounding factors, measurement validity and reliability, analysis and treatment of missing data. In relation to qualitative research, the highest grades are given to well-designed studies that consider recruitment, sampling, data collection, data analysis, reflexivity, ethics and value. A high rating indicates that the findings are a reasonable representation of the phenomenon of interest.

Of the 16 studies included in this review there were two high quality studies (both RCTs) and three moderate quality studies, including one quantitative study and two qualitative studies. The remaining 9 studies were judged to be low quality. Methodological limitations in the quantitative studies included small sample sizes (sample sizes ranged from 10 to 750) with insufficient numbers of participants in the intervention and control groups, lack of randomisation, problems of attrition and missing data, and specificity of the setting making it difficult to generalise results. Limitations in the qualitative studies included lack of consideration given to sampling, weaknesses in data collection and analysis, including representation of qualitative themes using language that would be more appropriate for quantitative research, and lack of critical reflection, for example, only reporting positive experiences of music and singing interventions.

Strengths and Limitations of the review process

The comprehensive search strategy ensures that this overview represents a comprehensive summary of all existing eligible studies published prior to the search dates and the pre-publication of our protocol on PROSPERO ensures methodological transparency and militates against potential post-hoc decision making which can introduce bias to the process. Dual screening of searches and data extraction and independent quality assessment of included reviews ensured a rigorous process.

Taking published studies as the sole evidence increases the potential risk of publication lag, wherein possible important new evidence that has not yet been included in published reports is not identified and included. However, the grey literature review (Daykin et al. 2016b) did include recent unpublished data from studies completed in the last three years.

The use of the GRADE and CERQual criteria introduces an element of subjective judgement. A consistent approach to judgements across the different interventions has been applied but it should be recognised that these judgements are open to interpretation.

Implications for practice

There is high quality evidence that targeted, culturally relevant music and singing interventions, including music therapy can enhance mental wellbeing of younger and older people with diagnosed conditions in specific contexts. There is moderate quality evidence that targeted, culturally relevant music and singing interventions can enhance mental wellbeing and decrease depression in older people with chronic conditions in residential and community settings. This reinforces the findings reported in Volume 1, which showed

convincing evidence that participatory music and singing programmes can help to maintain wellbeing and prevent isolation, depression and mental ill health in older adult age groups. Further, participants with a wider range of chronic conditions report wellbeing benefits from music and singing, including increased mental wellbeing, quality of life, self-awareness and behaviour change.

There is, therefore, evidence to support the development of policy and continuation of support for music and singing interventions for wellbeing outcomes for people with identified conditions. However, people respond differently to different singing and music interventions so these need to be carefully designed and targeted in order to maximise wellbeing outcomes for people with identified conditions.

Implications for research

A key challenge for establishing evidence in this field is the breadth and diversity of projects and research approaches. Studies included in this review encompass a wide range of music and singing activities in diverse delivery formats, often delivered in specific settings with particular characteristics. As well as addressing the methodological challenges of quantitative and qualitative research discussed above, situated research is needed to understand the impacts of music and singing in particular contexts.

References

Included Studies in H2 Report

Batt-Rawden, K.B., 2006. Music: a strategy to promote health in rehabilitation? An evaluation of participation in a 'music and health promotion project'. International Journal of Rehabilitation Research, 29(2), pp.171-173.

Batt-Rawden, K. and Tellnes, G., 2011. How music may promote healthy behaviour. Scandinavian journal of public health, 39(2), pp.113-120.

Bekiroğlu, T., Ovayolu, N., Ergün, Y. and Ekerbiçer, H.Ç., 2013. Effect of Turkish classical music on blood pressure: a randomized controlled trial in hypertensive elderly patients. *Complementary therapies in medicine*, *21*(3), pp.147-154.

Bensimon, M., Amir, D. and Wolf, Y., 2008. Drumming through trauma: Music therapy with post-traumatic soldiers. The Arts in Psychotherapy, 35(1), pp.34-48.

Bensimon, M., Amir, D. and Wolf, Y., 2012. A pendulum between trauma and life: Group music therapy with post-traumatized soldiers. *The Arts in Psychotherapy*, *39*(4), pp.223-233.

Chen, C.J., Sung, H.C., Lee, M.S. and Chang, C.Y., 2015. The effects of Chinese five-element music therapy on nursing students with depressed mood. *International journal of nursing practice*, *21*(2), pp.192-199.

Chen, S.L., Lin, H.C. and Jane, S.W., 2009. Perceptions of group music therapy among elderly nursing home residents in Taiwan. *Complementary therapies in medicine*, *17*(4), pp.190-195.

Haslam, C., Haslam, S.A., Ysseldyk, R., McCloskey, L.G., Pfisterer, K. and Brown, S.G., 2014. Social identification moderates cognitive health and wellbeing following story-and song-based reminiscence. *Aging & mental health*, *18*(4), pp.425-434.

Hays, T., 2006. Facilitating wellbeing through music for older people with special needs. *Home health care services quarterly*, *25*(3-4), pp.55-73.

Kim, D.S., Park, Y.G., Choi, J.H., Im, S.H., Jung, K.J., Cha, Y.A., Jung, C.O. and Yoon, Y.H., 2011. Effects of music therapy on mood in stroke patients. *Yonsei medical journal*, *52*(6), pp.977-981.

Lord, V.M., Hume, V.J., Kelly, J.L., Cave, P., Silver, J., Waldman, M., White, C., Smith, C., Tanner, R., Sanchez, M. and Man, W.D., 2012. Singing classes for chronic obstructive pulmonary disease: a randomized controlled trial. *BMC pulmonary medicine*, *12*(1), p.1.

Morrison, I., Clift, S., Page, S., Salisbury, I., Shipton, M., Skingley, A., Vella-Burrows, T., Coulton, S. and Treadwell, P., 2013. A UK feasibility study on the value of singing for people with chronic obstructive pulmonary disease (COPD). *UNESCO Obs*, *3*, pp.1-19.

Skingley, A., Page, S., Clift, S., Morrison, I., Coulton, S., Treadwell, P., Vella-Burrows, T., Salisbury, I. and Shipton, M., 2014. "Singing for Breathing": Participants' perceptions of a group singing programme for people with COPD. *Arts & Health*, *6*(1), pp.59-74.

Sun, J. and Buys, N., 2012. Participatory community singing program to enhance quality of life and social and emotional wellbeing in Aboriginal and Torres Strait Islander Australians with chronic diseases. *International Journal on Disability and Human Development*, *12*(3), pp.317-323.

Sun, J., Zhang, N., Buys, N., Zhou, Z.Y., Shen, S.Y. and Yuan, B.J., 2013. The role of Tai Chi, cultural dancing, playing a musical instrument and singing in the prevention of chronic disease in Chinese older adults: a mind–body meditative approach. *International Journal of Mental Health Promotion*, *15*(4), pp.227-239.

Tamplin, J., Baker, F.A., Jones, B., Way, A. and Lee, S., 2013. 'Stroke a chord': the effect of singing in a community choir on mood and social engagement for people living with aphasia following a stroke. *NeuroRehabilitation*, *32*(4), pp.929-941.

Warth, M., Keßler, J., Hillecke, T.K. and Bardenheuer, H.J., 2015. Music therapy in palliative care: a randomized controlled trial to evaluate effects on relaxation. *Deutsches Ärzteblatt International*, *112*(46), p.788.

Wlodarczyk, N., 2007. The effect of music therapy on the spirituality of persons in an in-patient hospice unit as measured by self-report. *Journal of Music Therapy*, *44*(2), pp.113-122.

WU, S.M., 2002. Effects of music therapy on anxiety, depression and self-esteem of undergraduates. *Psychologia*, *45*(2), pp.104-114.

Appendix 1: Reasons for exclusions in the H2 (not dementia) category

Authors	Year	DOI	Reason for Exclusion (see legend next page)
Allen J.	2010	n/a	Study design
Auge, Mercadal-Brotons & Resano	2015	http://dx.doi.org/10.5209/rev_PSIC.2015.v12.n1.48907	Comparator
Baker, Felicity Anne; Rickard, Nikki; Tamplin, Jeanette; Roddy, Chantal	2015	http://dx.doi.org/10.3389/fnhum.2015.00299	Comparator
Batavia,A. I.; Batavia,M.	2003	http://dx.doi.org/10.1080/0963828021000031025	Study design
Erkkila, Jaakko; Punkanen, Marko; Fachner, Jorg; Ala-Ruona, Esa; Pontio, Inga; Tervaniemi, Mari; Vanhala, Mauno; Gold, Christian	2011	http://dx.doi.org/10.1192/bjp.bp.110.085431	Population
Hanser, S.B., Bauer-Wu, S., Kubicek, L., et al.,	2006	http://dx.doi.org/10.2310/7200.2006.014	Population
Lipe,A. W.;Ward,K. C.;Watson,A. T.;Manley,K.;Keen,R.;Kelly,J.;Clemmer,J.	2012	http://dx.doi.org/10.1016/j.aip.2011.11.002	Comparator
Lord,V. M.;Cave,P.;Hume,V. J.;Flude,E. J.;Evans,A.;Kelly,J. L.;Polkey,M. I.;Hopkinson,N. S.	2010	http://dx.doi.org/10.1186/1471-2466-10-41	Population
Mandel, Susan E.; Davis, Beth A.; Secic, Michelle	2014	http://dx.doi.org/10.1080/00185868.2014.906830	Population
McCaffrey, R	2011	http://dx.doi.org/10.1136/ebn1148	Study design
Mezey, G.; Durkin,C.; Krljes, S.	2015	http://dx.doi.org/10.1080/14789949.2015.1069881	Population
Sekhon, P.;Piccoud,I.;Wadibia,M.; Soni,S.; Dhairyawan, R.	2014	n/a	Study design
Stordahl, J.	2009	n/a	Study design

Reasons for Exclusion

- **Population** - Does not include the population of interest i.e. adult participants, worldwide, living with a chronic health condition but are not undergoing active treatment excluding paid professionals
- **Outcome** - Does not include outcomes of interest i.e. subjective wellbeing measured as an outcome measure using a recognised measure/method
- **Intervention** - Does not include interventions of interest i.e. interventions focused on music or singing including listening, performing and music therapy offered to enhance wellbeing (Excluding clinical music therapy, clinical procedures, medical tests and diagnostics)
- **Study design** – Is not a study design of interest i.e. primary study with empirical data of wellbeing outcomes and processes by which wellbeing outcomes are achieved. Quantitative, qualitative or mixed methods. Published between 1996-2016
- **Comparator** – does not use a comparator e.g. no music or signing, white noise, usual routine i.e. inactive comparator
- **Redundant** – the authors have published a more recent study which includes and expands upon the paper excluded