Full-Length Article

Singing for Health, Connection and Care

Amy Clements-Cortés[1]

[1] *University of Toronto, Music and Health Research Collaboratory, Baycrest Centre, Toronto, Canada*

Abstract

Singing Together was the third part of a multi-phase investigation examining the benefits of singing with older adults in an adult daycare program (Phase 1), and in a long-term care facility (Phases 2 and 3). Phase 3 focused on residents of a long-term care facility who were diagnosed with mild to moderate cognitive impairment and Alzheimer's disease, and was unique in its extended scope of examining their choral participation with caregivers, or significant others. Pain, energy level, and mood were assessed using multiple objective and self-reported tools. Results of 16 weeks of choir sessions indicate statistically significant reduced perceptions of pain and increased energy and mood for both residents and significant others. Qualitative themes in this study included: encourages maximized participation; facilitates interaction and bonding; promotes enjoyment and fun; encourages improved mood and attitude; facilitates energy and motivation; promotes stress release and relaxation; and singing as a recognized therapy. Future implications of these findings will be discussed as well as overall analysis of the research project. A literature review outlining the effects of clinical choral singing with respect to older adults was provided in Part1: Clinical Effects of Choral Singing for Older Adults [1]of this two part paper.

Keywords: ***caregivers, dementia, mood, older adults, singing***

multilingual abstract | **mmd.iammonline.com**

Introduction

Singing Together was the third study in the multiphase 'Buddy's Glee Club' investigation, which examined the benefits of older adult residents of a long-term care facility who were either cognitively intact or diagnosed with Alzheimer's or other dementias, attending choral sessions with a caregiver. With the current literature reviewed for singing and health [1], there seemed to be a lack of studies focusing on residents of long-term care and family or caregiver involvement. Singing Together (Phase 3) was unique from the 2 previous phases conducted at the research site in that it included caregivers, and a more complex study design allowing for the inclusion of multiple data sources as well as independent video observer ratings.

The 'Buddy's Glee Club' studies were designed to examine the benefits of choral singing based on Hettler's [2] 1976 model with a focus on social, emotional and physical wellness. With an aging population, increasingly more research is being conducted on how recreational activities benefit physical, social, and emotional wellness for residents of long-term care facilities. Wellness, as detailed by Hettler's [2] dimensions model, can be understood in six categories: occupational (satisfaction through work), emotional (positive feelings about oneself, awareness/acceptance of feelings), physical (diet and exercise), spiritual (search for meaning), intellectual (creative/stimulating activities), and social (contributing to one's environment/community). In promoting wellness, music has been a current area of focus as an inexpensive, non-pharmacological, treatment that potentially has a variety of benefits, and the body of research supporting the use of music in long-term care facilities is growing. Singing is an action that does not require prior experience and choral singing provides an arena for inclusive activity.

Both Phase 1 and Phase 2 of (Buddy's Glee Club) involved older adults (cognitively intact or diagnosed with Alzheimer's or dementia) attending a weekly choral session led by a music therapist for 16 weeks. Phase 1 included 28 participants (5 male, 23 female) who attended an adult day program and involved an individual interview post- study, as well as a battery of assessments gauging both pre- and post-intervention ratings for general health, self-esteem, anxiety,

PRODUCTION NOTES: Address correspondence to:

Amy Clements-Cortés, PhD, RP, MTA, MT-BC, FAMI. 56 Destino Crescent, Woodbridge, Ontario, L4H 3E1, Canada; Email: notesbyamy2@yahoo.ca | COI statement: The author declared that no financial support was given for the writing of this article. The author has no conflict of interest to declare. The work was supported by a Private Donor, Baycrest Foundation, Toronto; & Advancing Interdisciplinary Research in Singing.

feelings and quality of life. Pre- and post-tests were compared to assess any changes in participant reports of these domains and were analyzed by *t* tests. There were no statistically significant quantitative finds. However, qualitative findings pointed to the emergence of 5 main themes: friendship and companionship; simplicity; happiness and uplifting and positive feelings; relaxing and reduced anxiety; and fun [3].

Phase 2 included 25 participants (of which 16 were used for the data analysis as they attended 10 or more choral sessions) who lived in a long-term care home. The process of data collection involved: observation, weekly self-test/administrator reports for mood, pain, anxiety, happiness and energy, and individual interviews post study. Happiness was differentiated from mood as it is considered a separate subjective indicator of wellness [4]. Further energy, was defined as having adequate or sufficient power to engage in activities requiring exertion in a broad sense; meaning that this included not only physical energy but mental energy. Average weekly pre- and post-session scores for happiness and mood increased for all 16 sessions; energy increased for 14 of 16 sessions; pain decreased for 14 of 16 sessions, and anxiety decreased for 11 of 16 sessions. Statistically significant ($p < .01$) results for four indicators: increases in mood, energy, and happiness, and a decrease in pain were established via T-test analyses, two-tailed with aggregated sessions' data [5].

Methods

Objective

The purpose of the study was to examine the effects of choral singing with residents of a long-term care facility, diagnosed with Alzheimer's disease, dementia, or cognitive impairment, and their caregivers.

Research Questions

Research questions included:

1) What, if any, are the changes in pain, mood, and energy from the beginning of the session to the end of each session for the significant others/companions and residents singing in the choir?
2) Can singing in a choir facilitate the acquisition of therapeutic goals including: reducing pain, improving mood and energy, increasing social interaction, and improving quality of life?
3) What specific aspects of the choir do the residents and significant others find beneficial?
4) What are the perceived benefits of the choir on residents as described by caregivers/ significant others of the residents?

Participants

This study consisted of 35 participants in 3 different participant groupings. Group 1 included 14 older adults, herein referred to as 'residents', who were residing in the long-term care facility with a diagnosis of mild to moderate dementia, as assessed by the Mini-Mental State Examination (MMSE) and with various physical and/or mental health issues. Group two consisted of 14 participants, which will be referred to as 'significant others (S/O) of these residents and included family members, nurses, or private companions. Group three contained 7 participants including the choral director (music therapist), staff, music therapy intern and volunteers in the choir program. Inclusion criteria included the ability to answer questions regarding participation in the choir, fluency in English, and for resident participants, a link with a family member, nurse, or private companion who was also willing to participate in the study. Exclusion criteria included a tendency to behave disruptively in a way that would negatively impact the participation of others.

Recruitment

Participants were recruited from the long-term care facility. Resident participants were notified about the study by the staff and by flyers posted in their activity areas. Residents were invited to voluntarily take part and were referred to the researcher by the therapeutic recreation program staff. Once the participants from the long-term care facility were recruited, their S/Os were invited to participate, one S/O per resident participant.

Ethical Considerations

This study received ethical approval from the University of Windsor Ethics Board, as well as the long-term care facility's Ethics Board. Participants were able to withdraw from the study at any point, with an opportunity for resident participants to participate in a different recreational activity available.

Confidentiality and anonymity were ensured through several practices: 1) Names of participants were changed when reporting results; 2) Interview transcriptions were shredded after the information was verified by each participant; 3) All electronic data was stored on the secure server at the long-term care facility, password protected, and deleted one year post study; 4) Video/DVD recordings were stored in a locked filing cabinet and destroyed 1-year post study.

Study staff attempted to acknowledge and eliminate any potential risks that may have developed by participating in the study such as negative memory association to choral songs fatigue, or strain from singing. Participants were given the option to leave sessions and/or withdraw from the study at any time, and all efforts were made to eliminate risks to the participants. No potential risks occurred.

Informed consent
Participants received an information sheet about the study and were asked for verbal and written consent to participate. In the cases where residents were diagnosed with a cognitive impairment that prevented them from consenting to participate, their substitute decision maker was asked for verbal and written consent. These participants then received and were asked to sign an assent form.

Program
Choral Sessions. Participants attended 16 weekly 1-hour choir sessions. Each week participants engaged in breathing exercises and a vocal warm up, sang four to five songs from the choral repertoire, and processed the choices with discussion and spontaneous reminiscence, movements or other interactions that arose. At the end of the 16 weeks, there was a final performance given by the choir in the large atrium of the long-term care facility. All choral singing selections were accompanied on piano or guitar. The songs were selected based on the intake musical preferences assessment and were primarily songs from the 1930's and 1940's alongside cultural songs relative to the participants. (Appendix A -choir repertoire).

Data Sources
This study contained three different subject groups as discussed above. Assessment measures for group 1 (residents) focused on changes in pain, mood, and energy from the beginning to the end of each session, and also on overall change from the beginning to the end of all of the choir sessions. Group 2 (S/O) were also examined for changes in pain, mood, and energy, and participated post-study in an interview on perceived benefits of the choir for themselves and their respective resident participant. Group 3 (study staff) were interviewed post-study on the overall experience and perceived benefits of choir participation.

Intake Form. Before sessions began, upon securing consent from each resident and S/O participant, the Research Assistant (RA) completed an intake form for group one and two participants that asked general questions regarding age, fluency in English, level of education, occupation, singing history, medical history, mental health history, and musical preferences.

Pre-, Post-, and Midterm Tests. Pre- and post- tests were completed each session by resident participants and S/O participants to assess changes in pain, mood, and energy. The RA and staff (therapeutic recreationists, music therapy intern) completed the tests for the residents who were unable to rate themselves and assisted in administering the tests. The RA and staff were trained in administering the tests and were not otherwise affiliated with the research study in order to decrease bias. S/Os completed their own tests. The tests consisted of visual scales rating pain, mood, and energy on a scale of 0 to 5.

In addition to the tests rating their own pain, mood and energy, S/Os completed questionnaires at the start, middle, and end of the entire block of choir sessions to assess their respective resident participant. The pre-choral session questionnaire asked S/O to rate their resident's pain, energy, and mood on a scale of 0 to 5 and provide information about the resident's level of choir experience, and emotions expressed regarding joining the choir. Midterm questionnaires required the S/O to again rate pain, energy, and mood of the residents on a scale of 0 to 5. The post-test asked for the S/O to: rate the resident's pain, energy, and mood, report any emotions the resident expressed about the choir; as well as if the choir affected the resident's pain, energy, and mood. Each questionnaire included a space for general comments as well.

Observation. Video was taken of the singers and their S/Os during each session from two cameras that each focused on one half of the participants. Each session was split into three sections: pre-session, mid-session, and post-session. The videos were labeled with numbers and then randomly jumbled (eg., session 1, Pre: 116, Mid: 113, Post: 125). Two additional video raters who were not involved in the choral sessions each analyzed all videos as an outside source rating pain, mood and energy. They were blind to the stage and week of the session the video was from. The main RA compared scores from the two video raters and took the average of those two scores. The video raters assessed pain, mood, and energy based on the criteria listed in Appendix B [6-8]

Pain. Adapted from FLACC Scale [6]*. Energy. Based off of Thayer* [7] *(1989) Activation-Deactivation Checklist (AD ACL). Mood/level of engagement. Based on the Dementia mood assessment scale* [8].

Interviews. Interviews were conducted upon the completion of all 16 choir sessions with all participants (see Appendix C). Interviews were audio recorded, transcribed, and analyzed for key words and themes. For the residents, questions focused on the choir experience, its benefits and drawbacks, and any changes in mood, energy, and pain. For S/O and staff/volunteer participants, questions focused on the S/O's/staff's/volunteer's perception of the choral experience for the resident, and whether they perceived any changes in mood, energy, or pain for the resident by attending the choir. S/Os were also asked to reflect on their own choral experience and any changes in mood, energy, or pain.

Data Analysis
Quantitative Data. Quantitative data was analyzed using paired t-tests to compare aggregate mean pre- and post-session numerical rating scores in order to identify statistically significant changes in pain, energy, and mood. The 16 post-pre ratings were aggregated into single mean values for each participant and S/O. The analysis was conducted separately

for residents and for S/O. Charts depicting the mean and standard error ratings by session were also reviewed for each of the three measures. Additionally, T-tests were conducted for the video ratings derived from video raters analysing session videos in the manner as described above. We assess statistical significance at the 5% level.

The horizontal axis of the charts depicts the week of the study, which ranges from 1 to 16. The vertical axis, which ranges from -1 to +1, depicts the mean difference between pre- and post-session rating scores. Each data point (red box) represents the mean change in score from all participants for each week of the study. These data points indicate the degree to which the treatment improved or degraded the participants' ratings. Points below the zero line indicate a mean decline in score, and hence an improvement in mood, pain, and energy. Similarly, points above the zero line indicate a mean increase in score, and hence a deterioration in mood, pain, and energy. The lines around the point (the blue lines) depict the standard error, or the group's overall cohesion of ratings. Longer lines indicate more heterogeneity or variation in respondents' ratings.

Qualitative Data. The interview data was analyzed by 2 additional RAs. They were accredited Music Therapists (MTA), familiar with this client population and had previously participated in singing studies; however, they were not active participants in the choir and thus were able to consider the results objectively. The RAs individually considered the interview transcripts and identified significant statements or ideas. From these statements, they created descriptive codes or short phrases that summarized the main meaning behind the statements. Once all the interviews where analyzed in this manner, the codes where organized into a small number of broad themes to identify perceived effects of choir participation. The Principle Investigator (PI), along with the RAs, then considered the themes and further clarified and formulated the categories that the themes identified. The PI and RAs each independently reviewed the final list of themes in relation to the transcripts to confirm the contexts and meanings were accurately interpreted. After this had been completed individually, they met as a team to present and discuss their results. The PI made the final decisions regarding the themes that were chosen.

Results

Quantitative

A total of 28 participants (14 residents, 14 S/Os) (8 male and 20 female) [participant groups 1 and 2] were included in the analyses, as they had completed the pre- and post-tests as well as the interview. Older adults ranged in age from 66 to 99 years old and S/Os ranged in age from 40 to 86 years old. Of the 28 participants, 8 had previously participated in a choir singing group. The most commonly reported items in the medical history questionnaire administered pre-study were dementia (n=14), hypertension/high blood pressure (n=12), diabetes (n=5), and cardiovascular issues (n=9). With regards to mental health, a few people reported a history of depression (n=10) and anxiety (n=2).

	Total n=35	Resident Group n=14	Significant Others Group n=14	Staff/Volunteers Group n=7
Male	8	6	2	0
Female	27	8	12	7
Age Range	21-99	66-99	40-86	21-77
Dementia	14	14	0	N/A
Hypertension/High Blood Pressure	12	9	3	N/A
Diabetes	5	4	1	N/A
Cardiovascular Issues	9	7	2	
Depression	10	7	3	N/A
Anxiety	2	2	0	N/A

Table 1: Participant Baseline Characteristics

Pre- and Post- Tests for pain, mood and anxiety. Table 2 details descriptive and test statistic results for the study. The results indicate that there has been a statistically significant reduction

Item Scored	Participant	N	Pre-Mean (SD)	Post-Mean (SD)	Difference	P-value
Pain	Resident	14	0.6739 (0.41)	0.4193 (0.31)	-0.2545	0.0088
	Significant Other	14	0.0863 (0.11)	0.0258 (0.04)	-0.0605	0.0295
Mood	Resident	14	1.4029 (0.37)	1.0766 (0.25)	-0.3262	0.0015
	Significant Other	14	0.2154 (0.12)	0.1327 (0.11)	-0.0827	0.0179
Energy	Resident	14	1.5172 (0.40)	1.3084 (0.26)	-0.2087	0.0494
	Significant Other	14	0.3046 (0.16)	0.1964 (0.13)	-0.1082	0.0067

Table 2: Descriptive and test statistic for singing group's pre- vs post-session scores, P-value: one-sided test for mean difference<0; Pain: 0=no pain, 5= a lot of pain; Mood: 0=very happy, 5= depressed; Energy: 0=lots of energy, 5= exhausted

Wellness Domain	Theme	Example of Theme
Social	Encourages maximized participation	"It was amazing to see my mother start singing these songs without even looking at the lyrics, she just knew them. I could see everyone getting something out of it".
		"She [a resident] remembers the old songs, and when you tell her its Glee Club she's in a hurry to come".
	Facilitates interaction and bonding	"For me, I looked forward to the bond/experience of participating in a choir with my dad. For me, it's great to see him singing and involved. I'm really glad we signed up".
Emotional	Promotes enjoyment and fun	"Every Wednesday I look forward to it very much, especially with [my wife] next to me. Although her short term memory is gone, she loves singing. And I think Glee Club is one of the best programs here".
	Encourages improved mood and attitude	"Singing makes me feel good".
		"Singing makes me feel happier".
Emotional & Physical	Facilitates energy and motivation	"She's more energized after the session, she wants to walk and walk and walk and walk. It's like waking up all her muscles".
	Promotes stress release and relaxation	"She is calmer when she is singing".
Emotional & Social & Physical	Recognized as therapy	"For her, she has some pain, but sometimes it diverts her. It's good, you know, music is really therapy".
		"There is no pain when I'm singing. When I'm feeling pain and I am singing, the pain stops".

Table 3: Qualitative Themes: Benefits of Singing

in pain over the course of the study. This is the case for residents and for the S/O group. Not surprisingly, given their higher initial levels of pain, the observed reduction in pain was larger for residents than their S/Os -0.2545 vs -0.0605). Similar results were noted for the other two measures: mood and energy.

The observed improvement in mood and energy were significant for each participant group. The improvements, or reductions in mean rating scores, were larger for residents than for their significant others in each case.

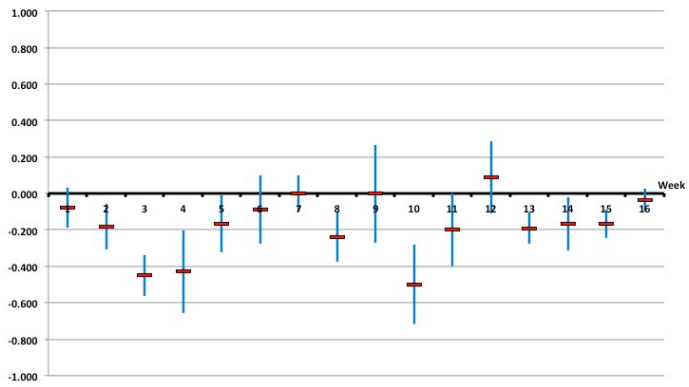

Figure 1: Mean (SE) Change in Pain by Week – Residents and Significant Others Combined

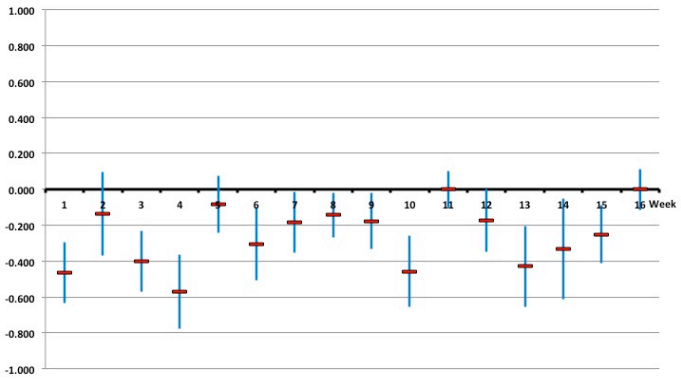

Figure 2: Mean (SE) Change in Mood by Week – Residents and Significant Others Combined

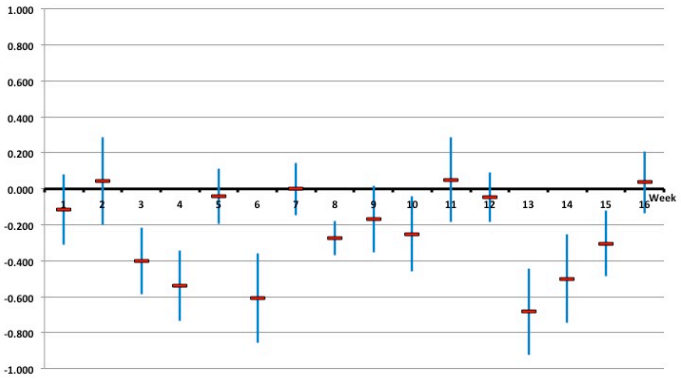

Figure 3: Mean (SE) Change in Energy by Week – Residents and Significant Others Combined

Referring to *Figure 1* we note that the mean pain scores declined post-session in the vast majority of weeks in the study. Only in week 12 did we see an increase or a worsening of pain. *Figures 2* and *3* present the weekly changes in mean ratings for mood and pain respectively.

At the start, middle, and end of the program (i.e., week 1, 8 and 16), the S/Os were asked to assess the residents' levels of pain, mood and energy. There was no statistically significant difference in these assessments in weeks 8 or 16 relative to week 1. A potential reason for this is likely the small number of observations used in comparing any two individual sessions (n=14), these are in reality snapshots and do not reflect the full picture.

Observation. The average video raters' scores for pre- vs post-session mood, energy and pain were compared to assess changes. While pain decreased, the decline was not statistically significant. As expected, the energy score increased markedly from 3.00 to 3.74 and was significant. Similarly, the average mood rating also increased and was statistically significant. A potential reason for a lack of finding a statistically significant pain effect with video ratings may be a result of the quality of the video. As a result, participants may not have been rated accurately.

Qualitative Findings: Themes Arising from Participant Interviews

An analysis of the participants' interview comments (both of residents and S/Os) revealed seven major themes. Benefits of the musical experience were identified according to social, emotional, and physical wellness. The distribution of the themes in these categories is as follows: two contributed to social wellness, two contributed to emotional wellness, two contributed to both emotional and physical wellness, and one contributed to all three categories. The individual themes are discussed in more detail below with supporting quotations from the participant interviews. *Table 3* provides a summary of the themes.

Social wellness themes

Singing in Glee encourages maximized participation. The fact that an experienced music therapist led the choral experiences appeared to have a positive impact on the sessions with respect to all of the themes discussed. In particular, it had significant benefits in facilitating maximum participation for the resident participants in sessions. Further the music therapist assisted in the pacing of songs, song selection, rehearsal strategies and creating an inclusive environment. A daughter said, "*It was amazing to see my mother start singing these songs without even looking at the lyrics, she just knew them. I could see everyone getting something out of it*". A S/O who was a private nurse reflected on song selection saying, "*She [a resident] remembers the old songs, and when you tell her its Glee Club she's in a hurry to come*". Another said, "*[the conductor] was very skillful at engaging everybody, her presence was a leading force*", while a third companion commented, "*The conductor knows how to get everyone to sing and feel they are contributing to the group's goals*".

Singing in Glee facilitates interaction and bonding. Interview comments reflected that singing builds a sense of belonging and community. This choir was unique in that it combined resident participants with S/Os which helped create a place that specifically fostered bonding and interactions that would otherwise not have taken place. Many commented that it helped them feel closer to the person they attended the choral sessions with. The daughter of one resident stated, "*For me, I looked forward to the bond/experience of participating in a choir with my dad. For me, it's great to see him singing and involved. I'm really glad we signed up".* Another daughter said:

"*The experience was wonderful for me. It was extremely rewarding to see how singing could bring people together and help them work together. I believe the experience was rewarding for the residents as well. Overall, they appeared to feel part of the community and proud of the work they were doing*".

A spouse participant said, "*I am also enjoying singing with them. It makes me more active; a good way to spend time with [my wife]*".

In regard to social interaction, the choir facilitated natural and spontaneous moments for resident participants to interact not only with their S/O but also with other resident participants. The same was true for S/Os interacting with all participants. Some comments included: "*Even though she doesn't remember names, she recognizes that she's with neighbours and friends. She's happy to sing with the group, the time flies when she is*

with other people" and "*She's starting to interact with others... saying hi, thank you, goodbye - in ways she never did before*".

Another caregiver shared that they had seen an improvement in their loved one during the duration of the choral program:

"*Before she wasn't very social, I'd say only 50% [of the time], but since the choir she's [up to] 75%, so I've seen a 25% improvement. Now she knows how to say hi and thank you, how to interact with others. This is a big change, she never did it before*".

The social benefits of interacting in a choral program such as the Glee Club provided unique opportunities for interaction between a variety of participants, including resident-to-resident, resident-to-S/O, and S/O-to-S/O.

Emotional wellness themes

Singing promotes enjoyment and fun. An important theme that arose from the interview transcripts was the perception of the Glee Club as a fun and enjoyable experience. Caregivers shared that "*She loves to go [to the sessions], she always wants to go*" and "*He's always really eager to come. It's a really good program*". Many of the participants expressed their enjoyment of singing and the emotional benefits of participating in group singing. One S/O shared about his wife's love of singing, despite her limited ability to participate in other activities, stating, "*Every Wednesday I look forward to it very much, especially with [my wife] next to me. Although her short term memory is gone, she loves singing. And I think Glee Club is one of the best programs here*". For these residents with mild to moderate dementia, having the confidence that they are going to an enjoyable and safe activity is extremely beneficial.

Singing encourages improved mood and attitude. Along with the previous theme of fun, there were also a large number of responses that referenced the capacity of Glee to improve the mood of the participants. Residents shared comments such as "*Singing makes me feel good*", "*Singing makes me feel happier*" and "*I like the choir because it gives me an injection of happiness*". Many S/Os also commented on the impact of the choral sessions for improved mood for both themselves and resident participants. One daughter expressed her appreciation for the positive impact on her father, stating, "*The choir is at 3:00 so it really helps the sundowning, it changes his mood to happy-go-lucky, that's why I like it, because he keeps singing, it's really good, really helps*".

Emotional and physical wellness themes

Singing facilitates energy and motivation. Study participants described the choral sessions as energizing and stimulating. Many participants felt an increase in their energy levels during choir sessions, and that energy continued into the remainder of their day.

S/Os commented that resident participants wanted to walk, sing and move after sessions and reported increased energy levels for the resident participants as well as themselves. One S/O commented, "*It's good, you know, gives her more energy after the choir. When we're going out, she sings in the hallway*". Another caregiver shared that, "*She's more energized after the session, she wants to walk and walk and walk and walk. It's like waking up all her muscles.*" These comments and similar others reinforce that choral singing can arouse motivation and energy.

The process of rehearsing each week and preparing for the final choral performance was highly motivating for the S/Os as well as the resident participants. It created an atmosphere of fun and music, while also providing a sense of mutual purpose. Comments that were shared included: "*I never sang before or thought I could sing, but because of this program I started to sing and I really enjoy it*" and "*I was looking forward to it all the time. When I'd get there sometimes I'd be tired or whatever from my day but I would start getting right into it*".

Overall, there was a general sense of activity and motivation throughout the choral experience. One S/O summarized it in the following way, "*I enjoyed it totally, everybody was so bright and cheery, so it was a good place to be. I felt there was a purpose for the afternoon, and the people [at the long-term care facility] really need that feeling of purpose*".

Singing promotes stress release and relaxation. Glee Club provided a refuge from the stress surrounding some of the residents and their S/Os. The experience of group singing and support as well as the musical surrounding helped calm anxiety and created a more relaxing and comfortable setting. Comments such as "*She is calmer when she is singing*" and "*It's psychologically relaxing, no drawbacks*" indicate the benefits of stress reduction and relaxation experienced by the participants.

Emotional, social, and physical wellness themes

Singing is recognized as therapy. A common comment made by participants acknowledged the function of music as therapy. Many remarked on the benefits for a number of ailments or issues including pain. A resident participant's comment sums up the thoughts of many during the interviews by stating, "*There is no pain when I'm singing. When I'm feeling pain and I am singing, the pain stops*". Another resident said, "*Music is a benefit, singing is phenomenal therapy*", while a daughter commented: "*For her, she has some pain, but sometimes it diverts her. It's good, you know, music is really therapy*". The use of music as a therapeutic method of alleviating pain was a recurring theme found in the comments of the participants, both the residents themselves and their S/Os.

Discussion

Findings indicate that singing in a choir led by an MTA successfully reduced perceptions of pain and increased energy and mood from beginning of session to the end for both adults with diagnosed cognitive impairment and for their significant others (family members, nurses, and private companions of these adults). Quantitative analysis confirms statistical significance for each group and also the groups combined on the 3 measures. These results coincide with previous findings regarding pain perception [9]; increased positive mood [10], and Camic et al. [11], who suggested that including both adults with dementia and their caregivers in a mutual activity would produce positive results. Increased physical wellness was also evidenced in the qualitative data of this study as reported through the themes of: singing facilitating energy and motivation, and promoting stress release and relaxation.

Statistically significant decreases in reported pain occurred throughout the study for both resident and S/O participants. The results showed greater significance, however, for the residents as compared with their S/O. These results align with the initial pain threshold reported by the two groups; since the residents originally had higher levels of pain, the choral experience provided a greater reduction for the residents than it did for S/Os, who may or may not have had significant pain.

Throughout the 16 sessions, there was a consistent decrease in the average scores for reported pain throughout the study. The only exception to this was in Week 12 when the scores increased, showing a worsening in pain from the previous week. A potential factor that may have contributed to this was a fire alarm that went off during the choral session. While participants remained in the choral area and continued the program in-between loud speaker announcements, it did seem to cause some concern or general confusion/worry amongst the resident participants. Further, the volume of the instructions over the loud speaker was somewhat abrasive or intrusive, perhaps drawing participants back from the choral experience and in a place to be more focused on their current health issues present that day which appeared to be reported as pain.

In keeping with earlier findings qualitative themes in this study indicated increased social benefits including increased participation and facilitated interaction and bonding [12,13]. This was evidenced in interview comments from participants, both residents and their S/Os, analysis of recorded sessions, and observations from the choir facilitator. The social wellness themes that emerged indicated that singing in the Glee Club encouraged maximized participation and facilitated interaction and bonding. The use of specific leadership techniques for the choir is thought to be particularly relevant. Having an MTA facilitating the choir and incorporating reminiscence and discussion throughout the rehearsals helped foster these social interactions. The use of a microphone emerged as an effective way to promote discussion, fun and pleasurable moments as well as to encourage and focus on individual members.

It has been found that, "The level of improvements to general quality of life confirm the view that participatory singing is combating the potentially negative effects of ageing, along with the debilitating effects of bereavement, widowhood, declining health and isolation" [14, *p. 170*]. Improvements to emotional well-being, social life, and self-confidence were also identified [14], as well as decreases in depression and anxiety [15]. This study supports those findings with qualitative data indicating improvement in emotional, social, and physical wellness as well as consistent acknowledgement in the qualitative data of music as a recognized therapy. Specifically, there were many comments made in the interview describing increases in activity, motivation, and mood/attitude both during and following the choir sessions. The perceived effects of the choir on residents as described by S/Os were also derived from interview comments. S/Os frequently commented that their loved one's participation in choir helped facilitate social interaction with their group members, gave their loved ones motivation and energy, and increased mood and energy.

The involvement of caregivers in the choral program is a distinguishing feature of this choral study. As previously found, positive themes of social inclusion and bonding were associated with adults with dementia participating in group singing with their caregivers [11].

The results of this study add to the literature on overall health benefits of choral singing for adults with dementia and their family members and caregivers. The quantitative data address the potential for participation in choral activities to reduce pain perception and increase mood and energy. The qualitative data indicates specific themes regarding the impact of choral participation on social, emotional, and physical wellness. While all areas of wellness were represented, emotional wellness was associated with five of the seven themes and thus emerged as the largest and most significant outcome in this study.

Limitations

One limitation of a study such as this one where the primary research group is adults with cognitive impairment is finding accurate objective measures from which to analyze the data. Pain, mood, and energy were rated on a scale of 0 to 5, but this was sometimes challenging for resident participants. To help assist with this challenge, an RA and study staff with no vested interest in the study results assisted in administering the tests. The choice to have staff that included a music therapy intern and the RA administer the tests instead of S/Os was to prevent any bias in rating the domains. Further as noted above these individuals received training on test administration. A visual

analogue scale was used for participants who were not able to state a number from 0-5 based on prior research with persons diagnosed with Alzheimer's disease (AD), that noted the reliability of pain assessment in this population was increased by employing visual analogue scales as people with AD may demonstrate a decline in expressive and receptive language abilities [16]. Face scales were also used and participants were encouraged to point to the face that best described their current pain, mood, and energy.

Other limitations encountered in this study included the small group sample size and lack of a control group. Researcher observations were used for the video observation component of this study, presenting the possibility of subjectivity similar to prior research encountering the same issue [17]. To address this challenge, two research assistants independently rated the sessions based on pre-set criterion and without knowing what stage of the study the session was from. The scores were then compared and averaged for the purpose of the study.

Future Considerations

Choir Implementation Strategies

The data from interviews conducted with staff, residents, and S/Os indicated that the techniques and strategies used by the therapist were effective in engaging the residents, helping residents achieve maximum enjoyment, and promoting interaction. By the choir director implementing specific techniques as well as being present in the moment to facilitate natural interaction, a safe and enjoyable environment for participation was created.

The use of vocal warm-ups was significant in orienting the residents to where they were and what activity they were about to participate in. The exercises worked to secure their attention effectively and reminded them gently that they were in a singing group. Also selecting music that was "preferred" and familiar was important in maximizing participation of the resident participants and may have also been motivating.

The choir director also made sure to include reminders and comments throughout the choir sessions to orient members and remind them of what they were doing. This included repeating song names multiple times. The repetition and frequent reminders provided the opportunity for the residents to understand what was occurring, eliminating the need for cueing from their S/O. This facilitated less stressful interactions between S/Os and residents, resulting in greater freedom and enjoyment in their interactions.

Using the full range of space available to guarantee that each member of the group was able to see and interact individually with the conductor was also important in this choir. The choir director facilitated this by moving from one side of the group to the other as she conducted, prioritizing the personal interactions that occurred throughout the session.

The focus of several of the strategies used in the choir was on increasing interaction between members. The introduction of a microphone half way through the study was one such strategy. It was introduced once the members were already familiar with the choir setting and their fellow members, and was passed around for those who were comfortable enough to try it. This had two purposes: the microphone facilitated the means for enhanced interactions as it drew attention toward one person and allowed him/her to be heard. The resident also received encouragement from the director as well as praise and feedback from the group. The microphone also helped to identify singers who might be comfortable singing solos during the concert.

Natural interaction between members sitting in close proximity with each other happened both organically and through the facilitation of the choir director, and volunteers. For example, residents would often begin chatting with their neighbours, and if this did not happen, the choir director or volunteers might ask questions to begin these kinds of conversations.

The use of song sheets had multiple purposes. First, it helped create the feel of a true choir practice and further oriented residents to their task. It also helped serve as a stimulus for interaction and conversation as there would be questions and discussions about the songs while they were handed out. This facilitated greater interaction for residents, both with other residents and their S/Os.

The only drawback mentioned was the challenge of bringing residents to and from the choir sessions. This was primarily a factor at this long-term care facility because residents came from all floors in the large scale facility and so significant time was invested in transportation and waiting for the elevators etcetera. This was less of a challenge than in prior studies as each resident participant did have a S/O who brought them to the choir.

Implications

This study helps shed light on some benefits of choral singing for adults with cognitive impairment and their family members/significant others, but it highlights a need for further research detailing objective data on these topics. The focus of this research study was on the overall health benefits for adults with dementia, while a large focus of the study by Camic et al. [11] was on the benefits experienced by the caregivers. Further research could be conducted analyzing the relational benefits of singing together in a group for both members in the relationship, and how this benefited their overall health and quality of life.

Conclusion

The results of this study indicate that singing in a choir has benefits in the physical, social and emotional domains. Self-reports demonstrate a statistically significant reduction in pain over the course of the study, and improvement in mood and energy were statistically significant for each participant group. Objective video ratings demonstrate significant increases in average rating of mood ($P<0.05$) and energy. Qualitative interviews gave rise to several themes, including benefits of singing in facilitating interaction, bonding, enjoyment, energy, and motivation.

Further, this study's results indicate that choral singing can have an impact on the pain, energy, and mood levels of residents in a long-term care facility who have diagnosis of mild to moderate dementia as well as for S/Os who attended the choral sessions and participated with them. For all participants, singing in a choir was associated with a decrease in levels of perceived pain and an increase in energy and overall mood. Comments from participants, both residents and family members/significant others, demonstrate the positive impact of choral singing under the guidance of a trained music therapist. The choir setting benefited participants by promoting active participation and facilitating interaction and bonding. The leadership by an accredited music therapist helped create a positive and motivated environment, fostering a sense of both purpose and inclusion for all choir members. The choir also provided an opportunity for residents and their S/Os to interact in a fun and positive way, encouraging improved mood and attitude and reducing stress levels and agitation. Future implications include using a variety of tools to encourage participation, the importance of a trained music therapist to create a positive, engaging environment, and the value of including significant others and family members as a part of the music making experience.

Acknowledgement

Thank you to Dr. Boris Kralji, Exectuive Director (Economics) and Chief Economist at the Ontario Medical Association, for assistance with the quantitative statistical analysis.

References

1. Clements-Cortes, A. Effects of Clinical Choral Singing. *Music Med*. 2015: 7(3):7-12.
2. Hettler B. (1976). Six Dimensions of Wellness Model [fact sheet]. Stevens Point, WI: National Wellness Institute, Inc. Available at [LINK] Accessed June 14, 2014.
3. Clements-Cortes, A: Singing for life [published online 2013]. *Activities, Adaptation Aging*. 37(4): 273-290. doi: 10.1080/01924788.2013.845716.
4. Argyle, M. *The psychology of happiness (2nd ed.)*. New York, NY: Routledge; Taylor & Francis; 2001.
5. Clements-Cortes, A: Choral Singing Benefits for Older Adults. *Can J Music Ther*. 2014;20(1):85-109.
6. Merkel SL, Voepel-Lewis T, Shayevitz JR, Malviya S. The FLACC: A behavioral scale for scoring postoperative pain in young children. *Pediatr Nurs*. 1997;23(3): 293-297.
7. Thayer RE. *The Biopsychology of Mood and Arousal*. New York, NY: Oxford U.P; 1989.
8. Sunderland T, Minichiello, M. Dementia mood assessment scale. *Int Psychogeriatr*. 1997; 8(3): 329-331.
9. Dunbar RIM, Kaskatis K, MacDonald, I, Barra V. Performance of music elevates pain threshold and positive affect: Implications for the evolutionary function of music. *Evolutionary Psychol*. 2012;10(4):688-702. Available at: [LINK]. Accessed March 25, 2014.
10. Grape C, Sandgren M, Hansson LO, Ericson M, Theorell T. Does singing promote well-being?: An empirical study of professional and amateur singers during a singing lesson [published online 2002]. *Integrative Physiol Behav Sci*. 2003; 38(1):65-74. doi: 10.1007/BF02734261.
11. Camic PM, Williams CM, Meeten F. Does a 'Singing Together Group' improve the quality of life of people with a dementia and their carers? A pilot evaluation study [published online 2013]. *Dementia*. 2013;12(2):157-176. doi: 10.1177/1471301211422761.
12. Clift S, Hancox G, Morrison I, Hess B, Kreutz G, Stewart, D. Choral singing and psychological well-being: Quantitative and qualitative findings from English choirs in a cross-national survey [published online 2010]. *J Appl Arts Health*. 2010;1(1):19-34. doi: 10.1386/jaah.1.1.19/1.
13. Kreutz G. Does singing facilitate social bonding. *Music Med*. 2014. 6(2):61-69.
14. Hillman S. Participatory singing for older people: A perception of benefit [published online 2002]. *Health Educ*. 102(4):163-171. doi: 10.1108/09654280210434237.
15. Tomaino CM. Meeting the complex needs of individuals with dementia through music therapy [published online 2013]. *Music Med*. 2013;5(4): 234-241. doi 10.1177/1943862113505775.
16. Scherder E, Bouma A. Visual analogue scales for pain assessment in Alzheimer's disease. *Gerontol*. 2000;46(1):47-53. doi: 10.1159/000022133.
17. Götell E, Brown S, Ekman SL. Caregiver singing and background music in dementia care. *West J Nurs Res*. 2002;24(2):195-216.

Biographical Statement

Amy Clements-Cortés, PhD, RP, MTA, MT-BC, FAMI is Assistant Professor, Music and Health Research Collaboratory, University of Toronto; Senior Music Therapist/Practice Advisor, Baycrest, Toronto.

Appendix A: *Regular choral songs included in the choir's repertoire*

1. I Got Rhythm (2:13);
2. When You're Smiling (2:32);
3. When The Red, Red Robin Comes Bob-Bob-Bobbin' Along (3.37);
4. Blue Skies (2:30);
5. Bei Mir Bist du Schein (2:30);
6. Love Me Tender (3:30);
7. Oh What a Beautiful Morning (2:25);
8. Hava Nagila (2:30);
9. You are my Sunshine (1:40);
10. Goodnight Irene (2:30); and,
11. Tumbalaiaka (2:34).

Appendix B: ***Video Rating Criteria***

Rating Criteria	1	2	3	4	5
Pain	No observable signs of distress or pain: Relaxed, no particular expression	Furrowed brow, occasional grimace	Rigidity, tension, moans	Clenched Jaw, frequent complaints, difficulty breathing/ moving	Crying, screaming, constant complaints, immobile
Energy	Asleep	Awake, calm, at rest	Some movement, talking, alertness	Talkative, singing the majority of the time, movement	Active, full of pep, lively
Mood	Crying, rude comments to others, physical agitation	Frowning, anxious, no social interaction	Some smiling, responsive to others, Feeling "ok"	Enjoyment, smiling, full participation	Positive, happy, smiling, laughing

Pain. *Adapted from FLACC Scale* [6] ***Energy.*** *Based off of Thayer* [7] *(1989) Activation-Deactivation Checklist (AD ACL).* ***Mood/level of engagement.*** *Based on the Dementia mood assessment scale* [8]

Appendix C

Interview Questions for Resident Participants

1. Describe the choral sessions that you took part in.
2. What was the overall experience of participating in the choir like for you?
3. What were some techniques or things that took place in sessions that were helpful or enjoyable for you?
4. Did issues arise in choral sessions? Can you describe how these were addressed?
5. How would you describe your overall health?
6. Did your participation in the choir help facilitate opportunities to interact with others and/or make new friendships?
7. How would you describe your overall mood?
8. Did singing in the choir change your mood?
9. How would you describe your energy?
10. Did singing in the choir change your energy?
11. How has your pain been lately?
12. Did singing in the choir help change your pain?
13. What would you say were the benefits of engaging in the choir?
14. What would you say were the drawbacks of engaging in the choir?
15. Is there anything else you would like to say or comment upon?
16. What was it like to have_____ (Significant Other) come to the choir?
17. Would you keep going to the choir after this study is over?

Interview Questions for Significant Others

1. Why did your significant other (spouse, parent, sibling, relative, friend, etc.) join the choir?
2. What types of activities and/or programs do they participate in at Baycrest besides the choir? Describe the choral sessions that your significant other took part in.
3. Please describe your significant other's level of participation and/or engagement in the choir.
4. What was the overall experience of participating in the choir like for you?
5. What were some techniques or things that took place in sessions that were helpful or enjoyable for you and your significant other?
6. Did issues arise in choral sessions? Can you describe how these were addressed?
7. How would you describe your significant other's overall health?
8. Please describe your significant other's interactions with others.
9. Did participation in the choir help facilitate opportunities for your significant other to interact with others and/or make new friendships?
10. How would you describe your significant other's overall mood?
11. Did the choir change your significant other's mood?
12. How would you describe your significant other's overall energy?
13. Did the choir change your significant other's energy?
14. How would you describe your significant other's pain?
15. What would you say were the benefits and the drawbacks of you and your significant other engaging in the choir?
16. Have you noticed any changes, apart from the ones described earlier in your significant other since the beginning of choir?
17. Is there anything else you would like to say or comment upon?
18. Would you recommend that your significant other continue in the choir after this study is complete?