**CMPQI Final Report**

June 30th, 2020

Project #: 34305-23019
Agency: Tennessee Tech University

Project Name: Improvement of Quality of Life for Nursing Home Residents through the 'Music & Memory' Program

## Introduction

This progress report is the final report of the Improvement of Quality of Life for Nursing Home Residents through the 'Music & Memory' Program. We ~~are~~ provided personalized music through the use of MP3 players to residents of nursing homes. This project's overall goals were to:

1. Improve quality of life and care of residents through person-centered care.
2. Implementation of culture change initiatives that go beyond regulatory requirements to improve quality of care and life.
3. Reduction of unnecessary antipsychotic medication use among nursing home residents.

The IRB for the project was originally approved on 2/22/17 through 2/22/18 and has been approved for extensions and changes multiple times (2/9/2018 – May 14, 2018, 1/25/19 – 1/25/20) with the most recent being 4/24/19 – 4/24/20. During the reporting period, project activities focused on planning, scheduling, networking, and training.

The project was implemented in five facilities in the Upper Cumberland region of Tennessee and in one additional facility that had already begun the process of Music and Memory certification. The plan was to fund start-up cost/renewal and/or renewal/additional equipment for each agency by this grant. Training was included in the start-up cost for the agencies' staff as well as for the nursing students, other students, faculty, and other volunteers. Through procurement of this grant, the Whitson-Hester School of Nursing (WHSON) requested funds for program certification, renewal for an additional three years, supplies, labor, and manpower for the nursing homes to become certified in the Music & Memory program (Music and Music, Inc., 2016).

## Modifications

1. Revision of faculty budget due to a change in administration at the department level. The grant PI is now serving as the Dean of the WHSON. Some of the PI duties and pay were distributed among other members of the grant. The changes were approved through CMS.
2. One of the original facilities, Life Care Center of Crossville was unable to fulfill their commitment of participation. NHC of Sparta was the new facility approved through CMS.
3. No cost extension of the grant through June 30, 2020. Due to purchasing restrictions, challenges of developing a process for purchasing the music through iTunes at the University level resulted in a delay of initial music purchases. A no cost extension was

approved to help maintain the project and successfully change the environment with no additional funds.

4. Due to internal changes in the Music and Memory program, renewal of the Music & Memory certification was not needed, therefore those funds were not paid to Music and Memory.
5. The dissemination of research data and findings was to occur at an end of the project conference with attendees from the area. The Conference was scheduled for March 6th, 2020. A F4 tornado hit Putnam County on March 3rd and caused devastation to the area. Tennessee Tech University classes were canceled for the rest of the week and the conference was canceled. The plan was to reschedule in May. However, University events were canceled due to COVID-19. With the uncertainty of restrictions on gatherings and social distancing, the conference has not been rescheduled.

**Measurable outcomes**

The goals/objectives (with measures and statistical analyses) of the researchers were to:

1. Improve the physical, cognitive, and emotional functioning of Alzheimer's patients—thereby addressing "Improve quality of life and care of residents through person-centered care" (CMPQI Grant Focus Areas); Measures: Observations by caregivers.
2. Assess nursing staff and nursing students' attitudes pre- and post-intervention of Music and Memory to assess the focus area "Implementation of culture change initiatives that go beyond regulatory requirements to improve quality of care and life" (CMPQI Grant Focus Areas); Measures: Nursing staff and nursing students' attitudes, Staff and student satisfaction of the Music and Memory program.
3. Reduce the number and frequency of uptake of antipsychotic medications prescribed for patients pre-, during, and at end of grant period—thereby addressing "Reduction of unnecessary antipsychotic medication use among nursing home residents" (CMPQI Grant Focus Areas); Measures: Number of antipsychotic medications prescribed for patients pre-, during, and at end of grant period.

To measure the effectiveness of this program, this grant used evidence-based practice to measure cognitive and psychosocial functioning as well as positive physical demeanor of Alzheimer's and dementia patients as observed by their nursing home caregivers. Staff and nursing students' attitudes and satisfaction were evaluated pre- intervention. In addition, the number of antipsychotic medications prescribed for patients pre-, during, and at end of the grant period were monitored in some of the facilities to see if the number of these type drugs and frequency of use during and after the intervention of the Music and Memory program are reduced.

**Data Results**

A total of 65 patients were started on Music and Memory during the program, but for various reasons such as hospitalization, illness, passing, etc., there was not enough data to analyze on all patients. Data was collected on 43 patients.

**Goal 1** Improve the physical, cognitive, and emotional functioning of Alzheimer's patients

measured by Multidimensional Observation Scale for Elderly Subjects (MOSES) and Positive Physical Demeanor Scale – Patient Lightening Up Rating Scale (PLRS)

**Did you meet the outlined goal or objective? Why or why not? Yes, the outlined goal was met.** The data below will show an improvement in the physical, cognitive, and emotional functioning of Alzheimer's' as measured by the Moses and PLRS.

**What impact did your activities targeted at meeting the outlined goal or objective had on nursing home residents in the facility or facilities?**

The program made a positive impact among the residents. Given the demographic of the population involved, the results reported were encouraging. Positive changes were noted across several items measured by the MOSES instrument. The largest positive changes were among the following items, all related to feelings of depression and anxiety; looking sad and depressed (48%), looking worried and anxious (46%), reporting sadness and depression (43%), sounding sad and depressed (42%), and irritability (38%).

**Analysis of Data Obtained Using the Multidimensional Observation Scale for Elderly Subjects (MOSES)**

Table 1 shows the number of patients who were observed during each period, up to 16 observation periods. It is important to note that all patients were not observed during the same time period as recruitment was performed throughout and some patients were hospitalized, died or declined use of the device. Data was collected every two weeks. Analysis of data obtained using the Multidimensional Observation Scale for Elderly Subjects (MOSES) involved computing differences between the rating scores for the 8th/4th and 1st periods for each patient for each item. During Period 4, 35 patients were observed, and during Period 8, 24 patients observed. All participants were observed at least twice. The patients were all located at different facilities (see Table 2).

**Table 1. Number of Cases Observed During Each Period**

| Period of Observation | Number of Patients |
|---|---|
| 1 Period | 47 |
| 2 Periods | 47 |
| 3 Periods | 41 |
| 4 Periods | 35 |
| 5 Periods | 30 |
| 6 Periods | 28 |
| 7 Periods | 25 |
| 8 Periods | 24 |
| 9 Periods | 18 |
| 10 Periods | 13 |
| 11 Periods | 12 |
| 12 Periods | 11 |
| 13 Periods | 8 |

| | |
|---|---|
| 14 Periods | 5 |
| 15 Periods | 4 |
| 16 Periods | 3 |

**Table 2. Patients by Facility: MOSES Data**

| | Frequency | Percent |
|---|---|---|
| Facility 1 | 10 | 21.3 |
| Facility 2 | 6 | 12.8 |
| Facility 3 | 9 | 19.1 |
| Facility 4 | 4 | 8.5 |
| Facility 5 | 18 | 38.3 |
| Total | 47 | 100.0 |

The program made a positive impact among the residents. Given the demographic of the population involved, the results reported seem encouraging. Positive changes were noted across several items measured by the MOSES instrument. The largest positive changes were among the following items, all related to feelings of depression and anxiety; looking sad and depressed (48%), looking worried and anxious (46%), reporting sadness and depression (43%), sounding sad and depressed (42%), and irritability (38%).

The five items with the least reported positive changes were; use of restraints (8%), using the toilet (13%), understanding communication (13%), memory of recent events (13%), pessimism about the future (13%), and provoking arguments with other residents (13%).

Figure 1. Percent of Patients with a Positive Change from the 1st to 8th Observation

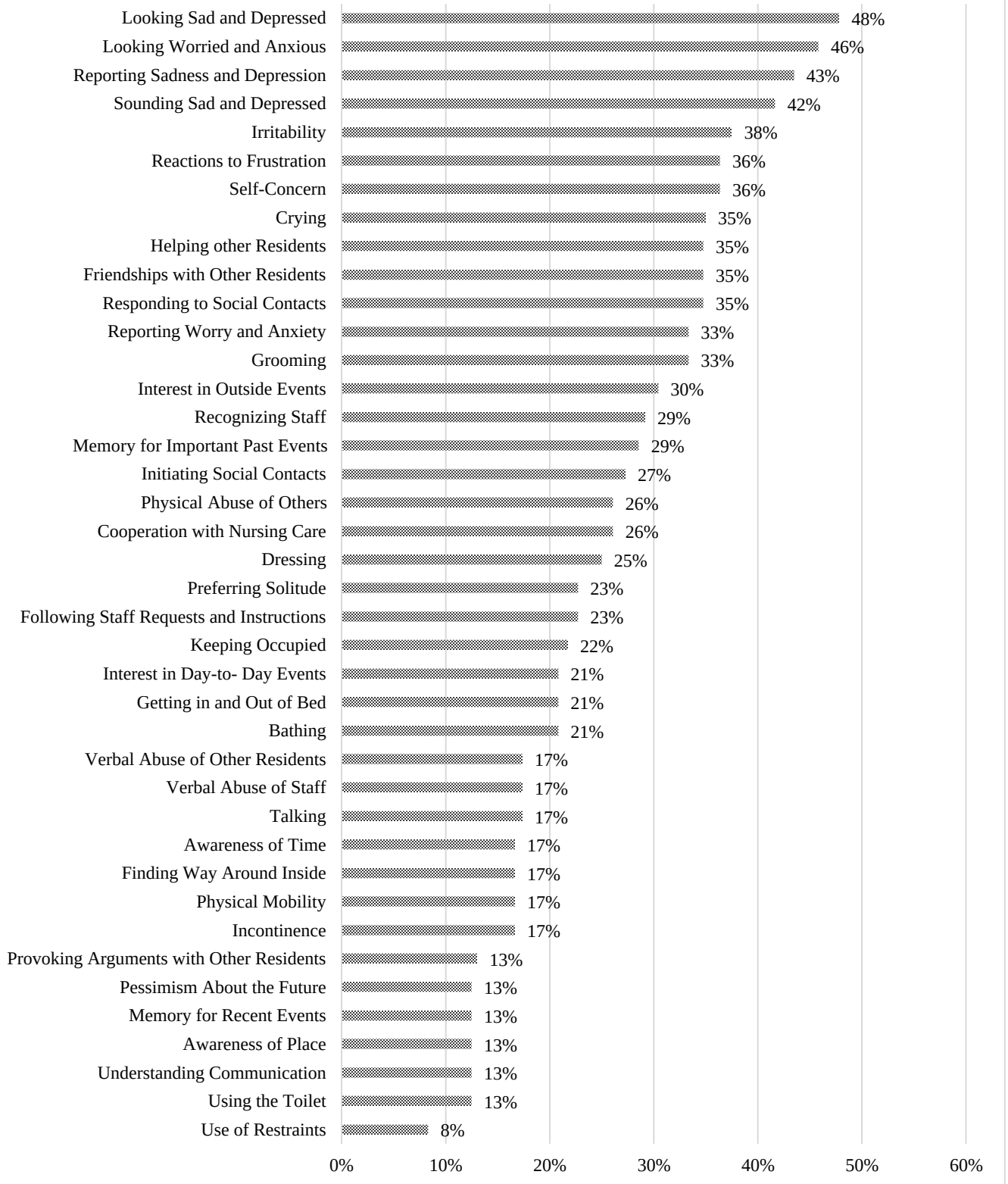

Table 3 shows the difference between each item when evaluated at Period 4 and when evaluated at Period 8 (sorted by Period 8 percentages as in Figure 1). It is evident that the percent of patients with positive changes increased with four additional periods of intervention (and observation). However, the sample size was not consistent during the two periods used for the evaluation of this difference (see Table 1). Overall, one may conclude that the longer the period of implementation of the Music and Memory program, the better are the observed health outcomes of the patients.

Differences between the two percentages ($8^{th}$ and $4^{th}$) were tested using the chi-square test of equality of proportions. Significance was evaluated using an alpha level of 0.10, and adjusting for type I error using the Bonferroni correction. Thus, in order to be significant at the 0.10 alpha level, each p-value would need to be less than or equal to .0025. On five of the items, the differences were large enough to be close to significance, though they were not. The items are: *looking sad and depressed; reporting sadness and depression; grooming; reporting worry and anxiety;* and *cooperation with nursing care.*

Table 3. Period 8 and 4 Evaluation Percentages by Item

| | Item | Difference at Period 8 (N = 24) | Difference at Period 4 (N = 35) |
|---|---|---|---|
| 17 | Looking Sad and Depressed | 48% | 24% |
| 20 | Looking Worried and Anxious | 46% | 27% |
| 18 | Reporting Sadness and Depression | 43% | 15% |
| 19 | Sounding Sad and Depressed | 42% | 21% |
| 27 | Irritability | 38% | 20% |
| 24 | Self-Concern | 36% | 19% |
| 28 | Reactions to Frustration | 36% | 18% |
| 22 | Crying | 35% | 27% |
| 35 | Responding to Social Contacts | 35% | 18% |
| 36 | Friendships with Other Residents | 35% | 29% |
| 40 | Helping other Residents | 35% | 24% |
| 3 | Grooming | 33% | 14% |
| 21 | Reporting Worry and Anxiety | 33% | 14% |
| 38 | Interest in Outside Events | 30% | 24% |
| 12 | Recognizing Staff | 29% | 21% |
| 16 | Memory for Important Past Events | 29% | 21% |
| 34 | Initiating Social Contacts | 27% | 15% |
| 25 | Cooperation with Nursing Care | 26% | 9% |
| 31 | Physical Abuse of Others | 26% | 12% |
| 1 | Dressing | 25% | 17% |
| 26 | Following Staff Requests and Instructions | 23% | 18% |
| 33 | Preferring Solitude | 23% | 9% |
| 39 | Keeping Occupied | 22% | 24% |
| 2 | Bathing | 21% | 14% |
| 7 | Getting in and Out of Bed | 21% | 9% |

| | | | |
|---|---|---|---|
| 37 | Interest in Day-to- Day Events | 21% | 27% |
| 10 | Talking | 17% | 15% |
| 29 | Verbal Abuse of Staff | 17% | 15% |
| 30 | Verbal Abuse of Other Residents | 17% | 9% |
| 4 | Incontinence | 17% | 11% |
| 6 | Physical Mobility | 17% | 17% |
| 11 | Finding Way Around Inside | 17% | 9% |
| 14 | Awareness of Time | 17% | 23% |
| 32 | Provoking Arguments with Other Residents | 13% | 3% |
| 5 | Using the Toilet | 13% | 11% |
| 9 | Understanding Communication | 13% | 18% |
| 13 | Awareness of Place | 13% | 20% |
| 15 | Memory for Recent Events | 13% | 14% |
| 23 | Pessimism About the Future | 13% | 11% |
| 8 | Use of Restraints | 8% | 3% |

**Patient Lightening Up Rating Scale Findings**

The Patient Lightening Up Rating Scale (PLRS) was designed to be administered to each patient every two weeks in order to monitor their change over time. There were challenges, however, during the actual implementation of the program because some patients (across all facilities) were not assessed consistently across all time periods, and there were gaps between data collection periods due to any number of reasons, for example, hospitalization, increase in illness, no recorded device, etc. Nevertheless, for most patients, we were able to compute the average rating, per month across the one, two, or three measures collected. We conducted a couple of analyses using the PLRS data.

Percent of Residents with a Positive Increase in Rating

The first analysis consisted of (i) computing a difference between the first observation and last observation for each patient, and (ii) computing the percentage of patients with a positive difference within each facility. The findings are presented in Table 3. The data in Table 3 are also presented in Figures 6-9.

**Table 3. Percentage of Patients with a Positive Difference in Rating by Facility**

| | Eyes widen or "light up" | Swaying to music | Moving arms and/or legs in a dancing motion | Tapping hand or foot to music | Smiling | Laughing | Clapping to music | Singing | Humming | Whistling |
|---|---|---|---|---|---|---|---|---|---|---|
| Facility 1 (*n* = 10) | 38% | 31% | 31% | 8% | 23% | 31% | 31% | 46% | 38% | 0% |
| Facility 2 (*n* = 4) | 14% | 14% | 29% | 14% | 0% | 0% | 14% | 14% | 29% | 14% |
| Facility 3 (*n* = 8) | 30% | 10% | 30% | 20% | 20% | 30% | 40% | 10% | 20% | 0% |
| Facility 4 (*n* = 5) | 0% | 17% | 17% | 33% | 17% | 0% | 0% | 17% | 33% | 17% |
| Facility 5 (*n* = 16) | 35% | 35% | 30% | 20% | 35% | 30% | 25% | 35% | 20% | 20% |
| Total | 29% | 25% | 29% | 18% | 23% | 23% | 25% | 29% | 27% | 11% |

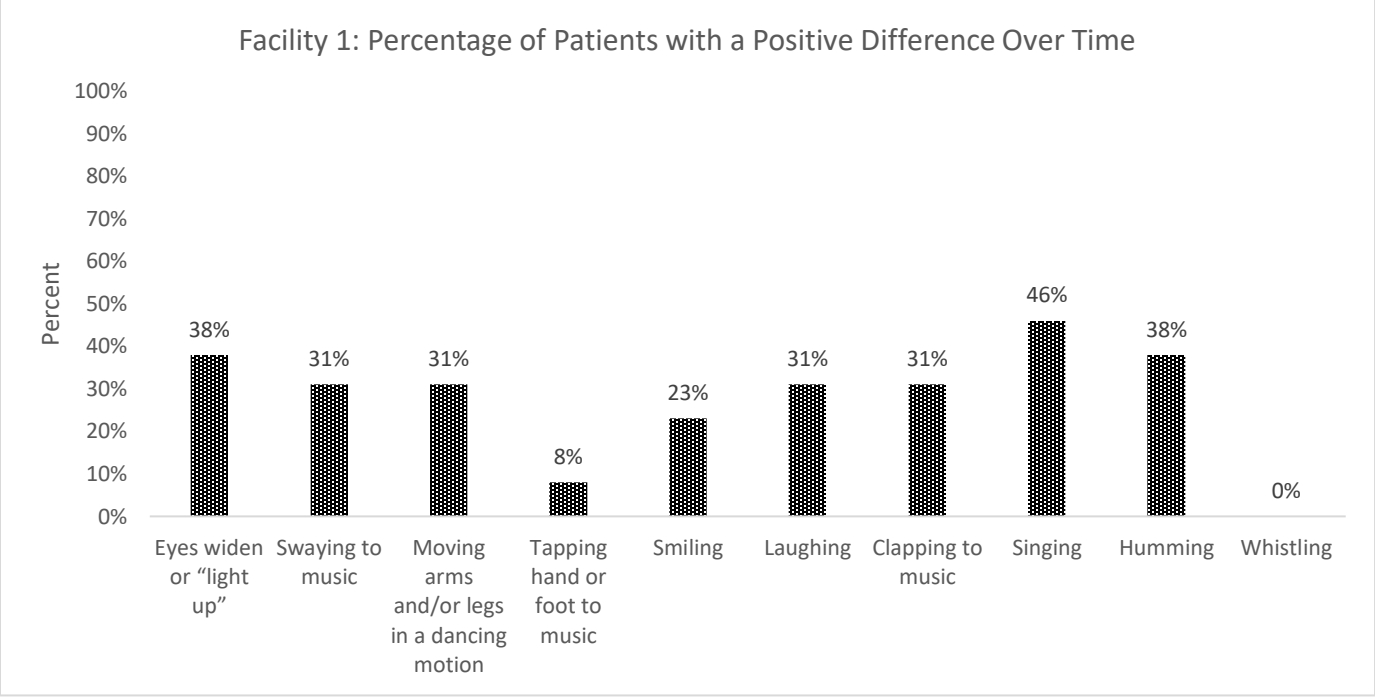


*Figure 6.* Percentage of participants with a positive difference for each item related to music therapy in Facility 1.

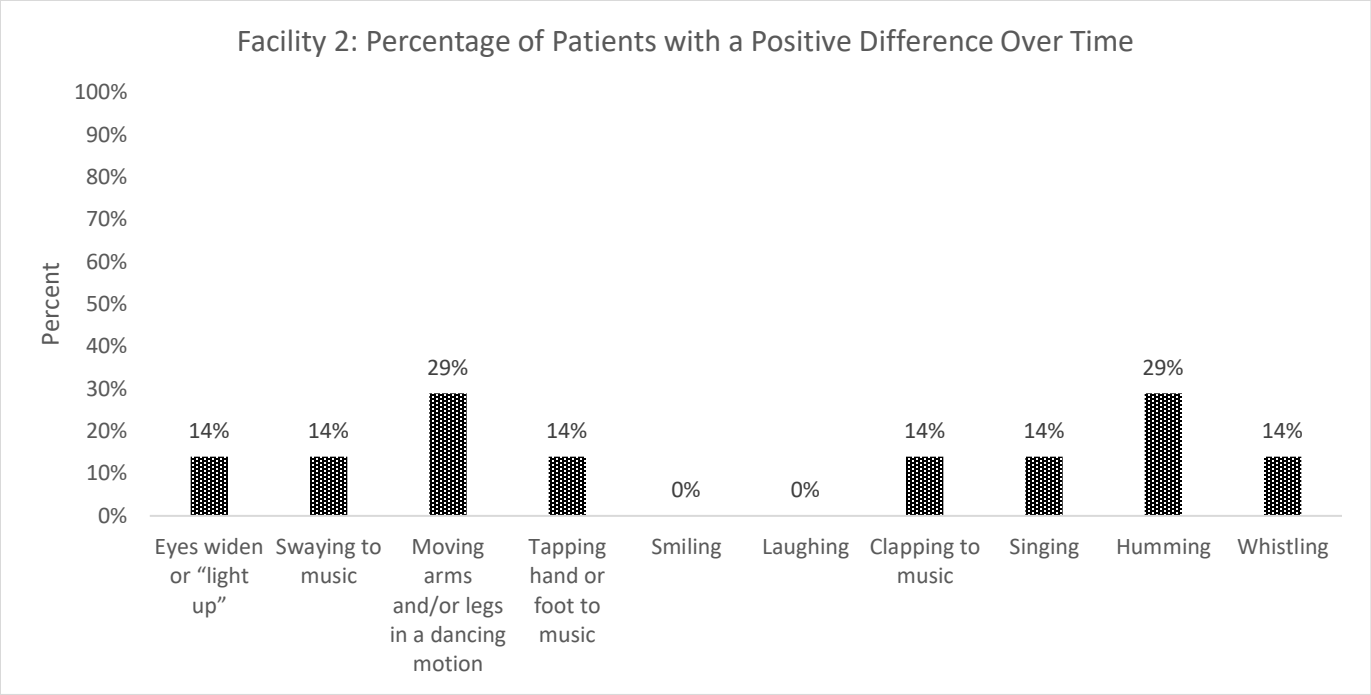


*Figure 7.* Percentage of participants with a positive difference for each item related to music therapy in Facility 2.

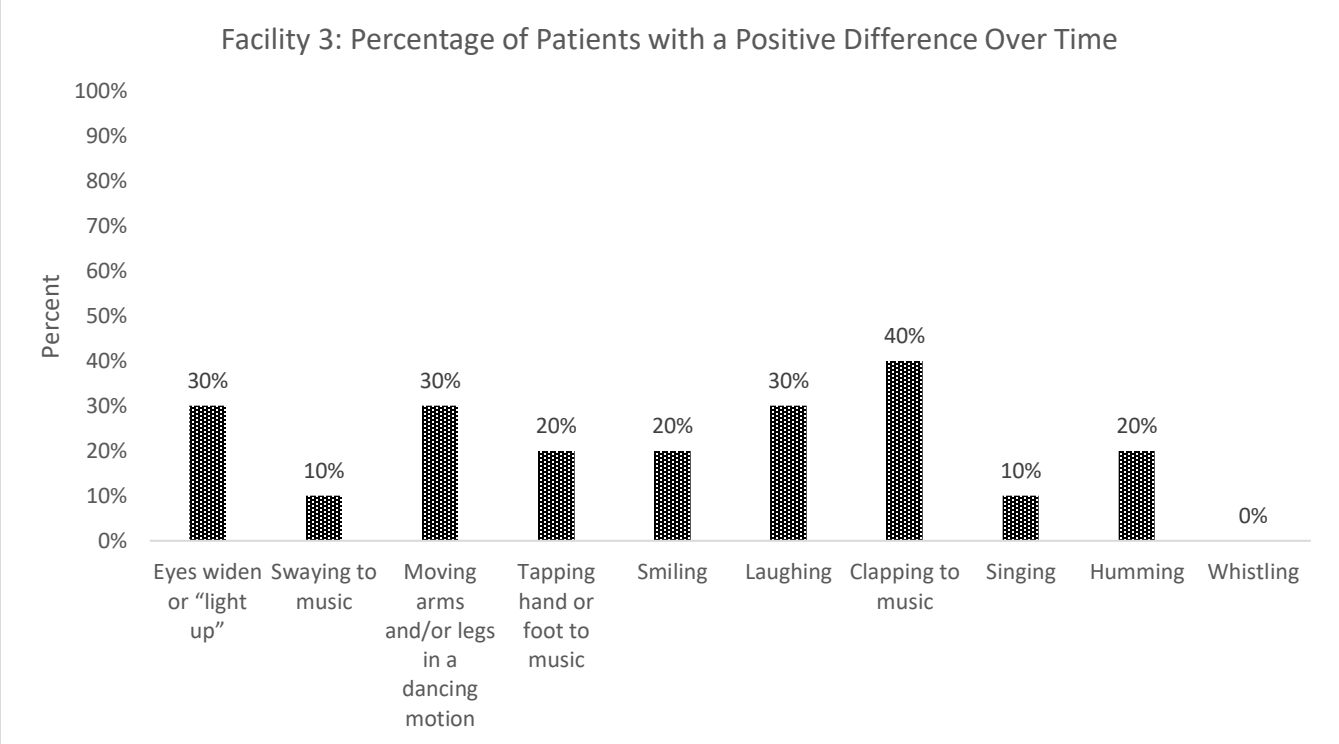


*Figure 8.* Percentage of participants with a positive difference for each item related to music therapy in Facility 3.

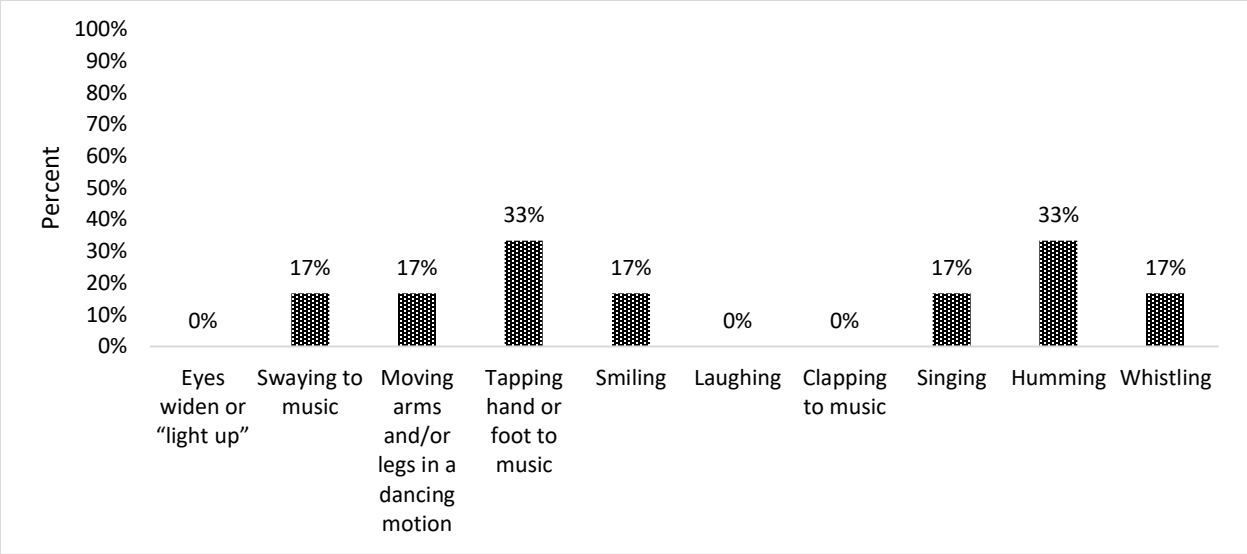


*Figure 9.* Percentage of participants with a positive difference for each item related to music therapy in Facility 4.

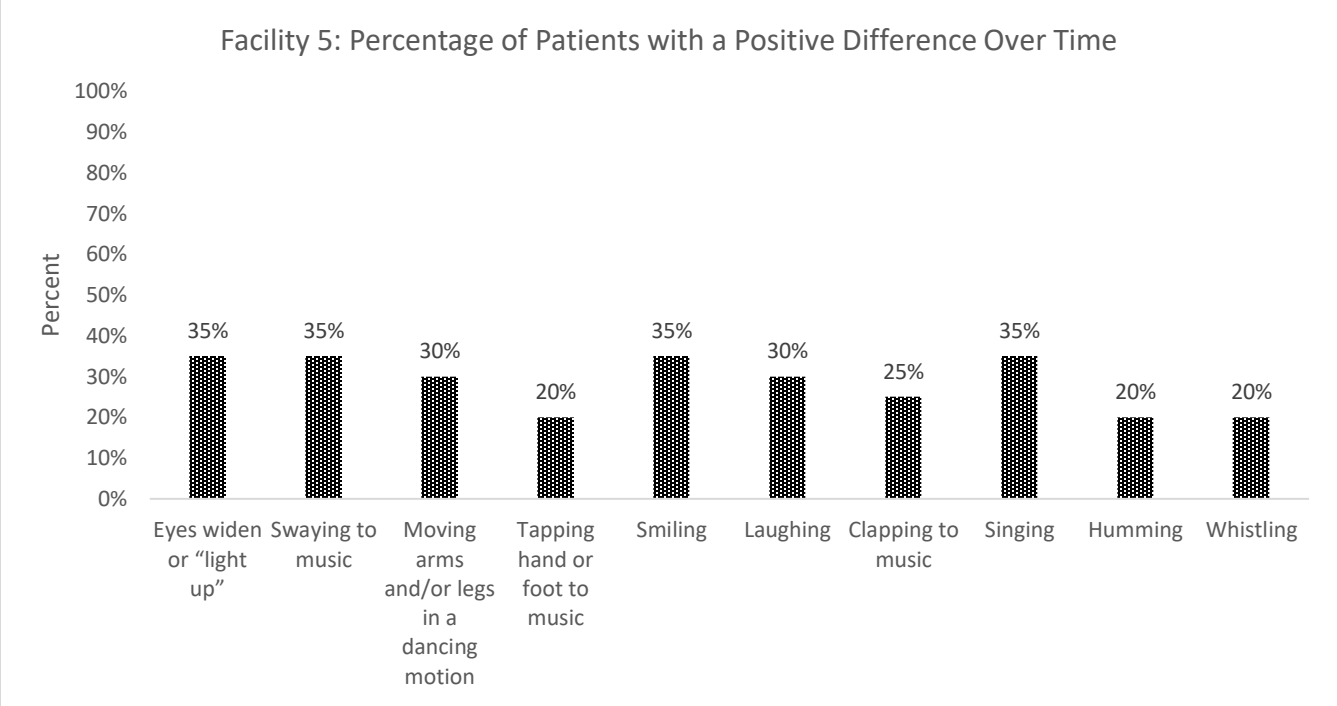


*Figure 10.* Percentage of participants with a positive difference for each item related to music therapy in Facility 5

**Goal 2** Assess nursing staff and nursing students' attitudes pre- and post-intervention of Music and Memory measured by Kemper questionnaire (modified) and Satisfaction Survey

**Did you meet the outlined goal or objective? Why or why not?**

Pre-attitudes were assessed and showed positive beliefs for music therapy. Post intervention attitudes and satisfactions were anecdotal. Several comments are listed below. The investigators were only able to collect a small number of Kemper surveys and satisfaction surveys post- Music and Memory treatment due to various reasons such as student groups at each facility changed halfway through the project; unanticipated staff changes at facilities; etc. Since there were small numbers, data was not able to be used for post-treatment analysis.

**What impact did your activities targeted at meeting the outlined goal or objective had on nursing home residents in the facility or facilities?** Attitudes among caregivers and healthcare providers were overwhelmingly positive. Positive beliefs of the staff for music intervention may assist implementing the music to more patients.

**Kemper Attitude and Belief Survey Findings**

The Kemper survey was administered to health care professionals at all five facilities before the Music and Memory treatment began during the first quarter of 2019. This instrument was designed to gauge the perceptions of the providers regarding the program before the treatment and to be followed up with a post-treatment survey. There were a total of 116 participants across the five facilities who completed the pretest. The distribution of these participants by gender and type of caregiver is given in Tables 1 and 2.

**Table 1. Distribution of Respondents by Facility and Gender**

| | Missing | Female | Male | |
|---|---|---|---|---|
| Facility 1 | 0 | 18 | 2 | 20 |
| Facility 2 | 1 | 23 | 1 | 25 |
| Facility 3 | 0 | 16 | 4 | 20 |
| Facility 4 | 0 | 19 | 1 | 20 |
| Facility 5 | 0 | 15 | 2 | 17 |
| Total | 1 | 91 | 10 | 102 |

**Table 2. Distribution of Respondents by Facility and Type of Caregiver**

| | Caregiver/Family | Facility Staff | TTU Student | Total |
|---|---|---|---|---|
| Facility 1 | 2 | 7 | 11 | 20 |
| Facility 2 | 0 | 14 | 11 | 25 |
| Facility 3 | 3 | 6 | 11 | 20 |
| Facility 4 | 0 | 8 | 12 | 20 |
| Facility 5 | 2 | 4 | 11 | 17 |
| Total | 7 | 39 | 56 | 102 |

The findings presented here reflect the attitudes of healthcare professionals at the start of the Music and Memory program. As illustrated in Figures 1 through 5, across all five facilities, the majority of professionals felt that music therapy could (i) improve mood, (ii) lift spirits/boost energy, (iii) reduce stress, and (iv) reduce agitation. Conversely, only small percentages felt that music therapy (i) is fake, (ii) only works for "New Age" types, and (iii) generally worthless for sick patients.

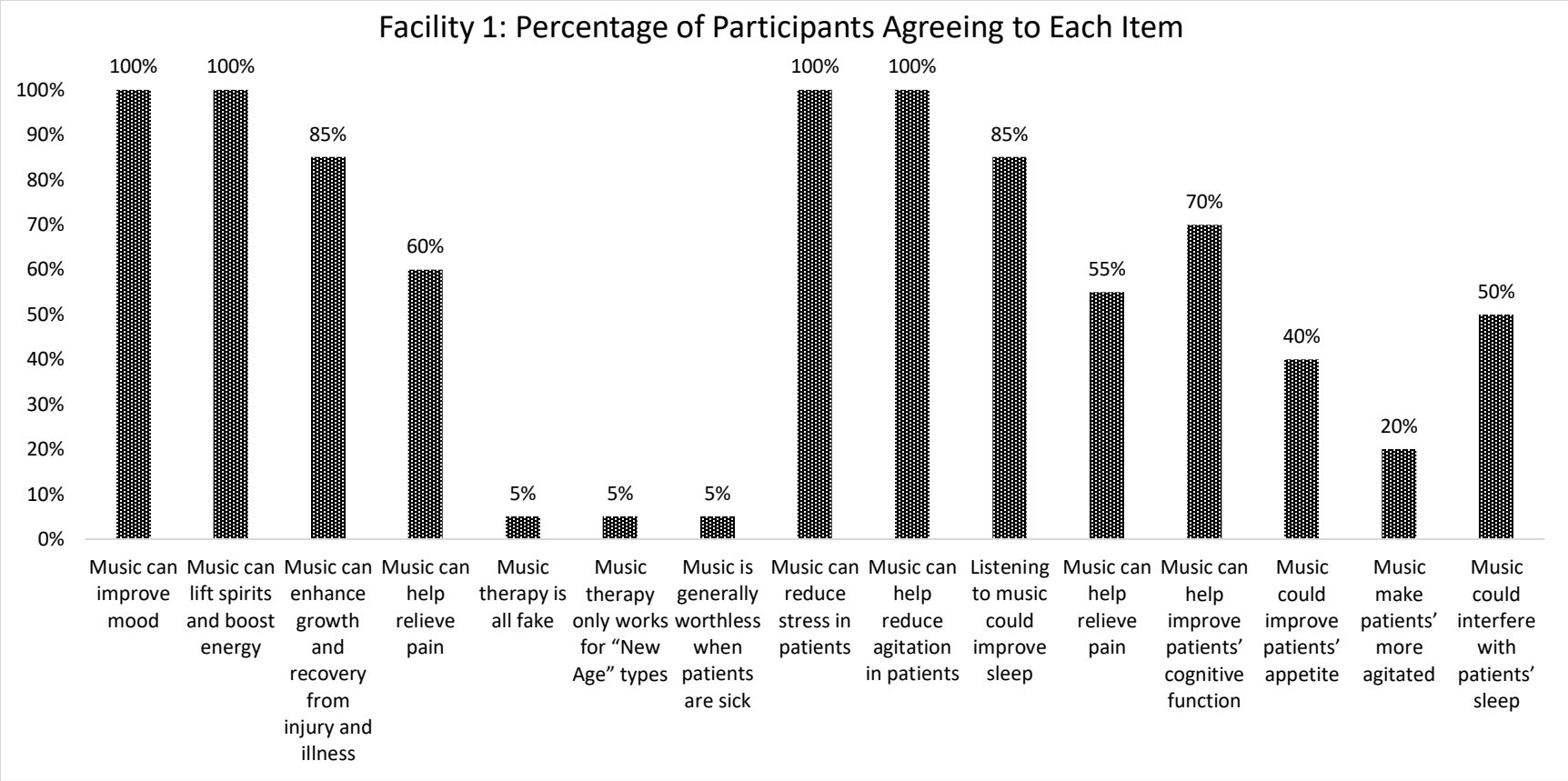


*Figure 1.* Percentage of participants agreeing with each item related to music therapy.

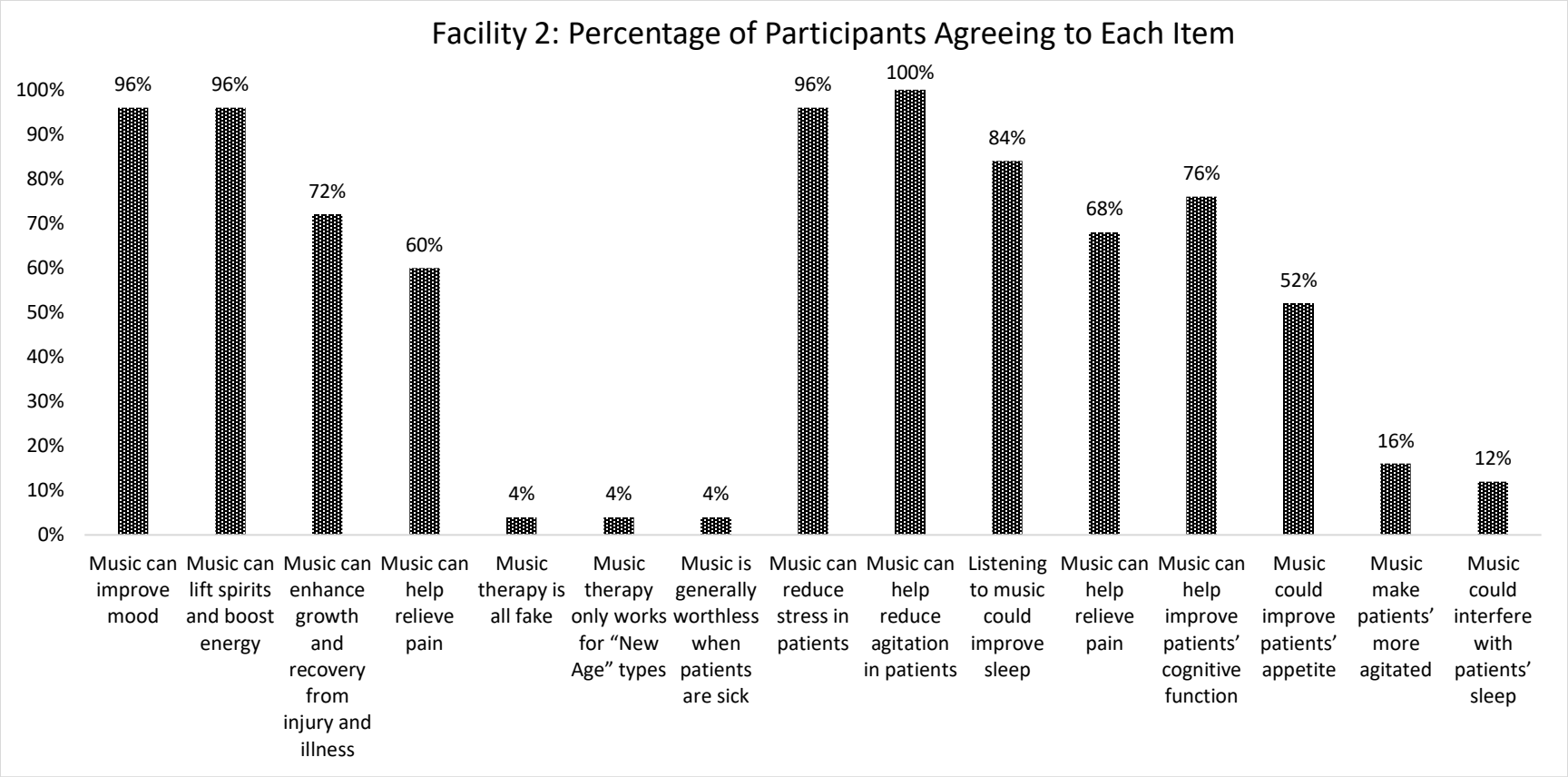


*Figure 2.* Percentage of participants agreeing with each item related to music therapy.

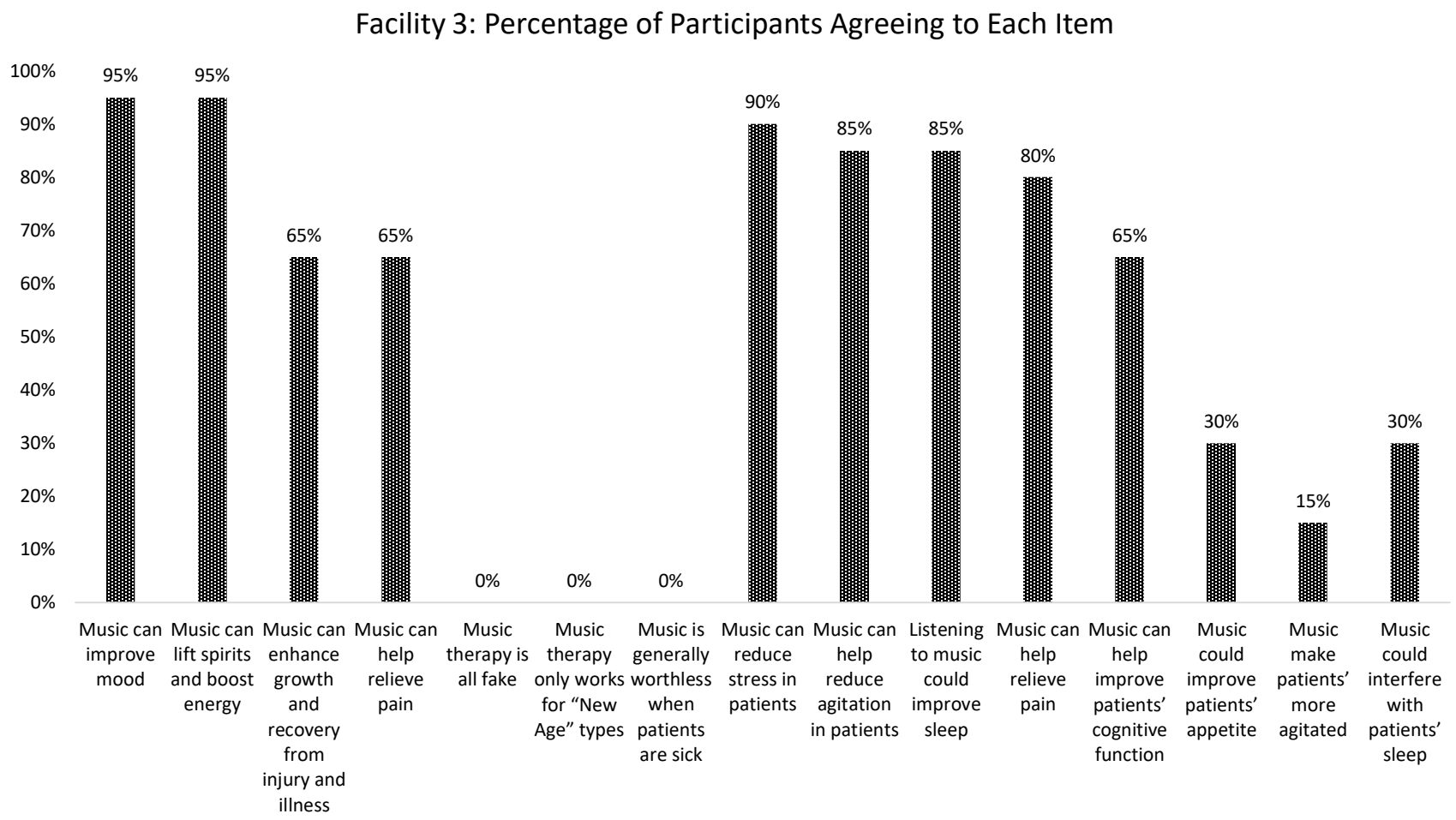


*Figure 3.* Percentage of participants agreeing with each item related to music therapy.

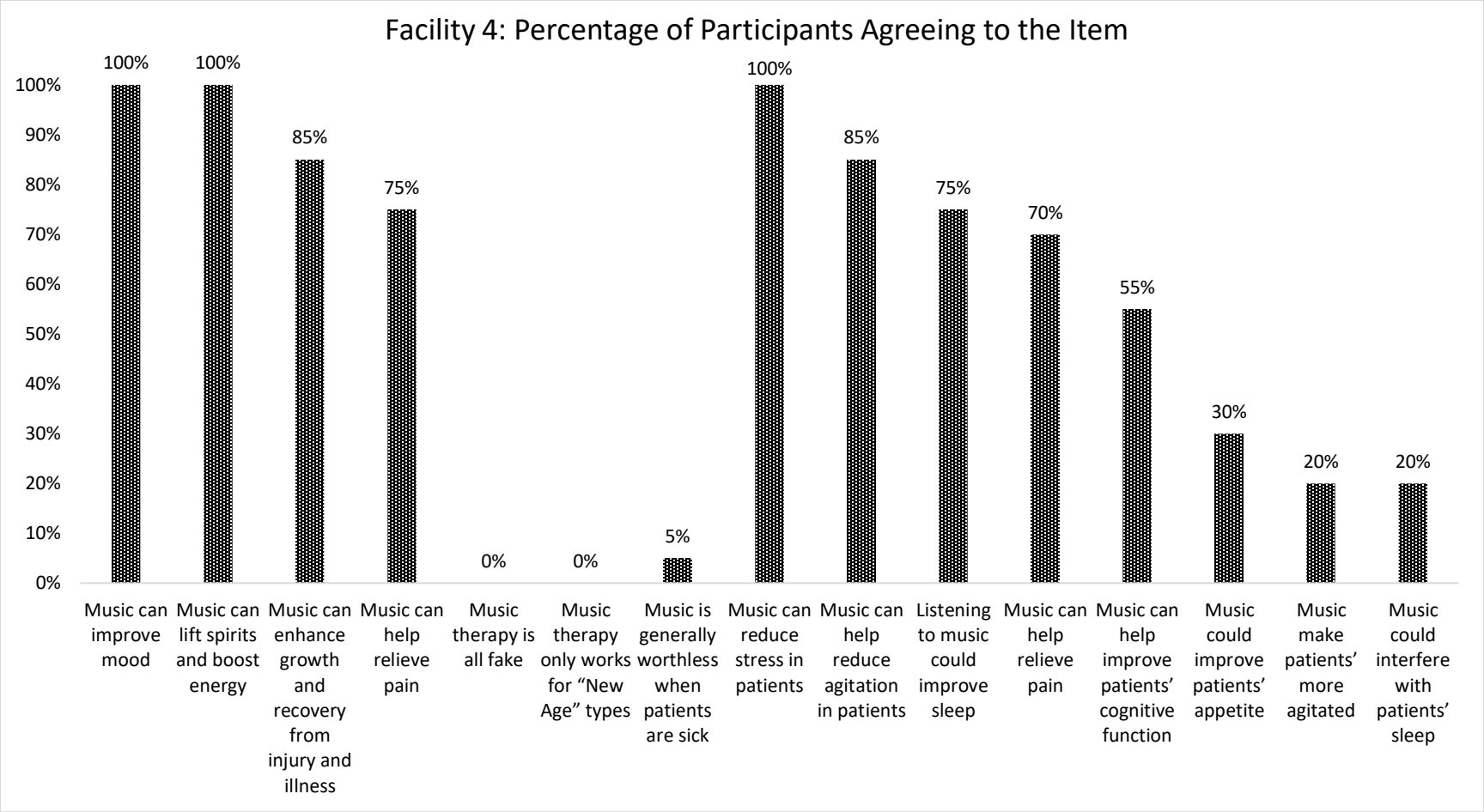


*Figure 4.* Percentage of participants agreeing with each item related to music therapy.

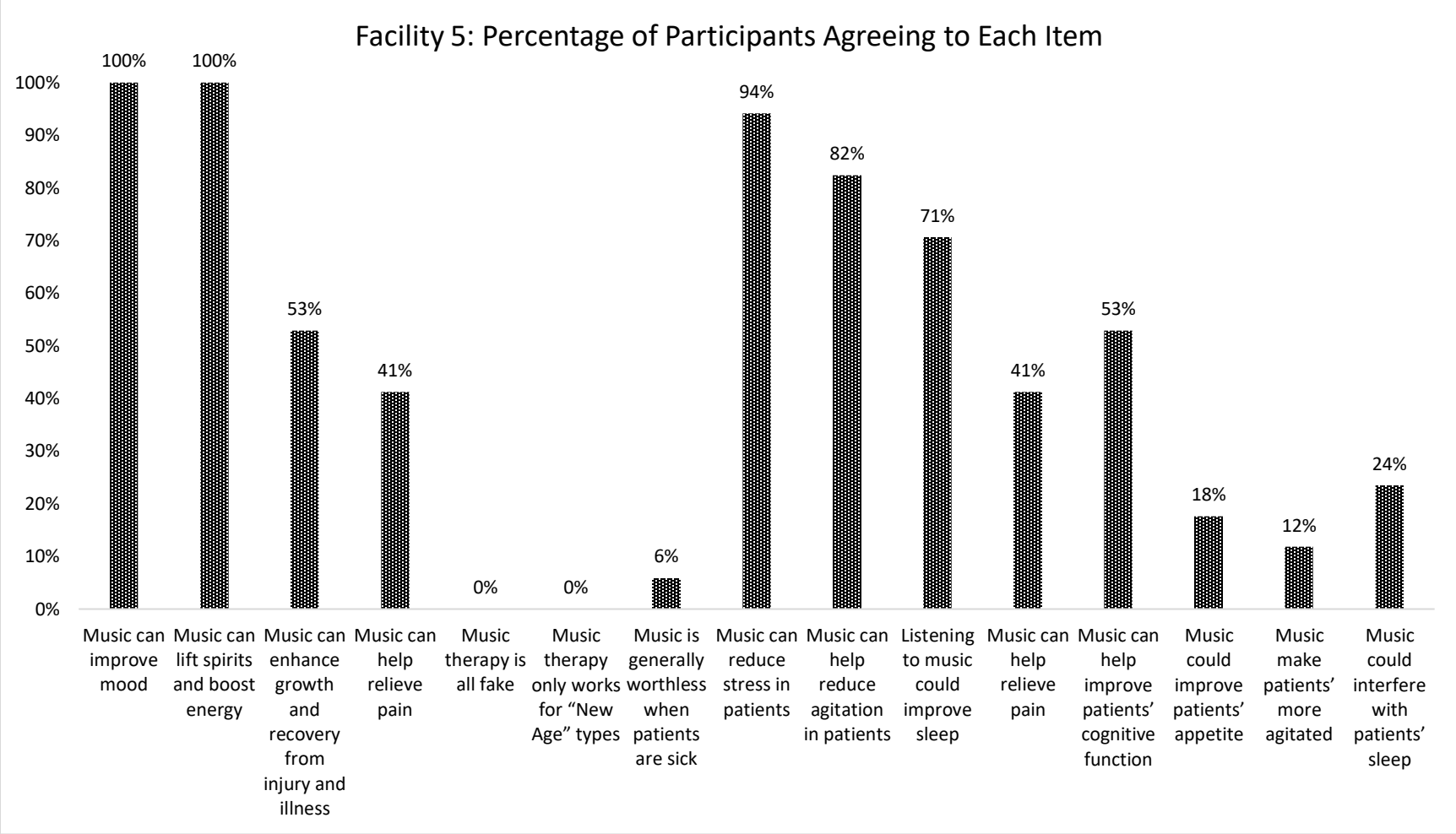


*Figure 5.* Percentage of participants agreeing with each item related to music therapy.

**Comments post project:**

*"During the time of COVID-19 and the patients are isolated, the music and been a blessing for the patients."*

*"Now that we have all of this equipment, we don't have to tell a patient the all of the devices are in use and that they will have to wait to listen to music".*

*"This has been a wonderful project that personalizes the patient's music."*

*"This project has been so helpful to our patients."*

**Goal 3** Reduce the number and frequency of uptake of antipsychotic medications prescribed for patients pre-, during, and at end of grant period.

**Did you meet the outlined goal or objective? Why or why not? No.** Only 1 facility allowed access to actual medication administration to measure success of a decrease of antipsychotic medications. This restriction limited the ability of investigators to evaluate decreases in dosing of medications that were ordered on an "as needed" basis.

**What impact did your activities targeted at meeting the outlined goal or objective had on nursing home residents in the facility or facilities?**

In the one facility that allowed access, medication orders were obtained monthly related to psychotropic and pain medications. There were no statistically significant changes related to medication orders. However, one patient did have a decrease in the dosage of antidepressant medication during the study period and one patient had a decrease in dosage of pain medication over a study period.

**Summary of Findings**

Healthcare professionals at all facilities reported an overall improvement in patient outcomes over time, albeit there may have been fluctuations in the ratings from time to time. Attitudes among caregivers and healthcare providers were overwhelmingly positive. Positive changes were observed among the patients, with data from the MOSES instrument suggesting that longer periods of implementation of the intervention tended to correlate with better outcomes. Although the percentages of patients with positive differences (as measured by the PLRS) tended to be fairly low, this is not surprising, given the population being studied. Rather, it is encouraging to note that in each facility, there were a number of patients responding positively to the intervention.

**Notable Success Stories**

The following are qualitative observations from the field notes of the faculty supervisors and providers. They shed light on the successes of the program.

- *In one facility, there was a married couple who both participated in the program—sometimes they would listen to music together and his cognition was pretty good. He could sing the songs to her from their wedding and first dates. This made her happy and smile.*

- *When we started with my first patient, we listened to the music with her and she danced in her bed and sang the songs. It was exactly the way some of the music and memory videos had shown the patient respond.*
- *I had a couple patients and/or family see other patients using the music or had heard about the program and asked us to let them or their family participate.*
- *One gentleman changed from mumbling and many times agitated to smiling, humming, tapping his foot every time we put the music on. The staff were able to get him settled at night with the music.*
- *One lady had traveled the world and was an avid musician and dancer. She was always wandering around trying to leave and repeating the same phrases over and over. When we placed the music, she would remember parts of the song and most often the artist.*
- *One lady talked rapidly all the time with nonsensical sentences and phrases. We put music on her and she settled down and when her favorite song came on (as identified by a family member) she actually started singing the song clearly. She had not been able to put a coherent sentence together in a long time.*
- *One gentleman who was angry, abusive, and used a lot of foul language immediately settled down and changed his demeanor when music was applied. His improved demeanor would persist for several hours following the music intervention. He had a background as a musician in his family's bluegrass band.*

**Challenges Experienced During Program Implementation**

During the course of the program the faculty supervising the implementation of the program recorded field notes based on their observations. The following are some of the special circumstances that were noted across the facilities which posed challenges to the program.

- Each facility experienced several residents pass away during the study year. In one institution, one resident passed away, another had five residents, another had four residents pass away during the study year. In one institution, some patients were reported to become unresponsive to the intervention.
- Data collection was not consistent among all the providers/caregivers. In some facilities, it was difficult to get the staff to document their observations (using the available survey forms) and to document the daily use of music.
- Music and Memory Company had financial problems and terminated all their staff halfway into the project. The company realigned—but no more funds were given to this program as directed by the state. We were still able to utilize online resources but we lost the consultant with whom we had worked closely with.
- Patients could be in any stage of dementia to be included in this study. The majority of the patients were in the later stages of dementia which may have affected their response to the personalized music and the inability of the intervention to improve the condition over time.
- In some of the facilities, there were staff changes, turnover, and other daily responsibilities and chores which demanded the staff's time.
- Only 1 facility allowed access to actual medication administration to measure success of a decrease of antipsychotic medications.
- At the beginning of project implementation, facilities were involved with transition to electronic health records which diverted time and attention away from the initiation of the project.

- Purchasing requirements of the University stating that there must be a designated person from the investigator team to purchase iTunes made it very difficult to adjust playlists and supply devices to new patients. This delayed introduction of devices and replacement of devices that were lost or misplaced. This greatly limited the staff's involvement and training in creating and adjusting playlists for the participants.

**Plan to Showcase with Stakeholders**

The plan to showcase with stakeholders was to host an on-ground conference inviting students, nursing home staff and administrators, and the community at large. The conference was scheduled for March 6, 2020. A F4 tornado hit Putnam County on March 3rd and caused devastation to the area. The plan was to reschedule in May. However, the University events were canceled due to COVID-19. With the uncertainty of restrictions on gatherings and social gatherings, the conference has not been rescheduled. In order to present the results/outcomes of the study, the research team for this project plans to submit articles for publication and hopefully be invited for podium/poster presentations.

**Feedback from Staff, Family, or Residents as a Result of the Project**

*"During the time of COVID-19 and the patients are isolated, the music has been a blessing for the patients."*

*"Now that we have all of this equipment, we don't have to tell a patient that all of the devices are in use and that they will have to wait to listen to music".*

*"This has been a wonderful project that personalizes the patient's music."*

*"This project has been so helpful to our patients."*

*At one facility, the unit manager would apply the music at approximately 4pm each day. She noted that it helped some of the residents avoid the agitation associated with "Sundowners" in several of the residents.*

*One family member was amazed when the music was applied and her mother began sharing memories about events from years past that she had not talked about for a long time.*

**Greatest Impact(s) of the Work performed utilizing CMP Funds**

This grant allowed the provision of training for staff of the nursing homes, computers loaded with iTune songs for generational preferences, and equipment (MP3 players, ear phones, and speakers) for individual patients in order to implement the Music & Memory program. The greatest impact(s) of the work performed utilizing CMP funds focused on a quality of life for Alzheimer and dementia patients in handling their issues and emotional/behavioral problems. Patients experienced depression, anxiety, irritability, and restlessness. Many times, these are

problems that are difficult to manage without the use of medications. This program gives caregivers another tool to utilize in the management of emotional problems.

Increased movement inspired by the music is also very beneficial for patients who are many times bed or chair bound. Alzheimer and dementia patients experience progressive decline in physical and cognitive ability. While the Music & Memory Program cannot halt this naturally occurring decline, it can have positive effects on the physical and emotional problems that occur during the decline.

**Best Practices Resulting from the Project**

1. Internal culture of the agency needs to be supportive of the project. Build relationship first. Reveal ways of how this helps the patient and the staff as care providers.
2. Recognize that there will be unique challenges for each facility.
3. Have a dedicated and enthusiastic point person for each facility to assist with implementing the program
4. Have a point person responsible for assisting with music playlists and equipment. It was helpful to have a box for the patient's device in the patient's room so the device could be easily located.
5. It is good to have alternative ways of applying the music. Some patients may require an external speaker as opposed to a headset device.
6. Music should be consistently applied as part of the patient's daily routine and as needed.
7. The most beneficial music is the patient's preferred music – this is sometimes difficult to ascertain and may require trial observation until it is apparent that the patient is enjoying the music.
8. Playlists should be adequate to avoid repetition and should be updated with the patient's preferred music on a regular basis.

**Activities to Ensure sustainability since theCompletion of the Project:**

Intangible and tangible items have been given to the agencies (see list) throughout and at the end of the program.

**Intangible Deliverables**

Intangible deliverables include:

- Training/Certification for nursing home staff, nursing students, and nursing faculty for the implementation of Music & Memory for nursing home residents in various stages of dementia
- Methods of use

**Tangible Deliverables**

Tangible deliverables for each agency include:

- Computer loaded with iTunes songs from various time periods and artists

- MP3 Players
- Ear phones
- Speakers
- Chargers

Both the intangible and the tangible deliverables will allow the nursing homes to sustain the music and memory program to impact the residents with dementia futuristically. In addition, nursing students who were involved in this process and influenced by this program and intervention will provide insight and a new perspective in the care of dementia patients throughout the agencies in which they will serve as BSN prepared Registered Nurses.