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Effects of Therapeutic Music on Improving Depressive Symptoms Among Long-Term Care Facility Residents

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EFFECTS OF THERAPEUTIC MUSIC ON IMPROVING DEPRESSIVE SYMPTOMS AMONG LONG-TERM CARE FACILITY RESIDENTS

by

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DEDICATION

I would like to dedicate this project to the most important people in my life: my parents, my husband, and my son! It has been such a long and arduous journey to pursue my nursing degrees, and I never thought that I could make this far. I still remember the excitement of receiving the acceptance letter to the associate nursing program, and now I am finishing up my doctoral study. There were days with rainbows and thunderstorms, tears of joy and sorrow throughout the years. It was not easy, and it shouldn't be. We have been optimistic and persistent. We know things will not always go as planned, but we are certain that we will not give up easily! We have learned the most valuable thing going through this adventure together - hold a positive attitude until the future rewards you! As a family, we are working together toward our new goal - the goal of living a happy and meaningful life!

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ABSTRACT

Depression is a common mental disorder that can contribute to both physical and psychological suffering (Skinner, 2014). The prevalence rate of depression is especially high among long-term care facility residents (CounsultGeri, 2018; Lolk & Andersen, 2015). The purpose of this EBP project was to establish a protocol incorporating therapeutic music as an adjunct therapy for managing depressive symptoms among residents of a long-term care facility in the Midwest. Roy adaptation model (Roy, 2009) was utilized as the theoretical framework, and the model for evidence-based practice change (Rosswurm & Larrabee, 2009) guided the project implementation. A total of 13 subjects were recruited from the facility with 11 completing the entire project. A weekly 30-minute session of listen-to-favorite-music activity was offered to subjects for 12 weeks. Music was delivered via CD players in subjects' rooms with the assistance of nursing or activity staff. The Geriatric Depression Scale-Short Form (GDS-SF) was administered to subjects at baseline, 8 weeks post-intervention, and 12 weeks post-intervention. A repeated-measures ANOVA test was employed to compare GDS-SF scores from three different times, and a significant effect was detected, $F(2, 20) = 5.81$, $p < .05$. Follow-up protected paired-samples *t* tests reveal that 12-week-post-intervention GDS-SF scores decreased significantly compared to baseline, $t(10) = 3.16$, $p = .01$, with the average 12-week-post-intervention score being 4.27 ($SD = 2.97$) and the average baseline score being 6.27 ($SD = 2.53$). Results demonstrate that a weekly 30-minute session of listen-to-favorite-music activity over a period of 12 weeks is effective for reducing depressive symptoms among residents of the long-term care facility. The protocol developed during the EBP project is efficacious and easy to implement, and the practice change should expand to similar facilities. Moreover, patients from various other settings, such as inpatient hospitals and assisted living facilities, may be considered in future EBP projects.

CHAPTER 1

INTRODUCTION

Background

Depression, a commonly encountered mental disorder, can produce profoundly negative effects on both physical and psychological health. The mechanism of depression is rather complex that multiple body systems can be affected by the disease process. Patients with depression can go undiagnosed for a long period of time whilst suffering symptoms ranging from mild, such as fatigue and insomnia, to severe, including weakened immune system, suicidal attempts, and even death (Skinner, 2014). The prevalence rate of depression is especially high among long-term care facility residents, “at least one out of ten persons living in a nursing home seems to have depression and more have depressive symptoms” (Lolk & Andersen, 2015, p. 1). Although depression is commonly treated with antidepressants, they are not panaceas. Many antidepressants appear on the Beers list due to their increased risks of adverse effects when used among geriatric populations (Frank, 2014). Also, many elderly suffer from depressive symptoms but do not meet the criteria for a diagnosis of depression warranting pharmacological treatments. Therefore, it is worth exploring effective nonpharmacological interventions with little risk when managing both depression and depressive symptoms.

The history of music as a healing agent can be traced back to ancient Roman times. Plato considered music to be the “medicine of the soul” while Aristotle believed that the cathartic effects of music could lead to improvement of negative mood (Thaut, 2015; The History of Music and Art Therapy, 2018). Many contemporary studies have also revealed the therapeutic effects of music interventions on managing depression, anxiety and pain (Aalbers et al., 2017; Klainin-Yobas, Oo, Suzanne, & Lau, 2015; Nilsson, 2008). In 2007, Dr. Oliver Sacks, a neurologist, published the book named

"Musicophilia" in which he analyzed multiple case studies involving music interventions. Dr. Sacks wrote, "familiar music acts as a sort of Proutian mnemonic, eliciting emotions and associations that had been long forgotten, giving the patient access once again to moods and memories, thoughts, and worlds that had seemingly been completely lost (p. 380)." Music can stimulate brain's reward mechanism and alter the production of various neurochemicals associated with emotions (Chanda & Levitin, 2013). Researchers have detected that music stimulation could lead to increased release of dopamine which is linked to pleasurable feelings (Salimpoor, Benovoy, Larcher, Dagher, & Zatorre, 2011). Also, according to Suzuki et al. (2004), salivary chromogranin A is an identified marker for psychological stress, and their study revealed statistically significant decrease of saliva Chromogranin A after 16 sessions of music intervention among patients with dementia.

Statement of the Problem

Elderly adults are more susceptible to depression attributed to various factors, including declining health of selves as well loss of lifetime partners and friends (Chan et al., 2012; Zhang et al., 2017), and long-term care facility residents are at even higher risks for depression (CounsultGeri, 2018; Lolk & Andersen, 2015; Morley, 2010).

Data from the Literature Supporting Need for the Project

Depression affects nearly 5 million Americans aged 65 and older (Blazer, 2009), and "over 40% of residents in long-term care facilities and 15% of community-dwelling older adults have been diagnosed with depression" (CounsultGeri, 2018). Depression is associated with decreased level of functioning and quality of life as well as increased agitation among nursing home residents (Lolk & Andersen, 2015).

Data from the Clinical Agency Supporting Need for the Project

The facility nurse practitioner and medical director both voiced concerns about depressive symptoms among these residents and also displayed great interest in the

EBP project which would employ a nonpharmacological intervention for managing depressive symptoms (personal communication, July 18, 2018). A review of medical records from the facility residents revealed that more than 25% of long-term residents were currently taking antidepressants.

Purpose of the Evidence-Based Practice Project

Compelling Clinical Question

The compelling clinical question is: how to incorporate therapeutic music as an adjunct therapy for managing depressive symptoms among residents of the long-term care facility.

PICOT Question

Among long-term care facility residents who are 55 years old and above, have a Brief Interview for Mental Status (BIMS) score $\geqslant$ 8 and a Geriatric Depression Scale-Short Form (GDS-SF) score $\geqslant$ 2, how does a weekly 30-minute session of listen-to-favorite-music activity compared to current practice of no regular favorite-music-listening activity affect depressive symptoms within an 8-week and a 12-week time period?

Significance of the EBP Project

The EBP project has established a protocol of incorporating therapeutic music as an adjunct treatment for managing depressive symptoms among residents of the long-term care facility. Under this protocol, the facility staff were directed to offer therapeutic music to residents regularly via CD players. Proper staff training as well as the cost-effective and easy-to-implement nature of the music intervention adopted in the EBP project has contributed to sustainability of the practice change.

CHAPTER 2

THEORETICAL FRAMEWORK, EBP MODEL, AND REVIEW OF LITERATURE

Theoretical Framework

Overview of Theoretical Framework

As elaborated in Roy adaptation model (RAM) (Roy, 2009), individuals are adaptive systems that constantly mediate internal and external stimuli categorized as focal, contextual and residual. Focal stimuli are factors that directly contribute to a situation; low serum serotonin level could be identified as the focal stimulus of depression. Contextual stimuli involve other elements that have identifiable effects on a person's situation; entertaining activities are examples of contextual stimuli conducive to improving depressive symptoms. Residual stimuli refer to factors that produce unclear effects on a patient's condition; medications carrying unknown adverse effects can be considered as residual stimuli. All types of stimuli are processed by the regulator and cognator subsystems. The regulator subsystem provides feedback through the physiological routes while the cognator subsystem provides feedback through the emotional and cognitive routes. Increasing heart rate is an example of how the regulator subsystem processes the stimuli of low blood volume in order to maintain homeostasis of the whole body system; activating pleasurable memories or feelings in responses to certain music or smells is an example of how the cognator subsystem regulates emotional pathway.

Each individual will eventually achieve one of the three adaptation levels ranking from high to low: an integrated level, a compensatory level, or a compromised level. At the integrated level, the adaptation is working successfully that all fundamental needs of the body system are well balanced and homeostasis is achieved. At the compensatory level, the adaption is still able to combat abnormality and restore basic functioning of the body system eventually; however, the full system capacity could not be reached. The

compromised level of adaptation occurs when the body system fails to reverse harmful behaviors and balance fundamental needs. So at this level of adaptation, homeostasis is disrupted.

Roy (2009) also identified six nursing processes in assisting patients to facilitate an adaptation: assessment of behavior, assessment of stimuli, nursing diagnosis, goal setting, intervention, and evaluation. Roy suggested that two levels of assessments should be conducted. During the first level, patient's behaviors should be assessed; and the second-level assessment involves identifying stimuli contributing to such behaviors. To achieve an integrated level of adaptation, interventions should be targeting alteration of harmful stimuli and improvement of coping mechanisms.

Application of Theoretical Framework to EBP Project

Roy (2009) provides excellent guidance on how to facilitate the integrated level of adaptation within human systems, and the EBP project focusing on emotional adaptation was developed under the framework of RAM.

Nursing home residents have a relatively high prevalence rate of depression or depressive symptoms (Lolk & Andersen, 2015), which represents a compromised level of adaptation in terms of mental well-being. In order to improve the adaptation, a first level of assessment should be conducted to evaluate patients' behaviors. GDS-SF was utilized during the project to identify some maladaptive behaviors such as "loss of interest in previous hobbies", "avoidance of social interactions" as well as "undue self-blaming". A second level of assessment needs to focus on various stimuli. The focal stimulus of depression is the inadequate serum serotonin level, and the contextual stimuli may include some environmental factors such as lack of social life and entertaining activities. Some common nursing diagnoses associated with depression include "failure to thrive" and "ineffective role performance". The goal of this EBP project was to improve depressive symptoms of residents residing in the long-term care facility,

and this goal was evaluated with GDS-SF. When it comes to interventions, efforts should be made to alter not only the focal stimuli but also the contextual stimuli, and possibly residual stimuli if they can be identified. To modify the focal stimuli, serotonin reuptake inhibitors are prescribed when indicated for patients with depression. However, modifying the contextual stimuli, such as meeting residents' entertainment needs, can be overlooked at times. This EBP project incorporated therapeutic music as an adjunct treatment for depressive symptoms, and such an intervention was intended to modify the contextual stimuli by providing residents with entertainment activities of listening to their favorite songs. The last step includes evaluating the outcome of interventions targeting a highest level of adaptation as possible. In this EBP project, baseline and post-intervention GDS-SF scores were compared to assess the effects of intervention.

Strengths and Limitations of Theoretical Framework for EBP Project

Certain strengths can be identified when applying RAM (Roy, 2009) to this EBP project. First, this model provides step-by-step directions on how to promote effective adaptions, and the various steps are organized in a logical order that is easy to follow. Second, as a nursing model, RAM incorporates the nursing processes into its theory development. Nursing interventions can be easily integrated into nursing processes. Therefore, RAM is particular suitable for this project that adopted nursing interventions. However, RAM is not without limitations. The two levels of assessments proposed in this model can be challenging and time-consuming. Both patients' behaviors and environmental factors needed to be evaluated in order to identify potential focal and contextual stimuli, and such evaluations were rather complicated at times.

Evidence-Based Practice Model

Overview of EBP Model

Model for evidence-based practice change (MEBPC) is an updated version of the original model created by Rosswurm and Larrabee in 1999. Larrabee incorporated her

experience in nursing education and leadership into the development of MEBPC in 2009 (Melnyk & Fineout-Overholt, 2015). MEBPC includes six steps relating to the sequential stages of an EBP project. The first step begins with assessing the need for practice change. External and internal data should be collected to identify a clinical problem warranting practice change. External data provide background for the clinical problem, and internal data reflect the need of a specific facility. The second step is to locate the best evidence; multiple reliable sources should be explored, including databases, guideline websites, textbooks, and so on. High levels of evidence are more convincing than low levels of evidence when the study qualities are comparable. The third step involves critically appraising the evidence. When analyzing a piece of evidence, not only the level of the evidence but also the quality needs to be evaluated; various tools are available for this purpose. The fourth step includes designing practice change, during which a new protocol should be developed to incorporate the proposed changes into current practice. During the fifth step, the new protocol will be implemented, and periodic evaluations should be conducted to monitor intervention outcomes. The last step emphasizes sustaining the practice change. The new protocol should become standard of care when the proposed outcomes are achieved. Measures should be in place to ensure that the protocol continues to be carried out after the completion of the pilot project. Furthermore, the results should be disseminated in order to spread the experience gained from the project (Melnyk & Fineout-Overholt).

Application of EBP Model to EBP Project

MEBPC (Rosswurm & Larrabee, 2009) was utilized when developing the EBP project. During the first step, the external data relating to the prevalence rate of depression among nursing home residents nationwide as well as the profound negative effects of the disease were presented to stakeholders to establish significance of the clinical problem. The internal data were obtained from facility providers and patients'

medical records. To locate the best-practice evidence regarding therapeutic music interventions, seven notable databases were searched, including Cochrane, Joanna Briggs Institute (JBI), Cumulative Index of Nursing and Allied Health Literature (CINAHL), and Medical Literature Analysis and Retrieval System Online (MEDLINE) etc. During the third step, the Hierarchy of Evidence for Intervention Questions (HEIQ) developed by Melynk and Fineout-Overholt (2015) was utilized to evaluate the level of evidence while the Johns Hopkin Research Evidence Appraisal Tool (JHREAT) (Dang & Dearholt, 2017) was adopted to grade the quality of evidence. When it came to designing practice change described in the fourth step, various factors, including financial costs, staff workload, and residents' preferences were analyzed to ensure feasibility of the proposed practice change. The fifth step involved offering a weekly 30-minute session of listen-to-favorite-music activity for 12 weeks to eligible residents in the long-term care facility. GDS-SF scores from various times were compared to evaluate outcome of the above intervention. The last step focused on project sustainability and result dissemination. Facility staff were directed to continue offering residents therapeutic music regularly despite completion of the EBP project. Furthermore, residents were encouraged to request therapeutic music intervention as needed. The facility administrators, providers, and staff were updated with the project results, and the results were also disseminated on various occasions with poster or oral presentations.

Strengths and Limitations of EBP Model for EBP Project

The strengths of MEBPC (Rosswurm & Larrabee, 2009) in guiding this EBP project are evident. First, the creators of MEBPC are both nurses, and their backgrounds have instilled a distinctive nursing perspective into this model. Therefore, this model is particularly applicable for directing nursing interventions, and the EBP project involved offering residents opportunities to listen to their favorite music on a regular basis, which is a non-invasive and cost-effective nursing intervention. Also, MEBPC emphasizes the

importance of involving stakeholders at various stages of a project, and taking such considerations could significantly smoothen the process of changing practice. The data collected from providers and residents' medical records confirmed the necessity of the EBP project, which contributed to project initiation. Later on, the support from administrators and staff was essential to the successful implementation and sustainability of the project. A limitation of MEBPC could be identified as its lack of clarity on how to disseminate project results. Sustaining practice change is explained in detail in the last step of the model; however, there is little information regarding result dissemination, be it through conference presentations or publications.

Literature Search

Sources Examined for Relevant Evidence

Five major healthcare databases together with two psychology databases were searched for this review, including Cochrane, JBI, CINAHL, MEDLINE, Nursing & Allied Health, PsycINFO, and PsycARTICLES. The Cochrane database produced 27 results when searching with the keywords of "depression" and "music*"; the time limiter was set for the last 5 years, and language was set as "English". Two studies relevant to the topic were chosen for this project. JBI produced 35 results when the same keywords were entered; the limiters included "aged care" and "2012-2018". Five articles from JBI were reviewed and one was accepted. CINAHL generated 60 results when the same keywords were chosen; limiters were "Boolean/phrase", "2012-2018", "English language", "scholarly journals", "aged: 65 + years", and "aged: 80 and over." Twenty one articles were reviewed and two were accepted from CINAHL. Ninety-nine studies yielded from the MEDLINE database when searching with the same keywords listed above; the limiters included "Boolean/phrase", "English", "aged: 65 + years", "aged: 80 and over", and "2012-2018". Thirty-eight articles were reviewed, and two were accepted. The limiters used in Nursing & Allied Health included "English", "aged (65 + years)", "aged

(80 + years)", "peer reviewed", "2012-2018", "scholarly journals", "subject heading-mainsbject" for the keyword of "music*", and "anywhere" for the keyword of "depress*". Of the 47 articles yielded from searching the Nursing & Allied Health database, 12 were reviewed, and none was accepted. The PsycINFO database generated 155 results when searching with the same keywords of "depress*" and "music*", and the limiters used were "Boolean/phrase", "English", "aged (65 years & older)", "very old (85 years & older)", "scholarly journals", and "2012-2018". Of these 155 results, 32 were duplicates that had already been reviewed when searching other databases; 10 articles relevant to the topic were reviewed and none was accepted. The same keywords and limiters used for searching the PsycINFO database were utilized to search the PsycARTICLES database; two results were produced and reviewed with none being accepted from this database. The last two articles accepted for this project were obtained through "citation-chasing". Articles were eligible if they were rated as Level III or above on the evidence pyramid developed by Melnyk and Fineout-Overholt (2015), and of good or high quality evaluated with JHREAT (Dang & Dearholt, 2017). Other inclusion criteria were: evaluated depression as an outcome; primary interventions included therapeutic music; English version was available. Exclusion criteria included: primary outcome was related to other chronic disease management, such as fibromyalgia, sclerosis, or stroke rehabilitation; studies were conducted in acute settings, including hospitals and acute psychiatric institutions; types of music employed were limited to a localized population with poor generalizability. The literature search results were summarized in Table 2.1. as following; the databases were listed in search order.

Table 2.1.

Results of Literature Search

Database	Yielded	Duplicates	Reviewed	Accepted
Cochrane	27	2	4	2
JBI	35	0	5	1
CINAHL	60	12	21	2
MEDLINE	99	25	38	2
Nursing & Allied Health Database	47	6	12	0
PsycINFO	155	32	10	0
PsycARTICLES	2	0	2	0
Citation Chasing	N/A	N/A	5	2
Total	425	77	97	9

Levels of Evidence

The tool utilized for evaluating level of evidence was HEIQ (Melynk & Fineout-Overholt, 2015). HEIQ clearly displays the various levels of evidence guiding an EBP project. Level I evidence includes systematic reviews; Level II contains randomized controlled trials (RCTs); Level III consists of controlled cohort studies; Level IV represents uncontrolled cohort studies; Level V encompasses case studies, case series, qualitative studies as well as EBP and QI projects; Level VI features evidence concluded from expert opinion (Melnyk & Fineout-Overholt). The evidence used for this EBP project was from Level III and above as displayed in Table 2.2.

Table 2.2.

Results of Evidence Appraisal

Level	Design	Quality	Accepted
I	Systematic Reviews	High	2
		Good	3
II	Randomized Controlled Trials	Good	3
III	Controlled Cohort Studies	Good	1
IV	Uncontrolled Cohort Studies	N/A	0
V	Case Studies and Case Series, Qualitative & Descriptive Studies, EBP Implementation & QI Projects	N/A	0
VI	Expert Opinion	N/A	0

Note. Adapted with permission from "Hierarchy of Evidence for Intervention Questions," by B. M. Melnyk, and E. Fineout-Overholt, 2015, *Evidence-Based Practice in Nursing & Healthcare: A Guide to Best Practice, 5*, p. 92.

Appraisal of Relevant Evidence

The tool utilized for evidence appraisal was JHREAT (Dang & Dearholt, 2017). JHREAT provides detailed instructions on how to evaluate study quality and assign a rating to the article. For example, a high-quality study should have consistent and generalizable results in addition to adequate control while a good-quality study needs to have reasonably consistent results with some control. Also, both high and good-quality studies require a sufficient sample size. The evidence grid (see Table 2.3.) is displayed toward the end of this chapter.

Level I. Aalbers et al. (2017) conducted a systematic review and a meta-analysis evaluating the effects of music interventions on depression across the lifespan. The search strategy was well explained in the article. Multiple credible sources were searched including the Cochrane Common Mental Disorders Controlled Trials Register (CCMD-CTR), the Cochrane Central Register of Controlled Trials (CENTRAL), Ebsco/PsycInfo, CINAHL, the World Health Organization International Clinical Trials

Registry Platform (WHO ICTRP), and the National Guideline Clearing House etc. The time period for article publication year was set from inception to June 2016 for most databases. Inclusion and exclusion criteria were explicitly explained, and a flow chart showing the number of studies eliminated at various stages was also provided. Two reviewers performed the review process, including article selection and data extraction, independently. In general, the risks for selection bias had been greatly reduced by utilizing independent reviewers. A total of nine studies involving 421 subjects were compared and analyzed. The systematic analysis provided lengthy descriptions as well as a table digest for each study in terms of design, sample, methods, and results. Among the nine studies, there were eight RCTs and one clinical controlled trial (CCT) with convenience samples recruited from various settings. Simple random sampling method was utilized for most of the RCTs. Although the specific interventions varied among individual studies, the efficacy of therapeutic music on improving depressive symptoms had been demonstrated in most studies reviewed in the article. Data were also extracted and analyzed in an aggregated manner. Standardized mean difference (SMD) was calculated for continuous data while odds ratio was examined for dichotomous data. The authors analyzed various outcomes of music interventions, including depression, anxiety, and quality of life etc. The meta-analysis revealed that music interventions resulted in improvement on both clinician-rated (*SMD* = -0.98, 95% CI [-1.69, -0.27]; 3 RCTs, 1 CCT, *n* = 219) and patient-rated depressive symptoms (*SMD* = -0.85, 95% CI [-1.37, -0.34]; 3 RCTs, 1 CCT, *n* = 142). However, the effect of music interventions on improving anxiety and quality of life was non-significant. In general, the results were consistent across studies, and the size of treatment effect was adequate. The authors of the systematic review listed the following limitations of their review: first, they were not able to compare therapeutic music with other psychological

interventions on improving depression, anxiety, and quality of life; also, they were unable to identify the most effective music delivery method for managing depressive symptoms. According to HEIQ (Melynk & Fineout-Overholt, 2015), this article belongs to Level I on the evidence pyramid; evaluated by JHREAT (Dang & Dearholt, 2017), this article is of high quality based on the criteria discussed above.

Dao le, L.K. (2016) published a JBI evidence summary revealing the efficacy of therapeutic music on managing behavioral problems among older adults with dementia. A great number of studies were reviewed to make the summary: a Cochrane review involving five studies, four systematic reviews involving more than 60 studies, a meta-analytic review involving 21 studies, and four RCTs. The inclusion and exclusion criteria for article selection as well as a flow chart displaying the number of studies eliminated at various stages of the review were not provided. Also, the details of individual studies regarding sample selection and specific interventions were not specified. Multiple outcomes including agitation, depression as well as level of social and cognitive functioning were evaluated. The results relating to the efficacy of music interventions on improving behavioral symptoms were consistent across studies. A Grade B recommendation was made on incorporating therapeutic music to manage multiple behavioral symptoms, such as depression and agitation, among people with dementia. According to HEIQ (Melynk & Fineout-Overholt, 2015), this article belongs to Level I on the evidence pyramid; evaluated by JHREAT (Dang & Dearholt, 2017), this article is of good quality based on the criteria discussed above.

Quach (2017) performed a narrative systematic review investigating the efficacy of various music interventions on improving depressive symptoms and quality of life among elderly with chronic diseases. A total of 13 articles, including five RCTs and eight quasi-experimental studies, were included in this review. Multiple databases, including CINAHL, PubMeb, Medline, and PsycINFO, were searched during the review. The key search

terms as well as the inclusion and exclusion criteria were well explained, and a flow chart displaying the number of studies eliminated at various stages of the review was provided. The details regarding individual study samples and methods were not elaborated in this review. According to Quach, “eight of nine studies that specifically used a depression-measuring instrument showed significant decreases in depression (p. 58)”. Interventions such as listening to music, singing, playing instruments as well as a combination of the above techniques all have demonstrated efficacy on decreasing depressive symptoms among elderly with chronic diseases. The conclusion was drawn logically from the analyses of all studies involved. One limitation of the systematic review is related to evidence application. Most of studies in the review were conducted outside of the United States, which might affect the generalizability of results to American patients. According to HEIQ (Melnyk & Fineout-Overholt, 2015), this article belongs to Level I on the evidence pyramid; evaluated by JHREAT (Dang & Dearholt, 2017), this article is of good quality based on the criteria discussed above.

Van der Steen et al. (2017) implemented a systematic review exploring the effects of music-based interventions on emotional well-being among people with dementia. Patients’ mood status, behavioral problems as well as cognitive and social functioning were examined in the review. A total of 17 studies were included in the review with nine RCTs evaluating the outcome of depression. These nine RCTs involved 376 subjects, and a meta-analysis was conducted with the pooled data. Multiple databases, including Cochrane, Geronlit/Dimdi, Research Index, Carl Uncover/Ingreta, Musica and Cairss etc., were searched with key words of “music”, “singing”, and “auditory stimulation”. Inclusion criteria were: subjects have been formally diagnosed with dementia; music-based interventions were utilized; outcomes included mood status, cognition, social behaviors, and adverse effects of music-based interventions. Articles were excluded if: they were not RCTs; total intervention sessions were fewer than five. A flow chart showing the

number of studies eliminated at various stages of the review was provided. Detailed information regarding study design, sample, methods, results, and outcomes of individual studies was described in both narratives and tables in the review. The conclusion was drawn logically from the meta-analysis results that music-based interventions are effective on reducing depressive symptoms among patients with dementia (*SMD* = -0.28, 95% CI [-0.48, -0.07]; 9 RCTs, *n* = 376). A section addressing limitations of the results was provided in the review. Although music-based interventions had demonstrated efficacy on improving depressive symptoms during immediate post-intervention periods, the long-term effects are not clear; future studies need to evaluate if the effects will sustain after completion of interventions. According to HEIQ (Melynk & Fineout-Overholt, 2015), this article belongs to Level I on the evidence pyramid; evaluated by JHREAT (Dang & Dearholt, 2017), this article is of high quality based on the criteria discussed above.

Zhao, Bai, Bo, and Chi (2016) conducted a systematic review to examine the efficacy of therapeutic music on improving depressive symptoms among elderly adults. A comprehensive literature search was conducted involving multiple databases: Cochrane, EMBASE, CINAHL, PsycINFO, and PsycARTICLES, and a total of 19 RCTs were selected for this review. The key words included “aged”,” aging”, “elderly”, “old*”, “depress*’, “music*”, and “sing”. The inclusion and exclusion criteria were clearly described: only RCTs were included; subjects were over the age of 60 and had a diagnosis of depression or scored positive on depressive-symptom-screening tools. A flowchart displaying the number of studies eliminated at various stages was presented in the review. The detailed information regarding study design, sample size, methods, and outcomes of individual studies was described in both narratives and tables. The authors confirmed the limitation of the systematic review that they were unable to compare the

control groups due to the heterogeneous makeup of control groups across studies. The results from meta-analysis were interpreted thoroughly, and the conclusion was drawn logically from such results. According to Zhao et al., “results showed music therapy had statistical significance in reducing depressive symptoms (SMD = 0.95, 95% CI = 0.78, 1.12）among elderly with depression, but the relationship between the efficacy of music therapy and depressive symptoms among elderly with dementia was not statistically significant (SMD = 0.39; 95% CI = -0.03, 0.82)” (p. 1196). According to HEIQ (Melynk & Fineout-Overholt, 2015), this article belongs to Level I on the evidence pyramid; evaluated by JHREAT (Dang & Dearholt, 2017), this article is of good quality based on the criteria discussed above.

Level II. Chan,Wong, Onishi, and Thayala (2012) conducted a RCT to investigate the efficacy of individual music-listening activities on decreasing depressive symptoms among elderly people in Singapore. The authors reviewed previous studies thoroughly; although a few classic articles from the early 90s were cited, most of the studies included in the literature review section were published within 10 years of 2012. A power analysis was carried out to determine the sufficient sample size. In order to achieve 80% power at a 5% level of significance, 56 subjects should be recruited for the study. A total of 52 subjects were initially recruited with 50 of the completing the entire study lasting 8 weeks. No significant demographic differences between the experimental and control groups were detected by the analysis of covariance (ANCOVA) test. The data collection method was well explained that data were collected on a weekly basis utilizing GDS-SF. It is a reliable and valid tool for evaluating depressive symptoms among elderly adults; it can be used to differentiate depressed from non-depressed elderly with a high correlation coefficient (r = .84, p < .001) (Sheikh & Yesavage, 1986). The results were presented clearly with several tables; both descriptive and inferential analyses were provided within

the tables. The narrative descriptions were consistent with the results displayed in tables and aided readers in interpreting statistical data. Several limitations were clearly identified and appropriately addressed. An example is: in order to reduce “Hawthrone effect” but also be able to attend to adverse reactions, researchers stayed a short distance away from a subject during each music-listening session. Consistent improvement of depressive symptoms had been detected since week 6 (p = .012) among the experimental group subjects. There was no statistically significant improvement within the control group at any point during the study. According to HEIQ (Melynk & Fineout-Overholt, 2015), this article belongs to Level II on the evidence pyramid; evaluated by JHREAT (Dang & Dearholt, 2017), this article is of good quality based on the criteria discussed above.

Guétin et al. (2009) carried out a RCT to evaluate the short-and-medium-term efficacy of therapeutic music on anxiety and depression among patients who had mild to moderate Alzheimer-type dementia. Guétin et al. clearly identified the gap in the literature as the lack of evidence regarding the medium-and-long-term effects of music interventions on anxiety and depression. Most previous researchers only investigated the short-term effects of such interventions. Many classic studies together with articles published close to 2009 were reviewed to provide the background information of therapeutic music interventions. The sufficient sample size of 22 subjects was calculated from a preliminary study with 5% of type I risks and a power of 90%.Thirty subjects were initially recruited, and a total of 24 subjects completed the entire study lasting 24 weeks. Subjects were randomly assigned either to an experimental or a control group; the comparability of demographic characteristics, including baseline depression scores, was confirmed. Geriatric Depression Scale (GDS) was utilized to evaluate depressive symptoms, and it is a valid and reliable tool for evaluating such outcomes among geriatric populations (Sheikh & Yesavage, 1986). The data were collected at baseline,

week 4, week 8, week 16, and week 24 with self-assessment questionnaires being administered to subjects. Narrative descriptions together with tables were provided explaining the data collection process and results. The conclusion was drawn logically after the comprehensive analysis of data. Statistically significant improvement of depressive symptoms ($p < .01$) had been detected among subjects of the experimental group starting week 4, and the effects sustained for up to 8 weeks after the last intervention session. According to HEIQ (Melynk & Fineout-Overholt, 2015), this article belongs to Level II on the evidence pyramid; evaluated by JHREAT (Dang & Dearholt, 2017), this article is of good quality based on the criteria discussed above.

Särkämö et al. (2014) implemented a RCT to investigate the effects of caregiver-assisted-music-listening activities on cognitive, emotional, and social well-being among persons with dementia (PWDs). The authors performed an exhaustive literature review. Most cited studies were published within 5 years of 2014, and some classic articles were also referenced. A total of 89 patient-caregiver dyads were recruited; of the 89 caregivers, 59 were family members and 30 were nurses. Seventy-four dyads completed the initial 10-week-intervention sessions and a second follow-up evaluation conducted 6 months from the last intervention session. Subject dyads were randomized into three groups, including a music-listening group, a singing group, and a control group receiving only usual care. There were no statistically significant differences among groups in terms of demographic characteristics including baseline depression scores. Data were collected through survey questionnaires and telephone interviews with subject caregivers, and no blinding practice was adopted during data collection. Cornell-Brown Scale for Quality of Life in Dementia (CBSQLD) was utilized to evaluate the outcomes of mood status and quality of life. The results were presented clearly with both narratives and tables. During the immediate follow-up upon completion of the10-week intervention, statistically significant improvement on CBSQLD scores were detected within both

singing and music-listening groups but not the control group; a second follow-up at 3 months after the last intervention session showed a trend favoring both intervention groups but the results were not statistically significant. The conclusions were drawn logically based on statistical analysis results. The authors also identified certain limitations of their study. For example, the types of dementia were not differentiated among subjects; therefore, it would be inappropriate to generalize the study results to patients with specific diagnoses, such as Parkinson's or Alzheimer's diseases. On the contrary, the sample was representative of patients with various pathologies of dementia, thus, the study results were applicable to PWDs in general. According to HEIQ (Melynk & Fineout-Overholt, 2015), this article belongs to Level II on the evidence pyramid; evaluated by JHREAT (Dang & Dearholt, 2017), this article is of good quality based on the criteria discussed above.

Level III. Janata (2012) performed a quasi-experimental study to evaluate the efficacy of music on agitative and depressive symptoms among residents residing in an assisted living facility. The author identified the knowledge gap in literature regarding the effects of increased music exposure time on patients' depressive symptom improvement. As described in the literature review section, the usual length of an individual session lasted from 15 to 40 minutes, and the common music delivery frequency ranged from one to three times a week. However, Janata's quasi-experimental study employed "heavy" doses of therapeutic music intervention. Residents in this study were exposed to music intervention for up to 3 hours daily. Most previous studies reviewed by Janata were within 5 years of 2012, although some classic articles were also referenced. A total of 38 subjects were recruited, and all of them completed the entire study lasting 12 weeks. Subjects were randomly assigned either to an experiment or a control group, and the demographic characteristics including baseline depression scores were comparable between the two groups verified with ANOVA tests. The data collectors were blinded to

the information regarding subjects' group assignment. Cornell Scale for Depression in Dementia (CSDD) was utilized to evaluate subjects' depressive symptoms. According to Williams and Marsh (2009), CSDD is a valid tool for screening depression among patients with mild to severe cognitive impairment; the sensitivity is 0.83 and the specificity is 0.73 when the cutoff score is ≥ 6. Both narratives and tables were provided when interpreting the results. Statistically significant results of depression improvement had been detected since week 3, and the effects were still present 2 weeks after discontinuation of intervention, $F(1, 36) = 4.30$, $p < .05$. The author identified treatment contamination as a limitation of the study and suggested to classify this study as a quasi-experimental design although randomization was present. Since the intervention involved automatically delivering music to speakers installed in patients' rooms at preset times daily, treatment contamination was possible when subjects from the control group entered other residents' rooms where music was playing. Therefore, true randomization might not be successful. According to HEIQ (Melynk & Fineout-Overholt, 2015), this article belongs to Level III on the evidence pyramid; evaluated by JHREAT (Dang & Dearholt, 2017), and this article is of good quality based on the criteria discussed above.

Table 2.3.

Evidence Grid

Citation	Purpose	Design	Sample	Measurement/ Outcomes	Interventions	Results/Findings	Level/ Quality
Aalbers, S., Fusar-Poli, L., Freeman, R. E., Spreen, M., Ket JCF., Vink A. C., Maratos, A., Crawford, M., Chen, X. J., Gold, C. (2017). Music therapy for depression. *Cochrane Database of Systematic Reviews*. *Issue 11.* Art. No.: CD004517. doi: 10.1002/14651858. CD004517.pub3.	1"To assess effects of music therapy for depression in people of any age compared with treatment as usual and psychological, pharmacological, and/or other therapies" (p. 1). 2 "To compare effects of different forms of music therapy for people of any age with diagnoses of depression" (p. 1).	Systematic review	Nine studies including eight RCTs and one CCT with a total of 421 subjects were analyzed in this systematic review.	Clinician-rated severity of depression symptoms were measured by Hamilton Rating Scale for Depression (HAM-D). Patient-reported severity of depression symptoms were measured by Beck Depression Inventory (BDI) and Geriatric Depression Scale (GDS).	The types of music employed and music delivery methods varied from study to study; an example could be encouraging subjects to select preferred music before delivering the selected music via a CD player to them. The length of an individual session varied from 30 minutes to 2 hours with the total intervention time period lasting from 4 to 12 weeks.	Based on meta-analysis results, music interventions produced statistically significant improvement on both clinician-rated (*SMD* = -0.98, 95% CI [-1.69, -0.27]; 3 RCTs, 1 CCT, *n* = 219) and patient-reported depressive symptoms (*SMD* = -0.85, 95% CI [-1.37, -0.34]; 3 RCTs, 1 CCT, *n* = 142) The effects of music interventions on improving anxiety and quality of life were not statistically significant.	Level I High quality
Chan, M. F., Wong, Z. Y., Onishi, H., & Thayala, N. V.	To evaluate the efficacy of individual music-	RCT	A total of 52 subjects were recruited from	GDS-SF was utilized to measure	Subjects were offered the opportunity to	Consistent improvement of depressive	Level II Good

(2012). Effects of music on depression in older people: A randomized controlled trial. *Journal of Clinical Nursing*, *21*(5-6), 776-783. doi:10.1111/j.1365-2702.2011.03954.x	listening activities on decreasing depressive symptoms among elderly people in Singapore.		snowballing-sampling method utilizing the research team members' social network. Subjects were 55 years old and above, community-dwelling, and able to communicate verbally. A total of 50 subjects completed the entire study.	depressive symptoms.	choose their preferred music from a collection of Chinese, Malay, Indian, and Western slow rhythmic music. The music were "60-80 beats/minute without accented beats, percussive characteristics or syncopation (p. 779)". A 30-minute session of individual music intervention was delivered by a research nurse utilizing an Mp3 or a CD player every week. Outcomes were measured at baseline and during each week up to 8 weeks.	symptoms had been detected since week 6 (p = .012) among the experimental group subjects. There was no statistically significant improvement within the control group at any point during the study.	quality
Dao le, L. K. (2016). *Dementia: Music Therapy*. Retrieved from Joanna Briggs Institute database.	To evaluate the efficacy of therapeutic music on managing behavioral problems among	Evidence summary	This summary was developed based on evidence synthesized from six	Multiple outcomes including agitation, depression as well as level of	Detailed information regarding types of music adopted, music delivery methods, and	A Grade B recommendation was made on incorporating music interventions to treat behavioral	Level I Good quality

(Accession No. JBI922)	older adults with dementia.		systematic reviews, four RCTs, and one crossover study. Databases used for searching the above articles were not specified.	social and cognitive functioning were evaluated across studies. Instruments utilized for measuring the above outcomes were not specified.	duration of interventions was not specified in the summary.	symptoms, including depression and agitation, among people with dementia.	
Guétin, S., Portet, F., Picot, M. C., Pommié, C., Messaoudi, M., Djabelkir, L., & ... Touchon, J. (2009). Effect of music therapy on anxiety and depression in patients with Alzheimer's type dementia: Randomised, controlled study. *Dementia and Geriatric Cognitive Disorders*, *28*(1), 36-46. doi:10.1159/000229024	To evaluate the short-and-medium-term effects of therapeutic music on anxiety and depression among patients with mild to moderate Alzheimer's diseases.	RCT	A convenience sample of 30 residents was recruited from a French nursing home. Subjects were randomly assigned either to an experimental or a control group. A total of 24 subjects completed the entire study lasting 24 weeks.	GDS was adopted to evaluate depressive symptoms.	Music was delivered in residents' rooms via headphones. Each individual session was 20 minutes, and the total intervention time period lasted for 16 weeks. Music was selected based on residents' preferences. "U sequence" technique was employed to arrange the sequence of music to be delivered.	Statistically significant improvement of depressive symptoms ($p < .01$) had been detected among subjects of the experimental group starting week 4, and the effects sustained for up to 8 weeks after the last intervention session.	Level II Good quality
Janata P. (2012). Effects of	To evaluate the effects on agitative	Quasi-experimental	A convenience sample (*n* = 38)	CSDD was utilized to	Customized music playlists	Statistically significant results of	Level III

widespread and frequent personalized music programming on agitation and depression in assisted living facility residents with Alzheimer-type dementia. *Music and Medicine, 4,* 8-15.	and depressive symptoms when delivering music from customized music playlists to residents with Alzheimer-type dementia residing in an assisted living facility.	design	was recruited from the Somerford Place Alzheimer's Assisted Living Facility in Roseville, California. Subjects were randomly assigned either to an experimental (*n* = 19) or a control group (*n* = 19). All subjects completed the entire study lasting 12 weeks.	evaluate depressive symptoms.	were created based on residents' preferences, and the selected music was streamed to speakers installed in residents' rooms. The customized playlists were played automatically several times a day with the daily total music intervention time lasting up to 3 hours. However, residents were not mandated to stay in their own rooms when the music was on. The total study lasted 12 weeks.	depression improvement had been detected since week 3, and the effects were still present 2 weeks after discontinuation of intervention; $F(1, 36) = 4.30$, $p < .05$.	Good quality
Quach, J. (2017). Do music therapies reduce depressive symptoms and improve QOL in older adults with chronic disease?	To evaluate the efficacy of various music interventions on improving depressive symptoms and quality of life	Systematic review	A total of 13 articles, including five RCTs and eight quasi-experimental studies, were	Geriatric Depression Scale-5 (GDS-5), Geriatric Depression Scale Short Form (GDS-SF), and	The types of music adopted and music delivery methods varied from study to study. For example, a radio	"Eight of nine studies that specifically used a depression-measuring instrument showed significant	Level I Good quality

Nursing, *47*(6), 58-63. doi:10.1097/01.NURSE.0000513604.41152.0c	among elderly with chronic diseases.		included in this review. Multiple databases including CINAHL, PubMeb, Medline, and PsycINFO were searched during the review.	Profile of Mood States (POMS) etc. were utilized in various studies to evaluate effects of therapeutic music on depression.	program was employed in a study to deliver music to subjects, and one other study involved subjects in instrument-playing activities. An individual session lasted from 30 minutes to 2 hours depending on the study; five studies adopted a weekly session of intervention while two studies employed bi-weekly sessions of intervention. The total intervention time period lasted from 1 to 6 months depending on the study.	decreases in depression" (p. 58). Interventions including listening to music, singing, and playing instrument all have demonstrated efficacy on decreasing depressive symptoms among elderly with chronic diseases.	
Särkämö, T., Tervaniemi, M., Laitinen, S., Numminen, A., Kurki, M., Johnson, J. K., & Rantanen,	To evaluate the effects of caregiver-assisted-music-listening activities on cognitive,	RCT	A convenience sample including 89 dyads of patients and caregivers was	Cornell-Brown Scale for Quality of Life in Dementia (CBSQLD) was utilized to	Subject dyads from the music-listening group listened to songs played via a CD player, and they	During the immediate follow-up upon completion of the10-week intervention, statistically	Level II Good quality

P. (2014). Cognitive, emotional, and social benefits of regular musical activities in early dementia: Randomized controlled study. *The Gerontologist*, *54*(4), 634-650. doi:10.1093/geront/gnt100	emotional, and social well-being among persons with dementia (PWDs).		recruited from five different day-activity and inpatient centers in Helsinki and Espoo. Subject dyads were randomized into a singing group (*n* = 30), a music group (*n* = 29), or a control group (*n* = 30). Seventy-four dyads completed the initial 10-week-intervention sessions and a second follow-up evaluation conducted 6 months from the last intervention session.	evaluate changes on mood status and quality of life.	were encouraged to discuss about their emotions and memories evoked by certain songs. "The music (6-10 songs/session) consisted primarily of traditional folk song and popular songs from the 1920s to 1960s. The songs were selected based on the individual music preferences of the PWDs" (p. 640). A weekly 1.5-hour-session of the music-listening activity was held for 10 weeks.	significant improvement on CBSQLD scores were detected within both singing and music-listening groups but not the control group; a second follow-up at 3 months after the last intervention session showed a trend favoring both intervention groups but the results were not statistically significant.	
Van der Steen, J. T., Van Soest-Poortvliet, M. C., Van der Wouden, J. C., Bruinsma, M. S., Scholten, R. J., & Vink, A. C. (2017). Music-	To investigate the effects of music-based interventions on emotional well-being among people with dementia. Patients' mood status,	Systematic review	A total of 17studies were included in this review with nine RCTs examining the outcome of depression. These nine	A subscale of the Behavioral Pathology in Alzheimer's Disease (BEHAVE-AD), Geriatric Depression Scale	The types of music adopted and music delivery methods varied from study to study; a subject could be listening to music	Statistically significant results showed that music-based interventions were effective on reducing depressive symptoms (*SMD* =	Level I High quality

based therapeutic interventions for people with dementia. *The Cochrane Database of Systematic Reviews*, 5CD003477. doi:10.1002/14651858.CD003477.pub3	behavioral problems as well as cognitive and social functioning were examined in the review.		RCTs involved 376 subjects, and a meta-analysis was conducted with the pooled data. Multiple databases, including Cochrane, Geronlit/Dimdi, Research Index, Carl Uncover/Ingreta, Musica and Cairss etc., were searched during the review.	(GDS), and the Neuropsychiatric Inventory (NPI) were utilized to measure depressive symptoms across studies.	played via a CD player alone in his/her room or actively singing with a music therapist during an intervention session. An individual session lasted from 30 minutes to 1.5 hours depending on the study; the total intervention time period lasted from 4 to 24 weeks.	-0.28, 95% CI [-0.48, -0.07]; 9 studies, 376 participants).	
Zhao, K., Bai, Z. G., Bo, A., & Chi, I. (2016). A systematic review and meta-analysis of music therapy for the older adults with depression. *International Journal of Geriatric Psychiatry*, *31*(11), 1188-1198. doi:10.1002/gps.4494	To examine the efficacy of therapeutic music interventions on improving depressive symptoms among elderly adults.	Systematic Review	A comprehensive literature search was conducted involving multiple databases: Cochrane, EMBASE, CINAHL, PsycINFO, and PsycARTICLES. A total of 19 RCTs were selected for this	GDS, HAM-D, Self-Rating Depression Scale, Hospital Anxiety and Depression Scale as well as CSDD were utilized to measure depressive symptoms across studies.	The types of music employed were not specified in this review. The professionals involved in delivering music interventions to subjects included music therapists, researchers, nurses, musicians, and psychiatrists. The	"Results showed music therapy had statistical significance in reducing depressive symptoms (SMD = 0.95; 95% CI = 0.78, 1.12) among elderly with depression, but the relationship between the efficacy of music therapy and depressive symptoms among elderly with	Level I Good quality

	review.	length of an individual session lasted from 20 minutes to 1 hour, and the total intervention time period lasted from 3 days to 1 year depending on the study.	dementia was not statistically significant (SMD = 0.39; 95% CI = -0.03, 0.82)" (p. 1196)

Construction of Evidence-Based Practice

Synthesis of Critically Appraised Literature

Intervention delivery methods. Various methods have been adopted when delivering therapeutic music interventions to subjects with depressive symptoms. The professionals involved in delivering interventions included music therapists, nurses, researchers, musicians, and psychiatrists (Aalbers et al., 2017; Quach, 2017; Van der Steen et al., 2017; Zhao et al., 2016). Musical instruments, CD players, Mp3 players, headphones, speakers, and multi-media devices have been utilized to deliver music to subjects. (Aalbers et al.; Chan et al.,2012; Davison et al., 2016; Guétin et al., 2009; Janata, 2012; Zhang et al., 2017). Group and individual interventions both have demonstrated efficacy across studies (Aalbers et al.; Chan et al.; Guétin et al; Janata; Quach).The types and language of music were also dependent on individual studies. Western Classical, Western modern jazz music, and slow rhythmic music were utilized in several studies (Chan et al.; Guétin et al.; Klainin-Yobas et al., 2015). In the RCT conducted by Särkämö et al. (2014), “the music (6-10 songs/session) consisted primarily of traditional folk song and popular songs from the 1920s to 1960s.The songs were selected based on the individual music preferences of the PWDs” (p. 640). Several other studies also emphasized the importance of offering subjects opportunities to choose music based on their own preferences (Aalbers et al.; Chan et al.; Davison et al.; Guétin et al; Janata;).

Intervention length. An individual intervention session lasted from 20 minutes to two hours across studies; the most common length of a study was between 4 to 12 weeks although some studies lasted longer than a year (Aalbers et al., 2017; Chan et al., 2012; Guétin et al., 2009; Janata, 2012; Quach, 2017; Särkämö et al., 2014; Van der Steen et al., 2017; Zhao et al., 2016). One to two weekly sessions were employed in most studies (Aalbers et al.; Chan et al.; Guétin et al.; Quach; Särkämö et al.; Van der Steen et al.; Zhao et al.). However, in a few studies, patients were encouraged to listen to their favorite music every day (Davison et al., 2016; Janata).

Outcome and measurement. Beck Depression Inventory (BDI), Cornell Sale for Depression in Dementia (CSDD), Geriatric Depression Scale (GDS), and Geriatric Depression Scale-Short Form (GDS-SF) were the most commonly used instruments for evaluating depressive symptoms reported in literature (Aalbers et al., 2017; Chan et al., 2012; Guétin et al., 2009; Janata, 2012; Quach, 2017; Van der Steen et al., 2017; Zhao et al., 2016). Meta-analyses were conducted in three systematic reviews appraised in this EBP project, and all three reviews revealed statistically significant results on improving depressive symptoms with music interventions (Aalbers et al.; Van der Steen et al.; Zhao et al.). The three RCTs and one quasi-experimental study selected for this EBP project also reveal statistically significant improvement of depressive symptoms from therapeutic music interventions (Chan et al.; Guétin et al.; Janata; Särkämö et al., 2014).

Best Practice Model Recommendation

Based on the evidence synthesized from literature and the considerations for project practicability, a best practice model recommendation can be made to include therapeutic music as a complimentary therapy in managing depressive symptoms among residents of the long-term care facility located in the Midwest. Music could be delivered via CD players in patients' rooms with the assistance of nursing or activity staff. Residents should be offered opportunities to choose their preferred music to be played, and some other options may include Western Classical, Western modern jazz music as well as traditional folk song and popular songs from the 1920s to 1960s. A weekly 30-minute session of listen-to-favorite-music intervention should be implemented for 12 weeks. GDS-SF could be used to evaluate the intervention outcomes at baseline and during post-intervention periods.

How the Best Practice Model Will Answer the Clinical Question

The clinical question of how to incorporate therapeutic music as an adjunct therapy for managing depressive symptoms among residents of the long-term care facility could be answered by the best practice model recommended above. This model addressed the

practicability of intervention designed specifically for this facility. The therapeutic music intervention adopted in this project was easy to implement; involving nursing and activity staff to deliver recorded music via CD players instead of hiring musicians to play live music was cost-effective. The outcomes can be evaluated by tools with good reliability and validity as reported in literature.

CHAPTER 3

IMPLEMENTATION OF PRACTICE CHANGE

The EBP project was implemented from September 29, 2018 to December 22, 2018 lasting a total of 12 weeks. The principal investigator of the project as well as facility certified nursing assistants (CNAs) and activity staff were all involved in delivering therapeutic music intervention to subjects via CD players.

Subjects and Setting

The EBP project was implemented in a 120-bed-capacity long-term care facility in the Midwest. The facility provides both long-term care and short-term rehabilitation services. Subjects of the EBP project were all long-term residents. Long-term residents normally have Medicaid as primary insurance and consider this facility as their home. To be included in the project, a subject needed to be 55 years old and above, have a BIMS score ≥ 8 and a GDS-SF score ≥ 2. According to Chu et al. (2014) and Zhao et al. (2016), patients with a higher level of cognitive functioning tend to benefit more from therapeutic music interventions; therefore, patients with a BIMS score < 8, indicating severe cognitive impairment (Saliba et al., 2012), were excluded from this project. Residents with aphasia or severe hearing impairment were also excluded.

Outcomes

The primary outcome was assessment of GDS-SF scores; a decrease in score indicates improvement of depressive symptoms. A repeated-measures ANOVA test was utilized to analyze the GDS-SF score changes over time. The secondary outcome was evaluation of the relationship between subjects' baseline cognitive status and their depressive symptom improvement after a 12-week time period. A subject's baseline cognitive status was evaluated with a BIMS score. A Pearson correlation coefficient was calculated to examine the relationship between the two variables.

Intervention

Each individual subject was encouraged to identify his/her favorite songs, singers as well as genres of music, and CDs of the voted songs, singers, or genres were purchased for them. In addition, subjects were also offered a collection of CDs containing popular folk songs from the 1920s to 1960s. Every week, six to ten different songs lasting a total of 30 minutes from the selected CDs were randomly played via a CD player in a subject's room. Once the music was on, a subject was instructed to close his/her eyes and listen to the music either in a sitting or lying position. A total of 12 weekly sessions were provided. During the first two sessions, the principal investigator remained in subjects' rooms to monitor adverse reactions with none being identified. From week 3 to 12, the principal investigator as well as CNA and activity staff were all involved in delivering the intervention. When deemed appropriate, subjects were left alone in their own rooms once the music was on, and the CD player was turned off when a 30-minute session was completed.

Planning

First, an evaluation of the facility was conducted to confirm the need for this EBP project. Then, an exhaustive literature review was carried out to identify relevant evidence to the topic. The evidence was appraised and synthesized subsequently to formulate the best practice model. The project proposal was presented during the July 2018 facility performance-improvement meeting, and feedback was incorporated to refine the proposed intervention. In-service education was delivered to facility CNA and activity staff through individual sessions during their worktime. Meanwhile, posters (see Appendix E.) were also displayed in the staff break room and nurse stations.

Data

Measures

GDS-SF was adopted to evaluate subjects' depressive symptoms in the EBP project. With a Cronbach's α between 0.88 and 0.91, GDS-SF is a reliable and valid tool for evaluating

depressive symptoms among elderly adults. Additionally, this tool has a high correlation coefficient (r = .84, p < .001) for distinguishing depressed from non-depressed elderly (Sheikh & Yesavage, 1986).

BIMS has been widely used in long-term care facilities as a screening tool for cognitive changes. A score ≥13 indicates intact cognition; a score of 8 to12 represents mild to moderate cognitive impairment; a score ≤ 7 signifies severe cognitive impairment (Saliba et al., 2012). Saliba et al. also pointed out, “for identifying any impairment, a BIMS score of 12 had sensitivity = 0.83 and specificity = 0.91; for severe impairment, a BIMS score of 7 had sensitivity = 0.83 and specificity = 0.92” (p. 611). BIMS scores were utilized to identify potential subjects and to evaluate the relationship between baseline cognitive status and the degree of depressive symptom improvement after 12 weeks of intervention.

Collection

The principal investigator administered GDS-SF tests to subjects at baseline, after 8 weeks and after 12 weeks of intervention. The following measures were undertaken to promote the accuracy of the evaluation. All tests were administered during morning time to eliminate the potential effects from “sundown syndrome” on test results. Subjects were instructed to circle the “yes” or “no” answer reflecting their genuine inner feelings. Assistance was provided to those who had difficulties in reading or writing due to other comorbidities such as impaired vision, arthritis, or Parkinson’s disease etc. Questions were read to such subjects, and the principal investigator recorded the answers based on subjects’ responses.

In this facility, social workers administer a BIMS test to every resident upon admission and then on a quarterly basis. Subjects’ latest BIMS scores were utilized for this EBP project, and such information was collected from their medical records. Similarly, subjects’ demographic information including age, gender, marital status, religion, race, current use of antidepressants as well as diagnoses of coronary artery disease (CAD), diabetes mellitus II (DM II), and chronic obstructive pulmonary disease (COPD) was also obtained from their medical records.

Management and Analysis

To protect confidentiality of data collected for this project, a code was assigned to each subject. The information matching codes to subjects' names have been stored in a separate computer from subjects' other information including demographics and depression scores. Both computers are password-protected. Subjects' signed informed consent and HIPPA authorization forms have been locked in a safe at the principal investigator's house.

The demographic data were analyzed with descriptive statistics of percentage distribution. A repeated-measures ANOVA test was utilized to evaluate the primary outcome: the GDS-SF score changes over time. A Pearson correlation coefficient was calculated to assess the secondary outcome.

Protection of Human Subjects

This EBP project has received an approval from Valparaiso University Institutional Review Board (IRB).The principal investigator also verified with the executive director of the facility where the project was implemented regarding additional ethic review requirements and was notified no further ethic review process was necessary for the EBP project at this specific site.

CHAPTER 4

FINDINGS

The purpose of this EBP project was to establish a protocol incorporating therapeutic music as an adjunct therapy for managing depressive symptoms among residents of the long-term care facility. This chapter presents the data analysis results of the EBP project; the key findings are explained in narratives and also displayed in the figures and tables to follow.

Subjects

Size

There were 40 long-term residents who had no discharge plan within 12 weeks of the projected starting date of the EBP project in September 2018. Twenty-one residents met the inclusion criteria including "55 years old and above, have a BIMS score $\geqslant$ 8 and a GDS-SF score $\geqslant$ 2". However, eight of them refused to participate. Therefore, 13 subjects were initially recruited for this project. One subject was discharged unexpectedly at 6 weeks post-intervention, the GDS-SF score obtained before her discharge was treated as the 8-week-post-intervention score. Another subject voluntarily withdrew from the project at 9 weeks post-intervention, and the GDS-SF test was not administered at that time due to his refusal. A total of 11 subjects completed 12 weeks of intervention from September 29, 2018 to December 22, 2018.

Characteristics

The demographic data were collected during the time of enrollment. The average age of subjects was 76.45 (*SD* = 12.81) years old with a range from 58 to 94, and the detailed age distribution is displayed in Figure 4.1. There were 63.6% females and 36.4% males (see Figure 4.2.). Distribution of racial makeup was also uneven with 81.8% of subjects being Whites and 18.2% being African Americans (see Figure 4.3.). Protestants constituted 45.5% of the total sample size; the rest were Catholics (36.4%) and atheists (18.2%) (see Figure 4.4.). More than half (54.5%) of subjects were widowed, and the percentage of married subjects was 9.1%; 36.4%

of total subjects reported never married (see Figure 4.5.). The prevalence rate of CAD, DM II, and COPD was 90.9%, 72.7%, 18.2% respectively among these subjects, and 54.5% of subjects were on antidepressant at the time of enrollment (see Figure 4.6.). The mean baseline BIMS score was 12.18 (*SD* = 3.03) with a range from 8 to 15. The percentage of subjects who had a baseline BIMS score between 8-12, indicating a mildly to moderately impaired cognitive status (Saliba et al., 2012), was 36.4%; the number was 63.6% for those who had a baseline BIMS score between 13-15, representing intact cognitive status (Saliba et al.) (see Figure 4.7.). The average baseline GDS-SF score was 6.27 (*SD* = 2.53) with a range from 2 to 12. The demographic characteristics, including baseline GDS-SF scores, of pre-intervention group and 12-week-post-intervention group were compared with no significant difference detected (see Table 4.1.).

Figure 4.1. Age Distribution

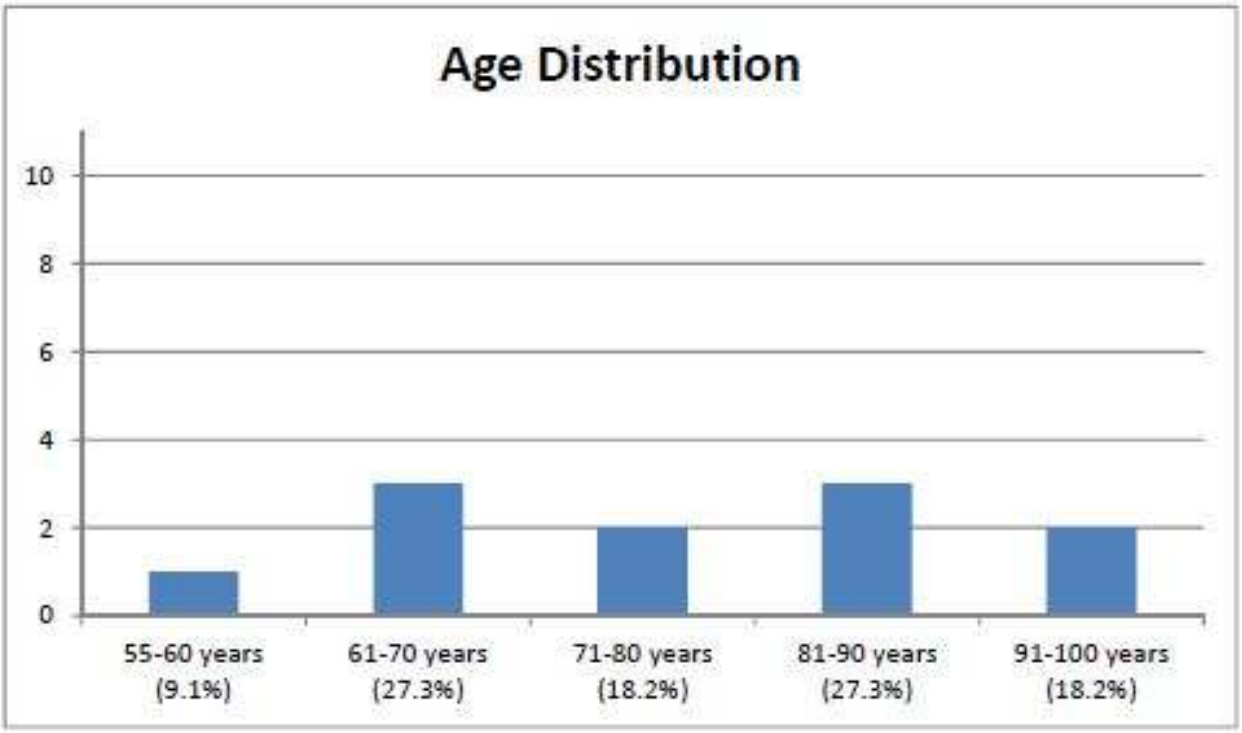


Figure 4.2. Gender Distribution

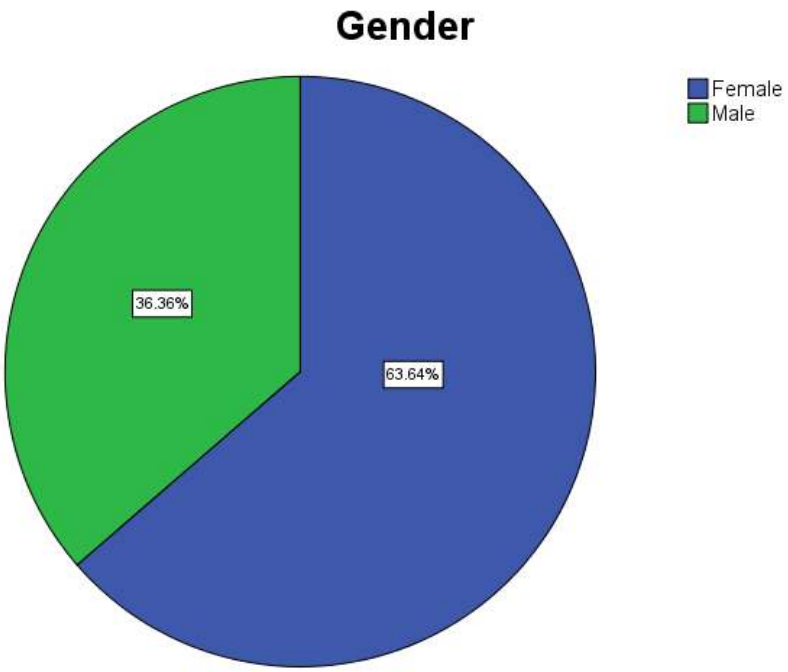


Figure 4.3. Race Distribution

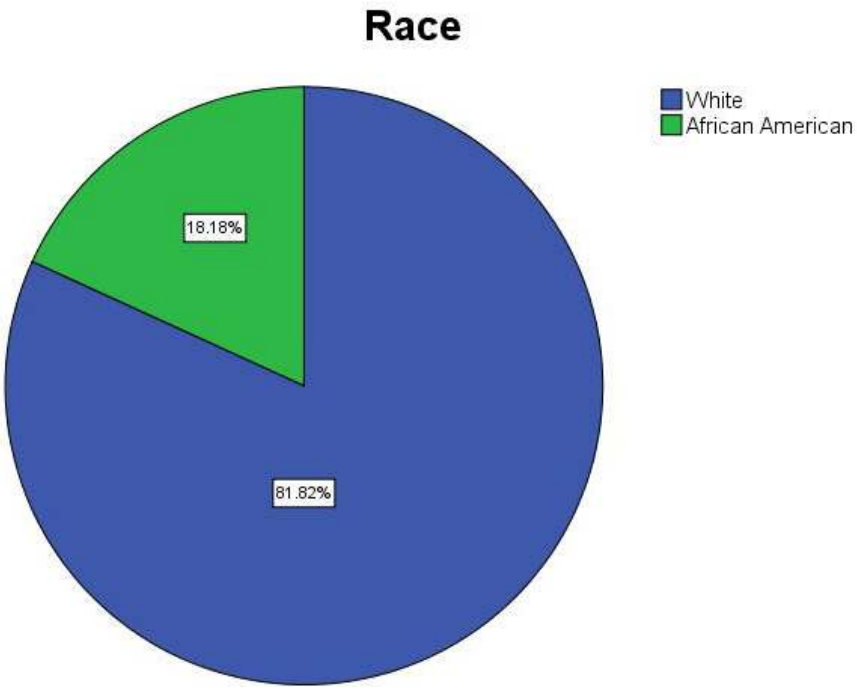


Figure 4.4. Religious Status Distribution

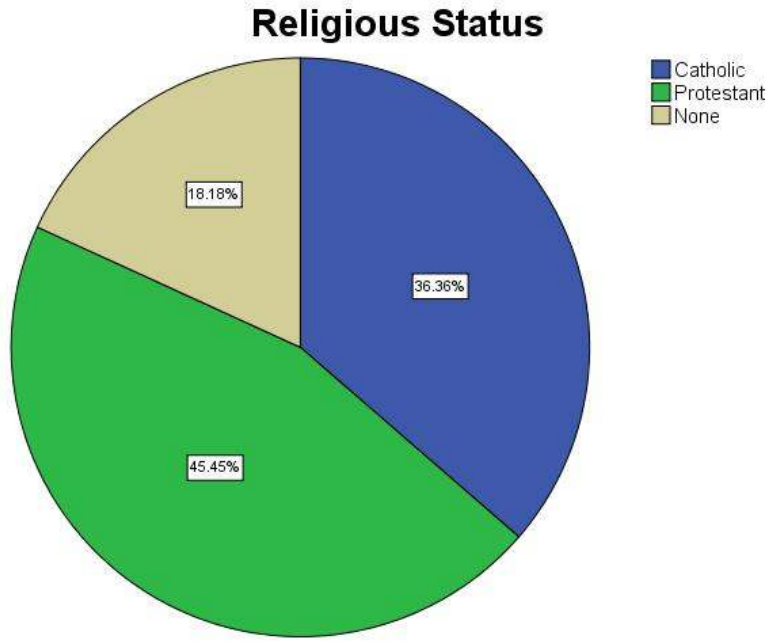


Figure 4.5. Marital Status Distribution

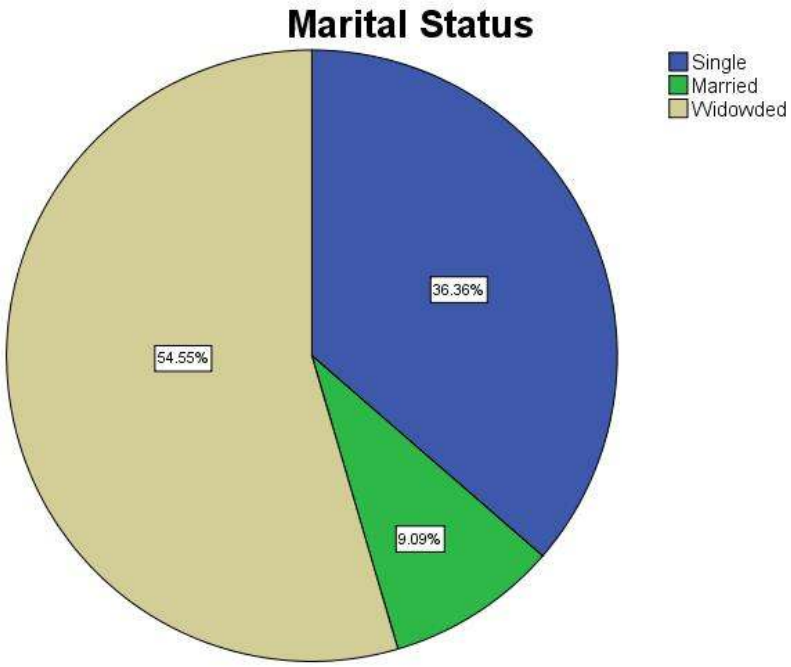


Figure 4.6. Percentage of Chronic Diseases and Antidepressant Use

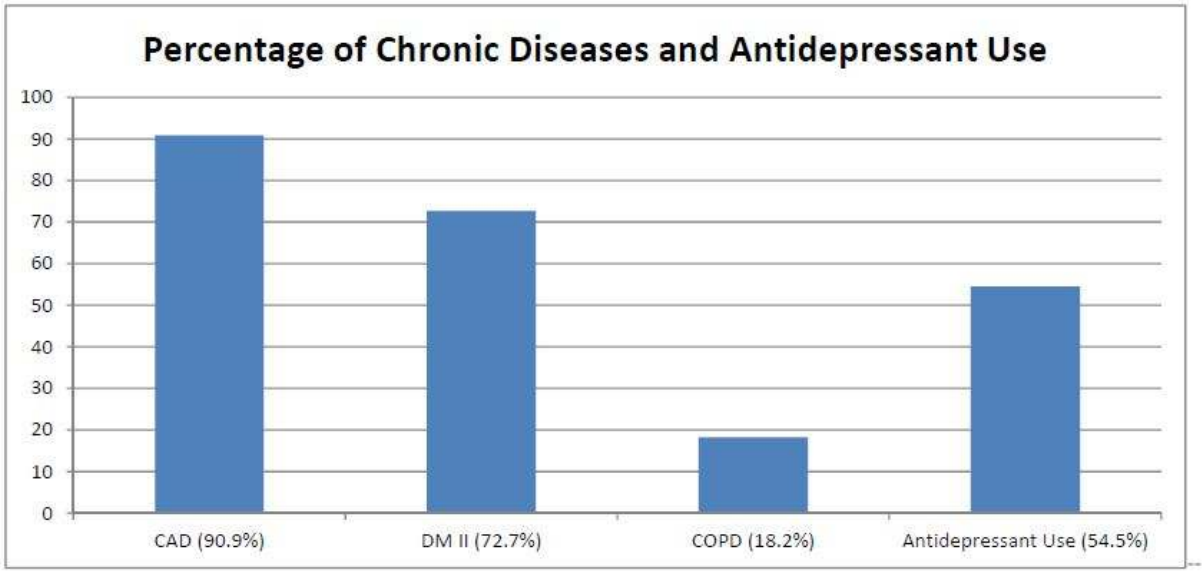


Figure 4.7. BIMS Score Category Distribution

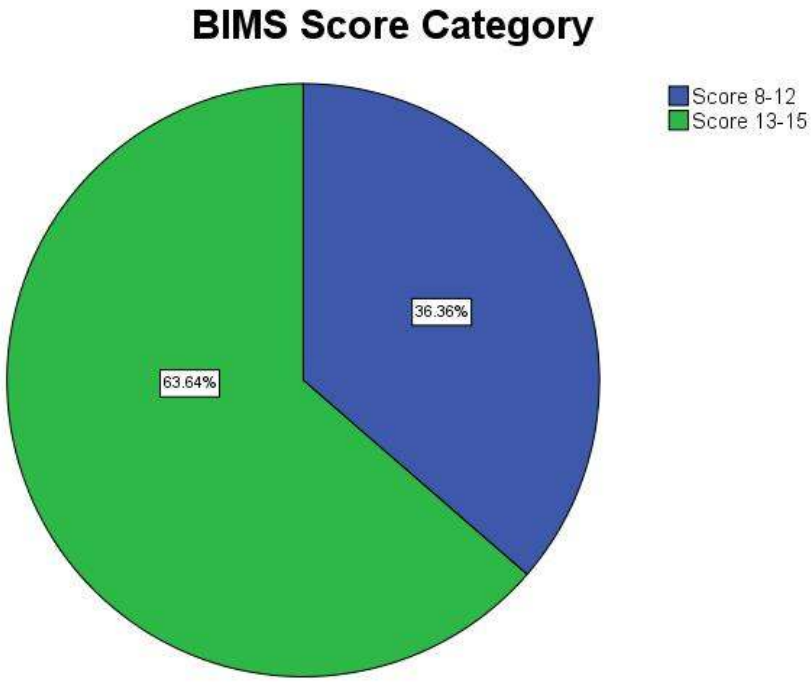


Table 4.1.

Demographics of Subjects

	Pre-Intervention		12 Weeks Post-Intervention		Test Statistic
	n (%)	*M* (*SD*)	*n* (%)	*M* (*SD*)	
Age		79.92 (12.59)		76.45 (12.81)	$t(22) = 0.10$, $p > .05$
Gender					$X^2(1) = 0.11$, p > .05
Female	8 (61.5)		7 (63.6)		
Male	5 (38.5)		4 (36.4)		
Race					$X^2(1) = 0.03$, p > .05
White	11 (84.6)		9 (81.8)		
African American	2 (15.4)		2 (18.2)		
Religious Status					$X^2(2) = 0.17$, p > .05
Protestant	7 (53.8)		5 (45.5)		
Catholic	4 (30.8)		4 (36.4)		
Atheist	2 (15.4)		2 (18.2)		
Marital Status					$X^2(3) = 0.92$, p > .05
Single	4 (30.8)		4 (36.4)		
Married	1 (7.7)		1 (9.1)		
Divorced	1 (7.7)		0 (0)		
Widowed	7 (53.8)		6 (54.5)		
CAD	12 (92.3)		10 (90.9)		$X^2(1) = 0.02$, p > .05
DM II	10 (76.9)		8 (72.7)		$X^2(1) = 0.06$, p > .05
COPD	3 (23.1)		2 (18.2)		$X^2(1) = 0.09$, p > .05
Antidepressant Use	7 (53.8)		6 (54.5)		$X^2(1) = 0.001$, p > .05
BIMS Score		12.62 (2.96)		12.18 (3.03)	$t(22) = 0.35$, $p > .05$
Score 8-12	4 (30.8)		4 (36.3)		
Score 13-15	9 (69.2)		7 (63.4)		
Baseline GDS-SF Score		6.85 (2.82)		6.27 (2.53)	$t(22) = 0.52$, $p > .05$

Note. CAD = Coronary Artery Disease; DM II = Diabetes Mellitus II; COPD = Chronic Obstructive Pulmonary Disease
* $p < .05$.

Changes in Outcomes

Statistical Testing

Data were analyzed with the Statistical Package for the Social Sciences (SPSS) 22.0. The statistical significance for all but protected paired-samples *t* tests was determined as $p < .05$. The protected paired-samples *t* tests involved three tests comparing GDS-SF scores at various times. In order to decrease the risks of inflating type I error, the significance level was set as $p < .017$ (.05/3).

GDS-SF was adopted to evaluate subjects' depressive symptoms throughout the EBP project. With a Cronbach's α between 0.88 and 0.91, GDS-SF is a reliable and valid tool for evaluating depressive symptoms among elderly adults. Additionally, this tool has a high correlation coefficient ($r = .84$, $p < .001$) for distinguishing depressed from non-depressed elderly (Sheikh & Yesavage, 1986). The Cronbach's α calculated for this EBP project were: 0.66 at base line, 0.70 after 8 weeks of intervention, and 0.73 after 12 weeks of intervention. GDS-SF consists of 15 questions. There is either a "yes" or a "no" answer to each question, and 0 or 1 point is assigned to each question based on the answer selected. A score less than 5 is considered normal; a score of 5 to 8 signifies mild depression; a score of 9 to 11 suggests moderate depression, and a score of 12 to15 indicates severe depression (Sheikh & Yesavage). The GDS-SF scores used for evaluation of depressive symptom changes over time were the exact scores instead of the categories; therefore, the level of measurement was set as "scale" in SPSS during data analysis.

BIMS has been widely used in long-term care facilities as a screening tool for cognitive changes. This tool contains three sections with each evaluating a different domain, including "attention", "orientation", and "short-term memory". Points are assigned to each section based on the accuracy of answers, and the total score is calculated by adding up points from all three sections. A score of 13 to 15 indicates intact cognition; a score of 8 to 12 represents mild to moderate cognitive impairment; a score ≤ 7 signifies severe cognitive impairment (Saliba et al.,

2012). Saliba et al. also pointed out, “for identifying any impairment, a BIMS score of 12 had sensitivity = 0.83 and specificity = 0.91; for severe impairment, a BIMS score of 7 had sensitivity = 0.83 and specificity = 0.92” (p. 611). BIMS scores were utilized to identify potential subjects and to evaluate the relationship between baseline cognitive status and the degree of depressive symptom improvement after 12 weeks of intervention. The BIMS scores used for calculating Pearson correlation coefficient in this EBP project were the exact scores instead of the categories; therefore, the level of measurement was set as “scale” in SPSS during data analysis.

Significance

The primary outcome was evaluation of effects from therapeutic music on GDS-SF score changes over time; a decrease in score indicates improvement of depressive symptoms. This outcome was evaluated to answer the PICOT question: among long-term care facility residents who are 55 years old and above, have a Brief Interview for Mental Status (BIMS) score $\geqslant$ 8 and a Geriatric Depression Scale-Short Form (GDS-SF) score $\geqslant$ 2, how does a weekly 30-minute session of listen-to-favorite-music activity compared to current practice of no regular favorite-music-listening activity affect depressive symptoms within an 8-week and a 12-week time period?

A repeated-measures ANOVA test was employed to compare subjects’ GDS-SF scores from three different times: pre-intervention period, 8 weeks post-intervention, and 12 weeks post-intervention, with a significant effect being detected ($F[2, 20] = 5.81$, $p < .05$). Follow-up protected paired-samples *t* tests reveal that 12-week-post-intervention GDS-SF scores decreased significantly compared to baseline, $t(10) = 3.16$, $p = .01$, with the average 12-week-post-intervention score being 4.27 ($SD = 2.97$) and the average baseline score being 6.27 ($SD = 2.53$) (see Table 4.2. and Figure 4.7.).

However, no significant difference exists between baseline scores ($M = 6.85$, $SD = 2.82$) and that of 8 weeks post-intervention ($M = 5.69$, $SD = 3.04$). Also, no significant difference

exists between scores of 8 weeks post-intervention (*M* = 5.37, *SD* = 3.13) and that of 12 weeks post-intervention (*M* = 4.27, *SD* = 2.97) (see Table 4.2. and Figure 4.7.).

Table 4.2.

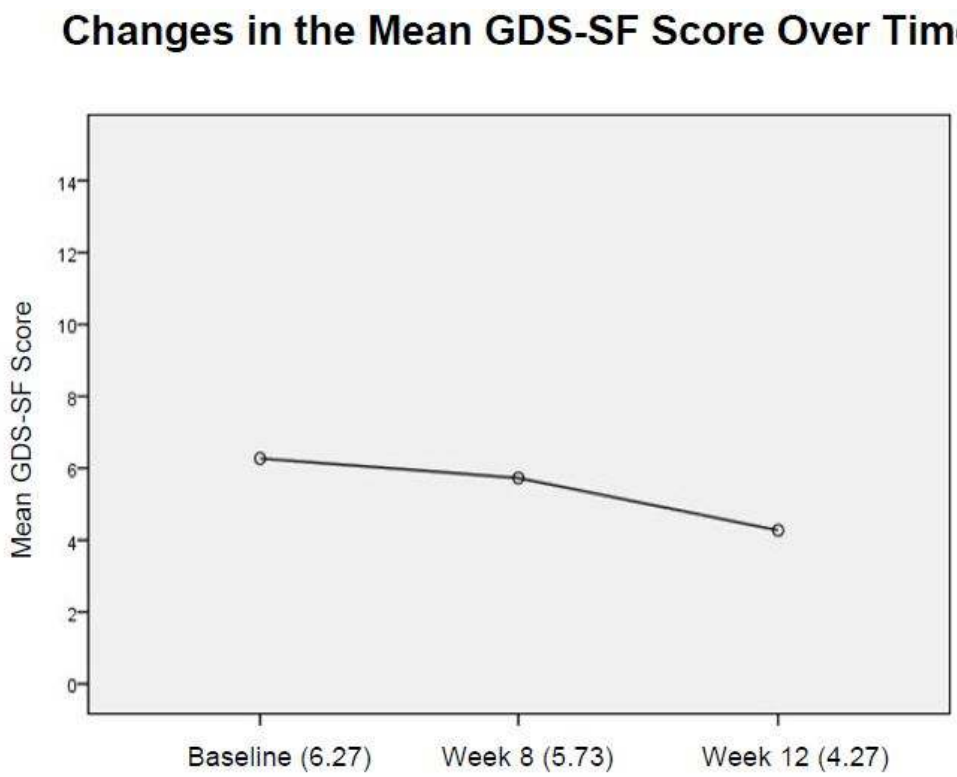
Protected Paired-Samples t Tests of Changes in the Mean GDS-SF Score Over Time

Comparisons	Time	*n*	*M*	*SD*	*t*	*df*	*Sig*
Pair 1	Baseline	13	6.85	2.82	1.73	12	.11
	8 Weeks Post-Intervention	13	5.69	3.04			
Pair 2	Baseline	11	6.27	2.53	3.16	10	.01*
	12 Weeks Post-Intervention	11	4.27	2.97			
Pair 3	8 Weeks Post-Intervention	11	5.73	3.13	2.59	10	.03
	12 Weeks Post-Intervention	11	4.27	2.97			

Note. GDS-SF = Geriatric Depression Scale-Short Form. The protected paired-samples *t* tests involved three tests comparing GDS-SF scores at various time. In order to decrease the risks of inflating type I error, the significance level was set as .017 (.05/3).

* $p < .017$.

Figure 4.7. Changes in the Mean GDS-SF Score Over Time



The secondary outcome was evaluation of the relationship between subjects' baseline cognitive status and their depressive symptom improvement. BIMS scores, as an indicator of cognitive status, were obtained from subjects' medical records during the time of enrollment. A Pearson correlation coefficient was calculated to examine the relationship between subjects' baseline BIMS scores and the improvement of GDS-SF scores after 12 weeks of intervention. A non-significant moderate positive correlation was revealed, $r(9) = .57$, $p > .05$, indicating a non-significant linear relationship between the two variables.

CHAPTER 5

DISCUSSION

The purpose of this EBP project was to establish a protocol incorporating therapeutic music as an adjunct therapy for managing depressive symptoms among residents of the long-term care facility. This chapter presents a comprehensive analysis of the statistical results, theory application as well as the strengths and weaknesses of the project. Future implications for practice, theory, research, and education will also be discussed.

Explanation of Findings

Primary Outcome

Overall**,** results of the EBP project support the evidence from literature that therapeutic music is an effective intervention for managing depressive symptoms (Aalbers et al., 2017; Chan et al., 2012; Davison et al., 2016; Guétin et al., 2009; Janata, 2012; Klainin-Yobas et al., 2015; Quach, 2017; Van der Steen et al., 2017; Zhao et al., 2016). However, there is a minor inconsistency regarding the earliest time when effects of intervention became statistically significant (Chan et al.; Guétin et al.; Janata). Based on the EBP project results, the PICOT question can be answered as: among long-term care facility residents who are 55 years old and above, have a BIMS score $\geqslant$ 8 and a GDS-SF score $\geqslant$ 2, a weekly 30-minute session of listen-to-favorite-music activity compared to current practice of no regular favorite-music-listening activity can decrease depressive symptoms within a 12-week time period.

The onset of effects from therapeutic music interventions on improving depressive symptoms varied from study to study. Janata (2012) had observed improvement as early as week 3; Guétin et al. (2009) first reported decrease of mean GDS score at week 4; Chan et al. (2012) had not detected consistent improvement until week 6. Some possible factors relating to such differences could be linked to the frequency of intervention sessions and music delivery techniques. In Janata's study, music was delivered multiple times daily via speakers installed in

individual subjects' rooms at preset times. Although subjects were not mandated to stay in their rooms when the music was on, such delivery frequency could contribute to greatly increased exposure to intervention. Therefore, it might not be surprising that subjects from this study started to benefit as early as week 3. Guétin et al. adopted a special software to program the sequence of music to be delivered. Subjects were still given options to choose their preferred music, and the selected songs were blended into a specific order known as "U sequence". This technique involved delivering music of stimulating, slow, and moderate rhythm within a single session of therapeutic music intervention. The songs delivered via this technique also varied from session to session, which might have further contributed to an enhanced listening experience. The earliest effects were detected at week 4 in this study.

The method employed in the EBP project shared the most similarities with that of the RCT conducted by Chan et al. (2012). Both interventions involved delivering music via CD players and weekly 30-minute individual sessions. Music was selected based on subjects' preferences, and nursing staff were involved in administering music intervention in both the EBP project and the RCT. Chan et al. had detected consistent effects since week 6, which was the latest when compared to the previous two studies that either employed increased intervention frequency (Janata, 2012) or a specialized music delivery technique (Guétin et al., 2009). One explanation for the further delayed onset of effects revealed from this EBP project at 12 weeks post-intervention could be small sample size. There were only 11 subjects who completed the EBP project compared to the final sample size of 50 in Chal et al.'s study.

Although the improvement of depressive symptoms from baseline to week 8 as well as that from week 8 to week 12 was not statistically significant in the EBP project, the results showed a trend favoring therapeutic music intervention as the average GDS-SF scores of baseline, of 8 weeks post-intervention, and of 12 weeks post-intervention were 6.27 (*SD* = 2.53), 5.73 (*SD* = 3.13), and 4.27 (*SD* = 2.97) respectively. Overall, the above results support the

"dosage effect" that depressive symptoms decrease gradually with the increase of accumulative intervention time, and such effect has also been reported in multiple other studies (Chan et al., 2012; Guétin et al., 2009; Särkämö et al., 2014).

Secondary Outcome

The secondary outcome was evaluation of the relationship between subjects' baseline cognitive status and their depressive symptom improvement after 12 weeks of intervention, and a non-significant moderate positive correlation was detected, $r(9) = .57$, $p > .05$. This result does not support the evidence reported in a systematic review (Zhao et al., 2016) and a RCT (Chu et al., 2014) that subjects with better baseline cognitive status tend to achieve more improvement of depressive symptoms with therapeutic music interventions. Some possible explanations for such inconsistency include: first, individual sessions of intervention were utilized in this EBP project while group sessions were adopted in Chu et al.'s study. These two distinctive music delivery settings might have resulted in some unknown effects. Also, patients with severe cognitive impairment were excluded from this EBP project while the subjects from Chu et al.'s study presented with various levels of cognitive functioning. Such differences should be accounted for when comparing results from the EBP project and the RCT. Furthermore, the small sample size of the EBP project increases risks for type II error.

Evaluation of Applicability of Theoretical and EBP Frameworks

Theoretical Framework

According to Roy adaptation model (Roy, 2009), individuals are adaptive systems that constantly mediate various internal and external stimuli. All stimuli are processed by the regulator and cognator subsystems. The regulator subsystem provides feedback through the physiological routes while the cognator subsystem provides feedback through the emotional and cognitive routes. Increasing heart rate is an example of how the regulator subsystem processes the stimuli of low blood volume in order to maintain homeostasis of the whole body system; activating pleasurable memories or feelings in responses to certain music or smells is an

example of how the cognator subsystem regulates emotional pathway. The ultimate goal of the human adaptive system is to achieve an integrated level of adaptation when all fundamental body needs are well balanced and homeostasis is achieved.

Roy (2009) pointed the direction of how to promote emotional adaptation through altering internal and external stimuli, and her RAM is a good fit for the EBP project. The nonpharmacological intervention of therapeutic music adopted in the project was designed under the framework of RAM. When patients presented with different amounts of depressive symptoms, there was a varying severity of maladaptation in terms of emotional health. Therapeutic music, as external stimuli, was introduced to such patients, and the intervention was intended to elicit patients' pleasurable memories and feelings, which constitute their internal stimuli. The statistically significant improvement of GDS-SF scores at 12 weeks post-intervention reflected how these stimuli were mediated by the cognator subsystem successfully leading to a subsequent positive effect on mood adaptation.

A couple of strengths can be identified when applying RAM (Roy, 2009) to this EBP project. First, the information on how to promote adaptation on various aspects of the human system was well presented in the model, and the step-by-step directions on how to apply the model were easy to follow. Second, Roy specifically addresses the emotional aspect of adaptation in addition to promoting physiological recovery. The emphasis on spiritual and mental well-being enables RAM to provide more pertinent guidance to this EBP project focusing on mood improvement. A weakness of applying RAM to this project was that the concept of stimuli can be too broad, and the effects of a specific stimulus on adaptation can vary from person to person. Thus, conducting individual evaluations were essential to ensure that appropriate stimuli were selected since one patient's favorite songs could be annoying to another patient.

EBP Framework

Model for evidence-based practice change (MEBPC) is an updated version of the original model created by Rosswurm and Larrabee in 1999. Larrabee incorporated her experience in nursing education and leadership into the development of MEBPC in 2009 (Melnyk, & Fineout-Overholt, 2015). MEBPC includes six steps delineating the sequential stages of an EBP project, and it was a good fit for this EBP project guiding the processes through data collection to practice change maintenance.

Directed by MEBPC (Rosswurm & Larrabee, 2009), both external and internal data were collected for developing the EBP project. The external data, such as epidemiology and detrimental effects of depression among long-term care facility residents, has contributed to an increased awareness of the clinical problem among facility administrators. The internal data collected from facility providers and residents' medical records confirmed the necessity of the project. An extensive literature search was conducted to identify evidence relating to the topic. Evidence appraisal ensured that the evidence selected was most relevant to topic and of decent quality. Taking project practicability into consideration was crucial for successful implementation. Recorded music was utilized in this project which satisfied the low-budget needs. Initially, GDS-SF scores were to be obtained at baseline and 12 weeks post-intervention. Later on, the principal investigator realized that obtaining a GDS-SF score at time of early withdrawal was also important since the early outcome of intervention could be evaluated with this measure. Further, an additional evaluation at 8 weeks post-intervention would be beneficial for the same purpose as well as monitoring the "dosage effect" of intervention. In other words, even if all subjects dropped out before 12 weeks, data could still be available to evaluate the early outcome of 8 weeks post-intervention or at time of withdrawal. After receiving an "approval for project change" from the IRB, a modification was made to involve the additional evaluations. To promote project sustainability, both staff and residents received reinforced education toward the end of the project. Dissemination of project results occurred via both formal and informal

communications. Overall, the project was carried out smoothly adhering to the six steps elaborated in MEBPC.

The strengths of MEBPC (Rosswurm & Larrabee, 2009) in guiding this EBP project included its easy applicability and emphasis on stakeholder involvement. The step-by-step instruction, serving as a "recipe" for the complete process of the project, is plain and easy to follow. With effective use of the "recipe", an overwhelming project can be divided into several small phases that are more manageable. Also, the benefits of involving stakeholders, including administrators, staff, and patients etc., have been enjoyed during various stages of the project. The support from these stakeholders was essential to the success of the project. One weakness of MEBPC was that the instruction on outcome dissemination was relatively vague, and it would be rather helpful if detailed information regarding effective vehicles for dispersing results was provided, be it presentations or publications.

Strengths and Limitations of the EBP Project

Strengths

The EBP project had multiples strengths. First, the intervention adopted was cost-effective and non-invasive. The devices involved in delivering therapeutic music included CD players and CDs. Unlike certain equipment, such as centralized music-streaming system, which requires initial installation and possible future technical support services, CD players are easy to purchase and operate. Also, the intervention of therapeutic music carried little risk compared to medications or even some invasive procedures. Although no adverse events relating to music intervention were identified in the literature, precautions described in chapter 3 were still taken when implementing this EBP project. As expected, no adverse reactions, such as agitation, were noticed when subjects were receiving the intervention.

Moreover, this project only imposed minimal burdens to subjects and staff. The schedule for delivering therapeutic music was planned based on individual subjects' preferences. The flexibility ensured that subjects' activities of daily living were not affected, which could further

promote their adherence to participation. Also, it took only a few minutes to set up a CD player, which barely interfered with facility staff's busy schedules. Again, the ease of operation was also conducive to staff adherence when implementing the protocol.

Last but not least, generous support was received from the facility administration and staff throughout the project. The administrators offered funding as well as other assistance during project implementation. Specific advice was given regarding additional funding information and ideal locations to place in-service posters. Staff also showed appreciation to utilization of nonpharmacological intervention for managing residents' mood status, and they all commented on the importance of keeping their residents happy. A nurse shared her previous experience of how certain agitated residents became calm and relaxed when music was playing, and she expressed warm welcome to this EBP project. Most staff were very receptive to in-service education regarding how to deliver the intervention to subjects, and some staff even offered advice regarding what music residents may like. A facility transporter recommended certain songs to the principal investigator based on residents' pleasing feedback on the songs he played when transporting residents. What matters most is that almost all subjects commented positively on the therapeutic music intervention and voiced appreciation to the principal investigator for introducing this project to them. Two out of 13 subjects did not complete the entire intervention, and only one voluntarily withdrew from the project at week 9 post-intervention. He stated that he lost interest, and he also voiced increased frustration with his roommate and facility CNA staff right before withdrawing from the project. It is not clear if his increased overall frustration was associated with the withdrawal since he refused to discuss further with the principal investigator. The other subject was discharged unexpectedly at 6 weeks post-intervention, and she expressed great appreciation of the project. Further, she commented that music can soothe her mind and she will continue to listen to music regularly after discharge.

Limitations

Certain limitations could be identified from the EBP project as well. First, the sample size is relatively small with only 11 subjects completing the entire intervention. A relatively large effect size is needed in a small sample to demonstrate statistically significant findings (White, 2011).The small sample size might be an explanation of why the mean GDS-SF score improvement was not significant at week 8 but at week 12. Although there was a gradual trend of improvement over time, the effect size was not large enough to produce statistically significant results at week 8 when such a small sample was used. In other words, the risks for type II error are increased in the project.

There was also selection bias when this sample was used to evaluate the correlation between baseline cognitive status and improvement of GDS-SF score at week 12. Patients with severe cognitive impairment were excluded from this sample; therefore, subjects from the EBP project were not representative of the whole spectrum of cognitive functioning. More specifically, the relationship of baseline cognitive status and improvement of depressive symptoms were only evaluated among residents without severe cognitive impairment in this project. This selection bias might have contributed to the inconsistent results of the secondary outcome when compared to evidence from literature as discussed previously.

Budget restraint was also a weakness that limited music delivery options for this project. Music therapist-led activities, live performance, and recorded music have been adopted in various previous studies for managing patients' depressive symptoms. There is no clear evidence showing which music delivery method is superior to others; however, all these methods have demonstrated efficacy (Aalbers et al., 2017; Chan et al., 2012; Guétin et al., 2009; Janata, 2012; Zhao et al., 2016). Offering subjects multiple options could possibly promote their interest in participation during future projects, which could contribute to achieving a sufficient sample size. Initially, the principal investigator was interested in hiring a professional music therapist. However, the projected expenses were not feasible for the budget. A subsequent

attempt was made to recruit volunteer music therapy students from a local university; unfortunately, there were no eligible students during time of the EBP project since the music therapy program was just initiated. The program director suggested using recorded music for this EBP project. However, she commented positively on the possibility of connecting future students to similar projects.

Implications for the Future

Practice

The EBP project reinforced that therapeutic music is cost-effective and non-invasive, and this adjunct therapy can be safely adopted by nursing or activity staff in managing depressive symptoms among long-term care facility residents. Therefore, the facility staff should continue the protocol of offering therapeutic music to those residents who have benefited from the project. Furthermore, the intervention should expand to some other residents that were excluded from the project. Patients who stayed for short rehabilitation were not recruited due to the consideration that such patients were expected to stay in the facility for less than 12 weeks, thus, would not be able to complete the project. However, these “short-stay” patients may still benefit from the intervention, and efforts should be made to offer them the best care possible. A modification could be considered in future EBP projects to offer such rehab patients a shorter program, eg. a 4-week program. Also, therapeutic music should be offered to residents with severe cognitive impairment, and the Cornell Scale for Depression in Dementia can be used for outcome evaluation among these residents. Moreover, the practice change of employing therapeutic music as an adjunctive treatment for depressive symptoms should expand to similar facilities. Various other settings, such as hospitals and assisted living facilities, could be considered for future EBP projects as well.

A weekly 30-minute session was adopted in this EBP project, and increased weekly frequency as well as a prolonged individual session length of therapeutic music interventions should be considered in future projects. As discussed previously, Janata (2012) had observed

improvement of depressive symptoms as early as week 3 with an intervention involving delivering music to subjects daily. Multiple other studies also revealed the “dosage effect” of therapeutic music interventions that depressive symptoms decrease gradually with the increase of accumulative intervention time (Chan et al., 2012; Guétin et al., 2009; Särkämö et al., 2014). Therefore, increasing the “intensity” of intervention should be considered whenever practical to maximize the benefits.

Meanwhile, future EBP project managers should continue exploring various resources so that more music delivery options, including live performance and music therapist-led activities, could be offered to subjects. Although there is no clear evidence supporting that one music delivery method is superior to others on improving depressive symptoms, offering subjects multiple options could be conducive to accommodating individual preferences and possibly enhance participation experiences. Actively connecting with local university music programs and recruiting volunteer students who have professional backgrounds of music therapy or performance could be a win-win strategy. Such collaboration will not only relieve budget strain for an EBP project but could also provide community service opportunities to those students.

Theory

Roy (2009) emphasized effects of various external and internal stimuli on the human adaptive system, and she proposed achieving homeostasis with interventions designed to optimize such stimuli. The intervention adopted in this EBP project was intended to elicit internal stimuli of pleasant memories and feelings from subjects by utilizing external stimuli of therapeutic music. The intervention was developed under the framework of RAM, and the EBP project results further reinforced the theory that successful alteration of external and internal stimuli could lead to a promoted adaptation as evidenced by subjects’ improved mood status in this case. The EBP project confirmed the value of RAM in guiding interventions focusing on modification of stimuli. The stimuli of therapeutic music were thoroughly explored in the EBP project, and an interesting finding revealed that the same stimulus can have varied effects on

different subjects. One person's favorite songs can be annoying to another person. Therefore, there are no universally good stimuli, and the effects of a stimulus should be carefully investigated on an individual basis. While exploring the effects of various stimuli, this EBP project has contributed to RAM regarding suggestions for theory application.

Research

Results of the EBP project support the evidence from literature that therapeutic music is an effective intervention for managing depressive symptoms (Aalbers et al., 2017; Chan et al., 2012; Davison et al., 2016; Guétin et al., 2009; Janata, 2012; Klainin-Yobas et al., 2015; Quach, 2017; Van der Steen et al., 2017; Zhao et al., 2016). Only recorded music was adopted in this project with the consideration of budget restriction. However, it is worth comparing the effects of various music delivery methods in future studies. Although live performance, music therapist-led activities, and recorded music all have demonstrated efficacy on improving depressive symptoms, there is no clear evidence showing which music delivery method is superior to others (Aalbers; Chan et al.; Guétin et al.; Janata,; Zhao et al.). It would benefit future EBP project development significantly when such information is available. For example, if research shows that patients with dementia are more receptive to recorded music than live performance since the latter can be overstimulating, then only recorded music should be offered to such patients. Also, are patients with intact cognition more interested in music therapist-led activities, and do such patients benefit more from interactions with music therapists than watching a live performance? In addition to the above questions, future research should also be conducted to investigate the effects of combining the above methods when delivering music to subjects. More efficient interventions that produce more benefits while consuming fewer resources could be designed when answers to these questions are available as the research continues.

Education

Nightingale established modern nursing on the foundation of holistic care, and she stressed the importance of creating a healing environment that is conducive to patients' body,

mind and spirit. Kolcaba, Tilton, and Drouin (2006) also emphasized the powerful role of holistic care in meeting patients' comprehensive needs of physical, psycho spiritual, sociocultural and environmental aspects. Therapeutic music represents only one of many holistic care interventions targeting promotion of patients' overall well-being, and the role of such interventions on healing should not be ignored. Curriculums focusing on complementary and alternative medicine (CAM) should be integrated into future nursing programs to promote the awareness of holistic care. To further facilitate the effective utilization of holistic care interventions, advanced practice nurses (APNs) should actively seek continuing education on CAM regularly. By doing so, APNs would become more knowledgeable when incorporating non-pharmacological interventions into treatment plans or initiating referrals to other CAM specialists when indicated.

Conclusion

The EBP project results support current evidence that therapeutic music intervention can be safely employed by nursing staff in managing depressive symptoms among long-term care facility residents. The protocol developed during the project is effective and easy to implement, thus, should be continued within the facility. Meanwhile, the successful experience should be shared with similar facilities, and the practice change should expand to those facilities so that a larger number of patients could benefit from such interventions. Further, patients from various other settings, such as inpatient hospitals and assisted living facilities, should be considered in future EBP projects as well. Questions regarding how to select the most effective music delivery methods are warranting further research. Accompanying issues on how to manage the costs incurred from certain expensive therapeutic music interventions, such as live performance and music therapist-led activities, will need to be addressed to ensure the practicability of such interventions during future EBP projects. Effective strategies on establishing a collaborative relationship with local music programs should be explored. Lastly, reinforcing the importance of holistic care throughout nursing education is essential to the effective utilization of

nonpharmacological interventions, such as therapeutic music, in promoting patients' overall well-being!

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AUTOBIOGRAPHICAL STATEMENT

YI JIN

Yi is an international student from Nanjing, China who came to the United States in 2007. She started her journey into the nursing field at Ivy Tech Community College (ITCC), Bloomington, Indiana in 2010. Yi obtained the Associate of Science in Nursing degree from ITCC in 2013 and the Bachelor of Science in Nursing degree from Valparaiso University (VU) in 2015. She then returned to VU pursuing the Doctor of Nursing Practice degree in 2016. Yi is an active member of the Sigma Theta Tau International Honor Society of Nursing and the Coalition of Advanced Practice Nurses of Indiana (CAPNI). She presented her evidence-based practice (EBP) project, focusing on improving depressive symptoms among long-term care facility residents with therapeutic music intervention, at the 2019 CAPNI Annual APRN Conference. Yi has received consecutive Dean's List Awards as well as multiple scholarships, including the Herbert H. Gerke Scholarship, CVS Health Foundation Scholarship, and Society of Nurses in Advanced Practice (SNAP) Scholarship etc., throughout her doctoral study. She also actively assists undergraduate nursing students in VU simulation laboratory. Yi worked as a registered nurse in both long-term care facility and inpatient medical unit, during when she developed great interest in geriatric and primary care.

ACRONYM LIST

APN: Advanced Practice Nurse

ANCOVA: Analysis of Covariance

BIMS: Brief Interview for Mental Status

CAD: Coronary Artery Disease

CAM: Complementary and Alternative Medicine

CBSQLD: Cornell-Brown Scale for Quality of Life in Dementia

CCMD-CTR: Cochrane Common Mental Disorders Controlled Trials Register

CCT: Controlled Clinical Trial

CD: Compact Disc

CENTRAL: Cochrane Central Register of Controlled Trials

CI: Confidence Interval

CINAHL: Cumulative Index of Nursing and Allied Health Literature

CNA: Certified Nursing Assistant

COPD: Chronic Obstructive Pulmonary Disease

CSDD: Cornell Scale for Depression in Dementia

DM II: Diabetes Mellitus II

EBP: Evidence-Based Project

GDS: Geriatric Depression Scale

GDS-SF: Geriatric Depression Scale-Short Form

HEIQ: Hierarchy of Evidence for Intervention Questions

HIPPA: Health Insurance Portability and Accountability Act

IRB: Institutional Review Board

JBI: Joanna Briggs Institute

JHREAT: Johns Hopkin Research Evidence Appraisal Tool

MEBPC: Model for Evidence-Based Practice Change

MEDLINE: Medical Literature Analysis and Retrieval System Online

MP3: Moving Picture Experts Group Layer-3

PICOT: Population Intervention Comparison Outcome Time

PWD: Persons with Dementia

RAM: Roy Adaptation Model

RCT: Randomized Control Trial

SD: Standard Deviation

SMD: Standardized Mean Difference

WHO ICTRP: World Health Organization International Clinical Trials Registry Platform

APPENDIX A INFORMED CONSENT

Consent to Be Part of the Evidence-Based Practice Project

This evidence-based project is designed by the doctoral student Yi Jin under the supervision of Dr. Rachel Fischer from College of Nursing and Health Professions of Valparaiso University. Base on prior research, therapeutic music is effective for depression. The purpose of this project is to incorporate music as a complimentary therapy in managing depressive symptoms among long-term care residents.

You will be encouraged to identify your favorite songs, singers, and genres of music, and these CDs will be provided by the project investigator for you to choose from. Some other CDs with popular folk songs from 1920s to 1960s will also be offered as choices to pick from. Every week, six to ten different songs lasting a total of 30 minutes from the selected CDs will be randomly played with a CD player in a your room. Once the music is on, you will be instructed to close your eyes and listen to the music either in sitting or lying position. This project will be from September 2018 to January 2019, a total of 12 weekly sessions will be provided to you.

Some potential risks may include unexpected emotional response, such as agitation. However, based on evidence from literature, no adverse event has been identified yet. During the first two sessions, the primary investigator will be staying in your room when the music is playing to make sure that you are safe. The therapeutic music may decrease your depressive symptoms over the time. Your will be evaluated with Geriatric Depression Scale-Short Form before the first session and after the last session of the therapeutic-music-listening activity.

Your personal information will be protected. A password-protected computer will be used to store your information, and your name will be replaced by codes when storing the information.

You can reach the primary investigator Yi Jin (contact information provided as below) with any questions or concerns. The participation is voluntary, and you can withdraw from this project at any time without any penalty.

This informed consent was approved by the Institutional Review Board of Valparaiso University on 09 / 21 /2018.

You will be offered a copy of this consent.

_____

Signature of Subject Date

_____

Signature of Primary Investigator Date

Contact Information for Yi Jin BSN, RN;
Email: Yi. Jin@valpo.edu; Cell: 219-309-9688

APPENDIX B HIPPA AUTHORIZATION FORM

HIPPA Authorization Form

Authorization for Use or Disclosure of Protected Health Information in compliance with the Health Insurance Portability and Accountability Act, 45 C.F.R. Parts 160 and 164.

I authorize _____ to use and disclose my protected health information in an aggregated manner which means all my personal identifiers will be removed when the data is analyzed and reported, and the data will only be reported in a group format. An example of how my information will be reported will be: the average age for this group is 60 years old, or 80% of the subjects are females. The authorization period is from present to future periods.

I understand that I can revoke this authorization, in writing, at any time without any penalty.

I understand that my treatment will not be affected by singing this authorization.

I understand that the information used or disclosed pursuant to this authorization may no longer be protected by federal or state law.

Signature of Patient or Personal Representative

Printed name of Patient or Personal Representative

Relationship to Patient

Date

APPENDIX C GERIATRIC DEPRESSION SCALE-SHORT FORM

Issue Number 4, Revised 2012

Editor-in-Chief: Sherry A. Greenberg, PhD(c) MSN, GNP-BC
New York University College of Nursing

The Geriatric Depression Scale (GDS)

By: Sherry A. Greenberg, PhD(c), MSN, GNP-BC,
Hartford Institute for Geriatric Nursing, NYU College of Nursing

WHY: Depression is common in late life, affecting nearly 5 million of the 31 million Americans aged 65 and older with clinically significant depressive symptoms reaching 13% in older adults aged 80 and older (Blazer, 2009). Major depression is reported in 8-16% of community dwelling older adults, 5-10% of older medical outpatients seeing a primary care provider, 10-12% of medical-surgical hospitalized older adults with 23% more experiencing significant depressive symptoms (Blazer, 2009). Recognition in long-term care facilities is poor and not consistent amongst studies (Blazer, 2009).

Depression is not a natural part of aging. Depression is often reversible with prompt recognition and appropriate treatment. However, if left untreated, depression may result in the onset of physical, cognitive, functional, and social impairment, as well as decreased quality of life, delayed recovery from medical illness and surgery, increased health care utilization, and suicide.

BEST TOOL: While there are many instruments available to measure depression, the Geriatric Depression Scale (GDS), first created by Yesavage, et al., has been tested and used extensively with the older population. The GDS Long Form is a brief, 30-item questionnaire in which participants are asked to respond by answering yes or no in reference to how they felt over the past week. A Short Form GDS consisting of 15 questions was developed in 1986. Questions from the Long Form GDS which had the highest correlation with depressive symptoms in validation studies were selected for the short version. Of the 15 items, 10 indicated the presence of depression when answered positively, while the rest (question numbers 1, 5, 7, 11, 13) indicated depression when answered negatively. Scores of 0-4 are considered normal, depending on age, education, and complaints; 5-8 indicate mild depression; 9-11 indicate moderate depression; and 12-15 indicate severe depression.

The Short Form is more easily used by physically ill and mildly to moderately demented patients who have short attention spans and/or feel easily fatigued. It takes about 5 to 7 minutes to complete.

TARGET POPULATION: The GDS may be used with healthy, medically ill and mild to moderately cognitively impaired older adults. It has been extensively used in community, acute and long-term care settings.

VALIDITY AND RELIABILITY: The GDS was found to have a 92% sensitivity and a 89% specificity when evaluated against diagnostic criteria. The validity and reliability of the tool have been supported through both clinical practice and research. In a validation study comparing the Long and Short Forms of the GDS for self-rating of symptoms of depression, both were successful in differentiating depressed from non-depressed adults with a high correlation ($r = .84$, $p < .001$) (Sheikh & Yesavage, 1986).

STRENGTHS AND LIMITATIONS: The GDS is not a substitute for a diagnostic interview by mental health professionals. It is a useful screening tool in the clinical setting to facilitate assessment of depression in older adults especially when baseline measurements are compared to subsequent scores. It does not assess for suicidality.

FOLLOW-UP: The presence of depression warrants prompt intervention and treatment. The GDS may be used to monitor depression over time in all clinical settings. Any positive score above 5 on the GDS Short Form should prompt an in-depth psychological assessment and evaluation for suicidality.

MORE ON THE TOPIC:

Best practice information on care of older adults: www.ConsultGeriRN.org.
The Stanford/VA/HIA Aging Clinical Resource Center (ACRC) website. Retrieved July 2, 2012, from http://www.stanford.edu/~yesavage/ACRC.html. Information on the GDS. Retrieved July 2, 2012, from http://www.stanford.edu/~yesavage/GDS.html.
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Geriatric Depression Scale: Short Form

Choose the best answer for how you have felt over the past week:

1. Are you basically satisfied with your life? YES / **NO**
2. Have you dropped many of your activities and interests? **YES** / NO
3. Do you feel that your life is empty? **YES** / NO
4. Do you often get bored? **YES** / NO
5. Are you in good spirits most of the time? YES / **NO**
6. Are you afraid that something bad is going to happen to you? **YES** / NO
7. Do you feel happy most of the time? YES / **NO**
8. Do you often feel helpless? **YES** / NO
9. Do you prefer to stay at home, rather than going out and doing new things? **YES** / NO
10. Do you feel you have more problems with memory than most? **YES** / NO
11. Do you think it is wonderful to be alive now? YES / **NO**
12. Do you feel pretty worthless the way you are now? **YES** / NO
13. Do you feel full of energy? YES / **NO**
14. Do you feel that your situation is hopeless? **YES** / NO
15. Do you think that most people are better off than you are? **YES** / NO

Answers in **bold** indicate depression. Score 1 point for each bolded answer.

A score > 5 points is suggestive of depression.
A score ≥ 10 points is almost always indicative of depression.
A score > 5 points should warrant a follow-up comprehensive assessment.

Source: http://www.stanford.edu/~yesavage/GDS.html
This scale is in the public domain.

The Hartford Institute for Geriatric Nursing would like to acknowledge the original author of this Try This, Lenore Kurlowicz, PhD, RN, CS, FAAN, who made significant contributions to the field of geropsychiatric nursing and passed away in 2007.

try this: A series provided by The Hartford Institute for Geriatric Nursing, New York University, College of Nursing

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APPENDIX D MUSIC PREFERENCE INTERVIEW QUESTIONS

Music Preference Interview Questions

1 What are your favorite songs?

2 Who are you favorite singers?

3 What are your favorite genres of music? Examples are: Jazz, Classical music, Country music, Popular music, Folk music and so on.

Notes:

Appendix E IN-SERVICE POSTER

Evidence-Based Project: Therapeutic Music

Clinical Problem: depression affects nearly 5 million Americans aged 65 and older, and many long-term care facility residents have depression. Depression could have many adverse effects on people's health.

Role of Music: according to research, therapeutic music could decrease anxiety, depression, and agitation among elderly people. Plus, there is little adverse effect compared to medications!

What You Can Do To Help: play music for our residents to make them happier! Most of our residents like country music, and some prefer gospel music! Who is the most popular singer voted by them? Frank Sinatra, yeah! You will be happy too when our residents tell you that they enjoy the music and appreciate your help. Just set up the CD player, press the button, and let the music play!