Effects of Music on Major Depression in Psychiatric Inpatients

Wei-Chi Hsu and Hui-Ling Lai

The study was to assess the effectiveness of soft music for treatment of major depressive disorder inpatients in Kaohsiung City, Taiwan. A pretest-posttest with a two-group repeated measures design was used. Patients with major depressive disorder were recruited through referred by the psychiatric physicians. Subjects listened to their choice of music for 2 weeks. Depression was measured with the Zung's Depression Scale before the study and at two weekly posttests. Using repeated measures ANCOVA, music resulted in significantly better depressive scores, as well as significantly better subscores of depression compared with controls. Depression improved weekly, indicating a cumulative dose effect. The findings provide evidence for psychiatric nurses to use soft music as an empirically based intervention for depressed inpatients.

THE WORLD HEALTH Organization estimates that major depression is now the fourth most important cause worldwide of loss in disability-adjusted life-years and will be the second most important cause by 2020 (World Health Organization, 2004). Depression is a frequently occurring psychiatric disorder with a prevalence of approximately 5% in the general population (Bebbington, Hurry, Tennant, Sturt, & Wing, 1981; Weissman, Leaf, Tischler, Blazer, Karno, Livingston-Bruce, & Florio, 1988). It is estimated that at least one-third of all individuals are likely to experience an episode of depression during their lifetime (Rorsman, Grasbeck, Hagnell, Lanke, Ohman, Ojesjo, & Otterbeck, 1990). In Taiwan the lifetime rates for major depression was 1.5 cases per 100 adults (Weissman, Bland, Canino, Glorisa, Faravelli, Greenwald, Hwu, Joyce, Karam, Lee, Lellouch, Lepine, Newman, Rubio-Stipec, Wells, Wickramaratne, Wittchen, & Yeh, 1996). Depressive disorders are persistent, recurring illnesses that cause great suffering for patients and their families (Williams, Mulrow, Chiquette, Elaine, Noël, Aguilar, Christine, & Cornell, 2000).

Depression results in high personal, social, and economic costs through suffering, disability, deliberate self-harm, and health care provision. The personal burden of depression includes higher mortality and impairment in multiple areas of functioning. The attendant economic costs to society and personal burden to patients and families are enormous. In the United States, the estimated costs of treating depression and the costs incurred by lost productivity exceeded $44 billion in 1990 (Greenberg, Stiglin, Finkelstein, & Berndt, 1993). Despite the availability of drug and psychotherapeutic treatments, much depression remains undiagnosed or inadequately treated (Freeling, Rao, Paykel, Sireling, & Burton, 1985). Although there is much research about depression, few studies have focused on the effects of music in improving depression (Aldridge, 1993), particularly in psychiatric inpatient.

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0883-9417/04/1805-0007$30.00/0
doi:10.1016/j.apnu.2004.07.007

Three types of therapy for major depressive disorder (MDD) have proven efficacy: pharmacotherapy, psychotherapy, and electroconvulsive therapy (Thase, Greenhouse, Frank, Reynolds, Pilkonis, Hurley, Grochocinski, & Kupfer, 1997). The most frequently used treatment for major depression is antidepressant medication (Depression Guideline Panel, 1983). As many as 30% to 35% of patients do not respond to treatment although the development of new and effective medications for depression (Baldessarini, 1985; Baldessarini, 1989; Silver & Yudofsky, 1988). Furthermore, medications also may induce unwanted side effects that can impair patients' quality of life and reduce compliance (Silver & Yudofsky, 1988). Even among patients who show improvement with short-term antidepressant use, there is a significant risk for relapse within 1 year after treatment termination (Craighead, Craighead & Ilardi, 1998; Keller, 1988). Therefore, nonpharmacological methods that promote a mind-body interaction without side effects should be tested to reduce depression in MDD patients.

Depression is one of the most common reasons for using complementary and alternative therapies (Ernst, Rand, & Stevinson, 1998). In 1991, 40% of the US adult population used at least one such therapy for 1 year (Astin, 1998). It is estimated that about 20% of those who suffering from depression had used an unconventional therapy within the past year (Eisenberg, Kessler, Foster, Norlock, Calkins, & Delbanco, 1993). Depression is among the 10 most frequent indications for using alternative therapies, and music is one of the remedies for this condition (Astin, 1998). Complementary and alternative therapies are popular in Taiwan. A survey revealed that 90% of Taiwanese families frequently combined a variety of approaches in treating illnesses (Wu & Hu, 1980).

Only three researchers have examined the therapeutic effect of music on depression. Each found that music had beneficial effects (Chung, 1992; Hanser & Thompson, 1994; Lai, 1999), but there were methodological problems of small sample size and lack of consideration of confounding factors. Moreover, none studied the effects of music on major depression in psychiatric inpatients.

Music is known to effect the individual by sympathetic resonance. Based on a psychophysiological theory synthesized from the literature, certain type of music induces relaxation and please responses (Lai & Good, 2002), which reduce activity in the neuroendocrine and sympathetic nervous systems, resulting in decreased anxiety, heart rate, respiratory rate, and blood pressure (Good, Stanton-Hicks, Grass, Anderson, Choi, Schoolmeesters, & Salman, 1999; Standley, 1986; Zimmerman, Pierson & Marker, 1988). Music has been found to increase circulating endorphin (Mockel, Rocker, Stork, Vollert, Danne, Eichstadt, Muller, & Hochrein, 1994), which is associated with moods (Gerra, Zaimovic, Franchini, Palladino, Guicastro, Reali, Maestri, Caccavari, Delsignore, & Brambilla, 1998). Thus, a music intervention was expected to improve depression. Addressing music selection is important when conducting music intervention. Music preference plays a large role because people generally like what they know and dislike the unfamiliar (Lai & Good, 2002). However, little is know about the effects of music on depression in psychiatric patients. Thus, the aim of the study was to test the hypotheses that, while controlling for identified covariates, subjects who used music as therapy at 6pm each day for 2 weeks would have (1) better depression scores and (2) better individual subscores of depression over time than those who did not use music.

METHODS

Subjects

Patients with major depressive disorder diagnosed by a psychiatrist according to the *Diagnostic and Statistical Manual of Mental disorder 4th edition* (DSM-IV) in a psychiatric ward of a psychiatric hospital in southern Taiwan were included in the study. Exclusion were current alcohol or substance abuse, primary psychiatric diagnosis other than MDD, ongoing participation any other alternative or complementary therapies, and were those who with suicidal ideation.

A total of 54 subjects were expected to achieve a power of .8 at alpha = .05, one-tailed, with a medium effect size, a medium correlation ($r = .50$) among three repeated measures, and using repeated measures analysis of covariance on depressive scores, the size of each group was computed to be 27 (Stevens, 1996). The subjects in both groups received either Efexor (venlafaxine HCl) 75 mg/#1 twice daily or Prozac (fluoxetine HCl) 20 mg/#1 daily during time the study was conducted.

Measures

1. The Zung's self-administered Depression scale (SDS) developed by Zung in 1965 is a 20-item clinical rating scale that was used to determine study eligibility and treatment outcome. The scale consisted of four subscales: pervasive affective disturbances, physiological disturbances, psychological disturbances, and psychomotor disturbances. The evaluation method was obtained based on interviews with the patients. Patients who received a score within the range of 50 through 60 were considered to be mildly clinically depressed, 60-69 were considered to be moderately to severely depressed, whereas patients who obtained a score of more than 70 were considered to be severely depressed. In addition to analysis of the total depressive score, the four subscale scores were analyzed so that effects of music on individual elements of depression could be determined. The SDS was administered three times during the study; there was one pretest and two posttests with a week between each test. The Chinese language translation of the SDS had a Cronbach's alpha reliability of the global score of .73 and a split half reliability of .84 (Yu & Hung, 1984). In this study, the Chinese version had a Cronbach's reliability coefficient of .86 for the overall score.
2. The following set of measures was administered before intervention. (1) Life stress event in the previous year was measured with the Life Event Check List (LECL) (Hwu, 1995); the alpha coefficient was .74 in this study. (2) Social supports were measured using the Social Support Scale (SSS; Wang, 1993); a = .87 with a split-half reliability coefficient of r =.83. The alpha coefficient was .88 in this study. (3) Music preference was assessed using the Music Preference Questionnaire (MPQ) developed by the investigators. (4) Heart rate (radial pulse), blood pressure, finger temperature, and observed respiratory rate were measured for 1 minute by the investigator before the introductory music and again after listening to the selected music. Rates were used to determine whether efforts to relax to the music resulted in a change in the autonomic reflexes. Heart rates, respiratory rates, blood pressure, and finger temperature were recorded on the Physiological Indicator Sheet (PIS) developed by the investigators.

Procedure

The study was approved by the institutional review board. Screening for eligibility occurred at the admission day after the hospital permission was obtained. Because the study was conducted in the same psychiatric ward, to avoid diffusion or imitation of treatment (Cook & Campbell, 1979), the first 27 new admission patients were then assigned to the control group. After the data of the control group were collected completed, individualized music intervention started with the 28th patient in the order of the admission. The investigator interviewed them to obtain demographic data and used questionnaires (SDS) to measure depressive score, life stress event (LECL), and social support (SSS). Those in the music group were asked at the first admission day about their music preferences. They then selected their preferred music. The investigator measured heart and respiratory rates, blood pressure, and finger temperature before and after listening to the music. Participants in the control group were not asked about music preferences, and their physiological index were not measured, and were asked to bed rest for 30 minutes. Patients of both groups received same antidepressants while for the patients in the music group soft music was provided everyday in addition and the course of music intervention was 2 weeks.

Intervention

The music intervention consisted of a choice of one of six types of CD music played for 30 minutes at 6 pm. Introduction of the music to participants was accompanied by brief instructions in its correct use. The choices included four types of Western music, and two of Chinese music for those who preferred these. The Western music types were: Baroque music, country music, easy listening music, natural sound music, and the Chinese music was of Chinese folk song, and Taiwanese folk song. Because Taiwan is an Americanized country and most music played on radio or television is of Western origin, the music was expected to be familiar to the Taiwanese.

At the first day, participants in the music group were asked to select one of six types of music from

an introductory short listening to each of the CDs for 30 seconds. They were asked to select the type that was most preferable. Before the introductory music was played, participants in the music group were asked about their music preference. Baroque music was most frequently chosen (n = 7, 25.9%), while 5 (18.5%) chose easy listening music and natural sound music equally followed by country music (n = 4, 14.8%), and a few chose Chinese and Taiwanese music (n= 3, 11.1% each).

Data Analysis

The SPSS 10.0 statistical software package (SPSS, Chicago, IL) was used for data analysis. Potential confounding covariates were assessed with Pearson's, point biserial, and Spearman's correlations. Independent t-tests were used to compare the groups on pretest global depressive score and its subscores so that the depression was not masked by the total score. To test the hypotheses, repeated measures analysis of covariance was used to determine group differences in the depressive scores. Post hoc t-tests with Bonferroni correction were used to determine group differences at each weekly posttest.

RESULTS

Description of Participants

Participants' ages ranged from 18 to 73 years (37 ± 12.5 years). The majority were married (n = 31, 57.4%), not employed (n = 30, 55.5%), and no family history of depression (n = 43, 79.6%). Forty-five (82.3%) had completed at least high school (12 years) and, less than 5 years on major depressive disorder (n = 37, 68.5).

Comparability of Groups

At pretest, there were no group differences in global depressive score, and the four depressive subscores. At the pretest, global depressive scores ranged from 68.6 to 91.2 in the music group, and 71.3 to 95 in the control group. Using t-tests, there were no significant pretest differences between the music and control groups in age, life stress event, and social support. Using χ^2 tests, there were no differences in marital status, education, family history, or employment between the two groups.

Four variables were related to depressive scores at one or more time points: age (r = −.34), years on major depressive disorder (r = −.30), life stress event (r = .26), social support (r = −.23 to −.29), and family history (r = .24-.45). These were used as covariates, along with pretest depressive score (r = .25-.50), when analyzing the depressive scores.

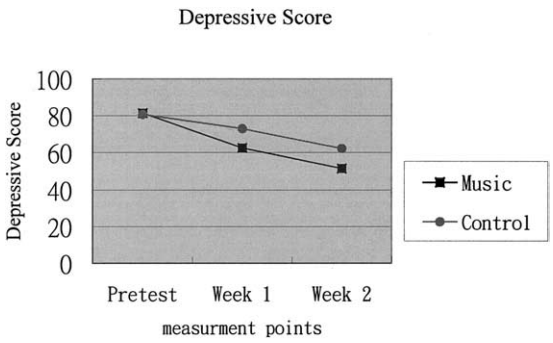

Fig 1. Zung's depressive score data from the pretest until week 2.

Depressive Score Outcomes

The music intervention was effective in improving mood not only on the global Zung's score, but also on the four subscores across two time points. In the music group, there were significant improvements, with a medium effect size in both global depressive score and scores of pervasive affective disturbances, physiological disturbances, psychological disturbances, and psychomotor disturbances. The positive changes also were observed in the control group who received antidepressant only.

Global Depressive Score

While controlling for pretest global depressive score, social support, and family history, repeated measures ANCOVA indicated a significant difference in depressive score ($F(1, 48) = 93.87$, $p < .01$). After removing variance explained by the covariates, 66% of the variance in the adjusted global depressive scores across Week 1 to Week 2 was associated with music therapy (Fig 1, Table 1). To further examine the differences between groups, post hoc multiple t-tests with a Bonferroni correction (adjusted alpha value, .025) were used. Significant differences showed that the music group had better depressive scores than the control group at each time point: week 1, $t(52) = 12.48$, $p < .01$, and week 2, $t(52) = 21.11$, $p < .01$. One-way analysis of variance indicated no signif-

Table 1. Zung's Depressive Scores: Means by Group and Time (N = 54)

	Music (n = 27)		Control (n = 27)		
Time points	M	SD	M	SD	t
Pretest	81.34	6.39	80.60	5.34	0.46
Week 1	62.45	8.14	72.91	6.16	−5.32*
Week 2	51.39	6.21	62.17	7.07	−5.95*

Note: *$p < .001$.

icant posttest differences in depressive scores among the six types of music at week 1, or week 2.

Depressive Subscores

In addition, the music group had significantly better scores on the four subscores over two weeks. Repeated measure ANCOVA showed that the music group had better scores on pervasive affective disturbances ($F(1, 47) = 18.22$, $p < .01$), physiological disturbances ($F(1, 48) = 38.16$, $p < .01$), psychological disturbances ($F(1, 44) = 34.55$, $p < .01$), and psychomotor disturbances ($F(1, 46) = 46.31$, $p < .01$).

Post hoc multiple t-tests were used to further examine the differences between groups. Significant differences showed that the music group had better depressive scores than the control group at each time point: week 1, $t(52) = 7.91$, $p < .01$, and week 2, $t(52) = 13.29$, $p < .01$ for pervasive affective disturbances, week 1, $t(52) = 6.79$, $p < .01$, and week 2, $t(52) = 12.73$, $p < .01$ for physiological disturbances; week 1, $t(52) = 12.07$, $p < .01$, and week 2, $t(52) = 17.23$, $p < .01$ for psychological disturbances ; and week 1, $t(52) = 12.69$, $p < .01$, and week 2, $t(52) = 22.60$, $p < .01$ for psychomotor disturbances.

Music on Autonomic Response

The investigator also measured the subjects' blood pressure, heart rates, respiratory rates, and finger temperature before they listened to the introductory music CD and after they listened to the selected music CD. Mean systolic blood pressure were 120±10.58 mmHg before listening to music and significantly lower at 118.40 ± 12.82 mmHg after ($t = 2.70$, $p = .01$). Mean diastolic blood pressure was 75.38 ± 5.24 mmHg before listening to music and significantly lower at 72.35 ± 4.83 mmHg after ($t = 14.91$, $p < .00$). Mean heart rates were 77.82 ± 4.33 beats per minute before listening to music and significantly lower at 70.68 ± 3.66 beats per minute after ($t = 27.78$, $p < .00$). Respiratory rates were 18.90 ± .90 breaths per minute before music and significantly fewer, 17.01 ± 1.65 breaths per minute after ($t = 6.95$, $p < .00$). Mean finger temperature was 25.24± 0.44 before listening to music and significantly higher at 32.84 ± 0.70 mmHg after ($t = -69.14$, $p < .00$). These observations suggested that the soft music was effects on the autonomic nervous system.

Responders versus Nonresponders

Participants were considered "responders" to music if their total posttreatment SDS scores dropped into less than 50 points. At the end of the study, more than one third of those in the music group responded to the intervention (n = 10, 37%), while the other 17 (63%) were still mildly depressed. Using t-tests to compare the two groups of responders and nonresponders, results revealed that no differences on demographic or confounding variables, or pretest scores of depression. More study is needed on responders to music used for depressed.

DISCUSSION

Participants diagnosed major depressive disorder used soft sedative music as therapy for 30 minutes every day for 2 weeks had better global depressive scores and also better individual subscales of depression over time than those who did not. The results of the study provide empirical support for the notion that soft music is effective auxiliary treatment for MDD.

There was an increasing dose effect on overall depressive scores from the pretest until Week 2 (Fig 1). Despite a meaningful clinical improvement in many participants, over half of those who improved were still mildly depressed after 2 weeks.

Our findings were similar to those in the three previous studies that used experimental approaches (Chung, 1992; Hanser & Thompson, 1994; Lai, 1999). In the Hanser and Thompson' study, music

was used with homebound elders rather than psychiatric inpatients. All types of music used in the present study were used daily and were found useful for depression.

Several observational studies have shown an association between preferred music and improved mental health (Lai & Good, 2002). Although the mechanisms of music responsible for the reduction in depressive symptoms are not exactly known in the field of music therapy. All six types of music in our study were used everyday and were found useful for major depressive disorder; the six types were similar in their effects.

In the present study, 30-minutes of soft music every day at 6 pm. improved depression after only 1 week, and the effect continued to increase for one more week. Because a plateau did not emerge (Fig 1), the possibility of greater improvement with a longer intervention period remains unknown. Also, both groups showed reductions on depressive scores, indicating that their symptoms were reduced. Those subjects who received the combination of antidepressant and music appeared to have the greater response to treatment. Whether the soft music had an interaction effect with antidepressants need to be further studied. The results can be explained by the psychophysiological theory that moods can be improved by relaxing the body with soft music, which decreases circulating endorphin (Gerra et al., 1998) that is related to emotion (Cook, 1986; Lane, 1992).

Limitations

First, the convenience sample limited generalization of the results. Second, a Hawthorne effect may have occurred due to awareness of participation in a study. Third, due to the absence of a true no-treatment control group, the possibility of a spontaneous recovery rate remains unknown.

Future Research

We recommend that researchers continue to explore the subscales of depression, in addition to global depressive score. Also recommended is testing the intervention for more than 2 weeks to determine when beneficial effects reach a plateau. More research is needed to document the effectiveness of music on other types of depression in other populations. Researchers and practitioners who wish to use music for depression can find music CDs of soft music similar to these examples in music stores or can contact us for further information. In addition, a crossover design for further trials might be used to determine whether this result can be replicated.

CONCLUSION

The findings contribute to knowledge about the effectiveness of soft music on major depressive disorder in psychiatric inpatients. Improvements included better global depressive score as well as pervasive affective disturbances, physiological disturbances, psychological disturbances, and psychomotor disturbances. Use of music yielded substantial improvements in depressive scores. The effectiveness of combined treatment of music and antidepressant in the music group is better than that in the control group. Music can be used therapeutically for major depressive disorder in psychiatric inpatients and is beneficial to the nursing care.

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