A Cost-Benefit Analysis of Music Therapy in a Home Hospice

Executive Summary

- Medicare's fixed daily rates create an absolute cost constraint on hospices; consequently, the growth in hospice brings financial pressures.
- The patient efficacy of music therapy has been demonstrated in the literature and includes improving pain, agitation, disruptive behaviors, communication, depression, and quality of life.
- Music therapy is well suited to hospice as it addresses the four domains of palliative care (physiological, emotional, social, and spiritual care).
- In this small study, the total cost of patients in music therapy was $10,659 and $13,643 for standard care patients, resulting in a cost savings of $2,984. The music therapy program cost $3,615, yielding a cost benefit ratio of 0.83. When using cost per patient day, the cost benefit ratio is 0.95.

Complimentary and Alternative Therapies are increasingly in use in health care today. Music therapy (MT), one modality examined in current literature, is gaining wider acceptance (Gallagher, Huston, Nelson, Walsh, & Steele, 2001). The patient efficacy of MT has been demonstrated in the literature and includes improving pain, agitation, disruptive behaviors, communication, depression, and quality of life. Some researchers have noted that MT also decreases the use of analgesics (Ikonomidou, Rehnstrom, & Naesh, 2004; Lukas, 2004; Pellino et al., 2005) and increases the efficiency and effectiveness of staff interventions (Ashida, 2000; Gerdner, 2005; Madan, 2005; Sung & Chang, 2005). While not explicitly looking at costs, these studies strongly suggest that MT may have a direct cost benefit by reducing medication costs and improving staff utilization.

Background

Hospice continues to be a rapidly growing and evolving area of health care in the United States. The Medicare Payment Advisory Commission (MedPAC, 2006) notes that the number of hospice beneficiaries increased by 49% from 2000 to 2004. Looking at the 2004 National Data Set reveals that 72% of hospice patients are Medicare recipients and that Medicare pays for 86% of all patient days (National Hospice and Palliative Care Organization [NHPCO], 2005). The survey also shows that cancer diagnoses now account for less than 50% of all hospice diagnoses. Though the average length of stay (ALOS) has increased from year to year, the median length of stay has remained around 21 days (NHPCO, 2005). These findings are also noted by MedPAC.

Medicare's fixed daily rates create an absolute cost constraint on hospices; consequently, the growth in hospice brings financial pressures. Identifying when a non-cancer patient has a 6-month prognosis is problematic and is partially driving the increase in ALOS (Ferrera-Reid, 2004; MedPAC, 2006). The increasing ALOS places some hospices at risk of reaching or exceeding the annual hospice cap, causing these hospices to receive less in reimbursements (MedPAC, 2006). Further, the hospice benefit was meant to reduce Medicare's cost of end-of-life care, leading to further financial pressures on hospices (MedPAC, 2006; Pyenson, Connor, Fitch, & Kinzbrunner, 2004).

Cost drivers and cost control. Providing quality patient care under tight fiscal restraints is challenging. Expenses related to medication costs have increased faster than Medicare's routine care per diem rate (Nowels, Kutner, Kassner, & Beehler, 2004). Patients and families exert pressure to receive newer, more expensive drugs, believing that they are more effective even though current research does not support this belief (Weschles, Maxwell, Reifsnnyder, & Knowlton, 2006). Medication waste after a patient dies is also a significant cost. Hauser, Chen, and Paice (2006) found that one hospice wasted from $109 to $206 worth of medications per patient after patients died. Other cost drivers include wages and travel expenses. Though Medicare reimbursements are adjusted regionally for salary, the rates do not account for the difficulty rural hospices (and some urban areas) face in recruiting and retaining staff (Casey, Moscovice, Virmig, & Durham, 2005). Likewise, the rates do not account for the greater distances that must be traveled in rural locations, which reduce the number of patients that can be seen in a day.

Medicare controls costs through the use of two annual caps: a cap on the average annual cost per patient and a cap on the total number of inpatient days permitted in a year (MedPAC, 2006). Unlike the per diem rates, the caps are not adjusted for regional...
differences. This means a hospice that is reimbursed at minimally adjusted rates can have an ALOS of 6 months, while a hospice that has a high adjustment (such as hospices in many urban areas) may need an ALOS of 3 months.

Different cost control initiatives have been studied and tried in hospice. For instance, Medicare allows hospices to pass two charges on to patients: a 5% co-payment for drugs (limited to $5 per drug) and a 5% co-payment for the cost of respite care (limited to $952 per year) (MedPAC, 2006). Private insurance companies may impose benefit caps or limit the number of days a patient is allowed to be in hospice (Deans, 2004). Medication costs are controlled by using contract pharmacies and limiting the drugs placed on approved formularies (Nowels et al., 2004). Beyond Medicare’s minimum requirements, additional admission requirements are also used by some hospices, such as requiring patients to forego chemotherapy and radiation, not allowing treatments with antibiotics, and not admitting patients who reside outside their home (Lorenz, Asch, Rosenfeld, Liu, & Ettner, 2004). Hospices may also require higher case-loads for staff. This technique is easier for urban hospices with larger staffs and larger patient censuses as opposed to a rural hospice that may have a census of only five patients (Vrimig, Moscovic, Durham, & Casey, 2004).

Music therapy. The American Music Therapy Association (AMTA, 2004) defines MT as “interventions designed to promote wellness, manage stress, alleviate pain, express feelings, enhance memory, improve communication, [and] promote physical rehabilitation.” By this definition, MT is well suited to hospice as it addresses the four domains of palliative care (physiological, emotional, social, and spiritual care) identified by Cecily Saunders and adopted as components of hospice care in the United States (Deans, 2004; Saunders, 2000). Though Medicare does not require that MT services be provided by hospices, MT is increasingly being used by hospice programs (Gallagher et al., 2001).

Patient efficacy of music therapy. The data from studies on the effect of MT on physiologic signs of pain is inconclusive (Hayes, Buffum, Lanier, Rodahl, & Sassos, 2003; Ikonomidou et al., 2004; Lee, Henderson, & Shum, 2004); however, other research has shown that MT improves the perception and reported level of pain (Gallagher, Lagman, Walsh, Davis, & LeGrand, 2006; Lukas, 2004). Strong evidence exists that MT decreases anxiety and stress (Gallagher et al., 2006; Hayes et al., 2003; Ikonomidou et al., 2004; Lee et al., 2004; Lukas, 2004; Pellino et al., 2005). Gerdrner’s (2005) finding that MT may aid in decreasing anxiety in patients with dementia is of particular interest to hospice. Though the study is small (N=8), the indications are promising for this population of hospice patients. Hsu and Lai (2004) and Gallagher et al. (2006) found MT improved mood and depression, a significant issue for the terminally ill (Mystakidou et al., 2005; Pessin, Rosenfeld, & Breitbart, 2002).

Patients with dementia, who are becoming a larger portion of hospice patients, present unique issues. Ashida (2000) found that reminiscence music significantly reduced the symptoms of depression in patients with dementia, and staff reported improved mood and interactions. MT is also effective intervention for agitation and disruptive behavior in patients with dementia, reducing the difficulty of providing care (Gerdrner, 2005; Remington, 2002; Richeson & Neill, 2004).

Music therapy in hospice. MT has a positive effect on a number of key hospice quality indicators: quality of life, patient satisfaction, and communication. Hilliard (2003) found that just a single MT session improves quality of life and patient satisfaction and that these scores increased with the number of sessions. Other research indicates that MT decreases patient isolation, improves patients’ interpersonal connections, and enables nonverbal patients to express feelings and connect with others (Chawin, 2002). MT can be used to communicate feelings and thoughts that could not otherwise be expressed (Hilliard, 2003).

Financial implications of music therapy. The question of how MT may affect the financial performance of hospices has not been addressed in the literature. In the only study located that specifically looked at the cost benefits of MT, Walworth (2005) examined the use of MT with pediatric patients undergoing non-invasive procedures. The use of music for procedural support resulted in more successful procedures, a reduction in the use of sedation, a decrease in the length of procedures, and a decrease in the number of staff interventions with patients.

Generalizing these findings to adult patients is difficult. While not specifically studying for cost effectiveness, many researchers noted a decrease in the use of opioids and other analgesics when patients used music therapy (Ikonomidou et al., 2004; Lukas, 2004; Pellino et al., 2005). None of the research mentioned previously measured staff time; however, there is evidence that suggests MT reduces anxiety, agitation, and disruptive behavior and improves mood (Ashida, 2000; Gerdrner, 2005; Madan, 2005; Sung & Chang, 2005), which suggests that staff interventions with patients would be more effective, and perhaps fewer in number.

Methods

This retrospective study was performed in a medium-sized, for-profit home hospice in the San Francisco Bay area. The hospice has an “always say yes” policy on admitting patients with only one limitation: the patient cannot be receiving care-focused chemotherapy. Otherwise, the hospice admits patients on anti-
nursing facilities were not included because these patients were spread across a large number of different facilities. Given the time constraints of this study, coordinating visits to the facilities was not feasible.

Cost-benefit analysis. A cost-benefit analysis (CBA) was performed comparing patients receiving MT to patients not receiving MT (SC). CBA compares two alternatives by quantifying the benefits of each alternative and comparing it to the cost of the interventions. CBA requires that there be a common unit of measurement for the benefits, generally dollars, and calculates the total value of the benefits (cost savings). The savings are then divided by the cost of the intervention, resulting in the cost-benefit ratio. If the ratio is greater than 1.0, the intervention is cost beneficial (Watkins, n.d.). In this study, MT was an alternative for SC, and the benefits were the cost savings between MT over SC. The costs of the intervention were only the additional cost of the MT program, as the cost of SC is included in the costs for the patients in MT.

When performing a CBA, care must be taken to account for contingent valuation, a patient's perception of the intervention's value. If a patient is to be charged for a session of MT and is not willing to pay for the session, the contingent valuation becomes zero because the patient has decided MT is not valuable (Watkins, n.d.). Since the hospice does not require the patient to pay for MT, contingent valuation was not an important issue in this study. In a CBA, data must also be adjusted so that past and future dollars can be compared to today's dollars; however, this study spans only a 9-month period, making aging unnecessary. The requirement to have a common unit of comparison means that CBA can only be used to compare tangible results. The literature identified a number of areas of potential savings that can be quantified easily: the use of medication for pain, anxiety, sleep, and depression, the number and length of nursing visits (both RN and LVN), and the number and length of home health aide (HHA) visits. The benefits can be measured in total cost savings.

Procedure. Nursing and HHA hours were gathered from a computer database. For each subject, charge creation reports were generated from the revenue gathering data. The total number of hours for RNs, LVNs, and HHAs was calculated from the data. Using budgetary data, the total cost of the hours was calculated. The cost of the MT program was calculated by examining billing records. Each visit to a subject patient was included in the cost figures. The MT-BC also attends interdisciplinary team (IDT) meetings and is paid for attendance. Since the MT-BC attends IDT meetings regardless of caseload, every IDT meeting that the MT-BC attended was also included in the costs.

Calculating the cost of medications could not be done as directly as staffing costs. The hospice utilizes a contract pharmacy that charges a fixed per diem rate.
for each patient; consequently, no variation in medication costs could be expected between subject groups. However, each patient's initial prescription and all refills are captured in the medication ordering system. Utilizing an online drug cost estimator (Prime Therapeutics, n.d.), estimates for the retail cost of the medications were determined that allowed equal comparison. The drug costs were calculated from each prescription and refill, not from the actual patient usage. This was done because the cost of a medication is incurred at the time it is ordered, whether or not the patient actually uses the drug. The total cost of medication was then calculated. The list of medications used in the calculation is shown in Table 2.

There were a greater number of patient days in the MT group than the SC group that had the effect of weighting the MT group. Consequently, the cost per patient day (PPD) was calculated. This yields an averaged cost for each patient over all the days and is intended to minimize the effect of the additional days for patients in MT. The cost PPD was calculated by dividing the total costs by the total number of patient days for each study group.

**Results**

The CBA is shown in Table 3. RN nursing care for patients receiving MT included 145 hours for a cost of $5,220, compared to 167.4 hours and $6,026 for patients in SC. LVN care for MT patients included 11.9 hours for a cost of $310, compared to 7.0 hours and $182 for SC patients. HHA care for MT patients included 238.3 hours for a cost of $3,842 compared to 231.6 hours and $3,733 for SC patients. Medication costs for MT patients were $1,287 and $3,702 for SC patients. The total cost of patients in MT was $10,659 and $13,643 for SC patients, resulting in a cost savings of $2,984. The MT program cost $3,615, yielding a cost benefit ratio of 0.83. When using cost PPD, the cost benefit ratio is 0.95.

**Discussion**

For this sample population, the cost-benefit analysis indicates that the expense of the music therapy program is greatly offset by the cost savings seen in other areas of care. The ratio was higher when

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<th>Table 3. Cost-Benefit Analysis</th>
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<td><strong>Music Therapy (n = 8)</strong></td>
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<tr>
<td>Hours</td>
<td>Costs</td>
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<tr>
<td>RN ($36.00/hour)</td>
<td>145</td>
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<td>LVN ($26.00/hour)</td>
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<td>HHA ($16.12)</td>
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<td>Medication</td>
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<td>Totals</td>
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<td><strong>Costs</strong></td>
<td><strong>Cost PPD</strong></td>
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<td>Cost Savings</td>
<td>$2,984</td>
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<td>MT Costs</td>
<td>$3,615</td>
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<td>Cost-Benefit Ratio</td>
<td>0.83</td>
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<td><strong>Standard Care (n = 8)</strong></td>
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<td>Hours</td>
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<td><strong>Costs</strong></td>
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| **RN** = registered nurse | **MT** = music therapy | **HHA** = home health aide
| **LVN** = licensed vocational nurse | **PPD** = per patient day |  

NURSING ECONOMICS/November-December 2007/Vol. 25/No. 6
The findings of this study are similar to that of Walworth (2005), who examined the use of MT for procedural support with pediatric patients. These findings should be of interest to hospices, which frequently are faced with patients who have symptoms that are difficult to manage. The unintentional consequence of cost savings could help hospices as they struggle to maintain costs in a time of increasing fiscal restraint while maintaining a high quality of patient care. It is important to note that while there were 35 additional days of patient care, there were fewer hours of RN care but increased hours of LVN and HHA care. This may indicate that patients in MT and their families are more open to the breadth of services provided by hospice. The findings of this study should also be of interest to those who care for the elderly, especially skilled nursing and long-term care facilities. Caring for patients in skilled nursing facilities presents many of the same problems as caring for the dying, especially since many elderly have early phases of terminal diseases. Future research needs to examine the use of MT in long-term care.

As a small, focused study, generalizing these findings to a wider population is not possible. Though attempts were made to control for gender, age, and length of stay, the sample size prohibited control for diagnosis or prognosis. Patients with non-cancer diagnoses present challenges for hospice as prognostication is difficult (Ferrera-Reid, 2004; Schonwetter et al., 2003), and some research suggests that caring for non-cancer patients is more costly (Campbell, Lynn, Louis, & Shugarman, 2004; Pyenson et al., 2004). Future studies need to control for the effect of these variables and allow for a larger sample size. Patients residing in skilled nursing, residential care, and assisted living facilities were not included in the sample. How the residential setting affects patient outcomes and cost was not ascertained. While all patients were considered for MT, not every patient was deemed appropriate nor elected to participate; this may have had the effect of biasing the MT program to patients who are more open to its benefits.

Finally, because the MT-BC tailors each care plan to the unique needs of each individual patient, there is no control for the MT intervention. The hospice administrator viewed using an MT-BC as a strong point and critical to the program’s success, a view supported in the literature (Chawin, 2002; Gallagher et al., 2001; Kemper & Danhauer, 2005). MT-BCs are graduates of accredited university programs, vetted by a national certification exam, operate under a standard of practice set forth by the AMTA, and follow a standard methodology for assessing patients, planning interventions, and evaluating outcomes (AMTA, 2004). Many of the studies examining music therapy do not use MT-BCs and frequently use only recorded music interventions, which may limit the effectiveness of the interventions.

In addition to the tangible benefits measured in this study, other benefits are evident. Evidence exists that MT may improve risk management for the hospice. Agitation and restlessness are leading causes of patient falls and staff injuries (Sung & Chang, 2005; van Doorn et al., 2003); consequently, one can argue that MT may reduce the number of falls and injuries. In skilled nursing facilities, such incidents are estimated to cost as much as $16,000 for hospital costs alone (Occupational Safety & Health Administration [OSHA], n.d.; Titler et al., 2005). A decrease in patient and staff injuries would then have a direct effect on insurance premiums (Iyer, 2004; OSHA, n.d.). Future studies should examine how MT affects falls and staff injuries and the cost benefit of this affect. Intangible benefits not included in this analysis can also be seen. The research cited indicates that MT may help improve hospice quality indicators, a direct benefit to quality control and accreditation processes. Improved patient behavior should lead to improved staff interactions with patients, which in turn should lead to improved working conditions, job satisfaction, and staff retention.

The impact on staff satisfaction may be significant. At the conclusion of the study, a short survey was given to all the hospice staff with 20 of the 40 staff members responding. All respondents strongly agreed that MT is beneficial to patients and that it improved their interactions with patients and their families. Though there was greater variation when asked if MT improved their working conditions, 70% agreed or strongly agreed. Only one disagreed, and the others had a neutral opinion. Most importantly, 70% of respondents agreed or strongly agreed that the MT program increased their job satisfaction, and 80% of the respondents felt that knowing the hospice paid for the MT program increased their commitment to the agency. The impact of alternative therapy programs on staff morale and commitment needs to be studied.

**Conclusion**

This small study adds to the growing body of evidence that music therapy has a positive impact on patient outcomes. Further, it has demonstrated that music therapy may have a positive financial consequence for hospice agencies. The existing literature explores many areas of great interest to hospice. Improved quality indicators, improved patient outcomes, and improved working conditions are all suggested in the research cited. The implication for financial savings has been identified, which this study supports. Most of the literature that has been written regarding the use of MT in health care examined one-time, short-term use of MT as procedural support. There is little research that examines the use of MT as a long-term therapy with patients who have chronic
or terminal conditions. Further research on the use of MT in long-term care, such as hospice, and its potential for cost savings should be undertaken.$

REFERENCES
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