Original Article

Costs of Novel Symptom Management Interventions and Their Impact on Hospitalizations

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Abstract

Four hundred thirty-seven patients with solid tumor cancer, undergoing chemotherapy, were enrolled, interviewed, and randomized to receive either a six-contact, eight-week, nurse-directed intervention or an automated telephone symptom management intervention. Patients were assessed at 10 and 16 weeks. Patients were queried at intake and at 10 and 16 weeks to determine the severity of their symptoms and if they had been hospitalized—if hospitalized, the number of hospitalizations and location of the hospital. The fixed and variable costs associated with the production of each arm were identified. Both total fixed and variable costs were greater for the nurse arm; total costs per patient were $69 and $167 for the automated and nurse arms, respectively. The overall symptom severity declined significantly over baseline and equally between the groups at 10 and 16 weeks. The relationship between reductions in symptom severity and the number of hospitalizations and days in the hospital was investigated using zero-inflated Poisson regression model. The cost of a hospitalization was estimated at $1,800 per day in 2004. At 16 weeks, those with 50% or greater reductions in severity had an adjusted mean of 1.1 days in the hospital, whereas those with increased symptom severity had a mean of 2.23. Reductions in hospitalizations related to lower severity suggest that the telephone arm could produce a net saving over cost of its development and implementation. Although promising, the links between reductions in severity of symptoms and fewer hospitalizations remain difficult to isolate. J Pain Symptom Manage 2010;39:663–672. *© 2010 U.S. Cancer Pain Relief Committee. Published by Elsevier Inc. All rights reserved.*

Key Words

Symptom management, trials, offset costs

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Introduction

A remarkable number of trials have been conducted to determine the impact of novel strategies for delivering self-care intervention on reducing the number and severity of symptoms among cancer patients.[1,2] Most compare experimental interventions against conventional care alone and some contrast more elaborate cognitive behavioral strategies with information and education interventions to manage symptoms. When compared, the less resource-intensive educational/information interventions appear to produce similar reductions in symptom burden as resource-intensive interventions.[3–6] To date, few reports compare the costs of delivering these interventions with their corresponding reductions in symptom severity or how improved symptom management might offset other costs, such as emergency department visits or hospitalizations, and thereby offset expenditures for enhanced strategies to manage symptoms. Symptom management interventions that engage patients in self-care strategies and demonstrate improved processes of care, while not imposing added demands on outpatient oncology personnel, should be considered for inclusion as a part of routine care and should be covered by insurers.

Cost-effectiveness analysis is an essential component in determining if novel interventions are compared favorably with established care. The importance of these analyses is reflected in a series of articles that begin to demonstrate how to compare costs with their effectiveness.[7–15] However, these analyses rely on units of impact, such as quality-adjusted life-years. In the case of symptom management trials, establishing a correspondence between symptom reduction and subsequent quality-adjusted life-years cannot be determined.[16–18]

To compare the impact of interventions on multiple symptoms with the costs of producing those effects, it is necessary to reduce the outcome observation to a single severity score. A summation of severity of multiple symptoms into an index produces such a score and provides a measure of the total symptom severity burden. Although a summation of the severity across all symptoms is not without limitations,[6,19–21] percent reductions of 50% or more in symptom burden generally are considered to be clinically and statistically significant.[22–24]

This research compared fixed and variable costs associated with the corresponding reductions in severity produced by each arm of a two-arm symptom management trial and linked these reductions with the rates of hospitalization reported by cancer patients in each trial arm during and immediately after their treatment. The average total cost per trial arm was compared with savings in hospitalization costs as one estimate of the possible effectiveness of the symptom management interventions.

Methods

Sample

After approval by the institutional review boards of the sponsoring university and the collaborating cancer centers, cancer patients meeting the following criteria were accrued: 1) 21 years of age or older; 2) having a diagnosis of a solid tumor cancer or non-Hodgkin's lymphoma; 3) undergoing a course of chemotherapy; 4) being able to speak and read English; and 5) having a touchtone telephone. Participating patients signed an informed consent form and had all sociodemographic information entered into a Web-based tracking system. Next, all the patients were screened for symptom severity using an automated voice response (AVR) version of the M.D. Anderson Symptom Inventory.[25] Patients scoring 2 or higher on severity of at least one symptom (range 0–10) entered the trial. Those not reaching this threshold after twice-weekly calls covering six weeks were sent a letter thanking them for participation but were not entered into the trial.

Patients who scored 2 or higher on severity received an intake interview and a copy of the Symptom Management Guide (SMG) and were randomized into either a nurse-administered symptom management (NASM) arm or an automated telephone symptom management (ATSM) arm using a computer minimization program,[26] which balanced patients by arm with respect to recruitment location and site of cancer. Both the arms of the trial received one call each for the first four weeks, skipped Week 5, were called on Week 6, skipped Week 7, and received a final call in Week 8. At 10 weeks, outcome data were obtained through a second interview. Figure 1 summarizes the number of enrolled and attrited patients at each step, and the number analyzed.