



Do complementary and integrative medicine therapies reduce healthcare utilization among oncology patients? A systematic review of the literature and recommendations



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ABSTRACT

Purpose: Complementary and integrative medicine (CIM) is frequently used by oncology teams for reducing physical and emotional side-effects related to cancer treatment. In light of the changing healthcare system, evidence is needed regarding the economic implications of these interventions. The purpose of this study was to: (1) systematically examine the literature for links between CIM interventions and healthcare utilization (2) provide recommendations for growing this area of research.

Method: PubMed and EBSCO databases were reviewed for articles reporting on healthcare utilization associated with CIM therapy use in oncology populations. CIM intervention characteristics and healthcare utilization were extracted and summarized from 7 articles meeting inclusion criteria.

Results: Studies included various CIM modalities. Most studies targeted physical symptoms (i.e., pain, infection, nausea/vomiting; $n = 4$). Healthcare utilization included medication use/cost ($n = 4$) and hospitalization length/cost ($n = 5$). All four studies (prospective/retrospective between-group, $n = 2$; within-subject pre-post, $n = 1$; RCT, $n = 1$) examining medication reduction noted decreased medication costs or use. Mixed findings emerged for studies examining hospitalizations (retrospective between-group, $n = 2$; within-subject pre-post, $n = 1$; RCT, $n = 2$), with only one study (retrospective between-group) indicating lower hospitalization duration in the CIM group.

Conclusions: Findings indicate the potential for CIM therapy to reduce healthcare utilization in oncology populations, particularly medication use. However, this research is limited both in size and quality. To increase the uptake of these interventions and to advocate for insurance coverage of CIM interventions, high quality economic evaluations are needed.

1. Introduction

Advances in cancer treatment have resulted in significant increases in cancer survival rates, which currently hover around 67% for adults of all ethnicities and diagnoses (Siegel et al., 2016). As a result, people with cancer are living longer. Despite the significant improvement in treatment outcomes, cancer- and treatment-related side-effects continue to pose a significant emotional, physical, and financial burden for patients (Holland, 1997; Ihbe-Heffinger et al., 2004; Schmitz et al., 2015; Spiegel and Giese-Davis, 2003). For example, depending on type of treatment and diagnosis, 60–72% of cancer patients have gastrointestinal difficulties (Miller and Kearney, 2004), 4% experience fatigue

after diagnosis but before treatment begins (Lawrence et al., 2004) and this number trends upward to 91% after initiation of treatment (Wang et al., 2014). In addition, 25–80% suffer from pain (Deandrea et al., 2014; Mesgarpour et al., 2014) and 3–31% report emotional distress (Krebber et al., 2014). Several of these side-effects persist into survivorship (DeSantis et al., 2014; Wang et al., 2014). Unfortunately, the efficacy and safety of standard protocols to treat these side-effects are not clear (Mesgarpour et al., 2014; Minton et al., 2014), and some treatment protocols are associated with other significant side-effects (Ballantyne, 2007; Mesgarpour et al., 2014; Miller and Kearney, 2004).

One avenue for reducing treatment-related side-effects is through the use complementary and integrative medicine (CIM) therapies. For

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the purpose of this manuscript, CIM interventions are defined as medical therapies that are not a part of conventional Western medicine and include alternative medical systems, biologically based therapies, mind-body therapies, manipulation therapies, and energy healing therapies (Barnes et al., 2008). As a result of their potential benefits, multiple guidelines for addressing treatment-related side-effects have endorsed the use of CIM interventions (Dupuis et al., 2017; Minton et al., 2014). Though controversy exists about the use of CIM interventions with oncology populations as a supplement for traditional oncology care (Deng and Cassileth, 2005), most oncology patients report using CIM interventions for coping with treatment-related consequences (Söllner et al., 2000). In fact, the prevalence of CIM use has nearly doubled over the past several decades among oncology patients, with 34–46% of adults (Horneber et al., 2012) and 30–60% of children using CIM interventions (Post-White et al., 2009; Valji et al., 2013).

A growing body of research has shown that CIM interventions improve quality of life outcomes by reducing the physical and emotional side-effects related to cancer (Deng and Cassileth, 2005). For example, a systematic review of CIM interventions documented a variety of CIM modalities reduce cancer-related pain by up to 36% in some trials (Bardia et al., 2006). CIM interventions among oncology patients also improve global quality of life with small to medium effect sizes ranging from 0.3 to 0.5 (standardized mean differences) (Chandwani et al., 2012; Shneerson et al., 2013). The positive effects of CIM interventions for patients currently receiving treatment for cancer (Johnson et al., 2014) also extend to long-term cancer survivors (Jeitler et al., 2017).

As a result of the incorporation of standardized protocols to include CIM-based interventions (Dupuis et al., 2017; Minton et al., 2014), the increased up-take of these interventions among oncology patients (Söllner et al., 2000), and the beneficial outcomes of CIM (Jeitler et al., 2017; Johnson et al., 2014), there has been a call to increase training and bolster curricula around CIM in oncology nursing (Bauer-Wu and Decker, 2012; Truant et al., 2015). Many nurses hold a favorable view of CIM interventions (Rojas-Cooley and Grant, 2009), and approximately 30–72% of nurses globally report delivering or recommending CIM therapies to their patients (Balouchi et al., 2016; Çamurdan and Gül, 2013; Shorofi and Arbon, 2017; Wilkinson and Simpson, 2002). Despite the growing interest in CIM therapies in nursing oncology care and evidence for the utility of CIM, most CIM interventions are not covered by insurance companies, and interventions that are covered by insurance plans are only paid for in part (Nahin et al., 2016b). Lack of insurance coverage has been noted as an identified barrier among nurses' use/recommendation of CIM therapies for patients (Balouchi et al., 2018), as this requires patients to pay for CIM interventions out-of-pocket, with average costs ranging from \$435 to \$590 (Nahin et al., 2016a). This may be a barrier to care, particularly for low-income families whose out-of-pocket expenses for cancer may already account for a significant portion of their income (Bernard et al., 2011).

While insurance coverage of CIM interventions has the potential to reduce the financial burden to patients and families, receiving approval for CIM interventions will likely require evidence of the health and economic benefits of these services. Several comprehensive systematic reviews have shown CIM interventions to be less costly for pain, emotional distress, and gastro-intestinal difficulties compared to treatment as usual across a variety of illnesses (Herman et al., 2005; Kennedy et al., 2009), yet there are limited reviews within oncology populations. As a result, providers interested in advocating for coverage of CIM interventions for their patients with cancer are unlikely to have sufficient data to present to insurance companies. Thus, the next step in this line of research is to evaluate the economic impact of CIM interventions within oncology populations. The primary purpose of this review was twofold: (1) to systematically examine the literature for links between CIM interventions and healthcare utilization, and (2) provide recommendations for growing this area of research.

2. Methods

A systematic literature review was conducted following guidelines for Systematic Reviews and Meta-analysis (Higgins and Green, 2011) and is described in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement guidelines (Moher et al., 2009; Moher et al., 2015).

2.1. Data search

In September 2016, PubMed and EBSCO databases were searched for peer-reviewed, original research articles originally published in English. There was no limit placed on publication date. The search strategy included all possible combinations of medical subject heading terms for the following categories: (1) neoplasms, carcinoma, brain neoplasms; (2) complementary therapies, mind-body therapies, therapeutic touch, yoga, biofeedback, mindfulness, meditation, imagery, hypnosis, acupuncture, massage, Tai Ji; and (3) healthcare utilization, healthcare use, hospitalization, cost-benefit analysis, economics, emergency service/hospital, patient readmission, ambulatory care (See Supplemental Table 1).

The PRISMA four-phase flow diagram detailing study selection is depicted in Fig. 1 (Moher et al., 2009). The initial search resulted in 3178 records (1199 after removing duplicates). One author screened the titles and abstracts of all 1199 original records and excluded articles including a sample other than patients with cancer, not referencing a CIM therapy as outlined by the National Health Interview Survey (NHIS) (Black et al., 2015; Clarke et al., 2015), not originally published in English, and/or not representing an original research project (i.e., reviews). Given the relatively small number of studies hypothesized to meet inclusion criteria, studies were not excluded based on their methodological design and control condition. In cases where multiple control conditions were present, analyses considered the more rigorous control condition. The full text versions of the remaining 240 articles were reviewed by one author and the 230 articles not including a measure of healthcare utilization were excluded, resulting in a final sample of 10 articles meeting all inclusion criteria.

2.2. Data extraction

The two authors independently completed data extraction for each article in accordance with a pre-established protocol. Data extracted from articles included: (1) identification of the manuscript (authors, year); (2) NHIS defined CIM intervention; (3) target of CIM intervention (emotional, physical, or financial outcome); (4) characteristics of participants (age, cancer diagnosis); (5) study design (cohort, cross-sectional, case-control, or randomized clinical trial); (6) measure of healthcare utilization; and (7) relationship between CIM intervention and healthcare utilization. For studies that included multiple measures of healthcare utilization, all outcome variables were included. Questions regarding the inclusion of data were discussed and resolved between authors.

2.3. Definitions of variables

Measures of CIM Interventions. CIM interventions were defined as those included in the Adult Alternative Medicine (Clarke et al., 2015) and Child Complementary and Alternative Medicine (Black et al., 2015) supplements of the NHIS (e.g., meditation, hypnosis, yoga, acupuncture, herbal/vitamin consumption, biofeedback, massage, mindfulness exercises). Studies using interventions not included in the NHIS (e.g., music therapy, supportive care, Korean medicine, etc.) were excluded. Given the diversity of potential CIM interventions, broad categories outlined by Barnes and colleagues (Barnes et al., 2008) were used to collapse intervention types. These included: alternative medical systems (e.g., Ayurveda), biologically based therapies (e.g., non-

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