

Original Article

Functional Impairments as Symptoms in the Symptom Cluster Analysis of Patients Newly Diagnosed With Advanced Cancer

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Abstract

Context. Symptoms and subsequent functional impairment have been associated with the biological processes of disease, including the interaction between disease and treatment in a measurement model of symptoms. However, hitherto cluster analysis has primarily focused on symptoms.

Objectives. This study among patients within 100 days of diagnosis with advanced cancer explored whether self-reported physical symptoms and functional impairments formed clusters at the time of diagnosis.

Methods. We applied cluster analysis to self-reported symptoms and activities of daily living of 111 patients newly diagnosed with advanced gastrointestinal (GI), gynecological, head and neck, and lung cancers. Based on content expert evaluations, the best techniques and variables were identified, yielding the best solution.

Results. The best cluster solution used a K-means algorithm and cosine similarity and yielded five clusters of physical as well as emotional symptoms and functional impairments. Cancer site formed the predominant organizing principle of composition for each cluster. The top five symptoms and functional impairments in each cluster were Cluster 1 (GI): outlook, insomnia, appearance, concentration, and eating/feeding; Cluster 2 (GI): appetite, bowel, insomnia, eating/feeding, and appearance; Cluster 3 (gynecological): nausea, insomnia, eating/feeding, concentration, and pain; Cluster 4 (head and neck): dressing, eating/feeding, bathing, toileting, and walking; and Cluster 5 (lung): cough, walking, eating/feeding, breathing, and insomnia.

Conclusion. Functional impairments in patients newly diagnosed with late-stage cancers behave as symptoms during the diagnostic phase. Health care providers need to expand their assessments to include both symptoms and functional impairments. Early recognition of functional changes may accelerate diagnosis at an earlier cancer stage. *J Pain Symptom Manage* 2013;46:500–510. © 2013 U.S. Cancer Pain Relief Committee. Published by Elsevier Inc. All rights reserved.

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Key Words

Cluster analysis, symptom, function, activities of daily living, cancer, newly diagnosed, advanced cancer

Introduction

In the late 1960s and early 1970s, the dedication and commitment of clinicians such as Twycross,¹ McCaffery,² and Foley³ led to an international movement that recognized that symptoms have to be assessed through patients' own accounts. Initially, clinical research focused on single symptoms. This focus, however, neglected the multiplicity of symptoms that patients experience. More recently, researchers explored the multiplicity and concurrence of patients' self-report of symptoms.⁴ Blesch et al.,⁵ for example, documented that increases in fatigue were associated with higher levels of pain and depression. Miaskowski and Lee,⁶ in a study among patients with osseous metastases undergoing palliative radiation therapy, found the triad of insomnia, pain, and fatigue to be concurrent and related. The findings of these and other seminal studies⁷⁻¹³ prompted Dodd et al.¹⁴ to offer the term "symptom cluster" to describe a group of three or more concurrent and related symptoms.

Since the addition of this term to the lexicon, several studies have focused on the identification of symptom clusters. Reyes-Gibby et al.¹⁵ have identified fatigue, pain, and depressed mood as a singular common cluster. Francouer,¹⁶ in a study of 268 patients who received radiation therapy for osseous metastases and home-based palliative care, identified four clusters: pain and fatigue, pain and weight loss, pain and fever, and sleep and fever. Each cluster was associated with depressed mood. In a sample of 1366 outpatients with different advanced cancers receiving palliative care, Cheung et al.¹⁷ identified two clusters. The first included fatigue, drowsiness, nausea, decreased appetite, and dyspnea and the second included anxiety and depression.

Symptom cluster research carries with it methodological challenges. For example, symptom clusters may differ depending on site and stage of disease and on treatment,^{18,19} hence samples need to be limited to homogeneous characteristics, such as common stages, and participants need to be

assessed in specific time frames, such as during active treatment or at the same time since diagnosis.²⁰

Another challenge to cluster research is that symptoms may affect patients' functional abilities.²¹ Symptom cluster research needs to account for this relationship. Miaskowski and Lee,⁶ for example, found that the symptom cluster of insomnia, pain, and fatigue had a consistent effect on patients' function. Specifically, the relationship of symptom clusters with stage of disease and function is important. Kurtz et al.,²² in an investigation on the effect of symptoms on the physical functioning of patients with advanced cancer, found that the levels of symptoms increased with advancing disease. More importantly, they found that the levels of symptoms predicted ($P = 0.002$) the patients' dependency on others for activities of daily living. In addition, levels of symptoms and more advanced stage of disease predicted ($P = 0.003$) the patients' immobility.

Impairment in activities of daily living may play an important role in the constellation of diagnostic symptomatology. For some patients, physical symptoms may be the first sign that an additional evaluation is needed to uncover a health care problem and determine a diagnosis. However, this is not always the case. Some people newly diagnosed with advanced cancer do not experience the common physical symptoms relied on to indicate further evaluation. Their first indication may be impairment in their ability to perform daily activities. McCorkle²³ has examined factors other than symptoms that may indicate a need for further evaluation and diagnostic work-up, especially patients' functional abilities.²⁴ Similarly, Cleland and Sloan²³ conceptualized that symptoms and subsequent functional impairment are most directly associated with the biological processes of disease, including the interaction between disease and treatment in a measurement model of symptoms.

Supported by the results of the previous work by McCorkle, we proposed to explore

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