Symptom Clusters

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Symptom experience following cardiac events and/or procedures is marked by the presence of multiple concurrent symptoms that may have a negative impact on daily activities and quality of life. Knowledge of the complex relationships between and among symptoms, as well as with clinical outcomes, is limited, especially for those recovering from cardiac events. Despite the knowledge that individuals are likely to experience multiple concurrent symptoms, most symptom research in cardiac patients has examined only individual symptoms.

Cluster analysis was introduced by Robert Choate Tryon in 1935. Today, it is a statistical analysis technique being used in many areas such as medicine, psychology, dentistry, and nursing research. Cluster analysis is a statistical data analysis tool that is used to cluster either subjects or symptoms or other selected variables. In nursing, it has been used to identify subpopulations of patients (patient clusters) that differ on selected variables such as symptoms. Identifying subpopulations of patients according to their symptoms is clinically important as it can be used to tailor nursing interventions or strategies based on the profile of symptoms. For example, subgroups of patients who have a high symptom intensity may need different symptom management strategies as compared with those patient profiles with low-intensity symptom ratings. Clustering of symptoms, as opposed to patients, can be used to identify which symptoms group together and is useful to design strategies or interventions for patients.

Theories Related to the Concept of Symptom Cluster. Several theoretical frameworks are available to guide symptom research. For example, the symptom management model from the School of Nursing, University of California–San Francisco, includes 3 components: symptom experience, symptom management strategies, and outcomes such as symptom status, functional status, and quality of life. The theory of unpleasant symptoms describes the attributes, antecedents, consequences, and the relationships between symptoms. Both models have been widely used to describe the symptom experience; however, a model built specifically for symptom cluster research has not been developed.

Evidence of Symptom Clustering. The concept of symptom cluster has been widely used in cancer research to describe the complex symptoms experienced by oncology patients. In addition to the development of diagnostic criteria for diseases and the identifications of potential mechanisms of diseases with unknown etiology, symptom clusters have an important role in predicting clinical outcomes such as health-related quality of life, functional status, cost, and self-care ability. Several studies have shown the association between symptom clusters and negative clinical outcomes. In contrast to symptom cluster research in oncology, few studies have been reported in cardiac populations, such as acute myocardial infarction, post–coronary artery bypass surgery, ischemic heart disease, and acute heart failure.

Measurement and Analysis Issues in Symptom Cluster Research. The measurement of symptoms is challenging because symptoms are subjective and multidimensional. Examination of multiple symptoms is even more challenging as it is difficult to capture all the dimensions and levels of intensity for each symptom. Barsevick has described 3 methods for symptom cluster analysis: factor analysis, cluster analysis, and path analysis. Choice of method depends on the purpose and objectives of the study. For example, path analysis helps to uncover the mechanism that “clusters” symptoms together and predicts the direction of relationships between symptoms. Cluster analysis, on the other hand, categorizes patients by similar symptom profile,
which may be an advantage in prioritizing symptoms and tailoring interventions to subgroups with a greater number and severity of symptoms. Kim and Abraham recommended using graphic modeling to explore the potential types and directions of relationships between symptoms. Cluster analysis is then used to construct the symptom cluster model, and finally, structural equation modeling is used to test the model.

One important decision in cluster analysis is whether to use the same cutoff score for all symptoms versus individual symptom-specific cutoff scores to divide patients with similar symptom profile into clustered subgroups. Given et al found that individual symptoms had different cutoff scores that represented different severity categories. They suggested that use of cut points for each symptom would be a better predictor of the degree of interference of these symptoms on patients’ daily life.

In summary, symptom cluster research is in its early developmental stage. The gaps in science are related to conceptual, methodological, and analytical issues. It will be necessary to address these issues to advance the science. Knowledge related to symptom clusters in populations other than cancer patients is minimal, and future research is warranted in other populations such as cardiovascular. This series of articles is designed to demonstrate the use of clustering symptoms in predicting outcomes in cardiovascular populations, specifically heart failure and coronary artery bypass patients.

REFERENCES