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THEORETICAL ARTICLE

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Symptom clusters: Revisiting the concept in nursing care for cancer patients

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Abstract

Background: Studies on symptom clusters among cancer patients have been conducted intensively. However, the concept seems not to be well defined, hindering its utilization in clinical practice.

Aim: The aim of this paper is to reconceptualize symptom cluster and discuss areas of future research.

Results: A cluster of symptoms should not be viewed as simply as a group of symptoms appearing together. It should be clinically relevant, and symptom members should be interactive or have a mutual etiology. A cluster is declared as stable if its "quality" or "nature" is remained instead of merely having the same number of symptoms. Importantly, each symptom cluster should have a sentinel symptom. The sentinel symptom could be the one that predicts the presence of the cluster or could be the one that significantly interacts with other symptoms. The search for symptom clusters, which are common among various patient groups, might be helpful in some aspects. However, to better understand them, symptom clusters should be examined in specific populations.

Conclusion: The nature of the relationship between symptom members, clinical relevance, sentinel symptom, stability, and prevalence are important features of a symptom cluster. More explorations into these properties by future studies are suggested.

1 | INTRODUCTION

Symptom management in oncology care is challenging because cancer patients usually suffer from multiple co-existing symptoms.[1,2] Therefore, nurses nowadays are shifting from considering symptoms as individual occurrences to treating them as a group, or symptom clusters. Dodd et al.[3] first described a cluster of symptoms as a group of at least three concurrent symptoms that interact with each other. In 2005, Kim et al.[4] published a concept analysis on symptom clusters. Although a definition of symptom cluster was proposed, the concept is still emerging and the authors left many unanswered questions for nurse researchers and theorists to address. For example, there is no consensus on whether the symptoms within a cluster should necessarily share a common etiology, on whether a certain symptom should be shared by a few clusters at the same time, on how long the symptoms in a cluster remain together, or on the statistical methods used for researching symptom clusters.[4,5]

A typical question about symptom clusters is how the concept could help nurses to improve their practice. In other words, what nurses could do, in both symptom assessment and symptom management, if they learned that certain symptoms always come together or if one symptom could be a predictor of others in the cluster. Up until now, numerous articles on symptom clusters have been published. However, more work is needed to reconceptualize the concept of symptom clusters, which can make it more meaningful in real nursing practice. This article is an attempt to address those issues. It is believed that the findings of this review would be useful for further empirical study and theoretical investigations on the concept of symptom clusters.

2 | THE CONCEPT OF SYMPTOM CLUSTER

A review of the literature shows that the definition of symptom clusters is still unclear. Miaskowski et al.[6] proposed that symptom clusters, symptom constellation and the co-occurrence of symptoms are synonyms. However, the most common term used in the literature is symptom cluster. Lacasse and Beck[7] declared "a symptom cluster includes two or more acute or chronic symptoms that are related and co-occur with moderate to severe intensity and distress." According to Molassiotis et al.,[2] "a symptom cluster (is) two or more symptoms that are clinically meaningful together, relate to each other at a given time, and share a significant variance with their cluster."

Similarly, Aktas et al.[8] argued, "a symptom cluster may be defined as two or more concurrent symptoms that occur together with a high degree of predictability; symptoms within a cluster should have a stronger association with each other than with symptoms in different clusters." Proposing an analysis of the symptom cluster concept, Kim et al.[4] described it as, "consist[ing] of two or more symptoms that are related to each other and that occur together. Symptom clusters are composed of stable groups of symptoms, are relatively independent of other clusters, and may reveal specific underlying dimensions of symptoms." Ferreira et al.[9] stated, "a better definition for symptom cluster is that it is a group of concurrent symptoms that may have a synergistic effect as a predictor of patient outcome…"

In short, many definitions have been proposed but there are two general agreements among scholars. First, a symptom cluster is a group of concurrent symptoms. Second, symptoms within the cluster are interrelated. However, the question raised is how would knowledge about symptom clusters facilitate nursing practice? The current literature identifies several issues which would be critical attributes of these concepts. They are stability, commonality, clinical relevancy, presence of sentinel symptoms, and the relationship among symptom members. The following sections are a description of those characteristics and how they would be applied in nursing care for cancer patients.

2.1 | Stability

One of the common questions about a symptom cluster is about its stability. The stability of a symptom cluster reflects the extent to which it remains longitudinally. For example, Molassiotis et al.[2] assessed symptom clusters four times: shortly after diagnosis, 3 months, 6 months, and 1 year after diagnosis. It was demonstrated that while some clusters (i.e., a cluster of mouth sores, dry mouth, and changes in taste of food) occurred at only one time in assessment, some others appeared consistent from the first to the last assessment. The authors have also proposed criteria to judge the stability of a cluster. According to Kirkova and Walsh,[10] at least 75% of the symptoms within a cluster should occur in the following assessment. Additionally, the most important symptoms of the cluster must be present to remain a cluster.

2.2 | Commonality

Commonality means the cluster remains consistent across subjects. It is asserted that some subgroups of cancer patients may have the same symptom clusters.[11] To detect symptom clusters, many researchers examined a group of patients with mixed cancer sites and stages,[12,13] whereas others tried to examine patients with specific cancer sites, such as lung or breast tumors.[14,15] Those practices implied that some authors assumed that symptom clusters were similar across cancer types and stages. In contrast, others believed that the occurrences of symptom clusters varied among subjects.

2.3 | Clinical relevancy

According to Kirkova et al.,[16] symptom clusters can be either "clinically predefined" or truly "statistically defined." In fact, many researchers reported symptom clusters based solely on statistical tests. However, others refused that approach. It is believed that symptom clusters must be clinically relevant. Walsh and Rybicki[13] used the term "face validity," "clinical relevance," and "credibility" to explain the practical soundness of symptom clusters which have been statistically established.

Molassiotis et al.[2] even state that a symptom cluster is "two or more symptoms that are clinically meaningful together." By this definition, clinical relevancy is one of the vital characteristics of a cluster. For example, these researchers described the cluster of constipation and feeling drowsy as clinically irrelevant. Thus, they refused to recognize the cluster despite statistical contradictions. In agreement, Henoch et al.[17] rejected the existence of the cluster of anxiety, breathlessness, and fatigue found in their study because it did not seem to be clinically relevant and it was not supported by previous studies.

2.4 | Presence of sentinel symptom(s)

Within the cluster, there are core or sentinel symptom(s) while others are secondary symptoms of the cluster. Molassiotis et al.[2] described that during the first year after a cancer diagnosis, some symptom clusters remained stable. However, within the cluster, there were some symptoms that always appeared whereas the rest changed over time. It was further argued that the remaining core symptoms are the criteria of the stability of the cluster across times and populations. Importantly, Barsevick et al.[18] emphasized that the key symptoms of a cluster could interact, leading to the occurrence of other symptoms or magnifying the functional disturbance.

However, the criteria to select the most important symptom of the cluster are not clear. Kirkova et al.[19] used the term "sentinel symptom" as a way to refer to the most prevalent symptom within a cluster. Brown et al.,[20] on the other hand, defined a sentinel symptom as "a co-occurring indicator or marker of the presence of a symptom cluster" (p. E427). According to Lacasse and Beck,[7] sentinel symptoms of a cluster are "the most problematic symptoms or a trigger symptom that may lead to the development of other related symptoms" (p. 108).

2.5 | Relationship among symptoms of the cluster

Symptoms within a cluster are interrelated.[3] According to Miaskowski et al.,[6] symptoms can be associated with each other, firstly, via a mutual mechanism or etiology; second, via a shared common variance; and lastly, via the negative outcomes these symptoms produced. Currently, researchers are using all of these three approaches to group symptoms.

Walsh and Rybicki[13] found that, interestingly, although the co-occurrences are criteria to cluster symptoms, the most prevalent symptoms such as depression, insomnia and fatigue do not cluster. They suggested that symptoms may cluster due to the underlying mechanism; symptoms in a cluster are not merely in coexistence. Ferreira et al.[9] believed that the level of interleukin–6 was an underlying biological mechanism of the relationship between low cognitive functioning, high insomnia, and high fatigue. Similarly, Cleeland et al.[21] hypothesized that pro-inflammatory cytokines partially determine the cluster of cognitive impairment and depression, fatigue, pain, and anxiety. There were also possible genetic factors that had an impact on the occurrence of vomiting and nausea in patients with cancer.[22]

In another perspective, symptoms in the cluster are grouped if their scores are significantly and statistically associated.[6] Currently, this is the most common way of clustering symptoms in literature. However, the results would be confounded by the dimensions of symptoms (intensity, frequency, or distress and occurrence score) and the statistical methods that are deployed. For example, Molassiotis et al.[23] reported that the cluster of appetite loss, dry mouth, and nausea was determined by symptom prevalence. Nevertheless, by examining severity, only nausea and appetite loss form a cluster. However, other researchers found that some clusters still appear regardless of the dimensions (intensity or occurrence score) utilized.[12]

In the third perspective, some researchers assumed that symptoms would form a cluster because they provide negative synergistic outcomes. For example, Fox and Lyon[14] proposed an interesting way of grouping symptoms into a cluster. The researchers investigated the impact of pain, fatigue, and depression on the quality of life of lung cancer patients. The pain was associated with fatigue but it did not relate to patient quality of life. In contrast, both fatigue and depression showed significant relationships with quality of life. The authors selected fatigue and depression and excluded pain from the cluster. It was asserted that pain and fatigue could not be clustered merely because that they are closely interrelated whereas fatigue and depression formed a cluster because they were related to the quality of life. In agreement, Ferreira et al.[9] firmly demonstrated that symptoms cannot be clustered if they do not provide any synergistic impact on patients' outcomes.

3 | DISCUSSION

The most important concern of a symptom cluster seems to be its clinical relevance. In the literature, it is not rare to see a cluster of symptoms, which appears to be "unexplainable" to the existing common knowledge of clinicians. In other words, such a cluster of symptoms is truly statistical but clinically irrelevant. Obviously, the ultimate goal of nursing studies is to enable nursing practice. Without clinical relevancy, the identified symptom cluster would not be of necessary concern for nurses. Therefore, this paper strongly advocates that symptom clusters should be thought of as a group of interactive symptoms.

In addition to clinical relevance, symptom clusters would also be a group of symptoms that share common etiologies. It would be fruitful for researchers to seek a common etiology of a cluster because that would help nurses control multiple symptoms through their interventions. Moreover, symptom clusters should be viewed as a group of symptoms which provide negative synergistic impacts on patients' outcomes. This perspective may be helpful to understand the negative consequences of multiple symptoms. However, there is no existing framework guiding nurses to judge the clinical relevancy of a symptom cluster. It is also not clear whether a symptom should be clinically predetermined and then statistically confirmed, or vice versa. Further examinations on these issues would be a great contribution to the development of symptom cluster studies.

Questions have been raised in regard to how long the symptoms need to simultaneously occur so that the cluster is viewed as stable.[4] In fact, since symptoms are dynamic, it may not be realistic to expect all symptoms to remain in the cluster longitudinally. Kirkova and Walsh[10] required at least 75% of the symptoms within a given cluster to occur in the next assessment to remain such a cluster. However, if the clinical relevancy of a symptom cluster is important, it is recommended that researchers should not be concerned with the number of symptoms but with whether the "nature" or "quality" of the cluster still remains when judging the stability of a certain cluster. Cluster members should share the same pattern of interaction with each other or share the same underlying mechanism.

It would be promising to seek frequently occurring clusters, which appear across populations. That would facilitate strongly nursing assessment and intervention. However, since symptom experience is highly individual and is influenced by various factors, it seems infeasible to seek for a symptom cluster that occurs consistently across patients' profiles. More importantly, to thoroughly understand the symptom cluster, the associations between symptoms or their common mechanism should be carefully investigated. Therefore, this paper recommends researchers focus on examining symptom clusters in particular populations rather than on general or heterogeneous populations.

Understanding sentinel symptoms of a cluster would revolutionize the concept of symptom clusters. It is believed that the identification of the key or sentinel symptoms of the clusters would enhance symptom assessment and management. Knowledge toward sentinel symptoms helps symptom assessment become more comprehensive, brief, and time conservative.[19] Treatments for symptoms would be prioritized better to meet patients' needs by focusing on the key symptom(s) of the cluster.[7] However, more research is needed to clarify the idea of sentinel symptoms.

4 | CONCLUSION

In conclusion, the ultimate goal of research on symptom clusters is to assist nursing assessment and the management of symptoms for cancer patients. This paper examines the reconceptualization of symptom clusters to make it more applicable in real nursing practice. A cluster should not be viewed solely as a group of symptoms appearing together. Members of a symptom cluster should interact with the others or have a common etiology. A cluster of symptoms is declared as stable if its "quality" or "nature" rather than its certain members is maintained. To be more practical for nurses, symptom clusters should have sentinel symptom(s). For symptom management and assessment purposes, sentinel symptoms should be the ones which interact significantly with other members or the ones predicting be presence of the cluster. Most importantly, this paper urges a call for a framework to determine the clinical relevancy of symptom clusters. Results from this study would be directions to advance the scientific state related to this concept. Further studies on this subject are highly recommended.

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DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no data sets were generated or analyzed during the current study.

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