FROM THE CO-EDITORS

Precision Health Symptom Science in Oncology Nursing

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Precision health symptom science research can potentially inform personalized approaches to symptom management.

Precision health is an emerging approach to predicting, preventing, treating, and managing disease (Centers for Disease Control and Prevention, 2024). Precision health research aims to understand the contributions of behavior, biology, and the social and environmental context to a person's health (Fu et al., 2020; Hickey et al., 2019). Studies in this field often involve the analysis of genetic and -omic (i.e., genomic, proteomic, and metabolomic) data alongside clinical, environmental, and patient-reported outcomes data (Fu et al., 2020; Harris et al., 2023). The evidence gained from this research is used to develop and deliver optimized interventions and to inform policy changes to meet the unique needs of individuals.

Precision health symptom science is concerned with interindividual variability in the symptom experience. Oncology nurse scientists have emerged as leaders in this field (Miaskowski et al., 2017). Nurses in the clinical setting have observed that patients who receive the same treatment for the same diagnosis may experience certain symptoms to a lesser or greater extent. Oncology nurse scientists use person-centered analytical approaches, such as latent class analysis, to characterize subgroups with distinct symptom experiences. Results of these studies have identified subgroups with a consistently low, moderate, or high symptom burden, or an increasing or decreasing symptom burden. Comparing the demographic, clinical, and biologic characteristics of patients with a high or increasing symptom burden

to those with a low or decreasing symptom burden facilitates the identification of potential risk factors for adverse symptom experiences.

A goal of precision health symptom science research is the reliable prediction of patients' symptom burden to optimize robust symptom management strategies across the cancer care trajectory. Another goal is to describe the biologic underpinnings of symptoms and use this information to develop novel approaches to symptom management (McCall et al., 2018). Knowledge related to genetics and -omics is expanding rapidly, giving oncology nurse scientists an unprecedented opportunity to identify biologic factors that may drive interindividual variability. Precision health symptom science research can potentially inform personalized approaches to symptom management interventions and nursing care.

In this special issue, we sought to feature articles representing the cutting edge of precision health symptom science. Two articles in this special issue describe studies that aim to characterize subgroups of patients with distinct symptom experiences. In a study of 1,338 patients with heterogeneous cancer types receiving chemotherapy, Shin et al. (2024) identified four subgroups of patients with distinct experiences of cough. In a separate analysis of data from these patients, Singh et al. (2024) identified three subgroups of patients with distinct experiences of chemotherapy-induced vomiting. In both studies, having a lower annual household income was a risk factor for membership in the subgroups with the highest symptom burden. A study by Seven et al. (2024) found that health behaviors (i.e., fruit and vegetable consumption and weight) and social determinants of health (i.e., race) were associated with cortisol levels, and quality of life (i.e., symptom domain) was associated with interleukin-6 levels

among non-Hispanic Black and Hispanic cancer survivors. This study may inform intersectional approaches to addressing the complex interaction of biopsychosocial health determinants to mitigate health disparities.

Three articles aim to identify genomic characteristics associated with adverse symptom experiences. In 116 postmenopausal women with early-stage hormone receptor–positive breast cancer, Davis et al. (2024) assessed associations between candidate genes from the nuclear factor E2-related factor 2 antioxidative response elements signaling pathway and the occurrence and severity of cancer-related fatigue. Grayson et al. (2024) assessed associations between DNA copy number alterations and psychoneurologic symptom occurrence and severity in 201 patients with metastatic breast cancer. Sheng et al. (2024) assessed associations between single nucleotide polymorphisms for neurotransmitter genes and preoperative palpitations in 398 patients scheduled for unilateral breast cancer surgery. Their findings suggest that specific genotypes are associated with higher odds of cancer-related fatigue, more frequent and severe psychoneurologic symptoms, and palpitations, respectively.

Oncology nurse scientists are at the forefront of precision health symptom science research. Future directions in the field include the development and evaluation of scalable approaches to screening patients for risk for a high symptom burden and targeted strategies for tailored symptom management. Research that describes the influence of environmental factors on biology (i.e., epigenetics) and the association between social and environmental factors and symptom experience is also warranted. Crucially, there is a need to ensure future work is grounded in data representative of the population to ensure that advances in precision health do not simultaneously exacerbate racial and socioeconomic disparities in cancer outcomes.

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