CHRONIC PAIN in BREAST CANCER SURVIVORS: The link between nutrition and pain

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ABSTRACT OF THE RESEARCH

Even with improved survival rates, many cancer survivors face long-term complications, with chronic pain being one of the most common. Notably, 22% of breast cancer survivors (BCS) report chronic pain post-therapy, with severe pain being more prevalent than moderate pain even five years after treatment. Chronic pain in BCS is complex and often poorly understood, making effective management challenging. While nutrition has been shown to influence pain processing in other chronic pain conditions, it remains underexplored in this population. Addressing nutrition-related mechanisms could offer a sustainable, cost-effective, and integrative approach to pain management in BCS.

This thesis aims to explore the link between pain and nutrition, investigating whether nutrition can serve as a modality in comprehensive pain management for BCS. Understanding this complex interaction and its underlying mechanisms could inspire new strategies and optimize existing treatments, particularly those incorporating nutrition-related factors.

Part one provides an overview of the current literature on the interaction between nutrition and chronic pain in cancer patients and survivors, identifying gaps for future research. Chapter one systematically reviews the relationship between nutrition and chronic pain in cancer populations, revealing limited documentation and the need for further study. Chapter two examines mechanisms of chronic pain, focusing on obesity, malnutrition, nutritional deficiencies, diet quality, immune function, systemic inflammation, and gut microbiota, and how these factors interact with the diet of cancer survivors. The narrative review concludes that nutrition holds potential not only for cancer prevention but also as a modality for chronic pain management in cancer survivors.

Part two investigates whether overall energy intake, macronutrient and micronutrient intake, and body composition are associated with pain in female breast cancer survivors, and whether these factors differ among pain subgroups. The study found that neuropathic pain in breast cancer survivors relates to several components of body composition, that pain appears to be associated with protein percentage and water content to some extent. Chapter four examines differences in diet quality and dietary intake between breast cancer survivors (BCS) experiencing chronic pain and healthy controls (HC). It also aims to understand the associations between dietary elements and pain-related outcomes within the BCS group. Despite no overall differences in diet quality, BCS with chronic pain consumed more anti-inflammatory nutrients than HC. Complex correlations between specific dietary components and pain outcomes emphasize the need for further research to explore these links for chronic pain management in BCS.

Part three delves deeper into the relationship between dietary variables and chronic pain by examining changes in glucose metabolism. Chapter five investigates differences in postprandial glycaemic response (PPGR) to beverages with varying glycaemic indices (low and medium) between BCS with chronic pain and HC, and explores the potential link between PPGR and pain-related outcomes in BCS. The findings suggest that medium glycaemic index beverages elicit significantly higher blood glucose responses in BCS, with impaired glycaemic responses potentially linked to pain sensitivity and endogenous analgesia. The pronounced glycaemic response to sucrose (a medium glycaemic index beverage) and the greater reduction in PPGR with isomaltulose (a low glycaemic index beverage) substitution highlight the importance of lower glycaemic index dietary choices in managing glycaemic regulation in BCS with chronic pain.

Overall, this thesis provides valuable insights for researchers, healthcare professionals, and cancer survivors, potentially informing new approaches to chronic pain management in BCS. It underscores the need for further exploration of the role of nutrition in chronic pain and offers a foundation for developing integrative strategies to improve patient outcomes.

CURRICULUM VITAE

Sevilay Tümkaya Yılmaz graduated as a physiotherapist from Dokuz Eylül University, Türkiye, in 2012. After graduation, she worked in clinical practice until 2016. In 2015, she was awarded a prestigious scholarship by the Republic of Türkiye Ministry of National Education to pursue her master's and doctoral degrees abroad. She completed her master's degree in Physiotherapy – Advancing Musculoskeletal Practice in 2017 at the University of Nottingham, UK. In 2019, she also became an osteopath after studying at the Turkish Institute for Adapted Osteopathy, Türkiye. In 2018, Sevilay began her PhD research program at Vrije Universiteit Brussel, focusing on chronic pain, with a particular emphasis on breast cancer survivors. Sevilay has (co)-authored 17 publications in peer-reviewed journals, with one additional manuscript currently under review. She has presented her research findings at various international conferences and delivered workshops on chronic pain and nutrition. Sevilay is dedicated to advancing the understanding and treatment of chronic pain, aiming to make meaningful contributions to the lives of patients, especially breast cancer survivors.