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Predicting the trajectories of post-surgical pain: the role of biopsychosocial factors

by

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ABSTRACT

Post-surgical pain is a major health issue from the perspective of patients, health professionals and the society as a whole. This thesis has the aim to identify psychological and psychosocial variables associated with chronic post-surgical pain, and to understand how these factors influence pain trajectories over time.

In the first chapter, complexity of post-surgical pain is explored. Starting from the definition of this phenomenon, conceptualization by the biopsychosocial model is presented. To understand how predictors at different levels might influence the patient's pain experience, pathophysiology of post-surgical pain is scrutinized, with a particular focus on the physiological substrate that can explain how psychological and psychosocial predictors can influence pain perception and modulation. Physiological, psychological and social risk factors for post-surgical pain are then presented. For each, potential mechanisms explaining association with this phenomenon are reviewed and discussed.

The second chapter presents a systematic review of the literature with meta-analysis on psychological and psychosocial risk factors of chronic post-surgical pain. Methodological adjustments were adopted to ensure that the synthesis of research results was based on a comprehensive sets of studies, and to take into account the effect of non-significant estimates in case they were not reported by original studies. After a selection from 6329 records, 63 articles were included in a narrative synthesis and 34 studies were employed to perform a meta-analysis. The narrative synthesis of the literature showed that evidence about the effect of psychological predictors is heterogeneous, with few predictors, such as optimism, mental health and surgical fear, consistently associated with chronic post-surgical pain. In contrast, the meta-analysis showed that depression, anxiety, catastrophizing and, to a lesser extent, kinesiophobia, optimism and self-efficacy, have a weak but significant association with chronic post-surgical pain. Results are discussed in the context of the available literature.

The third chapter presents the results of a longitudinal prospective study aimed at describing individual trajectories of pain intensity in patients who underwent knee or hip arthroplasty. The focus of this study was the analysis of pain as a process and in its relationship with central sensitization processes,

executive functions and trait and state psychological variables. This study was performed with 145 patients listed for surgery at the hospital Humanitas Pio X, which were asked to complete a pre-surgical assessment, to fill a pain diary during the first seven days after surgery and to provide data about their pain after one and three months from surgery. Statistical analyses were performed employing a multilevel growth curve analysis for acute pain trajectories and multiple regressions for follow-up data. Multiple imputation procedures were employed to account for missing information. Results showed that, after controlling for sex, surgical procedure and pain intensity, central sensitization was a predictor of the intercept of pain trajectories, scores on the Trail Making Test Part B were associated with their slope, and that daily post-surgical catastrophizing was a significant covariate of pain intensity. Analyses of follow-up data confirmed the predictive role of central sensitization and showed that emotional distress, along with executive functions, is related with pain intensity and interference. Finally, research and clinical implications of the findings of these studies are discussed.