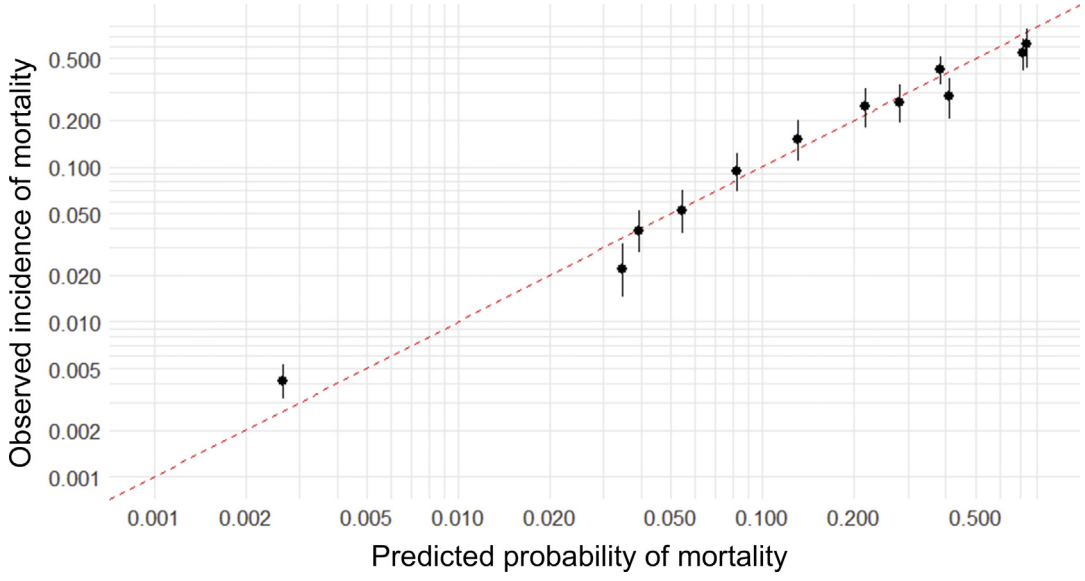

Fig. 1. Observed incidence of mortality *vs* calibrated predicted probability of mortality amongst patients in the test set (n=19 394). Predicted probabilities have been calibrated by applying the histogram binning technique in the validation set.

the increased incidence of death in the updated dataset. Our novel deep-learning model performed similarly to several comparison models, as indicated by the overlapping confidence intervals for area under the receiver operating characteristic curve and area under the precision-recall curve. The similarity in performance among the various models is qualitatively unchanged from the originally published results. It is easy for data quality issues to arise, particularly when large volumes of data are used or when datasets created for other reasons are repurposed for research use. Although the issue that we found did not lead to patient harm, similar issues in other clinical decision support situations may cause clinicians to take inappropriate actions that do lead to patient harm. Vigilance regarding data quality is a key step in machine learning, and this process does not stop once a model has been trained. Models intended for use in the clinical space must be continuously re-evaluated and updated. In our case, reusing a dataset for multiple analyses exposed a systematic error in outcome labels. A key takeaway from our experience is that incomplete labelling of the target variable can impair the performance of prediction models, even when robust analytic methods are applied.

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Declarations of interest

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Nutritional factors in chronic musculoskeletal pain: unravelling the underlying mechanisms

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Keywords: chronic pain; diet; inflammation; microbiome; musculoskeletal pain; nutrition; obesity

Editor—In a previous editorial, which focused on the importance of the link between nutritional neurobiology and central sensitisation in patients with chronic pain,[1] we proposed a diet-induced neuroinflammation model as a possible mechanism of chronic pain. It is essential to understand the role of nutritional factors such as diet and dietary patterns in this interaction between nutrition and neuroimmune activation. Here, we discuss the role of diet and dietary patterns in chronic musculoskeletal pain.

Lifestyle factors such as stress, poor sleep, obesity, and an unhealthy diet are gaining more attention within chronic musculoskeletal pain management.[2] These factors can influence the pain experience to an extent that under the same biological conditions, patients report different pain outcomes. Hence, clinicians often struggle to manage chronic musculoskeletal pain in clinical practice. Integrating lifestyle factors within an individually tailored multimodal treatment is a promising strategy to improve care in these patients. Here, we focus on the role of nutrition within such an individually tailored multimodal treatment plan for patients with chronic musculoskeletal pain. Nutrition is a factor that has received little attention in pain research so far, but which has great potential to become a key element in pain management. The WHO highlighted the importance of diet in relation to chronic disease management: 'Nutrition is coming to the fore as a major modifiable determinant of chronic disease, with scientific evidence increasingly supporting the view that alterations in diets have strong effects (both positive and negative) on health throughout life'.[3]

Nutrition is an essential part of musculoskeletal well-being. Unhealthy dietary behaviours and poor diet are suggested to predict, perpetuate, or underlie a variety of chronic musculoskeletal pain conditions.[4] For instance, obesity, excessive calorie intake, and diets high in sugar, fat, sodium, and/or caffeine are often observed in patients with chronic pain.[5] Additionally, low intake of several vitamins (e.g. A, B12, D, E, K), calcium, magnesium, and folic acid, among others, are suggested to contribute to chronic musculoskeletal pain.[6] These observations fuel the need for nutritional intervention studies. Yet, few experimental studies have investigated the possible effects of changing dietary patterns in patients with chronic musculoskeletal pain. The limited available evidence suggests pain relieving effects of plant-based dietary patterns.[7] For instance, a vegan diet resulted in pain relief in people suffering from fibromyalgia (compared with an omnivorous diet)[8] and in people with rheumatoid arthritis (uncontrolled study).[9] Another uncontrolled study found positive effects of a lacto-ovo vegetarian diet on pain intensity in patients with chronic musculoskeletal pain.[10] These positive effects often disappear when changing back to the former dietary pattern.

The potential of plant-based diets to decrease pain intensity may be explained by an increase in healthy eating behaviour. So far, the main explanatory mechanism for dietary induced neuroimmune activity resulting from plant-based diets is its positive and/or possible anti-inflammatory effect on the gut microbiome.[1] Poor nutrition is associated with increased biomarker levels of peripheral and central inflammation. Increased peripheral and central immune activity might cause aberrant glial activity leading to chronification and amplification of pain.[1] Conversely, Mediterranean, vegan, and vegetarian diets are inversely associated with inflammatory biomarkers and are more in line with the dietary recommendations for healthy eating compared with the omnivorous diet.[11] Additionally, poor nutrition can cause changes in the gut microbiome that result in systemic and central nervous system inflammation which can in turn lead to pain chronification and amplification.[12] Plant-based diets contain high dietary fibres, mono- and polyunsaturated fatty acids, plant-derived proteins and polyphenols, and may therefore play an important role in protecting the stability and diversity of the gut microbiome. Therefore, application of plant-based diets might alleviate pain by influencing the gut microbiome in a positive way, which may eventually reduce systemic and central inflammation.

Besides plant-based diets, calorie-restricted diets also show great potential, but specifically among overweight and obese patients having chronic musculoskeletal pain. For example, within obese or overweight people suffering from chronic osteoarthritis pain a calorie restricted diet can induce analgesia.[13] Besides the weight loss, and thus the decrease in load on the affected joints, positive effects can also be attributed to the positive association between pain severity and fat and sugar intake.[14] In addition, calorie-restricted diets can lead to a decrease in fat mass. Therefore, the low-level inflammation that is induced by the release of proinflammatory cytokines by adipose tissue may be decreased or even reversed.[15]

In conclusion, although dietary behaviour and diet are suggested to be associated with chronic musculoskeletal pain, the mechanisms behind this interaction are still unclear and need to be explored. Investigating the proposed role of nutrition in this population will provide new perspectives on how to include nutritional assessments, advice, and interventions within chronic musculoskeletal pain management. Therefore, there is a need for high-quality (experimental) research unravelling the underlying mechanisms enabling nutrition to be integrated as a part of chronic musculoskeletal pain management.

Declarations of interest

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Adductor canal or femoral triangle block: not a conundrum but a continuum. Comment on Br J Anaesth 2020; 124: e194–5

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Keywords: adductor canal block; femoral triangle block; postoperative analgesia; regional anaesthesia; ultrasonography

Editor—We read with great interest the letter by Sondekoppam and colleagues[1] redefining adductor canal block and femoral triangle block. We congratulate the authors for underlining how a very thin borderline exists between these two techniques, and how they can overlap each other in relationship to anatomical continuity, which makes differentiation of adductor canal block and femoral triangle block difficult.

We strongly agree with the statement: not by chance, we already described the continuity between the two techniques.[2] When an injection is performed close to the superficial femoral artery (SFA) in the 'true adductor canal', it can result in local anaesthetic spread that extends cranially towards the femoral triangle,[2] but also distally towards the adductor hiatus and potentially to the popliteal fossa.[3] As the authors suggested, we also believe that the SFA represents the continuity between those compartments, better than fasciae or muscles.

Based on these anatomical considerations, we must be aware that local anaesthetic could spread cranially when injected in proximity of the SFA, and thus lead to an undesired femoral nerve block. In the same way, as described by Wong and colleagues,[3] a distal adductor canal block could result in local anaesthetic spread towards the popliteal fossa, where the popliteal plexus and the sciatic nerve lie.[4] This relationship of continuity can be evaluated with ultrasound: the soap bubble[2] and the inverse double bubble signs[5] are previously described sonographic endpoints which in our and others' experience correlate with successful block. These signs can be used to follow local anaesthetic spread proximally along the entire thigh length.

Regardless of the anatomical level of the block, we suggest searching for these signs in real time during block execution and interrupting injection before local anaesthetic reaches the inguinal crease to avoid inadvertent femoral nerve block. We