the initiation (High (120-199 MME/day): aOR: 34.81, 95%CI: 18- 78.05, p<0.001 compared to mean daily MME: Low (<50 MME/day)) were associated with higher risk of long-term opioid use. The three most important variables using the random forest model were mean MME/day at initiation (MDA 140), history of suicide and self-harm (MDA 40) and IMD (MDA 30).

Conclusion: Almost 1 in 4 patients with fibromyalgia starting opioids became a long-term opioid user in this nationally representative dataset across the UK within the first year. The dose of initial opioid prescription, high deprivation score, history of suicide and self-harm, substance use disorder and obesity were associated with long-term opioid use.

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OP0198 UNSUPERVISED MACHINE LEARNING FOR PATIENT CLUSTERING IN CHRONIC REFRACTORY PAIN SYNDROMES AND FIBROMYALGIA: RESULTS FROM A MULTIMODAL TREATMENT PROGRAM

Keywords: Artificial intelligence, Fibromyalgia

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Background: Chronic Pain Syndromes (CPS), including fibromyalgia (FM), place a significant health and socioeconomic burden. Despite sharing a similar clinical presentation, they are a heterogeneous entity, often with different causes and in association with other conditions. Multimodal treatment programs allow a comprehensive clinical and physical assessment of those patients.

Objectives: The objective of this study is to identify subtypes in CPS patients including primary and secondary FM who were assessed during a two-week multimodal pain management program via an unsupervised machine learning model.

Methods: We collected data from 202 patients as part of a 2-week multimodal pain management program. Clinical features, comorbidities, medications and demographics were collected and patients were assessed by physical and mental questionnaires (e.g. BPI, FABQ, FABQ-W, POAM, HAS, HDS, PCS, TAMPA, OD) before and after the program. There was a weekly interdisciplinary case discussion between rheumatologists, pain specialists, psychiatrists, physiotherapists and occupational therapists. For data analysis, hierarchical agglomerative clusters were generated using the Ward variance minimization algorithm with Euclidean pairwise distances (Python 3.10). The number of clusters was selected by inspecting visualizations (including dendograms and radar plots), in combination with clinical interpretability and utility.

Results: Five patient subtypes with the following characteristics were identified: Cluster 1: Obese men with persisting peripheral and axial musculoskeletal pain, sometimes with an underlying immune-mediated disorder (IMD), poorly responding to disease modifying therapy. Bland psychological evaluation. *Clinical interpretation:* predominantly men in the late 50s. Possibly secondary FM, and/or underlying microcrystalline disorder or inflammatory osteoarthritis. Very closed to psychiatric evaluation or therapy. Cluster 2: Female patients with peripheral and axial pain since childhood or adolescence, sometimes with a post-traumatic stress disorder. Severe sleep problems. *Clinical interpretation*: primary FM, sometimes with an additional traumatic psychological background. Cluster 3: Women with chronic back pain, often with previous (failed) spine surgery. Normal weight. Often polymedication with opioids, antidepressantsants. *Clinical interpretation*: women with lumbar disc degeneration. Sometimes questionable spondylarthritis with refractory lumbar pain despite treatment with biologics. Cluster 4: Patients (men>woman) of younger age with low BMI and hyperlaxity. Peripheral pain of nociplastic character predominates, often since childhood or adolescence. High incidence of depression, anxiety or other psychological conditions. Virtual reality treatment is efficient. *Interpretation:* somatoform pain in younger patients spilled over from adolescence, often with substantial psychiatric comorbidity. Cluster 5: Overweight women in peri-menopause with metabolic syndrome. Axial and peripheral pain. Often use of antidepressants, notably Trazodone. Blood sedimentation rate can be elevated. *Interpretation:* peri-menopausal syndrome in obese patients with pain and low grade inflammation such as bursitis or tenosynovitis.

Conclusion: All five chronic pain phenotypes identified by unsupervised machine learning are consistent with clinical observations. Psychiatric comorbidities are prevalent in all clusters except one, where they may be suppressed. Work disability plays an important role in all patients. In at least two clusters, the pain seems to have its origin in childhood or adolescence. One cluster seems to be particularly influenced by hormonal and metabolic factors.

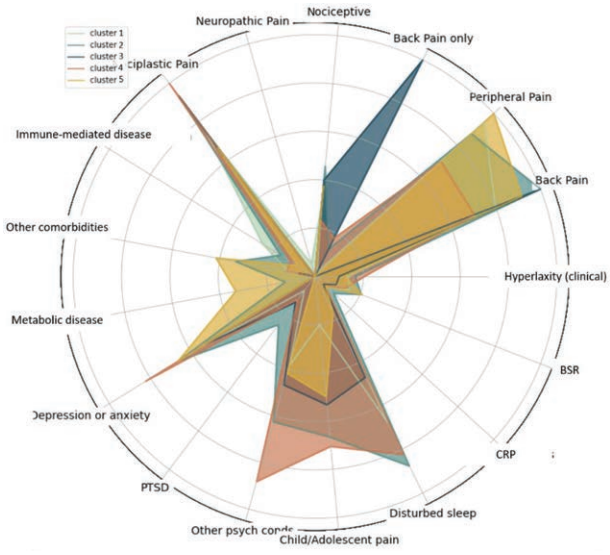

Figure 1. Radar plot of patient clusters. PTSD: Post-traumatic stress disorder. CRP: C-reactive protein, BSR: Blood sedimentation rate.

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OP0199 HAND OSTEOARTHRITIS PHENOTYPES AND THEIR ASSOCIATIONS WITH PAIN AND CHANGE IN PAIN

Keywords: Pain, Osteoarthritis

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Background: Hand osteoarthritis (OA) pain is characterized as heterogeneous and multifactorial. Different pain patterns may be explained by underlying phenotypes, which previously have not been explored.

Objectives: Using the biopsychosocial framework, we aimed to identify possible hand OA phenotypes and explore the associations with pain intensity and change in pain during a four-year follow-up.

Methods: Latent class analysis was used to determine classes of people with hand OA, based on baseline examination (2016-17), followed by posterior fit statistics. Biological, psychological, and social domains were examined by self-reported questionnaires, clinical assessment and imaging. Central pain sensitization was tested by pressure pain thresholds (PPT; kg/cm^2) and temporal summation (TS). Pain intensity at baseline and follow-up (2019-21) was self-reported on a Numeric Rating Scale (0-10) for hand and overall bodily pain the last 24 hours. Change in pain was calculated for both pain measures. Differences of the biopsychosocial variables and pain measures were assessed by one-way ANOVAs and chi-squared tests. The relations of the classes to the pain outcomes were analysed by linear regression.

Results: We identified five classes (Table 1). The highest pain intensity was reported by the class with low OA severity but higher burden of the other factors (Class 5), whilst the class with the most OA severity of the hands and lower extremities (Class 4) reported approximately one point less for pain intensity (Figure 1). Classes showed little change in pain and there was no significant difference (data not shown). Significant differences were found across all classes in association to baseline and follow-up pain. However, not for change in pain (data not shown), except Class 5 and change in hand pain (beta (95% CI); 1.13 (0.02, 2.25)). Class 5 indicated the most hand and overall bodily pain in comparison to the reference group (Class 1) with a beta (95% CI) of 3.27 (2.32, 4.22) and 3.08 (2.10, 4.07) at baseline and 2.04 (1.02, 3.06) and 2.74 (1.73, 3.76) at follow-up, respectively. The difference was smaller when comparing for Class 4 to