# Exploring the Association between Bio-Psycho-Social Predictors and Chronic Pain: An Analysis of Age and Pain Type

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## Background and aims

The relationship between biopsychosocial (BPS) predictors and Chronic pain (CP) is complex and may vary depending on age and pain type.

**Aims:**

- **Evaluate the prevalence of chronic pain with age.**
- **To describe predictor models for CP in different body sites based on the BPS predictors and age**
- **To evaluate the strength of the relationship between BPS pain predictors and CP across pain types and age groups.**

## Methods

**Study Population:** We used information from 501,408 individuals aged 38-73 in the UK Biobank dataset.

To examine the relationship between age and CP, baseline data from participants who reported experiencing a pain for more than 3 months was used.

**Train-Test:** The data were normalized, divided into a train-test set; grouped into age windows using a sliding window analysis approach.

**Pain-Related Features:** For each age window and pain type, we analyzed 105 features using logistic regression to predict CP.

**Categories:** These features were grouped into ten categories (mood, neuroticism, trauma, sleep, physiological, health, substance use, physical activity, socioeconomic, and occupational). The absolute mean coefficients of each category were used to determine the importance of categories per pain considering the age.

## Results

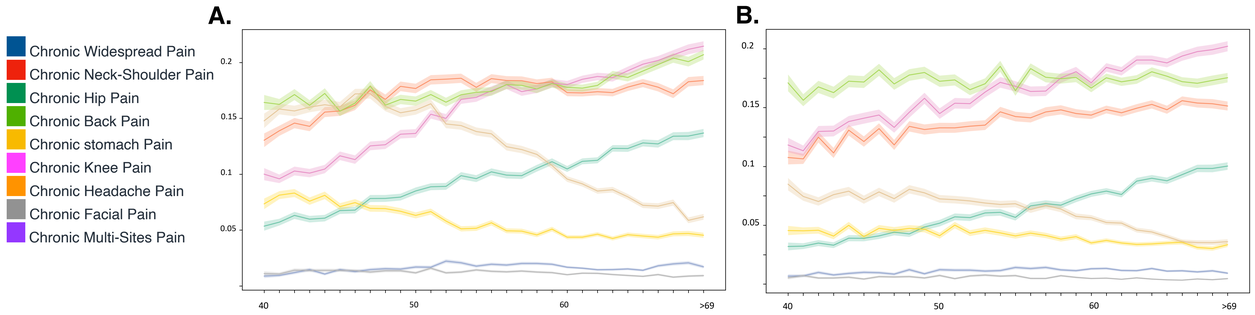


**Fig. 1. Prevalence of 8 Chronic Pain Sites with Age in Females and Males.** The x-axes represent age from 40 to 70. The y axes show the prevalence of CP, and the standard error of the mean. A. corresponds to the female and B. to the male.

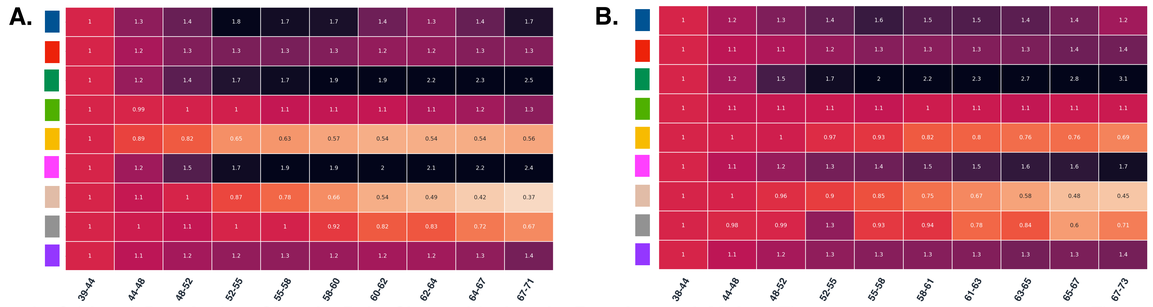


**Fig. 2. Odds of Developing Chronic Pain Sites with Age in Females and Males.** The x-axes represent age range. The y axes correspond to the type of CP. A. corresponds to the female and B. corresponds to the male.

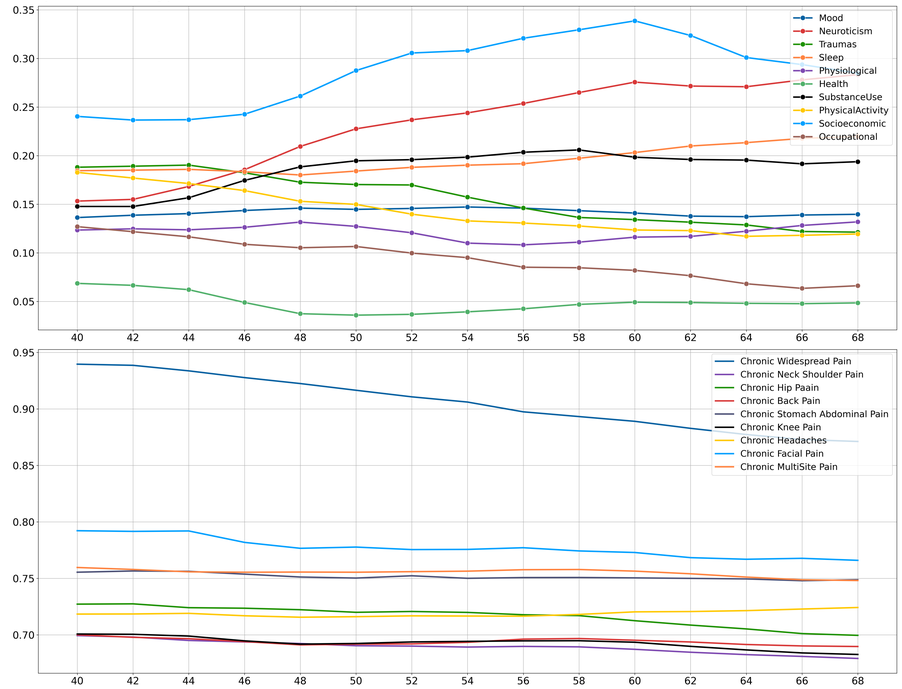


**Fig. 3.This graph/chart represents the coefficient values of 10 categories associated with chronic widespread pain across different age ranges.** The x-axis displays age range, while the y-axis represents the mean average coefficient values of the various categories

**Figure 4 displays the area under the curve associated with chronic widespread pain across different age groups.** The x-axis represents age range, while the y-axis corresponds to the mean average coefficient values of different categories.

## Discussion

1) CP prevalence is influenced by age and gender, with women having a higher prevalence of pain than men for all pain types except hip pain.

2) Chronic musculoskeletal pain and Muti-sites pain were more likely to occur with age, particularly in females. The likelihood of having chronic Hip and Knee pain is 2-3 times in the age range of 67-73 compared to the individuals in the age range of 38-44.

3) Neuroticism and Socioeconomic emerged as important predictors for most pain types and age groups. Socioeconomic predictors may become increasingly important in managing as people age.

4) Trauma is a stronger predictor for chronic musculoskeletal pain in younger individuals.

5) The AUC scores ranged from 0.70 to 0.94 in different CPs and remained relatively constant through age groups. The highest AUC belongs to widespread pain.

6) These findings highlight the relationship between BPS predictors and CP while considering age, with possible implications for pain prevention and management. It could be used to inform public health policies related to CP management and prevention to reduce the burden of chronic pain on society.

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## References

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