

Prognostic Predictive Model for the Development of Osteoarthritis using Electronic Medical Record Data

Background: As the most common joint disorder worldwide (1), osteoarthritis represents a growing concern for older adults. Prognostic predictive models (statistical models used to predict future disease development (2)) may enable the identification of patients at high risk of developing osteoarthritis, allowing for health and lifestyle modifications aimed at reducing the risk of disease development (3,4).

Methods: For our project, we accessed the DELPHI (Deliver Primary Healthcare Information) database which contains de-identified electronic medical records of more than 60,000 primary care patients in Ontario (5,6). From these data, we constructed a retrospective cohort examining patients' risk factors and followed them over time to observe incident cases of osteoarthritis. This retrospective cohort was used to develop and test prognostic predictive models, using methods such as logistic regression, to determine the models' ability to predict development of osteoarthritis. Models were evaluated, examining both discrimination (AUC) and calibration (calibration plots), using a reserved portion of patient data.

Results: A logistic regression model was built that predicts the incidence of osteoarthritis based on patient age, sex, Body Mass Index (BMI), osteoporosis status, and leg injury status (AUC: 0.73).

Discussion & Conclusion: By creating a prognostic predictive model for osteoarthritis, we aim to support primary health care practitioners in estimating an individual patient's risk of osteoarthritis; thereby allowing practitioners and patients to create unique plans to address the patient's personal risk factors.

Interdisciplinary Reflection: This project is highly interdisciplinary as it spans the fields of epidemiology, statistics, health informatics, primary health care, and computer science.

References:

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