FACULTY OF PHARMACY
IN HRADEC KRÁLOVÉ
Charles University

15th Postgraduate conference

28. – 29. January 2025

Abstracts

Section 6 - Clinical and Social Pharmacy

NETPHARM

This conference is supported by the project New Technologies for Translational Research in Pharmaceutical Sciences /NETPHARM, project ID CZ.02.01.01/00/22_008/0004607, co-funded by the European Union.

Co-funded by the European Union

MINISTRY OF EDUCATION, YOUTH AND SPORTS

CSP1

TESTING THE IMPACT OF ANTIDEPRESSANTS USE ON HOSPITALIZATIONS IN OLDER PATIENTS IN LONG-TERM CARE FACILITIES: A MACHINE LEARNING ANALYSIS

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Background: With the rising prevalence of depression and antidepressant (AD) use in aging population, testing the impact of ADs on various health outcomes is important. **Aim**: This study evaluates the relationship between AD use and hospitalizations among older patients in long-term care facility (LTCF) by using machine learning (ML) approach. **Method**: A retrospective ML analyses conducted using the Comprehensive Academic Search (CAS) dataset from the Netherlands (2005-2018) including interRAI LTCF data collected by routine clinical assessments of patients aged 60+. The primary outcome was hospitalization at 6-month and 12-month intervals with outcome values expressed graphically as Average Treatment Effect (ATE) and Individual Treatment Effect (ITE). Depression Rating Scale (DRS) was used to classify patients into four distinct groups, DRS3-6 (mild depression), DRS7-10 (moderate depression), DRS11-14 (severe depression), and DRS3-14 (total population) respectively. Tested variables were: sociodemographic factors, clinical diagnoses, medication profile and polypharmacy. Various binary ML models (including RandomForestRegression, MLPRegressor, GradientBoostingRegressor, LinearRegression, etc.) were employed in analyses. Model performance was evaluated using accuracy (ACC), sensitivity, specificity, and calibration metrics. The data was analyzed using Python and Jupyter Notebook version 3.9.7 and the following libraries: Scikit-learn package version 1.0.2 and EconML version 0.14.0 for ITE models were used for ML and statistical analysis. **Results**: The outcome analysis over a 6- month period did not yield significant findings compared to 12-months´ period. The analysis after 12-months using Linear Regression showed a slight increase in hospitalization rates across all depressive categories (ATE: 0.01-0.03). High accuracy was observed in both control and treatment groups (ACC_C > 0.9, ACC_T > 0.9). **Conclusion**: These findings highlight the importance of further studies to confirm or reject the hypothesis on potential negative effect of long-term AD use on hospitalization rates.

The study was supported by grants: I-CARE4OLD H2020 - 965341, NETPHARM CZ.02.01.01/00/22_008/0004607 project, Cooperatio KSKF1 FaF UK and SVV260 665.

THE ROLE OF SPIRITUAL ENGAGEMENT IN MODULATING COGNITIVE PERFORMANCE AMONG GERIATRIC PATIENTS: INSIGHTS FROM ARTIFICIAL INTELLIGENCE APPROACHES

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Religious and spiritual engagement is crucial for older adults, and potentially contributes to health maintenance[1]. However, studies examining the impact of spiritual activities on health outcomes in long-term care facility (LTCF) residents using machine learning (ML) remain limited[2]. This research aimed to predict the average treatment effects (ATE) and individual treatment effects (ITE) of spiritual activities on cognitive functions in LTCF residents using ML models. Data used from the Dutch Comprehensive Academic Search database included 48,142 LTCF residents aged 60+ (2014–2023), collected through interRAI version 9.0. Self-reported spiritual activities (e.g., prayer, meditation, attending services, reading spiritual literature) were analyzed. Cognitive functions were assessed using the Cognitive Performance Scale (CPS) six months post-baseline. ML models (e.g., gradient boosting, MLP, random forest, and linear regression) were evaluated with predictive performance using metrics: Mean Absolute Error (MAE), Mean Squared Error (MSE), and R-squared (R^2), adjusting for confounders like age, gender, marital status, loneliness, exercise, smoke, alcohol, social engagement and baseline CPS. Linear regression demonstrated the highest predictive accuracy for cognitive functions, yielding R^2=0.85, MSE=0.38, and MAE=0.36 in the control group and R^2=0.87, MSE=0.33, and MAE=0.34 in the treatment group, with an estimated ATE of -0.04 (95% CI: -0.05 to -0.03). The predicted ITE values ranged from -1.5 to +1.0. The SHAP method was used to identify key predictors, Alzheimer's disease, dementia, activities of daily living and social interaction showed the most significant impact on the model prediction. The varying treatment effects highlight the need for personalized approaches in LTCF, with future AI studies focusing on duration of exposure and tailored combined interventions.

This study is supported by grants: I-CARE4OLD H2020 - 965341, Cooperatio KSKF1 FaF UK, SVV260665 and NETPHARM CZ.02.01.01/00/22_008/0004607

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CSP3

TRENDS IN THE USE OF HYPNOSEDATIVES IN OLDER ADULTS IN HOME CARE AND LONG-TERM CARE

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Overuse of hypnosedatives is frequent in older adults. Current recommendations prioritize non-pharmacological strategies, avoid using long-acting benzodiazepines and long-term treatment with non-benzodiazepine hypnotics (Z-drugs), and early manage secondary causes of insomnia. We aimed to describe the trends in the use of hypnosedatives medications in older adults in home care and long-term care in Finland (2014-2019). A retrospective study was conducted using Finish datasets available for I-CARE4OLD H2020 research from THL Finland, including data of home care (HC) and long-term care (LTC) recipients aged 65+ from different regions of Finland. We used retrospective longitudinal data collected by interRAI (Resident Assessment Instrument) tools for HC and LTC, designed for comprehensive geriatric assessment. The data analysis was performed using R-software. Populations of assessed older HC and LTC older recipients between years 2014-2019 steadily increased, for HC from 27 185 (2014) to 44 072 (2019) and for LTC from 21 314 (2014) to 30 410 (2019). In HC, the use of hypnosedatives decreased from 29.7% (2014) to 23.5% (2019), whereas in LTC it increased from 26.7% (2014) to 27.3% (2019). Moreover, the use of benzodiazepines in HC declined from 8.6% (2014) to 4.9% (2019), and in LTC dropped from 6.7% (2014) to 3.2% (2019). Similarly, Z-drug use showed a decreasing trend from 14.9% (2014) to 10.1% (2019) in HC and from 7.5% (2014) to 4.3% (2019) in LTC. As a positive change can be mentioned an increasing trend in the use of melatonin in both settings of care (HC, LTC), from 12.0% (2014) to 18.9% (2019) and from 16.4% (2014) to 21.9% (2019) respectively. We observed reducing trends in benzodiazepines and Z- drugs use in both care settings, and a concurrent increase in melatonin prescription.

The study was supported by I-CARE4OLD H2020 – 965341, NETPHARM (CZ.02.01.01/00/22_008/0004607), Charles University (SVV260 665)

CSP4

UNDERTREATMENT OF DEPRESSION IN HOME CARE OLDER CLIENTS IN SEVERAL EU COUNTRIES

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Depression in older age is a common health problem, but it is often undertreated[1]. The aim was to analyze the prevalence of antidepressant (AD) use, psychotherapy (PT) and both strategies in older home care clients (HCCs) 65+ years in six European countries (Belgium, Finland, Germany, Iceland, Italy and the Netherlands), participating in the EU IBenC project. Included were HCCs with diagnosed depression or with a Depression Rating Scale (DRS) score≥3. A total of 2884 HCCs participated; females (67.4%) and 85+ old HCCs (44.8%) predominated. Of the HCCs, 31.0% had been diagnosed with depression or had a DRS score≥3, 18.6% used AD, 0.6% attended PT, and 0.2% utilized both AD and PT. Male HCCs (OR=2.2; 95% CI 1.3-3.8), HCCs with pain scale ≥1 (OR=1.9; 95% CI 1.2-3.1), with 3+ symptoms (OR=2.1; 95% CI 1.2-3.5), not using psychotropics (excl. AD, OR=2.7; 95% CI 1.7-4.4), with polypharmacy (OR=2.7; 95% CI 1.3-5.5) and using 0-4 medicines (OR=6.0; 95% CI 2.8-12.6) had higher odds of being without treatment. We observed the need for better depression treatment in older HCCs and, particularly, the lack of PT treatment more convenient for multimorbid HCCs.

Grants support: I-CARE4OLD H2020 – 965341, I-BENC – GA ID: 305912, NETPHARM CZ.02.01.01/00/22_008/0004607, Cooperatio research program (group Assoc. Prof. Fialová). Faculty of Pharmacy, Charles University and SVV260 665.

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CSP5

POTENTIALLY INAPPROPRIATE MEDICATION USE AMONG OLDER PATIENTS FROM CENTRAL AND EASTERN EUROPE

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Potentially inappropriate medication (PIM) use is a global public health issue that is understudied in Central and Eastern Europe (CEE). [1] Thus, we aimed to determine the prevalence of PIM use and its associated factors in older adults from 5 CEE countries. This cross-sectional study was conducted in Bulgaria, Croatia, Czechia, Estonia, and Serbia in community-dwelling older adults aged ≥65 years who visited community pharmacies. We determined the prevalence of PIM use by the EU(7)-PIM list [2] and its associated factors by multiple logistic regression. Most of the 2155 participants were women (63.3%) and aged 65–74 years (64.8%). The prevalence of PIM use was 56.0%, from 29.5% in Czechia to 70.0% in Croatia. The most common PIMs were benzodiazepines (16.7%), followed by nonsteroidal anti-inflammatory drugs (14.3%), and proton pump inhibitors taken for >8 weeks (14.1%). Residence, polymorbidity, and polypharmacy were significant factors associated with PIM use. Our results showed a high prevalence of PIM use and considerable cross-country differences.

The study was supported by: NETPHARM CZ.02.01.01/00/22_008/0004607, EuroAgeism Horizon 2020 – 764632, I-CARE4OLD Horizon 2020 – 965341, Cooperatio KSKFI.- Faculty of Pharmacy, Charles University, and SVV 260 665.

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CSP6

ANALYSES OF TRENDS OF PSYCHOTROPIC DRUG USE IN OLDER ADULTS IN LONG-TERM CARE FACILITIES

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Background: Psychotropic drugs are commonly prescribed for mental and neurological conditions in older long-term care (LTC) residents. Monitoring their use in LTC facilities (LTCFs) helps to inform prescribing practices and regulatory measures. **Aim:** To assess trends in psychotropic drug use among LTC residents in Finland from 2014 to 2019. **Method:** Retrospective analysis of data, maintained by the Finnish Institute for Health and Welfare (THL), based on InterRAI-LTCF assessments of residents aged 65+. Data analysis was performed using R software. **Results:** Populations of LTC residents increased from 21,314 (2014) to 30,410 (2019). Antipsychotic use declined from 32.7% to 30.1% ($p=0.0242$), anxiolytics from 24.0% (2014) to 17.9% (2017), and antidepressants from 33.0% to 29.9% ($p=0.0085$). Depression prevalence remained stable (29%-30%, $p>0.05$). Insomnia increased (25.5%-29.6%, $p=0.0085$), while hypnosedatives use remained stable (28%-27.3%). **Conclusion:** Results shows the need for balanced pharmacological and non-pharmacological management of psychiatric and neurological conditions in LTCFs, as well as the quality of management of these conditions.

The study was supported by grants: I-CARE4OLD H2020 - 965341, NETPHARM CZ.02.01.01/00/22_008/0004607 project, Cooperatio KSKF1 FaF UK and SVV260 665.

PILOT TESTING OF THE I-CARE4OLD-WP 7 PLATFORM BY MEDICAL PROFESSIONS FOR ASSESSING INDIVIDUAL RISK AND SELECTION OF APPROPRIATE TREATMENT STARTEGIES FOR COMPLEX OLDER PATIENTS IN THE CZECH REPUBLIC

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The I-CARE4OLD-project is an EU funded artificial intelligence research project which aims at supporting the care for chronically multimorbid seniors by developing a digital platform to predict changes in their health trajectories. The aim of this pilot study was to test ICARE4OLD-WP7 platform among Czech physicians. Data from the asssessments in the Czech Republic (CZ) were summarized in this study (from international pilot conducted in 7 EU countries: the Netherlands, Italy, Poland, CZ, Finland, USA and Belgium). 40 physisians (20 from home care (HC) and 20 from long-care (LTC) filled pre-, post- questionnaires and 7 clinical cases prepared for the pilot. Approximately 45% and 50% (HC/LTC) found the I-CARE4OLD platform suitable to help them accomplish their tasks more quickly and 95% and 25%, respectively would recommend ICARE4OLD platform to colleagues.

Grant support: I-CARE4OLD H2020 - 965341, NETPHARM project CZ.02.01.01/00/22_008/0004607, Cooperatio Faculty of Pharmacy, Charles University

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CSP8

ASSESSING THE IMPACT OF SARCOPENIA PARAMETERS ON PLASMA CONCENTRATIONS OF DIRECT ORAL ANTICOAGULANTS: A PILOT STUDY

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Due to the hydrophilic nature of direct oral anticoagulants (DOACs), sarcopenic patients with low muscle mass may be at risk of elevated plasma levels.

The study aimed to compare sarcopenia parameters and other selected parameters between patients with therapeutic and supratherapeutic DOAC levels.

Conducted from July to November 2024 at the University Hospital Brno, the study included patients aged ≥ 65 years on DOAC therapy for atrial fibrillation or maintenance therapy of deep vein thrombosis for at least one month, with creatinine clearance ≥ 15 mL/min. Sarcopenia parameters were assessed through appendicular skeletal muscle mass (ASMM/m²) via bioelectrical impedance spectroscopy, maximum handgrip strength, and 4-meter walking speed. DOAC plasma levels were measured before and 2–4 hours after administration.

Ninety-one patients (59.3% male; mean age 74.6 ± 5.9 years) were included, with 19.8% showing supratherapeutic DOAC levels. These patients had significantly lower sarcopenia parameters, including ASMM/m² ($P = 0.007$), handgrip strength ($P = 0.033$), and 4-meter walking speed ($P = 0.019$). Group differences were also observed in weight ($P = 0.016$), phase angle ($P = 0.038$), and sex ($P = 0.049$).

Patients with supratherapeutic DOAC levels exhibited poorer sarcopenia parameters. Further research with a larger representative sample of sarcopenic patients is needed to confirm this relationship.

The study was supported by Charles University grant SVV 260 665.

CSP9

INTERIM ANALYSIS OF ONE TEAM RANDOMIZED CONTROLLED TRIAL: LONG-TERM MEDICATION ADHERENCE IN CANCER PATIENTS WITH CARDIOVASCULAR COMORBIDITIES

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Our aim was to conduct an interim analysis of the ONE TEAM Study, focusing on medication adherence for cardiovascular comorbidities. The 18-month cluster-randomized controlled trial involved adult outpatients treated with curative intent for six cancer types, all having at least one cardiovascular comorbidity, and a primary care provider. During four visits (baseline, 6, 12, and 18 months), patients had blood pressure and laboratory values measured and completed a survey. Adherence and implementation were assessed using the self-reported Voils questionnaire and pharmacy dispense data. We included patients who completed the study in the interim analysis. Herein, we present the baseline data. The analyzed population comprised 61 patients, with a median age of 64 years, 62.3% white, 72.1% women, 59.0% diagnosed with breast cancer. Of them, 48 were diagnosed with hypertension, 37 with dyslipidemia, and 20 with diabetes mellitus. According to the Voils questionnaire responses, 80.8% of 47, 76.5% of 34, and 83.3% of 18 patients with hypertension, dyslipidemia, and diabetes, respectively, were adherent. Analyses with a complete sample size will explore further statistical associations.

The study was supported by Fulbright scholarship No°2023-28-07 and Charles University (GAUK 328 322, SVV 260 665). The study was founded by National Cancer Institute (1R01CA249568-01) and statistical support was paid by Duke Cancer Institute through NCI CCSG No°P30CA014236 (PI: Kastan).

CSP10

COMPARISON OF METHODS FOR DETECTING DRUG-RELATED HOSPITAL ADMISSIONS

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Drug-related hospital admissions account for 1 in 10 hospitalizations in OECD countries, placing a potentially avoidable burden on healthcare systems and carrying significant economic consequences.[1] There are various methods for detecting drug-related hospital admissions, including analysis of spontaneous reports, review of medical records, use of administrative databases and a combination of these approaches. The prevalence of drug-related hospital admissions varies widely in the literature due to differences in detection methodologies. Spontaneous reporting is insufficient due to substantial underreporting. Clinical adjudication of drug-related hospital admissions via detailed medical record reviews is the gold standard but is impractical for large-scale implementation due to high hospital admission volumes. To address underreporting, active surveillance methods, such as leveraging International Classification of Diseases (ICD) codes in national administrative databases, are often employed. However, variability in ICD code sets hampers accurate prevalence determination, and few studies have validated the sensitivity and specificity of ICD code sets in detecting drug-related hospital admissions. While narrow ICD code sets underestimate the prevalence of drug-related hospital admissions, expanding these codes to include diagnoses likely or possibly related to adverse drug events significantly improves detection, increasing sensitivity by 6–8 times without a huge decrease in specificity.[2] A broader ICD code set, when combined with other trigger tools, has the potential to more accurately identify drug-related hospital admissions and enhance patient safety by prompting medical record reviews of hospital admissions likely linked to adverse drug events.

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CSP11

SAFETY OF INJECTABLE DRUG PREPARATION AND ADMINISTRATION BY NURSES IN CZECH HOSPITALS: METHODOLOGY OF A PROSPECTIVE OBSERVATIONAL-INTERVENTIONAL STUDY

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The preparation and administration of injectable drug forms to patients are highly complex and carry a significant risk of errors, despite substantial attention to research and preventive measures. In the Czech Republic, this issue remains largely unexplored. The objective of this study is to examine the process of preparation and administration of injectable drug forms by nurses in two hospitals in the Czech Republic, identify risk factors for errors, propose preventive measures, implement these measures, and evaluate their effectiveness.

This three-phase prospective, observational-interventional, cross-sectional study will be conducted in two hospitals in the Czech Republic. In the first phase, errors occurring during the medication administration process by nurses will be identified using a validated direct observation method. Nurses' knowledge will be assessed through a questionnaire survey. In the second phase, educational interventions will be implemented based on the analysis of the collected data. In the third phase, the effectiveness of these interventions will be evaluated through direct observation. Data will be collected by two passive observers over five consecutive days in each unit during the first and third phases. A minimum of 2,000 drug administrations will be observed. Errors will be identified by comparing observational records with the patients' medication administration records and the registration documentation of the respective drugs. Participation of nurses and patients in the study will be voluntary. All data will be anonymized upon collection.

The results of this study will provide valuable feedback to nurses, physicians, and hospital management from an alternative perspective. They may also help raise awareness about medication administration safety for patients in hospitals across the Czech Republic.

The study was supported by Charles University (GAUK 237 323 and SVV 260 665).

CSP12

VALIDATION OF FIVE STEPS ASSESSMENT – PRELIMINARY RESULTS

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To unify the evaluation of inhalation technique, a simple and universal tool Five Steps Assessment (FSA), which is applicable to all inhalation systems currently available on the market, was introduced. This tool has been validated on a small sample of non-mild chronic obstructive pulmonary disease (COPD) patients[1] and the main aim of this study was to perform validation on a larger sample of patients with all stages of bronchial asthma or/and COPD. Patients were recorded during the manipulation of the inhaler(s), which allowed repeated assessment by 6 evaluators and determination of intra- and inter-individual variability. Sociodemographic and clinical characteristics of patients were obtained from medical records and structured interview. The data for preliminary analysis was based on the evaluation of inhalation technique by 5 evaluators in 111 patients perfoming 184 manipulations of inhalers. The most common inhalers were pressurized metered-dose inhaler (42.4%) and Respimat (17.4%). The Fleiss' Kappa calculation was used to assess the validity, the level of significance was pre-set to $p < 0,05$. The results of the Fleiss' Kappa calculation showed that when all inhalers were rated together and the 5 most commonly used inhalers separately, there was substantial or near-perfect agreement between raters in all five FSA steps.

The study was supported by GA UK 156324 and SVV 260 665.

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CSP13

PUBLIC HEALTH IMPACT OF HERPES ZOSTER VACCINATION IN THE CZECH REPUBLIC

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Age-related increases in disability and morbidity have the potential to overburden healthcare budgets and systems. The aim of this study was to assess the public health impact of the launch of recombinant zoster vaccine (RZV) in Czechia. The analysis was conducted on the population aged ≥50 from the Czech health system perspective. No other shingles vaccine is currently widely used in Czechia; therefore, the analysis was performed in comparison with scenario of no vaccination. A lifetime multi-cohort Markov model with a cycle length of one year was developed, cohorts were split into five age groups for people aged ≥50. The model health states were defined by the occurrence of herpes zoster (HZ), the potential subsequent development of postherpetic neuralgia (PHN) or non-PHN complications (ocular, neurological, cutaneous, and other non-pain) and death. Transitions between health states were determined based on the incidence obtained from published literature. Resource use was identified through discussions with Czech local clinical experts. Direct costs per HZ and PHN case were then derived based on Czech lists of reimbursed procedures. Costs and outcomes were discounted by 3%. Several alternative scenarios were generated considering different vaccination coverages of the target Czech population (4.320.558 adults aged ≥50 total). Over a lifetime horizon with vaccination coverage of 5%-50%, RZV has the potential to prevent 14.595-248.535 HZ cases and 2.518-44.440 of PHN cases; resulting overall in 523-8.297 QALYs gained. Along with the avoided cases, RZV could deliver savings on direct medical costs of EUR 3.993.564 to EUR 64.865.355. The number needed to vaccinate to prevent one HZ case is 15 to 9, to prevent one PHN case is 86 to 49 according to the vaccination coverage. For Czech adults over 50 years of age, RZV has the potential to provide significant public health benefits, including improved quality of life and saving direct medical costs by averting HZ and PHN cases.

The study was supported by SVV 260 665.