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Identifying Predictive Variables of High-Intensity Binge Drinking Through the Use of a Machine Learning Algorithm

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OBJECTIVES/GOALS: To test if a machine learning algorithm could predict a person's capacity to binge drink and explore what measures might be important for identifying individuals at risk for high-intensity binge drinking behaviors. METHODS/STUDY POPULATION: The sample included 1177 (474 female) non-treatment-seeking drinkers (age: 18-91 years), that were assigned to a group based on their heaviest drinking day reported in a 90-Day Alcohol Timeline Followback questionnaire. The groups were Non-Bingers (female: 12 drinks, male:>15 drinks). The sample was divided into a training sample (N = 884) and a testing sample (N = 293). A machine learning algorithm called random forest was then used to generate a predictive model based on measures of substance use, personality traits, and trauma. The model was applied to the testing sample to determine accuracy. RESULTS/ANTICIPATED RESULTS: The first model correctly assigned 190 out of 293 subjects, giving it a total error rate of 0.35, with lowest rates for non-binge (0.19) and high-intensity (0.18), while medium-intensity had the highest error rate (0.86). The most important variables for the accuracy of the model included: total score on the Alcohol Use Disorder Identification Test, first five sub-score of the Self-Reported Effects of Alcohol, Compulsive Drinking subscale, and presence of a current psychiatric diagnosis. As a follow-up analysis, we built and tested another random forest model without the use of drinking dependence measures. This model had a total error rate of 0.39, and introduced other important variables such as smoking behaviors, perceived stress, IQ, and number of negative life events. DISCUSSION/SIGNIFICANCE OF IMPACT: Our study showed that it was possible for a machine learning algorithm to predict binge drinking intensity better than chance. Drinking patterns were the most robust predictors, and stress, IQ, and psychiatric diagnoses were also useful in predicting binge drinking intensity.

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Identifying Symptom Pattern Trajectories among Heart Failure Patients in a Palliative Care Trial: A Work In Progress

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OBJECTIVES/GOALS: This work-in-progress aims to: 1) identify and differentiate symptom pattern trajectories in a sample of older adult heart failure (HF) patients over 24 weeks, and 2) examine associations between sociodemographic/clinical/physiological characteristics, dyadic health, and symptom trajectories. METHODS/STUDY POPULATION: ENABLE CHF-PC, a palliative care RCT (NCT02505425), was conducted at a Southeastern US medical center. Between 2016-2018, 415 older adult HF patients and 159 family caregivers were randomized to receive a psychoeducational intervention or usual care. Baseline sociodemographic information (age, gender, rurality, etc.) were collected. Outcome variables of interest include symptoms (Kansas City Cardiomyopathy Questionnaire (KCCQ), Functional Assessment of Chronic Illness Therapy-Palliative 14, Hospital Anxiety and Depression Scale (HADS)) and dyadic health (PROMIS-SF Global Health). We have calculated baseline descriptive statistics. Future work includes latent growth mixture modeling to identify distinct symptom trajectories and univariate associations with patient level factors. RESULTS/ANTICIPATED RESULTS: Of 415 patient participants, mean age was 64, 53% were male; 55% were African American; 26% were rural dwellers; 46% had +15.8) and low anxiety (6.7+3.6) and depressive symptoms (5.7+4.3) on the HADS. Of 159 family caregivers participants, the mean age was 57.9, 85.4% were female, 51.9% were African-American, and 65.2% were the patient's spouse/partner. DISCUSSION/SIGNIFICANCE OF IMPACT: Limited data describes HF symptom pattern trajectories.How co-occurring symptoms affect quality of life or are affected by personal or situational factors are not well-understood. This study will help to identify factors and symptom phenotypes that may serve as targets for future interventions.

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Identifying the needs of family caregivers of people with dementia to improve service delivery: Bridging a research-practice gap*

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OBJECTIVES/GOALS: The goal of this mixed methods project is to develop a comprehensive framework of the personal and care-related needs of informal caregivers of people with dementia. This model can be used to enhance targeted delivery of evidence-based services to caregivers in need. METHODS/STUDY POPULATION: To create a model of the personal and care-related needs of family caregivers of people with dementia, we conducted semi-structured in-depth interviews with current caregivers (N = 12) and conducted a content analysis of materials related to government reports and evidence-based interventions (N = 28) and existing measures of dementia caregiver needs (N = 54). Content analysis is a systematic qualitative methodology that is used to distill complex source material into content-related categories and is well-suited for both interview data and document data (Elo & Kyngäs, 2008). We identified themes related to caregiver needs through examination of materials within and across source categories. RESULTS/ANTICIPATED RESULTS: We propose a framework of five inter-related need categories: Environmental needs (e.g., transportation, health-care access, financial resources, time), psychological needs (e.g., emotional wellbeing, identity/autonomy, perceived preparedness), social needs (e.g., social support, family dynamics), health-related needs (e.g., health behaviors, sleep), and needs related to the care and functioning of the person with dementia. We also consider how needs and background characteristics transact to influence which services may be of greatest use. In the future, we plan to test this model empirically with a nationally representative sample of caregivers. DISCUSSION/SIGNIFICANCE OF IMPACT: Evidence-based services exist to meet the needs of dementia caregivers. A dearth of models clearly defining caregiver needs limits empirically-based plans for dissemination of services. We have identified