17. VIDEO AND TV WATCHING IMPEDES DEVELOPMENT OF COMPLEX LANGUAGE COMPREHENSION IN YOUNG CHILDREN WITH AUTISM

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Introduction: The effect of video and TV watching duration on 2 to 5-year-old children with autism was investigated in the largest and the longest observational study to-date.

Methods: Parents assessed development of 3,227 children quarterly for three years.

Results: Longer video and TV watching were associated with better development of expressive language but significantly impeded development of complex language comprehension. On the annualized basis, low-TV users (< 40 min TV per day) improved their language comprehension 1.4 times faster than high-TV users (> 2 hours TV per day). This difference was statistically significant ($p=0.01$). At the same time, high-TV users improved their expressive language 1.3 times faster than low-TV users. This difference was not statistically significant ($p=0.07$).

Conclusions: No effect of video and TV watching duration on sociability, cognition, or health was detected.

26. THE SIX STAGES OF ENGAGEMENT IN ADHD TREATMENT: RESULTS FROM A QUALITATIVE STUDY WITH DIVERSE, URBAN PARENTS

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Introduction: Attention-Deficit/Hyperactivity Disorder (ADHD) is one of the most common and morbid pediatric behavioral health conditions. While there are many effective treatments for ADHD, treatment utilization and adherence remain extremely poor, especially among socioeconomically disadvantaged and underrepresented minority families. The goal of this study is to examine the process by which families become engaged in ADHD treatment and the barriers and facilitators encountered that could serve as targets for an intervention to improve engagement in care.

Methods: We conducted in-depth, semi-structured qualitative interviews with 41 primary caregivers of diverse youth aged 3-17 years old in treatment for ADHD at an urban safety-net hospital. Interview topics included ADHD diagnostic and treatment experiences, community attitudes and stigma, intervention preferences, and other factors influencing treatment access and decision making. Interview transcripts were independently coded by 3 research investigators on common themes using grounded theory and thematic analysis.

Results: Caregivers described six stages in the process of obtaining and engaging in care for their child's ADHD: 1) Normalization & Hesitation; 2) Fear & Stigmatization; 3) Caregiver Advocacy; 4) Communication & Navigation; 5) Care & Validation; and 6) Preparation & Transition. Stages were described both as barriers as well as necessary and important milestones in the process of engagement in care. Successful completion of each stage facilitated progression through subsequent stages, while difficulty resolving any particular stage interfered with completion of subsequent stages and treatment engagement. Caregivers reported internal and external barriers and facilitators attributed to the success of navigating each stage.

Conclusions: This framework could be used to develop new strategies to measure engagement, as well as plan and deliver interventions to improve engagement in ADHD treatment. This research merits further development of strategies to support families across the continuum of decisions faced while managing ADHD.

15. REMOTE DIAGNOSIS OF DEMENTIA USING AI METHODS ON CLOCK DRAWING IMAGES

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Introduction: Detection of any form of cognitive impairment is challenging and the subjects have to undergo numerous evaluations and clinical tests. Hence, it would be of great importance to design a reliable and accessible procedure by which patients may get diagnosed for dementia remotely. The capability of the Clock Drawing Test (CDT) as an effective cognitive assessment tool has motivated us to develop an online diagnostic tool by leveraging artificial intelligence techniques.

Methods: Digital pen recordings of 3; 263 normal subjects and 160 with dementia in the Framingham Heart Study (FHS) were collected, where all subjects have completed two analog clock drawings, one drawn on command and the other by copying. We first modified and trained a Convolutional Neural Network (CNN) pre-trained on the ImageNet dataset to extract high level features of the CDT images, which generated a score associated with the likelihood of dementia for each patient. The generated scores for both command and copy CDTs along with age were used to train a logistic regression model to more precisely classify individuals as demented or normal.

Results: We have evaluated the performance of the developed models by applying 5-fold cross validation on the FHS dataset. On the test dataset, the model (modified pre-trained CNN) based on command CDT images yielded an AUC of $0.813\_0.043$. The logistic regression model using age and the generated scores of command and copy CDTs, yielded an average AUC and average F1 score of $0.906\_0.014$ and $0.946\_0.005$, respectively.

Conclusions: Our method need not necessarily have access to digital biomarkers or clinical tests since the CDT can be completed using pen and paper, capturing the image using a smartphone. Hence, our method offers a cost-effective and accurate screening tool to diagnose dementia and related diseases remotely.

29. SOCIAL DETERMINANTS OF HEALTH AND THEIR EFFECTIONS ON PREDICTING MISSED BREAST IMAGING APPOINTMENTS

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Introduction: Predictive models utilizing social determinants of health (SDH), demographic data, and local weather data were trained to predict missed imaging appointments (MIA) among breast imaging patients at Boston Medical Center. We compared MIA incidence among patients described in terms of many different variables, including social needs, demographics, imaging utilization, appointment features, and weather conditions at the date of the appointment.

Methods: This HIPAA compliant retrospective study was IRB approved. Informed consent was waived. After data preprocessing steps, the dataset contained 9,970 patients and 36,606 appointments from 1/1/2015 to 12/31/2019. We identified 51 potentially impactful variables used in the initial prediction model and assessed each patient for MIA. We then developed a parsimonious model via statistical feature selection, which isolated the 28 most predictive variables. We utilized linear and non-linear models including support vector machines (SVM), logistic regression (LR), and random forest (RF) to predict MIA and compared their performance.

Results: The highest-performing full model (using all 51 features) is the nonlinear RF that achieved an AUC of 71% and an F1 score of 77%. Linear and easier to interpret models achieved comparable AUC and F1 scores using just 28 variables. The most impactful variables on missed appointments were appointment-specific; weather features, SDH, and demographics had less predictive power. Inadequate access to transportation (OR=1.10) and difficulty paying utility bills (OR=1.09) both came close to statistical association with more missed appointments.

Conclusions: High accuracy prediction of MIA is not practical due to the complex and multifactorial etiologies of MIA. However, the algorithms presented achieved acceptable performance and demonstrated that appointment timing and department of order origin were useful predictors of MIA. In contrast with non-modifiable demographic factors, we can address SDH to decrease the incidence of MIA. For instance, identifying transportation as an impactful SDH would justify providing ride-share vouchers to selected patients.