A160 · NLP-Driven Identification of Acculturative Barriers to Depression Treatment for Ethnic Minority and Immigrant Youth

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Adolescents and young adults from ethnic minority and immigrant (EMI) backgrounds face a disproportionate burden of developing depression in comparison to their native-born and non-minority peers, yet EMI youth consistently have lower levels of mental health service use. They face unique stressors, such as language barriers and discrimination, in navigating their acculturation process. Prior research has solely focused on identifying acculturation proxies like nativity status and primary language spoken, but has excluded direct measures of acculturative experiences in electronic health records (EHR). This research seeks to identify and validate acculturative factors in EHR notes by leveraging both structured demographic information and unstructured session notes via a natural language processing (NLP)-based model.

Chart review of clinical notes was conducted using this model based on keyword searches matching a word bank of acculturative factors, which were refined based on manual review by trained clinicians. The model flagged three lines: the line containing the keyword, the line preceding it, and the line following it, which were used to validate whether the keyword indeed referred to the patient and whether it indeed referred to an acculturative factor. Preliminary findings suggest that the extraction approach is feasible at scale, and that a reliance on demographic proxy variables alone may underestimate the complexity of acculturative barriers experienced by EMI youth. By targeting barriers to care that are unique to minoritized youth, these research findings may inform the development of targeted screening tools and health policy interventions to improve culturally responsive care.

NLP-Driven Identification of Acculturative Barriers to Depression Treatment for Ethnic Minority and Immigrant Youth

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Ethnic minority and immigrant (EMI) youth bear a disproportionate burden of depression compared to native-born, non-minority peers. Yet they experience persistent inequities in access to and retention in mental health treatment. Acculturative stressors are strongly associated with adverse mental health outcomes, but they remain poorly documented in structured electronic health record (EHR) data. Existing research has demonstrated that free-text clinical notes contain more information on social determinants of health than standardized diagnostic fields. However, natural language processing (NLP) approaches have rarely been applied to identify acculturative barriers to care. This research sought to address that gap via two key aims: (1) to refine and validate an NLP-driven model for identifying acculturative factors; and (2) to evaluate whether there is a significant association between acculturative factors and mental health service utilization among EMI youth. Population inclusion criteria were restricted to patients aged 12-25 from designated ethnicity groups who received outpatient psychiatric referrals or depression-related mental health services.

For the first aim, patient chart review of clinical session notes was implemented with an NLP-based model. The model used keyword- and pattern-based extraction in random samples of EMI youth patients by flagging matches to a preliminary word bank of acculturative factors. The model flagged any line containing a keyword, the line preceding it, and the line following it, to provide semantic contextualization. The flagged keywords were then manually reviewed by a board of clinician researchers in order to validate whether the keyword actually referred to the patient (as opposed to other persons documented in the clinical note previously) and whether it indeed referred to an operationalized acculturative factor. The word bank was iteratively refined by adding and modifying terms, repeating on new random samples until the method achieved a 90% sensitivity and 90% specificity threshold to the gold standard set of manual chart abstractions.

A preliminary feasibility study of the model was conducted on a cohort of n=2,448 EMI youth. Results indicated that 1,603 patients (approximately 65.5%) were flagged for at least one acculturative stress indicator: 1,198 for language stress, 980 for general acculturative stress, 356 for family-culture conflict, 283 for discrimination, and 137 for sociopolitical distress (Figure 1). Iterative word bank refinement is ongoing, after which for the second aim, the association between acculturative factors and mental health service entry and retention outcomes will be analyzed via linear and nonlinear regression modeling. The acculturative factors extracted via NLP will serve as the primary independent predictors. Covariates will include sociodemographic factors, baseline physical health indicators, and comorbid mental health conditions to isolate the distinct impact of acculturative barriers on care continuity.

Current conclusions suggest that acculturative stress is documentable within unstructured EHR notes and that the extraction approach is feasible at scale. The preliminary findings also indicate that reliance on demographic proxy variables alone may underestimate the prevalence and complexity of acculturative barriers experienced by EMI youth. By targeting barriers to care that are unique to minoritized youth, these research findings may inform the development of targeted screening tools and health policy interventions to improve culturally responsive care.

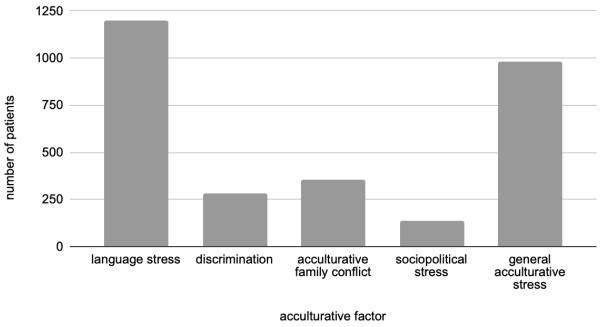

Figure 1. Frequency of acculturative stress factors experienced by youth patients