

Pharmacogenetics and Opioid Use Disorder

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OBJECTIVE: Opioid use disorder (OUD) is “a problematic pattern of opioid use leading to clinically-significant impairment or distress” characterized by the presence of at least two criteria, such as opioid cravings, tolerance, or withdrawal, over a 12-month period. OUD constitutes a significant public health crisis that affects 26.4 to 36 million people worldwide.

Recommended OUD management strategies incorporate the use of pharmacological measures, such as opioid agonist treatment (OAT), and psychosocial approaches. Buprenorphine/naloxone is indicated in the management of OUD and is metabolized by the cytochrome P450 3A4 (CYP3A4) enzyme. CYP3A4 is responsible for the metabolism of approximately 50–60% of currently prescribed medications. Variation in CYP3A4 correlates to differences in metabolism rates of medications like buprenorphine. Clinical pharmacogenetics studies the effect that inherited genetic variation have on an individual's medication response. The objective of our research is to determine whether pharmacogenetic testing can predict OUD management outcomes for patients taking buprenorphine/naloxone.

METHODS: The medical records of five African-American males maintained on buprenorphine/naloxone for OUD management for the past three years were reviewed. At each scheduled visit, routine urine screenings were conducted to confirm adherence to buprenorphine therapy and detect the presence of unauthorized substances. Additionally, assessment of buprenorphine therapy, including dose adjustment determinations and the presence of withdrawal symptoms, were conducted at each visit. DNA was collected via buccal swab and sent to a reference laboratory for pharmacogenetic analysis.

RESULTS: All of the patients presented with at least one copy of the CYP3A4*1B allele and required higher doses of buprenorphine/naloxone than recommended in order to maintain stability.

DISCUSSION: The CYP3A4*1B allele may confer an accelerated rate of buprenorphine metabolism. Further studies are required to determine whether this observation remains consistent a larger more generalizable patient cohort.