Investigating Possible Indicators of High Non-Medical Drug Use in the United States' Indigenous Populations

Abrielle Agron, Joseph Barr, Nick Mortimore, Tyrus E. Nelson, Linh Ta

Abstract: Non-medical drug use (NMU) is a serious health concern across the world, though the victims of NMU may not be equally distributed amongst different racial and ethnic groups. This project explored the 2019 United States Survey of Non-Medical Use of Prescription Drugs (NMURx) to determine demographic indicators of NMU to inspire future exploration of NMU. We found that, even after normalization to group size and controlling for income and education, respondents to the NMURx amongst American Indian, Alaskan Native, Native Hawaiian, and Pacific Islander demographics were more likely to partake in NMU.

Background: Various factors such as income, education, and access to care have been correlated to drug misuse[1]. Previous studies have identified health and healthcare disparities between indigenous and non-indigenous populations[2]. To examine comparative NMU amongst indigenous and non-indigenous populations, disparity of mental health disorders, household incomes, and levels of education were investigated.

Methods: NMURx data was collected in the United States in 2019. Demographic, prescription questions, and other risk factors were retrieved from the data. To determine incidence rate of demographic identity and drug use amongst respondents, respondents that replied "yes" were divided by total respondents in their subset, creating estimates/averages for comparison. For statistical analysis, we decided on a Random Forest model to predict the ILL_USE (illicit drug use) variable. One model was trained and tested on the full dataset using a 70% - 30% testing and training split, while another was trained on data from white participants, and tested on data from AIAN participants.

Results: On average, indigenous populations experienced higher rates of both medical and nonmedical use of prescription drugs. The model showed that lower education and income are strong predictors for illicit use. The races did not have a clear effect on illicit use in the Random Forest model since the values of importance are too small for all the races. Training the model on White and testing it on the American Indian or Alaska Native to predict the illicit use resulted in the testing error rate increasing from 35% to 60%. When examining differences between indigenous and non-indidgenous NMU graphically, accounting for income and education differences do not appear to change these differences, with indigenous populations having almost double NMU.

Discussion and Conclusion: We saw the test error rate of the model training on white doubled that of the full model. Therefore, we suggest that it is imperative that any studies or models ensure the use of data from indigenous populations. Differences in NMU may occur due to differences in living conditions and health services accessibility, though controlling for several factors still indicates higher NMU rates. Ultimately, the illicit drug use model illustrates trends in education levels and household income. Further investigation is merited into the causes of NMU disparities amongst indigenous populations in the United States.

---

[1] "What Are Risk Factors and Protective Factors?" *National Institute on Drug Abuse*, National Institute on Drug Abuse, 2011, www.drugabuse.gov/publications/preventing-drug-use-among-children-adolescents/chapter-1-risk-factors-protective-factors/what-are-risk-factors.

[2] Smith, Mary. "Native Americans: A Crisis in Health Equity." *Human Rights Magazine*, www.americanbar.org/groups/crsj/publications/human_rights_magazine_home/the-state-of-healthcare-in-the-united-states/native-american-crisis-in-health-equity/.