

## Racial/Ethnic Disparities in Mental Health

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## Abstract

Despite advances in access to health services, quality of care, and overall gains in life expectancy, racial / ethnic disparities in health in the United States persist and disproportionately affect the lives of racial and ethnic minority groups. This project is a descriptive approach to identifying mental health disparities for racial/ethnic groups in the U. S. using national survey data from the Centers for Disease Control's National Health and Nutrition Examination Survey, 2015-2016. Summary statistics and visualizations suggest the following: (1) health disparities exist for age at onset of drug use, with those Hispanic participants reporting the most variability in age of first use of both opioids and stimulants, and (2) health disparities in depression occurrence exist for racial/ethnic minority groups and for those without mental health insurance coverage. These preliminary findings provide a rationale to prioritize funding and policy change to increase the capacity of prevention and intervention efforts to address these disparities.

*Keywords:* race, ethnicity, mental health disparities, depression, substance use

## Racial/Ethnic Disparities in Mental Health

**Introduction**

Despite advances in access to health services, quality of care, and overall gains in life expectancy, racial/ethnic disparities in health in the United States (U.S.) remains to disproportionately affect the lives of racial/ethnic minority groups. D. R. Williams and Mohammed (2009) refer to the finding of Levine et al. (2016) that approximately 100,000 African Americans who would not die if there were no racial disparities die prematurely every year. Unfortunately, in the mental health arena, racial/ethnic disparities are no exception.

Even though the burden and impact of physical diseases on different racial/ethnic subgroups have been far more studied than the impact and burden of mental health disorders, we know that globally, depression is the leading cause of disability and loss of productivity, and that its direst outcome, death via suicide, is on the rise (WHO, 2018). It is well-known that mental health services are costly and thus a high proportion of the American population cannot afford them.

Given that depression is usually screened and treated first in primary care settings, access to medical care is the first barrier to treatment that racial/ethnic minority groups face (D. R. Williams & Mohammed, 2009). From there, racial/ethnic minority groups experience barriers such as low detection rate of mental health disorders in comparison to Whites (Borowsky et al., 2000); language barriers for non-English speakers (Fiscella, Franks, Doescher, & Saver, 2002); use of screening measures not translated or validated for racial/ethnic minority groups; issues of trust related but not limited to underrepresentation of racial/ethnic minorities among mental health professionals, and cultural differences in understanding and treating mental health disorders (Miranda & Cooper, 2004). Overall, these and other barriers affect the access and quality of treatment racial/ethnic minority groups receive in respect to their mental health.

Racial and ethnic minority groups in the U. S. are also disproportionately affected by drug use disorders and carry a greater burden of drug-overdose related deaths (Disease Control, Prevention, & others, 2011). Addressing these health disparities also means addressing the social and economic conditions, which systemically reinforce these disparities and influence individual-level drug-use behaviors. Some evidence suggests that early-onset of drug use is predictive of poorer drug-use outcomes in emerging and later adulthood (C.-Y. Chen, O'Brien, & Anthony, 2005), but few studies have examined the age of drug use onset – later drug use behavior relationship outside of alcohol, tobacco and cannabis use (Anthony, Chen, & Storr, 2005). Thus, we choose to explore age of drug use onset for stimulants and opioids to extend what is known about drug use health disparities.

In the present study, we aim to explore some of the health disparities among different racial/ethnic groups using a nationally representative sample, the National Health and Nutrition Examination Survey (NHANES) 2015 – 2016.

## Methods

### Participants & Design

The present study gathered data from the Center for Disease Control and Prevention's (CDC) National Health and Nutrition Examination Survey (NHANES). Using the 2015-2016 NHANES dataset, we were able to investigate levels of depression, drug use, whether or not individuals had insurance, if they have sought out mental health services, based on racial/ethnic group. Data from 4,843 participants was gathered, with the average age of participants being 32.04 ( $SD = 24.87$ ) years old. The majority of participants were women (2478), Hispanic (1573), and made \$100,000 or more (796). Table 1 presents the breakdown of the sample size and average age based on race/ethnicity.

## Measures

To assess depression symptoms, we used the depression module from the full Patient Health Questionnaire (Kroenke, Spitzer, & Williams, 2001: PHQ). The PHQ-9 is a 9-item, self-report screening instrument. Participants are prompted by the stem “Over the last 2 weeks, how often have you been bothered by any of the following problems?” Sample questions include “Feeling down, depressed, or hopeless?” and “Thoughts that you would be better off dead or of hurting yourself in some way”. The module uses a 4-point scale that goes from 0 (not at all) to 3 (nearly every day). “Refuse to answer” and “Don’t know” options are also included. A single score is derived from the depression module by summing the responses for the 9 items. Scores can range from 0 to 27; higher scores reflect more severe depressive symptoms. Insurance coverage was assessed with the item “Are you covered by health insurance or some other kind of health care plan?” from the NHANES Health Insurance Questionnaire. Response choices included “Yes”, “No”, “Refused”, and “Don’t know”. Usage of mental health services was assessed with the item “During the past 12 months, have you seen or talked to a mental health professional such as a psychologist, psychiatrist, psychiatric nurse or clinical social worker about your health?” from the NHANES Hospital Utilization and Access to Care questionnaire. Response choices included “Yes”, “No”, “Refused”, and “Don’t know”. Age of first drug use variables were assessed with single items from the NHANES Drug Use Questionnaire (DUQ). For this study we created a composite measure for age of first stimulant use, by averaging the items “How old were you the first time you used cocaine, in any form?” and “How old were you the first time you used methamphetamine?” Age of first opioid use was assessed with the item “How old were you the first time you used heroin?” For each of the three drug use items, participants responded with a numerical value representing their age at first use, ranging from 0-59 or with “I don’t know.” Participants were also permitted to refuse answering any question on the DUQ.

## Data analysis

We used R (Version 3.5.1; R Core Team, 2018) and the R-packages *bindrcpp* (Version 0.2.2; Müller, 2018), *dplyr* (Version 0.7.8; Wickham, François, Henry, & Müller, 2018), *forcats* (Version 0.3.0; Wickham, 2018a), *ggplot2* (Version 3.1.0; Wickham, 2016), *here* (Version 0.1; Müller, 2017), *kableExtra* (Version 0.9.0; Zhu, n.d.), *papaja* (Version 0.1.0.9842; Aust & Barth, 2018), *purrr* (Version 0.2.5; Henry & Wickham, 2018), *readr* (Version 1.2.1; Wickham, Hester, & François, 2018), *rio* (Version 0.5.16; C.-h. Chan, Chan, Leeper, & Becker, 2018), *stringr* (Version 1.3.1; Wickham, 2018b), *tibble* (Version 1.4.2; Müller & Wickham, 2018), *tidyr* (Version 0.8.2; Wickham & Henry, 2018), and *tidyverse* (Version 1.2.1; Wickham, 2017) for all our analyses.

To explore health disparities among racial/ethnic groups, we employed a variety of data visualizations with our variables of interest. First, we plotted the frequency of substance use accross ethnicities according to opioid and stimulant use. Then we plotted distributions of age of first substance use for each ethnic group. To assess depression, we first plotted average depression scores by ethnic group and explored the association of age of first substance use and depression scores accross ethnic groups by fitting a linear regression in our plot. Lastly, we explored differences in depression scores among the racial categories according to whether or not individuals had insurance coverage or has reported using mental health services.

## Results

The average depression score and average age of first opioid and stimulant use for each racial/ethnic group is presented in Table 2. Briefly, White individuals had the earliest age of first use for opioids (21.60 years). Interestingly, Asian individuals had the lowest average depression score (3.01) and started using both opioids and stimulants later than all other groups (mean age 27.86, 21.73 years respectively). Individuals who reported another

race or multiracial reported the earliest age of first use for stimulants (18.93 years) and highest reported depression score (3.47).

### **Disparities in opioid and stimulant use**

In our sample, 215 participants reported either opioid or stimulant use. To explore racial/ethnic disparities in reported use, we plotted the number of individuals who reported using opioids and/or stimulants based on their racial category. As shown in Figure 1, more Hispanic participants reported opioid and stimulant use, whereas Asian participants had the lowest reported frequency of use for both substances. To further explore disparities in substance use, we visualized the age of first use by ethnicity (see Figure 2). This plot shows that across both substance types Hispanic individuals have the most variability in their age of first use. Additionally, Asian participants have much more variability in their age of first opioid use compared to stimulants. This observation is slightly observed among Black and White individuals. Overall, it seems that the majority of participants reported their age of first use to be between ages 15-25 for both substance types. However, it is more pronounced for reported stimulant use.

Since depression and substance are strongly linked in the literature, we also produced a plot to explore racial disparities in average depression scores by substance type. As you can see in Figure 3, Asian individuals that reported stimulant use had the highest reported average depression score compared to all other groups. For opioids, White participants had the highest reported depression score. To further explore the relation between age of first substance use and depression, we graphed age of first use by the total depression score and faceted by substance type. Then, we overlaid a best fit linear regression onto the graph according to racial groups (see Figure 4). Interestingly, the plot suggests that there is a positive association between age of first opioid use and depression for Black individuals and a negative association for all other racial groups. Additionally, we observed a positive relationship between age of first stimulant use and depression for all racial groups, however

the slope of the relationship was more robust for Asian individuals.

### **Disparities in mental health**

To investigate racial/ethnic disparities in mental health, we explored insurance coverage and reported usage of mental health services (MHS) in the last year by racial/ethnic group. As can be seen in Figure 5, individuals who had insurance coverage had, on average, greater depression scores than individuals who did not have insurance coverage. Among individuals who did not have insurance coverage, the ones who reported no usage of MHS in the last year had, on average, higher depression scores than individuals who did report use of MHS in the last year. Alternatively, the average depression score of individuals who had insurance coverage did not differ substantially between individuals who reported usage of MHS in the last year and individuals who reported no usage of MHS in the last year. When looking at the differences between racial/ethnic groups in regards to insurance coverage, we see that in each racial/ethnic group there were more insured individuals than uninsured individuals. However, when evaluating the percentages of insured and uninsured individuals between each racial/ethnic group, the differences were evident. For instance, the percentage of White individuals who were insured, 92.48%, was substantially higher than the percentage of Hispanic individuals who were insured, 77.13%. Among uninsured individuals, Black and Asian individuals who used MHS in the last year seemed to have much lower depression scores than their uninsured counterparts who did not use MHS in the last year. On the other hand, the discrepancy was much smaller between uninsured Hispanic and White individuals who used MHS in the last year than those who did not. In regards to insured individuals who reported use of MHS in the last year and those who did not, the differences were not as significant regardless of their racial/ethnic group, except for individuals who identified as Other or Multiracial.



## Discussion

The results from this exploratory study provide a description of racial and ethnic disparities based on recent data from a national U.S. sample from 2015-2016. Strengths of this study include the nationally representative sample, specifically exploring health disparities in drugs have been overlooked until very recently (i.e., opioids and stimulants), and identifying health disparities based on access to adequate supports through insurance coverage. Results indicate that having insurance coverage did not necessarily relate to lower depression scores, in fact individuals who reported having insurance reported higher depression scores, on average. This measure of insurance may not have captured whether coverage was adequate, affordable, and if other systemic factors such as a stigma, cultural values, or racism might have affected depression outcomes. An additional limitation of this study, is that the depression measure used in the NHANES study has not shown evidence for cross-cultural validation, nor do we know if this measure was administered in languages other than English. Finally, results indicated that health disparities in opioid and stimulant drug use and age of onset for first drug use exist in racial and ethnic minority groups within the U. S. Hispanic individuals endorsed the greatest levels of opioid and stimulant use and the most variability in onset of drug use for both of these substances. Asian individuals reported the lowest levels of opioid and stimulant use, which is in line with a recent findings from the CDC (Disease Control et al., 2011). Future studies should address the relationship between access to mental health services and substance abuse treatment and age of onset, chronicity, and frequency of drug use, as individuals may have alternate options when struggling with mental health issues. Moreover, research on health disparities is incomplete without the inclusion of systemic variables, including socioeconomic conditions, and the perceived discrimination within the systems that are intended to support prevention, treatment, and rehabilitation of mental health conditions.

## References

- Anthony, J. C., Chen, C. Y., & Storr, C. L. (2005). Drug dependence epidemiology. *Clinical Neuroscience Research*, 2(5), 55–68.
- Aust, F., & Barth, M. (2018). *papaja: Create APA manuscripts with R Markdown*. Retrieved from <https://github.com/crsh/papaja>
- Borowsky, S. J., Rubenstein, L. V., Meredith, L. S., Camp, P., Jackson-Triche, M., & Wells, K. B. (2000). Who is at risk of nondetection of mental health problems in primary care? *Journal of General Internal Medicine*, 15(6), 381–388.
- Chan, C.-h., Chan, G. C., Leeper, T. J., & Becker, J. (2018). *Rio: A swiss-army knife for data file i/o*.
- Chen, C.-Y., O’Brien, M. S., & Anthony, J. C. (2005). Who becomes cannabis dependent soon after onset of use? Epidemiological evidence from the united states: 2000–2001. *Drug and Alcohol Dependence*, 79(1), 11–22.
- Disease Control, C. for, Prevention, & others. (2011). CDC health disparities and inequalities report: United states. *Http://Www. Cdc. Gov/Mmwr/Pdf/Other/Su6001. Pdf*.
- Fiscella, K., Franks, P., Doescher, M. P., & Saver, B. G. (2002). Disparities in health care by race, ethnicity, and language among the insured: Findings from a national sample. *Medical Care*, 52–59.
- Henry, L., & Wickham, H. (2018). *Purrr: Functional programming tools*. Retrieved from <https://CRAN.R-project.org/package=purrr>
- Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The phq-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine*, 16(9), 606–613.
- Levine, R. S., Foster, J. E., Fullilove, R. E., Fullilove, M. T., Briggs, N. C., Hull, P. C., ... Hennekens, C. H. (2016). Black-white inequalities in mortality and life expectancy,

- 1933–1999: Implications for healthy people 2010. *Public Health Reports*.
- Miranda, J., & Cooper, L. A. (2004). Disparities in care for depression among primary care patients. *Journal of General Internal Medicine*, 19(2), 120–126.
- Müller, K. (2017). *Here: A simpler way to find your files*. Retrieved from <https://CRAN.R-project.org/package=here>
- Müller, K. (2018). *Bindrcpp: An 'rcpp' interface to active bindings*. Retrieved from <https://CRAN.R-project.org/package=bindrcpp>
- Müller, K., & Wickham, H. (2018). *Tibble: Simple data frames*. Retrieved from <https://CRAN.R-project.org/package=tibble>
- R Core Team. (2018). *R: A language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing. Retrieved from <https://www.R-project.org/>
- WHO. (2018). Depression. Retrieved from <http://www.who.int/news-room/fact-sheets/detail/depression>
- Wickham, H. (2016). *Ggplot2: Elegant graphics for data analysis*. Springer-Verlag New York. Retrieved from <http://ggplot2.org>
- Wickham, H. (2017). *Tidyverse: Easily install and load the 'tidyverse'*. Retrieved from <https://CRAN.R-project.org/package=tidyverse>
- Wickham, H. (2018a). *Forcats: Tools for working with categorical variables (factors)*. Retrieved from <https://CRAN.R-project.org/package=forcats>
- Wickham, H. (2018b). *Stringr: Simple, consistent wrappers for common string operations*. Retrieved from <https://CRAN.R-project.org/package=stringr>
- Wickham, H., & Henry, L. (2018). *Tidyr: Easily tidy data with 'spread()' and 'gather()' functions*. Retrieved from <https://CRAN.R-project.org/package=tidyr>
- Wickham, H., François, R., Henry, L., & Müller, K. (2018). *Dplyr: A grammar of data*

*manipulation*. Retrieved from <https://CRAN.R-project.org/package=dplyr>

Wickham, H., Hester, J., & Francois, R. (2018). *Readr: Read rectangular text data*.

Retrieved from <https://CRAN.R-project.org/package=readr>

Williams, D. R., & Mohammed, S. A. (2009). Discrimination and racial disparities in health: Evidence and needed research. *Journal of Behavioral Medicine*, 32(1), 20–47.

Zhu, H. (n.d.). *KableExtra: Construct complex table with 'kable' and pipe syntax*.

Table 1

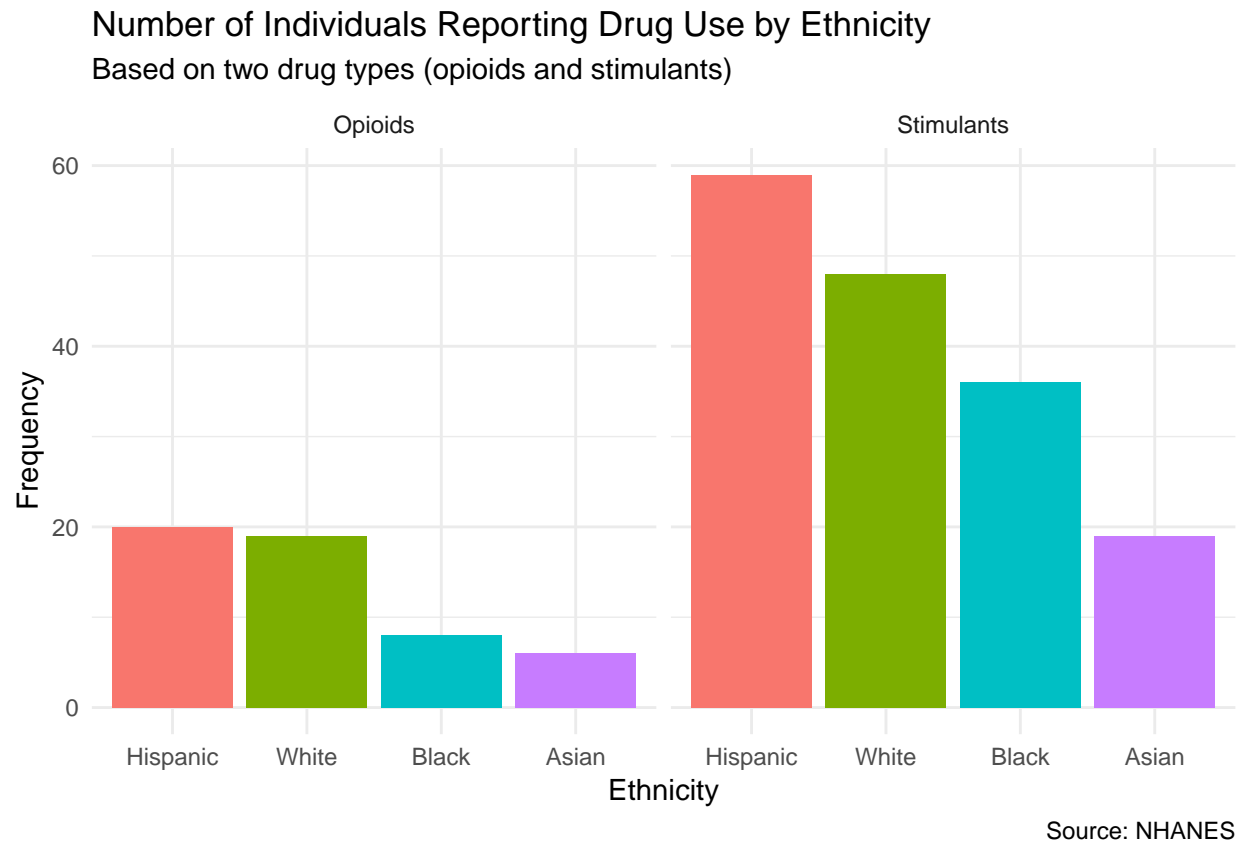
*Average age and sample sizes by  
ethnicity*

Ethnicity	Age	N
Asian	33.72	520
Black	30.97	1012
Hispanic	30.42	1573
Other/Multiracial	22.82	234
White	35.32	1504

Table 2

*Average depression score and age of first opioid and stimulant use by ethnicity*

Ethnicity	Depression Score	Opioid Use	Stimulant Use
Asian	3.01	27.86	21.73
Black	3.16	22.18	20.30
Hispanic	3.29	25.81	21.43
Other/Multiracial	3.47	22.33	18.93
White	3.43	21.60	20.23

*Figure 1*

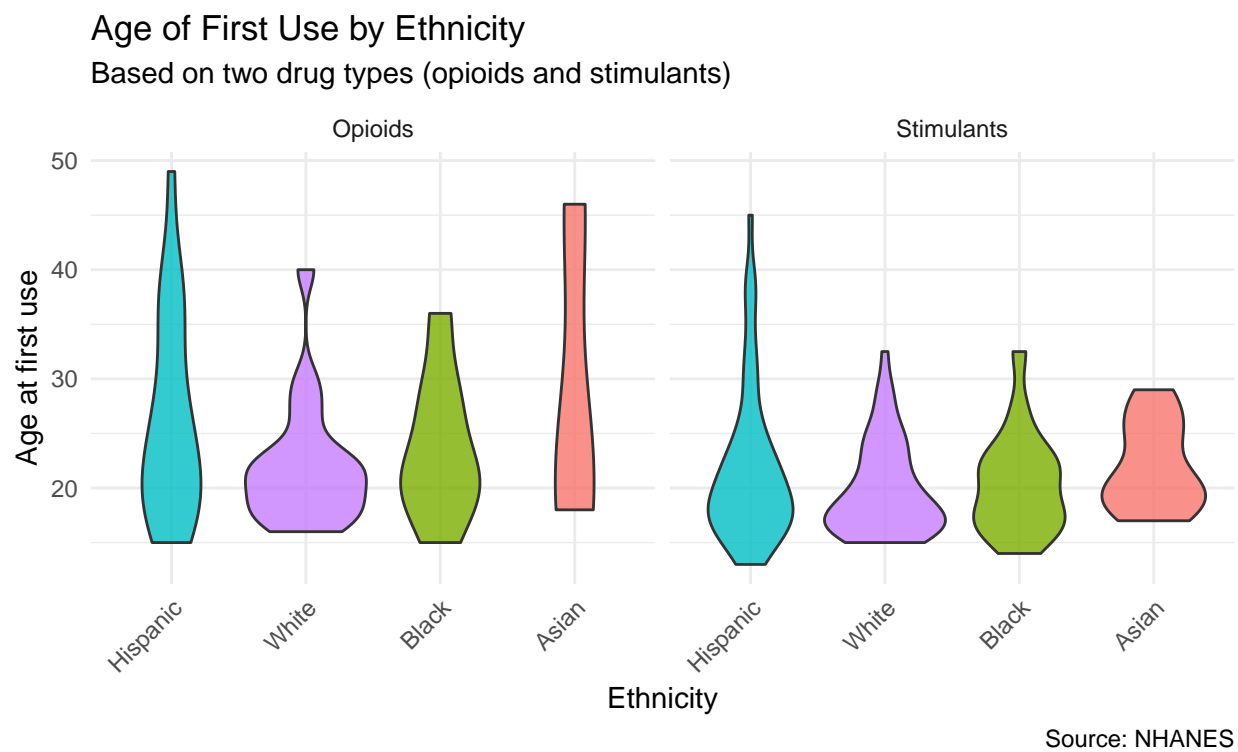
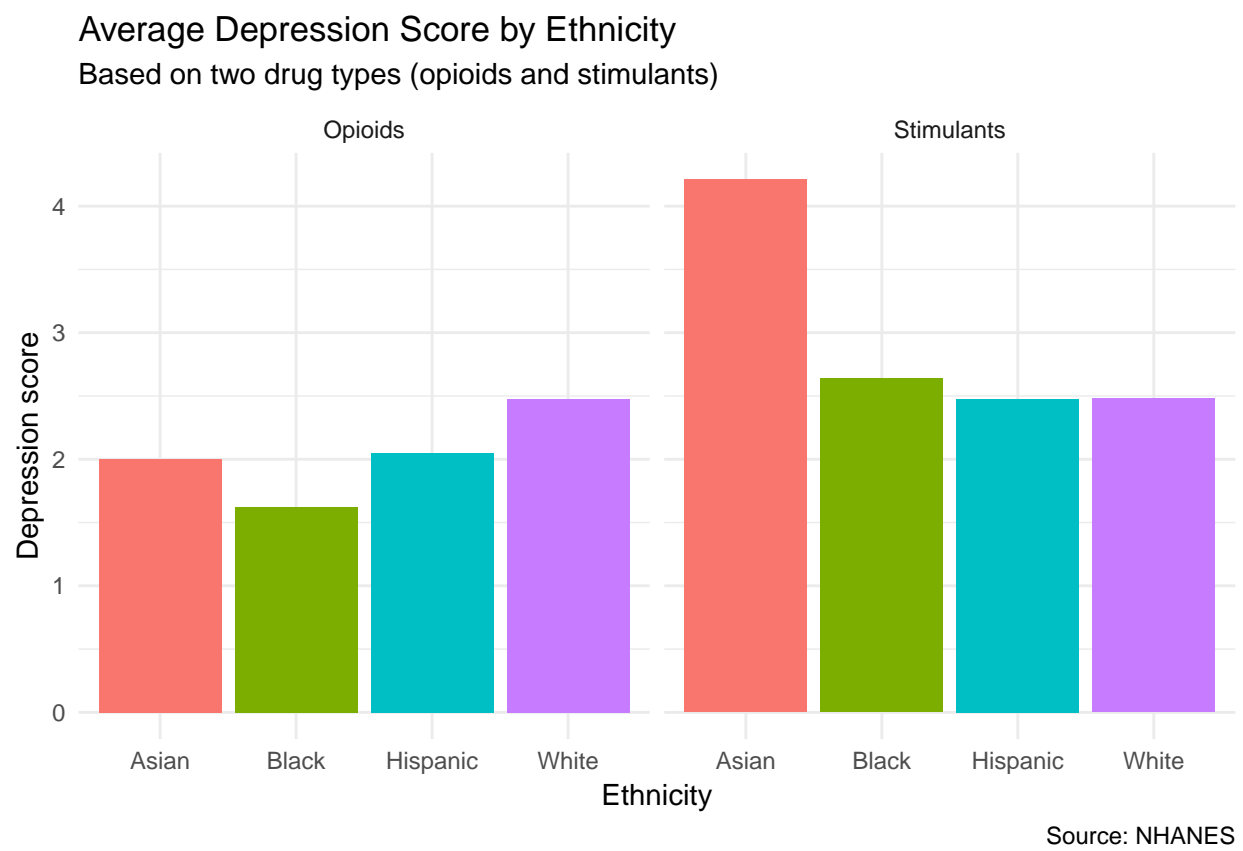


Figure 2



*Figure 3*

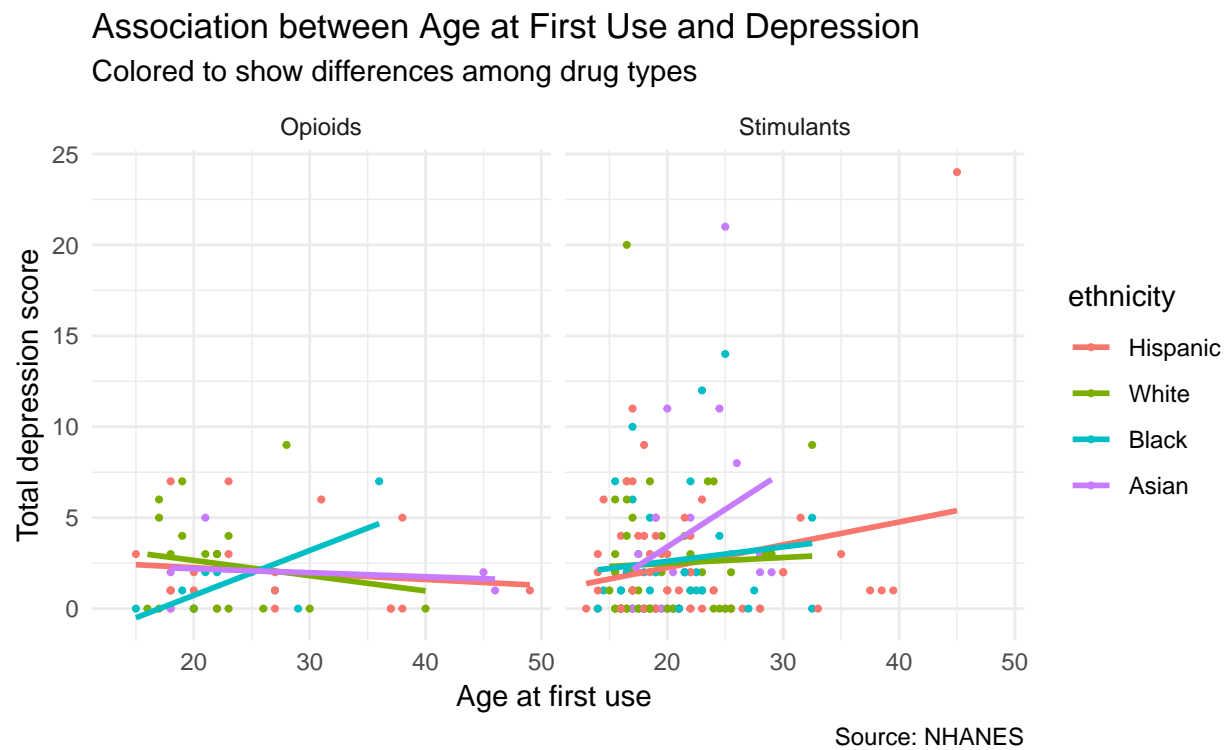


Figure 4

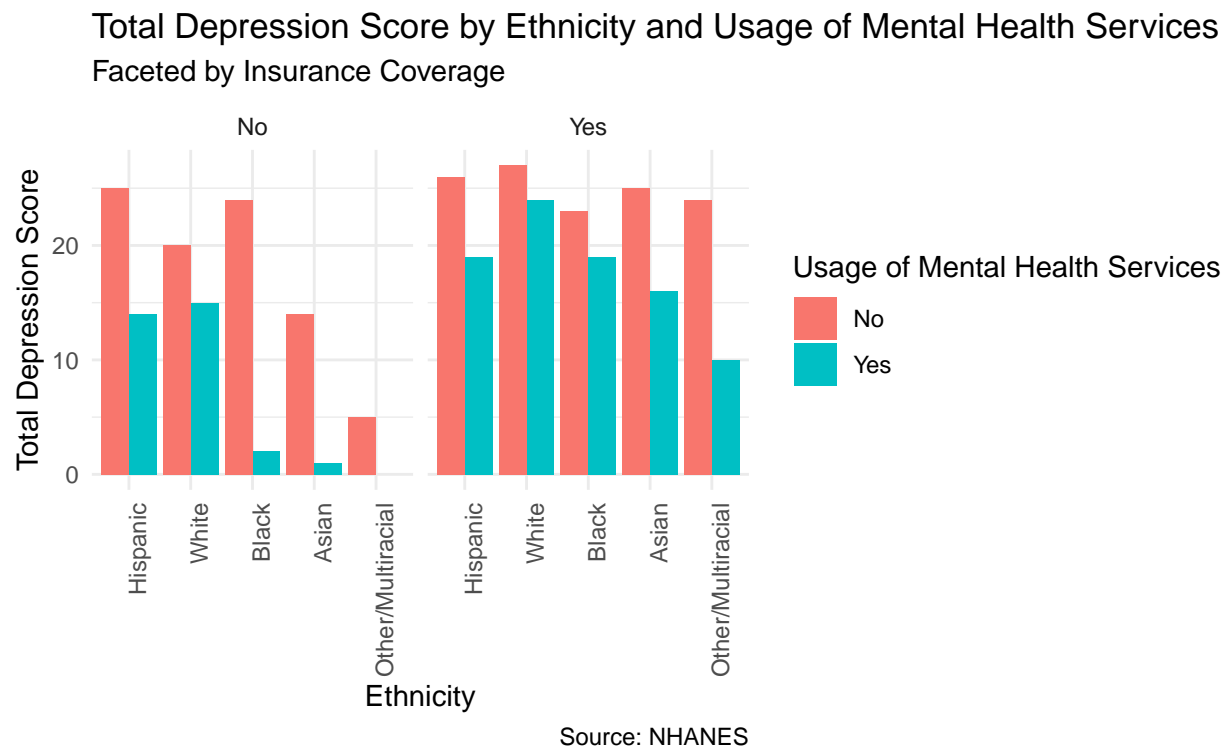


Figure 5