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Opioid Abuse in Rural Communities Among Adolescents With Bipolar Disorder

Sherlina Daishernai Holland
Walden University

Walden University

College of Health Sciences

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Sherlina Holland

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Review Committee
Dr. Patrick Dunn, Committee Chairperson, Public Health Faculty
Dr. Srikanta Banerjee, Committee Member, Public Health Faculty
Dr. Jagdish Khubchandani, University Reviewer, Public Health Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
2019

Abstract

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MPH, Grand Canyon University, 2014

BS, Lincoln University, 2012

Doctoral Study Submitted in Partial Fulfillment

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Doctor of Public Health

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Abstract

Low population density in rural areas makes it difficult to deliver services to people with mental health problems and nonmedical prescription opioid abuse remains a problem in the United States. The purpose of this cross-sectional study was to determine whether a parent's socioeconomic status affected care opportunities for children 12 to 17 years of age and whether bipolar disorder increased the likelihood of substance abuse in those children. The theory of reasoned action/planned behavior provided the framework for the study. Secondary data from the Interuniversity Consortium for Political and Social Research 36361 data system, specifically the National Survey on Drug Use and Health 2014, were collected that included information about the socioeconomic status of adolescents and their parents. Cross-sectional analysis was used to analyze data. The first research examined the extent to which bipolar disorder influenced opioid abuse in those between the ages of 12- and-17. There was a nonsignificant association between the variables: chi-square probability values ($p > 0.05$) for mental health difficulties and ever-used pain relievers non-medically. There was a significant association between mental health and emotional difficulties at $p < 0.05$. The second research question examined whether a parent's socioeconomic status impacted the level of care opportunities for those 12- to- 17- years -old in relation to bipolar disorder in rural communities. Using multivariate logistic regression analysis, no significance was found between level- of-care opportunities and a parent's socioeconomic status. The findings of this study have potential to bring about social change by increasing clinician skills related to intervention planning related to opioid abuse in rural communities among adolescents with bipolar disorder.

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Dedication

This doctoral study is dedicated in memory of my father Sherwood Divan Holland Sr. My father passed away many years ago, before I even reached high school. Something my father has always said always stuck with me. He said, “Baby I want you to go to school and be the doctor that you want to be”. It is because of him and my drive of course that I have made it this far in my education and life. I always wanted to prove that I can be the best version of myself and make my father proud. I would also like to dedicate this study to my sister and best friend, who through it all pushed me when I felt as though I wanted to quit. Finally, this doctoral study is also dedicated to my mother who always listened to me and ultimately encourages me to keep pushing through my studies and life.

Acknowledgements

I would like to thank all my family and friends who listened to me talk about my pursuit to obtain my doctorate in public health and all that comes with that achievement. Thank you Dr. Dunn, Dr. Thron and all the other individuals within the public health department that aided in my efforts in completing my doctorate in public health.

This process has not been easy. It was filled with stressful moments, anxiety and frustration. However with all of that being said, I still wanted to continue on in study and complete my degree. This process has been extremely rewarding and I would not want to trade the experience with anything else.

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Section 1: Foundation of the Study and Literature Review

Introduction

According to Substance Abuse and Mental Health Administration (SAMHSA), 18.7% of residents of nonmetropolitan (rural) counties had some sort of mental illness in the past year (as cited in Rural Health Information Hub, 2017). Availability of mental health programs are mostly located in urban communities over rural (as cited in Rural Health Information Hub, 2017). Rural young adults experience greater unmet need for mental health and alcohol or drug treatment than their urban residents (Chavez et al., 2018). Low population density in rural areas makes it difficult to deliver services to targeted persons with special needs (Rainer, n.d.). From 2004 to 2013 rural counties experienced a 20% increase in mortality, while metropolitan areas experienced only a 7% increase (Rural Health Information Hub, 2017). There is still an increase in mortality rates in those adolescents suffering with mental illness (RHIH, 2017). The lack of mental health treatment affects many students, and more than 90% of children who die by suicide have a mental health condition (National Alliance on Mental Illness, 2018).

According to SAMHSA (2016), people with mental health disorders are more likely than people without mental health conditions; to experience an alcohol or substance use disorder (SUD). There are approximately 10.2 million cooccurring mental health and addiction disorders (National Alliance on Mental Illness [NAMI], 2018). Accelerated aging can be a factor of bipolar disorder, and early interventions can decrease those effects (Kessing et al., 2015). Bipolar disorder is a recurrent chronic disorder and is one of the main causes of disability among young people, leading to cognitive and functional impairment, which in turn raises mortality (Molina et al., 2017).

Problem Statement

An individual who experiences mental illness at a young age is more likely to experience mental health problems during his or her lifetime (NAMI, 2018). The U.S. Department of Health and Human Services (HHS) and Health Resources and Services Administration (HRSA), stated that 90 million residents live in designated Mental Health Professional Shortage Areas (MHPSAs; as cited in Rainer, n.d.). Low population density in rural areas makes it difficult to deliver services to people with mental health problems (Rainer, n.d.). Two thirds of adults with bipolar disorder show signs during adolescence and about one third of young people with serious mood problems, eventually develop bipolar disorder over time (Sale, Kirk & Youngstrom, 2017).

According to Skogen et al. (2014), the use of alcohol and drugs is prevalent among adolescents; however, little is known about the association between substance abuse and concurrent/ problematic mental health. Early debut of alcohol and drug use is associated with depression and other mental health problems (Skogen et al., 2014). It is important to acknowledge the importance of research involving bipolar disorder and substance abuse. There is a gap in current research whether availability in treatment/care in rural communities has an impeding impact on bipolar disorder and substance abuse (Gerrity, 2014).

Purpose of Study

The purpose of this study is to directly identify the association between opioid abuse and adolescent bipolar disorder. To conduct research to prove whether or not an association is found to develop interventions/ programs to affect social change within the adolescent and public health community. Further quantitative analysis of bipolar disorder and opioid abuse in rural communities and its association with availability and care can prove beneficial to create social

change. This social change has the potential of increasing clinician skills surrounding intervention planning for the rural community populations. This social change can alter; the negative impact that poor mental health has on early life (Reardon et al., 2017).

Research Questions and Hypotheses

The following research questions can aide in developing interventions that lessen the impact of substance abuse among adolescents with a mental health condition.

RQ1: To what extent does bipolar disorder influence opioid abuse in those between the ages of 12-17?

$H_0$1: Bipolar disorder in adolescents is not associated with opioid abuse in ages 12-17.

H_a1: Bipolar disorder in those between the ages of 12-17 years is associated with opioid abuse.

RQ2: How does a parent's socioeconomic status impact level of care opportunities for those 12-to-17-years-old (i.e., accessibility to psychiatrist and correct medication) as it pertains to bipolar disorder in rural communities?

$H_0$1: A parent's socioeconomic status will not impact the level of care opportunities effecting mental health care for 12-to-17-years-old in rural communities.

H_a1: A parent's socioeconomic status significantly impacts the level of care opportunities affecting those 12-to-17-years-old with bipolar disorder in rural communities.

Theoretical Foundation

The theory of reasoned action/ planned behavior is the ability to predict an individual's behavior by his or her attitude toward performing a behavior (Hackman & Knowlden, 2014). The theory of reasoned action/ planned behavior was used because I examined on whether

adolescent's behavior of using opioids will change once level of care opportunities are acknowledged/ altered. This theory includes subjective norms that can be contributed by social and environmental surroundings and an individual's perceptions on how he or she can control his or her own behavior (Hackman et al., 2014). The more positive the subjective norms, the greater the chance the individual will be able to control the behavior (Hackman et al., 2014). The theory of reasoned action/ planned behavior can be incorporated better form than other theories within this study. The theory of reasoned action/ planned behavior focuses on an individual's attitude towards a behavior, which refers to whether an individual holds a positive or negative view of the health behavior being examined (Hackman et al., 2014). An individuals' attitude is comprised of beliefs, knowledge, and attitude and it is a moderate predictor of behavioral intention (Hackman et al., 2014). The theory of reasoned action/ planned behavior can be used to determine the likelihood of an individual engaging in a behavior, by analyzing behavior and allowing the individual to come to the realization on what he or she is doing is harmful (Montano & Kasprzyk, 2015). Using this theory will ultimately increase the chances, that full understanding of the topic will be understood and why a person may use illegal substances that may have bipolar disorder. Theory of reasoned action/ planned behavior can predict a proportion of the variance in intention and predict a number of different health behaviors and intentions like sexual behavior and substance abuse (Montano & Kasprzyk, 2015). Figure 1 below shows the flow of the Theory of reasoned action/ planned behavior and the steps it would take to change a person's behavior.

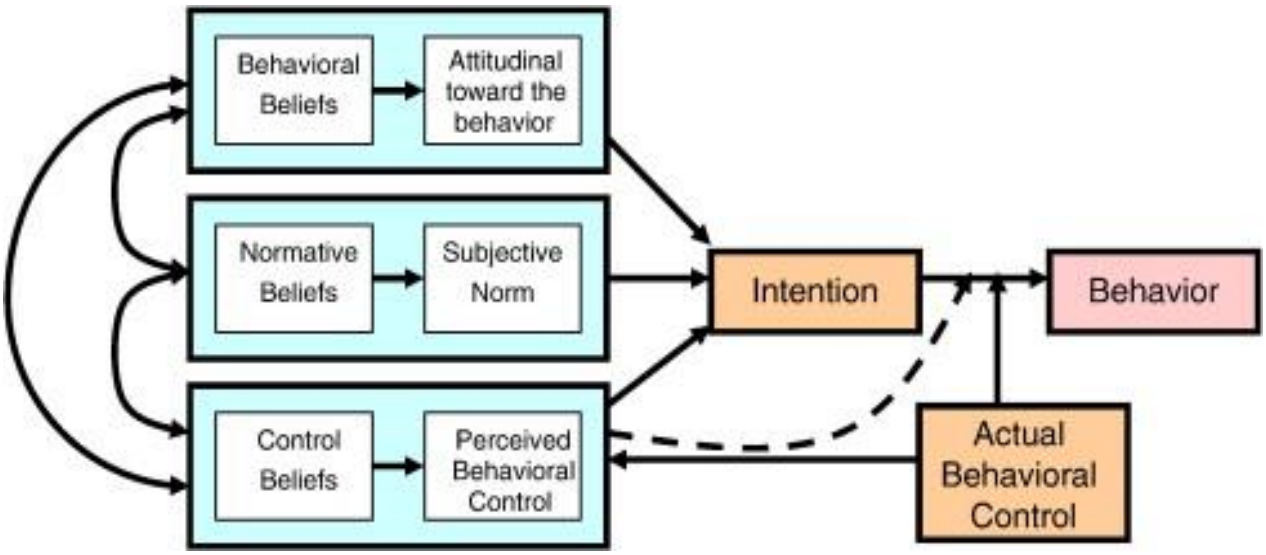

Figure 1. The theory of planned Behavior. Icek Ajzen, 1985, ver. 2006.

Nature of the Study

I chose the quantitative secondary data design to answer the research questions. Secondary data analyses can be used to provide insight on the need to conduct future studies on the topic. The study was descriptive as well as cross sectional in nature. Descriptive research is not experimental and where information is collected without changing the environment, meaning nothing is manipulated (The Office of Research Integrity, n.d.). Descriptive research can provide information about the changes in a person's health status, behavior, and attitudes in a particular group.

Applying a cross-sectional concept allowed me to be able to analyze data from a chosen population within a specific point in time. The RQ1 dependent variable was substance abuse or use of illegal substances, the independent variable was bipolar disorder, and the control variable was age category of 12-17. For RQ2 the dependent variable was level of care opportunities (i.e. accessibility to psychiatrist and correct medication), the independent variable was a parent's socioeconomic status and the control variable was location which was rural communities. The

variables were nominal/ categorical and continuous. The above variables aided in answering the research questions, which provided me with the assumption to reject or accept the null hypothesis.

Definitions

Access to medical care in rural communities: The timely use of personal health services to achieve the best possible health outcomes (Rural Health Information, 2017).

Adolescents: The World Health Organization defines an adolescent as any person between the ages 10 and 19 as cited in Csikszentmihalyi, (2018).

Bipolar disorder: A serious chronic mental illness characterized by unusual changes in mood energy and activity levels (SAMHSA, 2016).

Implementation: To carry out a situation/ place the plan established into action (Eldh et al., 2017).

Intervention: To intervene and or improve a situation (Eldh et al., 2017).

Lack of level of care opportunities (i.e. health insurance, substance abuse programs and mental health services): Individuals with reduced access to healthcare services (Rural Health Information, 2017)

Mortality: A term also used for death rate, or the number of deaths in a certain group of people in a certain period of time (National Cancer Institute, n.d.).

Opioid abuse/misuse: Using a prescription medication in a way that was not intended by a prescribing physician (Village Behavioral Health, n.d.).

Rural Communities: A low population density relative to its more urban counterpart (Curtin & Cohn, 2015).

Socioeconomic status: The social standing or class of an individual or group, and it can be measured as a combination of education income and occupation (American Psychological Association, n.d.).

Assumptions

I assumed that the National Survey on Drug Use and Health (NSDUH) of 2014 was based on the trends in the behavioral health of people aged 12-years-old and older in a civilian, noninstitutionalized population of the United States (Center for Behavioral Health Statistics and Quality, 2015). Because that the study was based on these guidelines, I assumed that the information collected was representative of all the states within the United States and it was only of those individual not incarcerated or under the age of 12 (Center for Behavioral Health Statistics and Quality, 2015). I assumed that the information gathered via survey was less likely to be biased, because the interviewing for the survey was done via audio computer-assisted self-interviewing (ACASI), which means the participants listen or read the questions and answer them honestly by him or herself (Center for Behavioral Health Statistics and Quality, 2015). It was assumed that because the data were collected by NSDUH of 2014, all information was gathered correctly and would be accurate. I assumed the techniques used for both RQ1 and RQ2 included the necessary coding to present an accurate result(s).

Scope and Delimitations

The scope of this study was descriptive and cross-sectional; the conclusions are only generalizable to rural communities; however, the communities can be across the United States. I focused on the subpopulation of adolescents aged 12 to 17 residing within the United States in rural communities that were surveyed by the NSDUH 2014 using the ICPSR 36361 data system.

Study Boundaries

NSDUH contains questions on a variety of topics, including type of drug used, type of care sought, as well as when did an individual first started misusing prescription drugs. I did not use geospatial mapping approaches. Geospatial mapping uses zip codes to distinguish between rural communities or a breakdown of individual states attributes. I did not use geospatial mapping because the data did not exist in the NSDUH. The variable that existed was the COUTYP2, which identifies the nonmetro portion of the survey that identifies rural areas.

Generalizability

The generalizability is limited to rural communities and those adolescents with a mental health condition suffering with opioid abuse. I focused on opioid abuse and adolescent mental health and whether an adolescent (12-17) with bipolar disorder is at a greater risk of using opioids to cope with his or her disorder. I also focused on a parent's socioeconomic status and whether it will affect the level of care an adolescent will receive once diagnosed with a cooccurring disorder like bipolar disorder and opioid abuse.

Significance

MDEs, occurs frequently in adolescents and is associated with NMPOU and opioid abuse/dependence (Edlund et al., 2015). Opioid abuse/use in ages 12-17 was at 6% within the past year and 8% reported past year MDE (Edlund et al., 2015). According to SAMHSA (2016), people with mental health disorders are more likely than people without mental health conditions to experience an alcohol or SUD. SAMHSA (2018) has developed a number of initiatives and programs to assist those individuals within rural communities like the Strategic Initiative, which focuses on health, home, and community. Although health initiatives have been established to reduce the mortality associated with mental health problems and to increase quality of life,

further focus must be placed on this topic to create a greater impact in society. This study has the potential of assisting individuals suffering from bipolar disorder and substance abuse issues. The percentage of deaths involving adolescent bipolar disorder and opioid abuse can be reduced. A new program/ initiative can be established that can help reduce opioid abuse as it pertains to bipolar disorder.

Despite being relatively rare, bipolar disorder can be a disabling illness due to its early onset and, severity on the given individual (Ferrari et al., 2016). Approximately two-thirds of bipolar disorder begins before age 19 within the United States and only1/3 in Europe (Post et al., 2017). There are approximately 10.2 million cooccurring mental health and addiction disorders (NAMI, 2018). Within the United States, 50% of youth aged 8-15 did not receive mental health services in the previous year (NAMI, 2018). The average delay between onset of symptoms and intervention is about 8-10 years (NAMI, 2018). Bipolar disorder within rural communities has not be thoroughly researched to provide insight on whether accurate/ efficient care can impact overall quality of life.

The burden of mental, neurological, and substance use disorders increased by 41% between the years of 1999 and 2010 that accounts for one in every 10 years of life decreased health globally (Patel et al., 2016). Kessing et al. (2015) found that at age 15, the remaining life expectancy was decreased by 12.7 years and 8.9 life years for men and women with bipolar disorder. Accelerated aging can be a factor of bipolar disorder, early intervention can be used to decrease those effects (Kessing et al., 2015). SAMHSA has a health initiative currently in implementation entitled, Prevention of Substance Abuse and Mental Illness, that promotes and implements preventive strategies to reduce the impact of mental SUDs within America (SAMSHA, 2016). Mental health programs are mostly located in urban communities over rural

(Rural Health Information Hub, 2017). Acceptability may impact mental health and create a barrier for a person receiving the care.

Social Change

A new program/ initiative can be established that can help reduce opioid abuse as it pertains to bipolar disorder. Further assistance needs to be provided to those affected by opioid abuse and a mental condition. Early intervention methods can aide in the efforts to decrease mortality and increase overall quality of life. This study has the potential of increasing effective care as well as informing healthcare workers on how to properly assist those individuals with a mental health condition who suffer with an opioid addiction.

Literature Review

Within this section I will explain the importance of ensuring care for adolescent mental health as it pertains to opioid abuse in rural communities. I will mental illness, especially bipolar disorder, opioid abuse, socioeconomic status, and location. I will describe the gaps in literature relating to access of care for those specified adolescents.

Mental Illness and Substance Abuse in Adolescents

Mental and SUDs impact individual's lives and can affect their health, families and communities wellbeing (SAMHSA, 2016). In 2015 over 33,000 people were killed by opioids, and in 2016 there were 53,000 overdose deaths (HHS, n.d.). Mental health is a concept that is culturally defined, but can be expressed as enjoyment of life, and ability to cope with daily stresses, sorrows, and sadness, as well as sense of connection to others (Sankar, Wani & Indumathi, 2017). There are more individuals needing mental health assistance than not. Mental health is an important aspect in individual's well-being and health (Sankar et al., 2017). An estimated 22.5 million Americans 12 and older have self-reported needing treatment for alcohol

drug use or a number of different illicit drugs (SAMHSA, 2016). According to the Center for Disease Control and Prevention (2018), adolescents aged 12-17 were identified as having current diagnoses of a 4.7% of illicit drug use disorder in the past year. Fewer than 1% of development assistance is used to aide in the care for those suffering with a mental or substance disorder (Patel et al., 2016).

Bipolar Disorder

Despite growing evidence that bipolar disorder often emerges in adolescence, the data are limited in terms of treatment patterns of youth with bipolar disorder in rural communities (Khazanov, Cui, Merikangas & Angst, 2015). Costello, He, Sampson, Kessler, and Merikangas (2014), stated that only a select few adolescents with psychiatric disorders receive treatment of any sort. From the few providers who administered care, only a few were specialized in in mental disorders (Costello et al., 2014). Early intervention methods/ techniques improve help-seeking behavior, which will increase the quality of life (Mitchell et al., 2016). A substantial proportion of youth with bipolar disorder do not receive treatment, and of those who do, many receive treatment for comorbid conditions like ADHD rather than for their mood-related symptoms like mania or depressive episodes (Khazanov et al., 2015). This identifies the need for proper treatment and the importance of clearly identifying proper diagnoses.

Opioid Abuse

Major depressive episode (MDE) is a risk factor in nonmedical prescription opioid use (NMPOU) among adolescents (Edlund et al., 2015). Edlund et al., 2015), focused on MDE and NMPOU and the effect it had on those individuals aged 12 to 17. On 71.9% of a adolescents' who had a co-occurring MDE and SUD receive treatment or substance abuse or mental health services, in the last year (SAMHSA, 2016). Jones (2017), concluded that improving access to

SUD treatment in primary settings is critical in combating the opioid use disorder epidemic. In 2010, health centers in rural areas had lower odds of providing on-site buprenorphine (Narcotic) treatment (Jones, 2017). There is a 45% higher rate of drug overdose in rural communities than in urban areas (Faul et al., 2015). Naloxone, which treats an opioid overdose, is less often used by EMT- basics, which are more commonly used in rural areas (Faul et al., 2015). This reduction or lack of treatment can be a barrier in reducing the amount of fatal overdoses associated with opioid. An estimated 2.1 million people had an opioid use disorder, which includes 1.8 million people with a prescription pain reliever use disorder and 0.6 million people with a heroin use disorder (Ahrnsbrak, Bose, Hedden, Lipari, & Park-Lee, 2017). The statistics on the number of individuals suffering with opioid use disorder and bipolar disorder shows the need for further research.

Parent's Socioeconomic Status

KJ, Sinha, Bhattacharjee, and Rai, (2015) concluded that there are many factors affecting adolescent bipolar disorder including parenting style, which may have a role in the onset and course of bipolar disorder. KJ et al., (2015) suggested that those students in a low socioeconomic status household are at higher risk of developing a mental health, condition especially bipolar disorder. Blackstock, Ki Byung, Mauk and McDonald (2018) revealed that financial difficulties are a barrier to care because there are direct and indirect costs associated with counseling. Mental health counseling for rural children can be expensive, and paying for it means either parents or a third party has to produce the funds required to obtain or continue care (Blackstock et al., 2018). Transportation can be a factor as well because a parent may not have the funds to support the travel back and forth to care (Blackstock et al., 2018). There are a higher percentage of all children in small/large rural areas than children in urban areas whose parents reported

experiencing financial difficulties, like difficulties in meeting basic needs such as food and housing, which can affect the amount of money left over for mental care (Robinson et al., 2017). Interventions are required to improve parents' identification of mental health problems with a child, which can reduce stigma and increase awareness of how to access services in the future (Reardon et al., 2017). Whether socioeconomic status has an impact in effective care is unclear and requires further study.

Rural Communities

Location can be a determinant factor in a person's ability to receive adequate care. Rural adolescents are less likely to have access to mental health services (Blackstock et al., 2018). Persons who live in rural areas have more reported health-related disparities than those in urban areas such as poorer health, more health risk behaviors as well as less access to health resources (Robinson et al., 2017). From a population health perspective, the mental health care system in the United States faces two fundamental challenges: (a) a lack of capacity and (b) an inequitable geographic distribution of services (Fortney et al., 2015). This can lead to reduced care in specific areas (Fortney et al., 2015). Robinson et al., (2017) found that there is a higher prevalence of mental, behavioral and developmental disorders among children in small rural areas (18.6%) than in urban areas (15.2%). Blackstock et al., (2018), expressed that rural children were more likely to receive a mental health prescription (8.0% vs. 6.4%) than they were to receive counseling (4.3% vs. 6.7%) when compared to urban adolescents. More adolescents may rely on medication for coping with a mental illness instead of other methods, which can lead to a misuse of opioids (Blackstock et al., 2018).

Literature Review Summary

There are gaps in adolescent bipolar disorder and opioid misuse as it pertains to implementation or initiatives/ programs to aid in the reduction of mortality within rural communities. There is a lack of information on the significance of early intervention methods as well how early intervention may or may not impact overall quality of life. Those adolescents who suffer with bipolar disorder sometimes seek illegal substances to cope with their illness, and it is not clear on whether a parent's socioeconomic status and location has an impact of care. Having identified these gaps within the literature review it is pertinent that continued research be conducted to further explain the answers to these concerns.

Summary

The above section included the literature review on the association between adolescent bipolar disorder and substance abuse particularly opioid abuse. I identified the gap in literature to show that location (i.e. rural communities) and, parent's socioeconomic status may be determinant factors in adolescents' ability to seek/ receive effective care to reduce the misuse of opioids. I identified the importance of this research by highlighting how adolescents with bipolar disorder have been affected in the past and the need for further implementation. I also identified the potential social change that could occur once the research is completed. The next section will include information on the methodology and design used to conduct the study.

Section 2: Research Design and Data Collection

Secondary data can be useful in gaining current information about adolescents affected with bipolar disorder. Using existing data can be cost effective; it allows the researcher to be able to analyze the data already in existence to address potentially new research that should be developed (Cheng, & Phillips, 2014). The following section includes information on the study design as well as the importance of this study.

Research Design and Rationale

The purpose of this quantitative/ cross-sectional study was to examine the determinants that affected adequate care for the adolescent with a mental condition. The secondary data that were used were from the ICPSR 36361 data system, specifically the NSDUH of 2014. NSDUH is a cross-sectional study rather than longitudinal, where the individuals were interviewed once and not followed for additional interviews in later years (HHS, 2014). The information was not repeated. The NSDUH series primarily measures the prevalence and correlates of drug use in the United States. The surveys are designed to provide quarterly, as well as annual estimates drug abuse/ use (HHS, 2014). I identified the numeric variables: COUTYP2 that identifies county metro non-metro status level- 3 (which is rural communities), IRFAMIN3 that identifies family income, CLINVST that is the number of times youth visited mental health clinic in the past year, and CATAG2 that is an age category. There were a number of different variables that were taken from this data set and used within the research. This data set includes national data that can be obtained to either prove or disprove the hypothesis.

Secondary Data Analysis Methodology

The technique used for RQ1 was the chi-square test. A chi-square test is used to determine the dependence between two variables. For RQ2 the logistic regression technique was used to compute an effective answer. Logistic regression analyses was used to determine the association on whether there was a lack of treatment for co-occurring disorders versus parent's socioeconomic status as well as the association between bipolar disorder and substance abuse.

Population

The population included adolescents' aged 12 to 17 in U.S. households. The survey provides information on the use of illicit drugs, alcohol, and tobacco use among those 12 and older. Based on the codebook ICPSR 36361 has a combined total of 67,901 surveys, from all states within the United States including the District of Columbia.

Sampling and Sampling Procedures

According to the NSDUH survey, the data included approximately 66,600 individuals who were surveyed across the United States. Eight states with the largest population (which together account for 48% of the total U.S. population aged 12 or older) were designated as large sample states (California, Florida, Illinois, Michigan, New York, Ohio, Pennsylvania, and Texas) with a target sample size of 3,600, while the remaining 42 states and the District of Columbia had target sample sizes of 900 (HHS et al., 2014). Although all states were included in this survey only focus on non-metro areas in each state were, used to clearly answer the research questions.

Sampling frame. The sampling frame included (a) 12 to 17 years of age individuals surveyed in NSDUH, (b) primarily rural communities in each state surveyed, (c) survey year

2014, (d) parents socioeconomic status, and (e) all races and ethnicities. This sample did not include individuals older than 18 years of age, even though the NSDUH included these numbers. The sample includes information on questions concerning treatment for both substance abuse and mental health-related disorders and history of drug use. My study was cross-sectional and descriptive.

Data accessibility and permissions. NSDUH data can be found with ease and accessed through the ICPSR website. This national database can be evaluated on a state by state basis. All questions can be downloaded and reviewed with no stipulations. No other data agreements were needed to access the data/ information used. I was required to create an account with ICPSR to access the database and confirm I was a Walden student.

Data Collection and Management

The 2014 NSDUH is the 34th in a series conducted over a period of time. The primary purpose of this survey was to measure the prevalence and correlates of drug use in the United States (HHS et al., 2014). This survey series includes information about the use of illicit drugs, alcohol, and tobacco among members of the U.S. civilian, noninstitutionalized population aged 12 or older (HHS et al., 2014). The survey also includes several modules of questions that focus on mental health issues (HHS et al., 2014).The 2014 sample was allocated to age groups as follows: 25% for youths aged 12 to 17, 25% for young adults aged 18 to 25, 15% for adults aged 26 to 34, 20% for adults aged 35 to 49, and 15% for adults aged 50 or older (HHS et al., 2014).

Instrumentation

I conducted a quantitative analysis of secondary data from ICPSR 36361 for the NSDUH 2014 survey to evaluate whether parents' socioeconomic status had any impact on the amount of care an adolescent can receive, as well as having a bipolar disorder and how that may impact the

increase of substance abuse. Reliability and validity for this analysis was performed by using chi square analysis between the variables to identify significance. Logistic regression was also used to identify importance in variables.

Operationalization of Variables

Table 1 shows the explanation of the variables used that were combined to create a new variable. The variables used were nominal and scaled within this analysis. The following table also shows the variables used within this study to answer the research questions. I used variables that were already recoded to provide myself with more accurate information. I combined variables that were associated with one another to reduce error and or missing values. The combined variables were TXEVER and TXDRONEV that will be renamed as *ever received treatment,* ANLEVER and ANLNOST that will be renamed as *ever used pain relievers non-medically* and AGE2.

Table 1

Operational Definitions of Variables

Name	Type of Measurement	Definition
Age	Nominal	Combination of age and age category
Ever used pain relievers non-medically	Nominal	Combination of ANLEVER and ANLNOST
ANALAGE	Scale	Age when first used pain relievers nomadically
Ever received treatment	Nominal	Combination of TXDRONEV and TXEVER
POVERTY2	Nominal	Poverty level (% of US census poverty threshold)

IRFAMIN3	Nominal	Recode- total family income
COUTYP2	Nominal	County metro/ non-metro status
HLTINDRG	Nominal	Drug abuse
HLTINMNT	Nominal	Mental or emotional difficulties
ANYMHED2	Nominal	Youth received education mental health service in past yr.
TXDRONAG	Scale	Age when first received treatment/ counseling for drug use

Data Analysis Plan

I analyzed the importance of effective timely care by using analyses like the chi-square and logistic regression tests. I was able to gain information on how adolescents with a mental condition (i.e. bipolar disorder) have an impact on substance use. I accessed the amount of time a youth (12-17) visited a physiatrist in the past year and overall where they able to access care, family income, location (non-metro i.e. rural community) and availability of programs.

Research Questions and Hypotheses

RQ1: To what extent does bipolar disorder influence opioid abuse in those between the ages of 12-17?

$H_0$1: Bipolar disorder in adolescents is not associated with opioid abuse in ages 12-17.

H_a1: Bipolar disorder in those between the ages of 12-17 years is associated with opioid abuse.

RQ2: How does a parent's socioeconomic status impact level of care opportunities for those 12 to 17 years old (i.e., accessibility to psychiatrist and correct medication) as it pertains to bipolar disorder in rural communities?

$H_0$1: A parent's socioeconomic status will not impact the level of care opportunities effecting mental health care for 12-17-years-old in rural communities.

H_a1: A parent's socioeconomic status significantly impacts the level of care opportunities affecting those 12-17-years-old with bipolar disorder in rural communities.

Analysis Techniques

I performed analyses to adequately answer the research questions. Within RQ1, the chi-square test will be used to directly identify the significance between mental disorder, age and drug abuse. RQ2 logistic regression was used to analyze the correlation between the variables and whether significance can be found between parent's socioeconomic status and ability to receive care.

Chi-Square. Using the chi-square test I was able to test relationships between categorical variables. The crosstabulation placed the two categorical variables simultaneously together, to compare the pattern of responses to what would be expected if the variables were truly independent of each other.

Logistic Regression analyses . Using the logistic regression technique, I was able to explain the patterns within RQ2. Logistic regression was used to identify the probability of association between the variables and whether I was able to identify on whether opioid abuse is affected by bipolar disorder.

Interpretation of Results

Using chi-square within RQ1 allowed the variables to be viewed using a crosstabulation table. The chi-square results was used to determine the results in RQ1 and whether the variables are independent or dependent of each other. The actual value and critical value was observed to aid in the efforts on whether the hypothesis will be accepted or rejected. In order to help with this analysis the chi-square test was analyzed at the 95% confidence level to determine the significance. I used logistic regression to be able to present visually in different forms on whether a statistically significance was present or not for RQ2. The interpretations of results were examined from the confidence level of 95%. Within logistic nominal regression model fitting information will be documented as well as the statistically significance. The P-value was used to identify the association between the variables in RQ1. The P-value allowed me to identify the association with a value of 1, identify if the association is absent if the value is 0 or creates a negative number.

Threats to Validity

The purpose is to reduce limitations of using ICPSR 36361 data for this investigation. The NSDUH contains an abundance of information from the surveys collected across the U.S., that allows for measuring of a wide variety of different topics and research agenda. The dataset has the following limitations: (a) 2011 through 2014 NSDUH estimates were based on weights that were post stratified to population control based on projections from the 2010 Census; (b) ICPSR 36361 data collection is subject to self-reporting on drug use and mental illness, recall/ truthfulness and, nonresponse biases that has the impact of losing design validity and, (c)

probability of missing information, that impacts the results external validity. Both internal and external validity are important in expressing quality and accuracy of the study.

External Validity

The external validity that was found in this study was the fact that some variables have missing components. Missing information can limit the accuracy of results produced. The missing data was not excluded, the respondent that left answers blank/refused to answer were included within the SPSS output to eliminate doubt involving accuracy of numbers.

Internal Validity

Internal validity problems exist when using surveillance data incorrectly. Choosing the wrong dataset, not having a predetermined goal for the study, how it will impact social change, and not handling study designs properly (Schlomer & Copp, 2014). The study was descriptive in nature internal validity should not be of concern. Internal validity focused on whether measurements methods have been altered inappropriately and or changed without acknowledgment. The data set used followed the standard guidelines and no measurements are repeated. All methods are free of judgment there was no barrier to effect the results as a whole, thus internal validity was not found.

Construct Validity

Using a multitude of analytic techniques was used it creates doubt in the found results. The statistics presented within this study are only as good as the reported data. The data collected was self-administered, there may be a reason for construct validity to be questioned. However, NSDUH reassures that due to the fact the survey/ questions were administered with ACASI, which is designed to provide the respondent with a highly private and confidential mode of

responding. Multiple tests were used to ensure the results would be as accurate as possible. The construct validity is not critical to propose error, being that the data were collected and presented accurately.

Ethical Procedures

This study is a Walden University project. I received the standard IRB approval from Walden University. I received confirmation to continue, after going through the IRB submission process. I submitted my proposal for review and corrections were made per revisions requested by Walden University's IRB.

Permissions

The Walden's University IRB approval number is 11-21-18-0668065. This project will serve as a doctoral capstone, Walden University IRB will oversee my capstone data analysis and results reporting.

Ethical Concerns

Ethical concerns that could arise from this study is how the data was handled by myself. For instance, was the data secured enough while that individuals who do not know how to handle sensitive information would not obtain the information? Another ethical concern could be how confidential was the collection of data in each individual state. The ICPSR 36361 data includes answers to each individual's response that was coded, so the concern of names or direct identifiers is not a concern.

Treatment of Data

All secondary data used followed the guidelines of Walden University Doctor of Public Health program. All data was investigated without bias and all direct identifiers were not included in the information used within the research study. To avoid any ethical issues, I used only the information given and will not attempt to decode the individual surveys. That would be a direct violation of HIPPA. All analyses were performed on my computer and was secured by my MacAfee data protection plan. All material was saved on an individual file to ensure material/findings was stored properly.

Summary

Section 2 mentioned the applied research methodology for secondary data, originally collected from NSDUH in rural communities within the United States. Next, a description of population investigated, sample examined, the research design, data collection procedure, data analysis, and the rationale for the data analysis techniques were presented for review. Section 2 presents the methodology used in the doctoral study, the next section presents results of the findings, relative to the two RQs I researched.

Section 3: Presentation of the Results and Findings

The purpose of this quantitative, cross-sectional study was to use secondary data to examine the determinant of adolescents' bipolar disorder in rural communities. I examined factors of age, parents' socioeconomic status, and location on how they can affect level of care and increase opioid abuse. Section 3 includes the results of statistical analysis (chi square and logistic regression) on data collected from across the United States. Eight states with the largest population (which together account for 48% of the total U.S. population aged 12 or older) were designated as large sample states (California, Florida, Illinois, Michigan, New York, Ohio, Pennsylvania, and Texas) with a target sample size of 3,600, while the remaining 42 states and the District of Columbia had target sample sizes of 900 (HHS et al., 2014). Although all states were included in this survey, I only focused on non-metro areas in each state. This section will include the results found from RQ1 using chi- square tests and RQ2 using logistic regression. I than conclude with a summary of the results found for both RQ1 and RQ2.

Data Collection of Secondary Data Set

The NSDUH series measures the prevalence and correlates of drug use in the United States (National Addiction & HIV Data Archive Program, 2016). The surveys are designed to provide quarterly, as well as annual, estimates of drug use and abuse. Information is provided on the use of illicit drugs, alcohol, and tobacco among members of U.S. households aged 12 and older (NAHDAP, 2016). Data were collected and prepared for release per Research Triangle Institute, Research Triangle Park, North Carolina.

Time Frame and Response Rates

The data collection occurred from January to December 2014. The results are provided by age subgroups. Substance use trends are presented for 2002 to 2014; however, for mental health issues they were only reported for 2008 to 2014.

Discrepancies in the Data Set

Although the design of the 2014 survey was similar to the design of the 1999 through 2001 surveys, there are methodological differences since 2002 that affected the estimates (NAHDAP, 2016). Each NSDUH respondent since 2002 has been given an incentive of $30 to participate; this change resulted in an improvement in the survey response rate (NAHDAP, 2016). Therefore, the data from 2002 and later should not be compared with data collected in 2001 or earlier to assess changes over time because of the increase in population data (NAHDAP, 2016).

For the 2008 survey, adult mental health questions were added to measure symptoms of psychological distress in the past 30 days and suicidal ideation (NAHDAP, 2016). In 2008, a split-sample design also was included to administer separate sets of questions (WHODAS vs. SDS) to assess impairment due to mental health problems.

The coordinated design for 2014 through 2017 included a 50% overlap in area segments within each successive 2-year period from 2014 through 2017 (NAHDAP, 2016). The designed overlap slightly increased the precision of estimates of year-to-year trends because of the expected small but positive correlation resulting from the overlapping area segments between successive survey years (NAHDAP, 2016).

Missing data. The data that are missing due to non-response to questions or a response of other were, included. Because the missing data were included in the data set, there was no bias. Some variables were re-coded using statistical imputation (NSDUH, 2014.). Statistical imputation was performed following logical inference to replace missing responses (NSDUH, 2014). For each imputation-revised variable, a corresponding imputation indicator variable indicates whether a case's value on the variable resulted from an interview response or was imputed (NSDUH, 2014). Missing values for some demographic variables were imputed by the unweighted hot-deck technique used in previous surveys.

Survey questions. The complete survey of questions used within the dataset from NSDUH can be found in appendix. Questions included age at first use as well as lifetime, annual, and past-month usage for the drug classes such as marijuana, cocaine, hallucinogens, heroin, inhalants, alcohol, tobacco, and nonmedical use of prescription drugs, (i.e., pain relievers, tranquilizers, stimulants, and sedatives; NAHDAP, 2016). The survey covered substance abuse treatment history and perceived need for treatment (NAHDAP, 2016). The survey included questions concerning treatment for both substance abuse and mental health-related disorders. Respondents were also asked about personal and family income sources and amounts, health care access and coverage, illegal activities and arrest record, problems resulting from the use of drugs, and needle-sharing (NAHDAP, 2016).

Descriptive Demographics of the Sample

In 2014 the NSDUH surveyed an estimated sample size number of 340,000 adolescents ages 12 to 17 in 2014 within the United States. These adolescents had SUD and an MDE in the past year. The specific number of adolescents 12 through 17 are displayed below in Figure 2.

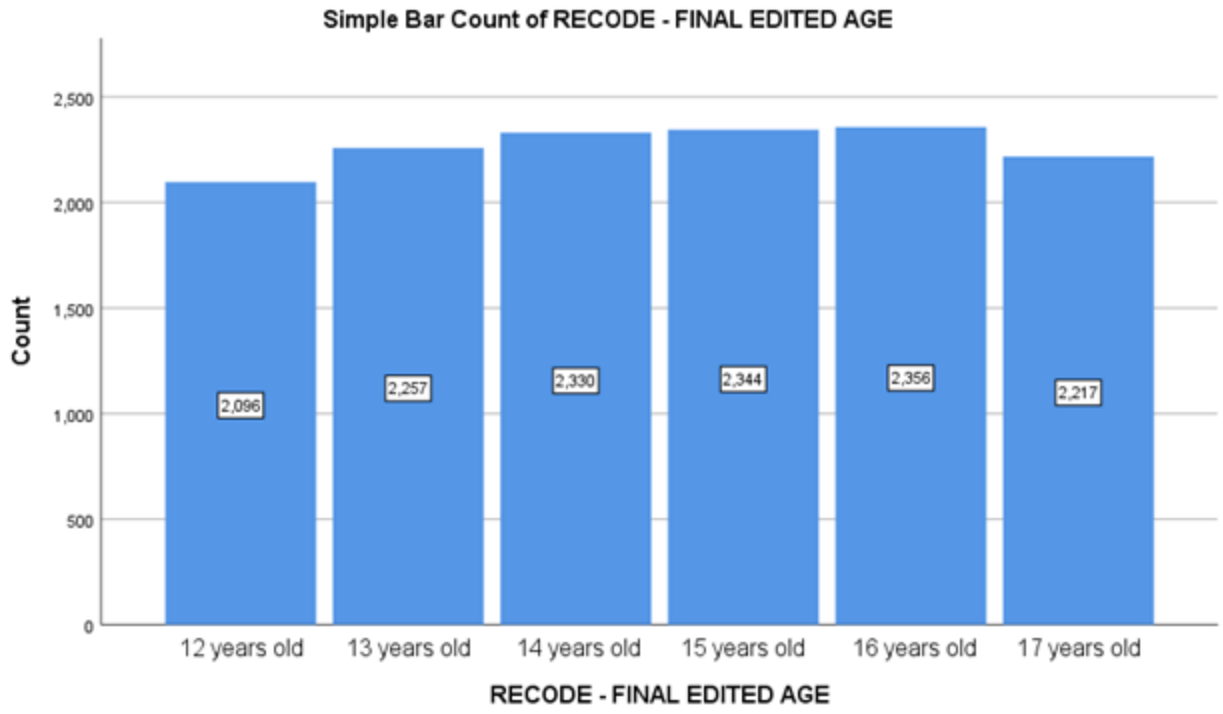

Figure 2. Final Edited Age

Sample Characteristics

Table 2 shows the correlations between the variables chosen to use within this doctoral study. Developing a correlations table shows visuals to the researcher where there is known significance between the variables. That can be used to better understand if a significance can be found. The following table includes significant correlation between the variables ever used drugs non-medically, age and total family income it was found to be significant at the 0.00 level, based on the correlation significance found at the 0.01 level. Mental difficulties were found to have a significant correlation at the 0.00 level with total family income. County non-metro area had a positive correlation between total family income. Poverty level had a positive correlation at the 0.00 level with ever used drugs non-medically, age, and total family income. These positive correlations found at the 0.01 show that there was significance between the variables compared.

Table 2

Correlations

		Ever Used Pain Relievers non-medically	Ever Received Treatment	RECODE - IMP.REVISED - TOT FAM INCOME
Ever Used Pain Relievers non-medically	Pearson Correlation	1	.400	.046**
	Sig. (2-tailed)		.432	.000
	N	7931	6	7931
Ever Received Treatment	Pearson Correlation	.400	1	.304
	Sig. (2-tailed)	.432		.080
	N	6	34	34
RECODE - IMP.REVISED - TOT FAM INCOME	Pearson Correlation	.046**	.304	1
	Sig. (2-tailed)	.000	.080	
	N	7931	34	55271
MENTAL OR EMOTIONAL DIFFICULTIES	Pearson Correlation	-.002	-.127	-.165**
	Sig. (2-tailed)	.898	.651	.000
	N	3463	15	25256
RECODE - FINAL EDITED AGE	Pearson Correlation	.061**	.146	.023**
	Sig. (2-tailed)	.000	.408	.000
	N	7931	34	55271
COUNTY METRO/NONMETRO STATUS (3-LEVEL)	Pearson Correlation	.006	-.088	-.090**
	Sig. (2-tailed)	.583	.620	.000
	N	7931	34	55271
POVERTY LEVEL (% OF US CENSUS POVERTY THRESHOLD)	Pearson Correlation	.041**	.243	.872**
	Sig. (2-tailed)	.000	.166	.000
	N	7865	34	54751

		MENTAL OR EMOTIONAL DIFFICULTIES	RECODE - FINAL EDITED AGE	COUNTY METRO/NONMETRO STATUS (3-LEVEL)
Ever Used Pain	Pearson Correlation	-.002	.061**	.006

Relievers non-medically	Sig. (2-tailed)	.898	.000	.583
	N	3463	7931	7931
Ever Received	Pearson Correlation	-.127	.146	-.088
Treatment	Sig. (2-tailed)	.651	.408	.620
	N	15	34	34
RECODE -	Pearson Correlation	-.165**	.023**	-.090**
IMP.REVISED - TOT	Sig. (2-tailed)	.000	.000	.000
FAM INCOME	N	25256	55271	55271
MENTAL OR	Pearson Correlation	1	.000	.048**
EMOTIONAL	Sig. (2-tailed)		.963	.000
DIFFICULTIES	N	25256	25256	25256
RECODE - FINAL	Pearson Correlation	.000	1	.012**
EDITED AGE	Sig. (2-tailed)	.963		.005
	N	25256	55271	55271
COUNTY	Pearson Correlation	.048**	.012**	1
METRO/NONMETRO	Sig. (2-tailed)	.000	.005	
STATUS (3-LEVEL)	N	25256	55271	55271
POVERTY LEVEL (%	Pearson Correlation	-.154**	.119**	-.056**
OF US CENSUS	Sig. (2-tailed)	.000	.000	.000
POVERTY	N	25042	54751	54751
THRESHOLD)				

		POVERTY LEVEL (% OF US CENSUS POVERTY THRESHOLD)
Ever Used Pain Relievers non-medically	Pearson Correlation	.041**
	Sig. (2-tailed)	.000
	N	7865
Ever Received Treatment	Pearson Correlation	.243
	Sig. (2-tailed)	.166
	N	34
RECODE - IMP.REVISED - TOT FAM INCOME	Pearson Correlation	.872**
	Sig. (2-tailed)	.000
	N	54751
MENTAL OR EMOTIONAL DIFFICULTIES	Pearson Correlation	-.154**
	Sig. (2-tailed)	.000
	N	25042
RECODE - FINAL EDITED AGE	Pearson Correlation	.119**

	Sig. (2-tailed)	.000
	N	54751
COUNTY METRO/NONMETRO STATUS (3-LEVEL)	Pearson Correlation	-.056**
	Sig. (2-tailed)	.000
	N	54751
POVERTY LEVEL (% OF US CENSUS POVERTY THRESHOLD)	Pearson Correlation	1
	Sig. (2-tailed)	
	N	54751

**. Correlation is significant at the 0.01 level (2-tailed).

Study Results

The results of the multivariate correlations justified the need for further investigation/ analysis. Being that multiple variables were found to have a significant value, shows that a more intricate analysis should be done to prove or disprove the association between the variables. This subsection will include statistical assumptions and results of the two RQs presented.

Research Question 1

RQ 1 asked the following: To what extent does bipolar disorder influence opioid abuse in those between the ages of 12-17?

Statistical assumptions. I analyzed the data for RQ1 using crosstabs and Pearson's chi-square. There are five assumptions that chi-square test includes which are (a) individual level data, (b) mutually exclusive categories, (c) independence, (d) nominal or ordinal categories and (e) values that should be for or more in 80% of the cells (McHugh, 2013). All the chi-square assumptions were met due to the fact the variables used were all nominal, independent and had cell counts with more than five individuals.

Crosstab and effect size results. Table 5 showed the subset of adolescents surveyed ages 12-17 had a non-significant chi-square probability values ($p > 0.05$) for mental health difficulties and ever used pain relievers non-medically. However, there was a significant

association between mental health and emotional difficulties and ages between 12 and 17 ($p < 0.05$), this can be shown in table 5. Values where it reads 2.00, 3.00, 4.00, 5.00, 6.00, 7.00 are equivalent to age 12= 2.00, 13= 3.00, 14= 4.00, 15= 5.00, 16= 6.00, and 17= 7.00. The results of the analysis are unclear; with a significant association between the variables mental health and age 12-17, there is no association between mental health difficulties and ever used pain relievers non-medically. The Pearson chi-square significance was .955 for the association between mental or emotional difficulties and ever used pain reliever non-medically. This value disproves that there is an association between the two variables. When the chi square test was also completed for the association between mental or emotional difficulties and age the Pearson chi square significant value was .000. Because the *P* value was less than .05 for the association between mental health and age, but greater than .05 for the association between mental health and misuse of pain relievers (i.e., opioids), the research question proposed has to be rejected. The significance is not fully incorporated between all values; thus, further investigation should be conducted. This association shows that there is a need for additional testing to prove or disprove an association to, answer the research question correctly. The further investigation into the individual variables could identify whether a significance can be found between age (12-17), drug misuse, and bipolar disorder. Additional statistical tests could prove to be beneficial in answer the research question correctly.

Table 3 (NSDUH, 2014)

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent

RECODE - FINAL EDITED AGE * MENTAL OR EMOTIONAL DIFFICULTIES	25256	45.7%	30015	54.3%	55271	100.0%
Ever Used Pain Relievers non-medically * MENTAL OR EMOTIONAL DIFFICULTIES	3463	6.3%	51808	93.7%	55271	100.0%

Table 4 (NSDUH, 2014)

RECODE - FINAL EDITED AGE * MENTAL OR EMOTIONAL DIFFICULTIES

Crosstab

			MENTAL OR EMOTIONAL DIFFICULTIES		
			Yes	No	Total
RECODE - FINAL EDITED AGE	Respondent is 12 years old	Count	886	67	953
		% within RECODE - FINAL EDITED AGE	93.0%	7.0%	100.0%
	Respondent is 13 years old	Count	999	68	1067
		% within RECODE - FINAL EDITED AGE	93.6%	6.4%	100.0%
	Respondent is 14 years old	Count	1025	96	1121
		% within RECODE - FINAL EDITED AGE	91.4%	8.6%	100.0%
	Respondent is 15 years old	Count	974	94	1068
		% within RECODE - FINAL EDITED AGE	91.2%	8.8%	100.0%
	Respondent is 16 years old	Count	1038	81	1119
		% within RECODE - FINAL EDITED AGE	92.8%	7.2%	100.0%

Respondent is 17 years old	Count	953	95	1048
	% within RECODE - FINAL EDITED AGE	90.9%	9.1%	100.0%
Respondent is 18 years old	Count	541	83	624
	% within RECODE - FINAL EDITED AGE	86.7%	13.3%	100.0%
Respondent is 19 years old	Count	444	80	524
	% within RECODE - FINAL EDITED AGE	84.7%	15.3%	100.0%
Respondent is 20 years old	Count	479	102	581
	% within RECODE - FINAL EDITED AGE	82.4%	17.6%	100.0%
Respondent is 21 years old	Count	500	104	604
	% within RECODE - FINAL EDITED AGE	82.8%	17.2%	100.0%
Respondent is 22 or 23 years old	Count	1029	203	1232
	% within RECODE - FINAL EDITED AGE	83.5%	16.5%	100.0%
Respondent is 24 or 25 years old	Count	1140	187	1327
	% within RECODE - FINAL EDITED AGE	85.9%	14.1%	100.0%
Respondent is between 26 and 29 years old	Count	1303	193	1496
	% within RECODE - FINAL EDITED AGE	87.1%	12.9%	100.0%
Respondent is between 30 and 34 years old	Count	1868	222	2090
	% within RECODE - FINAL EDITED AGE	89.4%	10.6%	100.0%
Respondent is	Count	5613	416	6029

	between 35 and 49 years old	% within RECODE - FINAL EDITED AGE	93.1%	6.9%	100.0%
	Respondent is between 50 and 64 years old	Count	2763	207	2970
		% within RECODE - FINAL EDITED AGE	93.0%	7.0%	100.0%
	Respondent is 65 years old or older	Count	1224	179	1403
		% within RECODE - FINAL EDITED AGE	87.2%	12.8%	100.0%
Total		Count	22779	2477	25256
		% within RECODE - FINAL EDITED AGE	90.2%	9.8%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	343.643[a]	16	.000
Likelihood Ratio	325.163	16	.000
Linear-by-Linear Association	.002	1	.963
N of Valid Cases	25256		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 51.39.

Symmetric Measures

		Value	Asymptotic Standard Error[a]	Approximate T[b]
Interval by Interval	Pearson's R	.000	.006	.047
Ordinal by Ordinal	Spearman Correlation	-.020	.006	-3.174
N of Valid Cases		25256		

		Approximate Significance
Interval by Interval	Pearson's R	.963[c]
Ordinal by Ordinal	Spearman Correlation	.002[c]
N of Valid Cases		

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.
c. Based on normal approximation.

Table 5 (NSDUH, 2014)

Ever Used Pain Relievers non-medically * MENTAL OR EMOTIONAL DIFFICULTIES

Crosstab

			MENTAL OR EMOTIONAL DIFFICULTIES	
			Yes	No
Ever Used Pain Relievers non-medically	2.00	Count	427	45
		% within Ever Used Pain Relievers non-medically	90.5%	9.5%
	3.00	Count	2694	283
		% within Ever Used Pain Relievers non-medically	90.5%	9.5%
	5.00	Count	13	1
		% within Ever Used Pain Relievers non-medically	92.9%	7.1%
Total		Count	3134	329
		% within Ever Used Pain Relievers non-medically	90.5%	9.5%

Total

Ever Used Pain Relievers non-medically	2.00	Count	472
		% within Ever Used Pain Relievers non-medically	100.0%
	3.00	Count	2977
		% within Ever Used Pain Relievers non-medically	100.0%
	5.00	Count	14
		% within Ever Used Pain Relievers non-medically	100.0%
Total		Count	3463
		% within Ever Used Pain Relievers non-medically	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.091[a]	2	.955
Likelihood Ratio	.099	2	.952
Linear-by-Linear Association	.017	1	.898
N of Valid Cases	3463		

a. 1 cells (16.7%) have expected count less than 5. The minimum expected count is 1.33.

Chi-square test is a statistical test used to test the relationship between categorical variables. To evaluate the independence using crosstabulation. Crosstabulation presents the distributions of two or more categorical variables (Statistical solutions, n.d.). I hypothesized that there will be a statistical significance found between the variables age, mental health or emotional difficulties and ever used pain relievers non-medically. However due to the p-value being > 0.05, the null hypothesis for RQ1 is accepted and the alternative hypothesis is rejected.

After completing the chi-square test the Pearson chi-square test shows statistical significance at the 95% confidence intervals for the association between age and emotional or

mental difficulties. However, there was no statistical significance found between age, ever used drugs non-medically and emotional or mental difficulties. Since there was not a clear statistical significance between all variables RQ1 one must reject the null hypothesis and accept the alternative hypothesis.

Research Question 2

How does a parent's socioeconomic status impact level of care opportunities for those 12 to 17 years old (i.e. accessibility to psychiatrist and correct medication) as it pertains to bipolar disorder in rural communities?

Statistical assumptions. I analyzed RQ2 using multivariate logistic regression. Six assumptions based on the logistic regression methodology, by Hosmer and Lemeshow (2000) include: (a) binary or ordinal dependent variable; (b) factor of one is the desired outcome; (c) model should be fitted correctly; (d) error terms need to be independent; (e) linearity of independent variables and log odds; and (f) dataset has a large sample size. Based on the logistic regression assumptions, all of the rules are met for this analysis. For the multivariate adjusted logistic regression the Nagelkerke's R2=0.261, correctly classified 75.5% of cases, and non-significant Hosmer and Lemeshow's test for model fit (p=0.572), thereby suggesting a model fit. Whereas, the weighted logistic model the Nagelkerke's Pseudo R2=0.232 and correctly classified 72.7% of cases.

Multivariate logistic regression results. Table 6 displays the parameter estimates from the variables ever received treatment, age, county metro/ non-metro status, family income, and poverty. Based off of the 95% confidence level from the lower and upper bounds the is no need for further investigation because no significance was found. The significance levels presented between all of the variables mentioned above ($p > 0.05$). This specific test was correlated from

the variables ever received treatment as the independent variable and county metro/ non-metro area, total family income and poverty as dependent variables as well as age as a control. Table 6 expresses the interpretation of the relationship between whether an individual received treatment, age, poverty level and location (i.e. rural areas). The population of study is an estimated 340,000 for adolescents aged 12-17 and being that the value is a larger population versus a smaller one, than it can be a lack of accuracy. Table 6 does not show a upper bound confidence level which suggests that a multicollinearity test should be conducted. Multicollinearity occurs when two or more variables are highly correlated with one another, which can contribute to the explanation of the dependent variable (Laerd Statistics, n.d.). Table 6 shows missing values for county non-metro variable and ever treatment received treatment with answers (2.00= yes, 12.00= no). Non-metro areas is 20% of the 3 level breakdown of the variable county metro/ non-metro and those who answered yes to having a mental or emotional difficulties is 86.7%. There needs to be a recoding of variables in order to specifically identify who said yes he or she has mental or emotional difficulties in rural (non-metro) areas.

Table 6 (NSDUH, 2014)

Ever Received Treatment		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B) Lower Bound	Upper Bound
2.00	Intercept	22.164	44329.885	.000	1	1.000			
	POVERTY LEVEL (% OF US CENSUS POVERTY THRESHOLD)	-12.369	13000.105	.000	1	.999	4.249E-6	.000	.[b]
	[Age=2.00]	20.518	13597.304	.000	1	.999	814447266.813	.000	.[b]

[Age=4.00]	-.900	6738.652	.000	1	1.000	.407	.000	.[b]
[Age=7.00]	32.540	4842.372	.000	1	.995	1354922471438755.980	.000	.[b]
[Age=13.00]	43.922	13247.535	.000	1	.997	1189266188300280000000.000	.000	.[b]
[Age=14.00]	32.754	5066.517	.000	1	.995	1677604267627244.000	.000	.[b]
[Age=17.00]	27.193	17560.435	.000	1	.999	644996233074.763	.000	.[b]
[Age=18.00]	-.900	6738.652	.000	1	1.000	.407	.000	.[b]
[Age=19.00]	21.094	14426.226	.000	1	.999	1449085432.787	.000	.[b]
[Age=20.00]	0[c]	.	.	0	.	.	.	.
[COUNTY METRO/NON METRO STATUS (3-LEVEL)=1]	10.629	11850.805	.000	1	.999	41299.746	.000	.[b]
[COUNTY METRO/NON METRO STATUS (3-LEVEL)=2]	0[c]	.	.	0	.	.	.	.
[COUNTY METRO/NON METRO STATUS (3-LEVEL)=3]	0[c]	.	.	0	.	.	.	.
[MENTAL OR EMOTIONAL DIFFICULTIES=1]	-12.076	14641.352	.000	1	.999	5.694E-6	.000	.[b]

	[MENTAL OR EMOTIONAL DIFFICULTIES=2]	0[c]	.	.	0	.	.	.	.
12.00	Intercept	-92.169	52962.483	.000	1	.999			
	POVERTY LEVEL (% OF US CENSUS POVERTY THRESHOLD)	18.908	12906.040	.000	1	.999	162853381.586	.000	.[b]
	[Age=2.00]	54.456	14012.122	.000	1	.997	4467548095371932000000000.000	.000	.[b]
	[Age=4.00]	16.511	10182.275	.000	1	.999	14817693.289	.000	.[b]
	[Age=7.00]	50.798	6218.973	.000	1	.993	1151931605236363700000000.000	.000	.[b]
	[Age=13.00]	16.873	8918.277	.000	1	.998	21266113.547	.000	.[b]
	[Age=14.00]	34.744	7210.360	.000	1	.996	122775998046021.000	.000	.[b]
	[Age=17.00]	36.211	12941.428	.000	1	.998	532564140789452626.000	.000	.[b]
	[Age=18.00]	16.511	10182.275	.000	1	.999	14817693.289	.000	.[b]
	[Age=19.00]	52.957	16377.838	.000	1	.997	997665588797229200000000.000	.000	.[b]
	[Age=20.00]	0[c]	.	.	0	.	.	.	.

	[COUNTY METRO/NON METRO STATUS (3-LEVEL)=1]	-17.488	.000	.	1	.	2.540E-8	2.540E-8	2.540E-8
	[COUNTY METRO/NON METRO STATUS (3-LEVEL)=2]	0[c]	.	.	0	.	.	.	.
	[COUNTY METRO/NON METRO STATUS (3-LEVEL)=3]	0[c]	.	.	0	.	.	.	.
	[MENTAL OR EMOTIONAL DIFFICULTIES=1]	18.284	16678.805	.000	1	.999	8722095.003	.000	.[b]
	[MENTAL OR EMOTIONAL DIFFICULTIES=2]	0[c]	.	.	0	.	.	.	.
13.00	Intercept	37.355	57110.470	.000	1	.999			
	POVERTY LEVEL (% OF US CENSUS POVERTY THRESHOLD)	-17.008	16042.661	.000	1	.999	4.105E-8	.000	.[b]
	[Age=2.00]	.767	18059.927	.000	1	1.000	2.154	.000	.[b]
	[Age=4.00]	-1.296	.000	.	1	.	.273	.273	.273
	[Age=7.00]	16.553	9452.571	.000	1	.999	15450720.220	.000	.[b]
	[Age=13.00]	30.962	18881.670	.000	1	.999	27965167223093.113	.000	.[b]

[Age=14.00]	15.522	12801.074	.000	1	.999	5511789.784	.000	.[b]
[Age=17.00]	31.998	.000	.	1	.	7882526859949 0.200	7882526859949 0.200	7882526859949 0.200
[Age=18.00]	-1.296	.000	.	1	.	.273	.273	.273
[Age=19.00]	-1.385	21731.641	.000	1	1.000	.250	.000	.[b]
[Age=20.00]	0[c]	.	.	0	.	.	.	.
[COUNTY METRO/NON METRO STATUS (3-LEVEL)=1]	14.409	15550.817	.000	1	.999	1809958.812	.000	.[b]
[COUNTY METRO/NON METRO STATUS (3-LEVEL)=2]	0[c]	.	.	0	.	.	.	.
[COUNTY METRO/NON METRO STATUS (3-LEVEL)=3]	0[c]	.	.	0	.	.	.	.
[MENTAL OR EMOTIONAL DIFFICULTIES=1]	-18.678	21641.175	.000	1	.999	7.730E-9	.000	.[b]
[MENTAL OR EMOTIONAL DIFFICULTIES=2]	0[c]	.	.	0	.	.	.	.

a. The reference category is: 23.00.
b. Floating point overflow occurred while computing this statistic. Its value is therefore set to system missing.
c. This parameter is set to zero because it is redundant.

Table 7 was developed to provide more detailed information and to display the number of times an adolescent went to visit a mental health clinic in the past year, the family income level and whether they resided in a metro or non-metro area. 7.9% represents a combined total of family income for individuals with income 29,999 or less. Those who answered yes to either having mental or emotional difficulties had a percentage of 92.2 % and non-metro represented 17.9% of those adolescents who answered to having went to visit a mental health clinic. For at least one visit to a mental health clinic for age 2.00 which represents 12 years of age, there is no significance at .597 which is makes the value of $P > 0.05$. There are missing values for age 17 represented as 7.00, which could not allow value to be produced thus an error was created and left blank. There is no statistical significance found in any of the variables listed in table 7.

Table 7 (NSDUH, 2014)

Case Processing Summary

		N	Marginal Percentage
# TIMES YTH VISITED MENT HLTH CLIN IN PY	1 Visit (YUMHCRN2=1)	34	0.5%
	2 Visits (YUMHCRN2=2)	26	0.4%
	3-6 Visits (YUMHCRN2=3-6)	49	0.8%
	7-24 Visits (YUMHCRN2=7-24)	44	0.7%

	25 or More Visits (YUMHCRN2=25-31)	19	0.3%
	No Visits (YUMHCRYR=2)	6139	97.3%
Age	2.00	940	14.9%
	3.00	1052	16.7%
	4.00	1114	17.7%
	5.00	1054	16.7%
	6.00	1111	17.6%
	7.00	1040	16.5%
COUNTY METRO/NONMETRO STATUS (3-LEVEL)	Large Metro	3077	48.8%
	Small Metro	2107	33.4%
	Non-metro	1127	17.9%
MENTAL OR EMOTIONAL DIFFICULTIES	Yes	5816	92.2%
	No	495	7.8%
RECODE - IMP.REVISED - TOT	Less than $10,000 (Including Loss)	72	1.1%

FAM INCOME	$10,000 - $19,999	167	2.6%
	$20,000 - $29,999	267	4.2%
	$30,000 - $39,999	371	5.9%
	$40,000 - $49,999	471	7.5%
	$50,000 - $74,999	1234	19.6%
	$75,000 or more	3729	59.1%
Valid		6311	100.0%
Missing		48960	
Total		55271	
Subpopulation		354[a]	

a. The dependent variable has only one value observed in 279 (78.8%) subpopulations.

Table 7 (NSDUH, 2014)

Parameter Estimates

# TIMES YTH VISITED MENT HLTH CLIN IN PY[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B) Lower Bound	Upper Bound
1 Visit	Intercept	-5.107	2.294	4.956	1	.026			

(YUMHCRN2=1)	POVERTY LEVEL (% OF US CENSUS POVERTY THRESHOLD)	-.966	.635	2.311	1	.128	.381	.110	1.322
	[Age=2.00]	.484	.916	.279	1	.597	1.622	.270	9.756
	[Age=3.00]	.928	.839	1.223	1	.269	2.529	.488	13.100
	[Age=4.00]	1.160	.804	2.083	1	.149	3.191	.660	15.430
	[Age=5.00]	.691	.869	.633	1	.426	1.996	.364	10.955
	[Age=6.00]	1.819	.762	5.700	1	.017	6.168	1.385	27.466
	[Age=7.00]	0[b]	.	.	0	.	.	.	.
	[COUNTY METRO/NON METRO STATUS (3-LEVEL)=1]	.715	.548	1.700	1	.192	2.044	.698	5.986
	[COUNTY METRO/NON METRO STATUS (3-LEVEL)=2]	.065	.616	.011	1	.916	1.067	.319	3.571
	[COUNTY METRO/NON METRO STATUS (3-LEVEL)=3]	0[b]	.	.	0	.	.	.	.
	[MENTAL OR EMOTIONAL DIFFICULTIES=1]	1.315	1.032	1.626	1	.202	3.726	.493	28.141
	[MENTAL OR EMOTIONAL DIFFICULTIES=2]	0[b]	.	.	0	.	.	.	.
	[RECODE - IMP.REVISED - TOT FAM INCOME=1]	-.043	1.480	.001	1	.977	.958	.053	17.414

	[RECODE - IMP.REVISED - TOT FAM INCOME=2]	-18.313	4220.778	.000	1	.997	1.113E-8	.000	.[c]
	[RECODE - IMP.REVISED - TOT FAM INCOME=3]	-.376	1.173	.103	1	.749	.687	.069	6.841
	[RECODE - IMP.REVISED - TOT FAM INCOME=4]	-.782	.991	.621	1	.431	.458	.066	3.195
	[RECODE - IMP.REVISED - TOT FAM INCOME=5]	-.323	.784	.170	1	.680	.724	.156	3.366
	[RECODE - IMP.REVISED - TOT FAM INCOME=6]	-.276	.520	.283	1	.595	.759	.274	2.100
	[RECODE - IMP.REVISED - TOT FAM INCOME=7]	0[b]	.	.	0	.	.	.	.
2 Visits (YUMHCRN2=2)	Intercept	-2.923	2.422	1.456	1	.228			
	POVERTY LEVEL (% OF US CENSUS POVERTY THRESHOLD)	-.684	.757	.817	1	.366	.504	.114	2.225
	[Age=2.00]	-1.899	1.072	3.140	1	.076	.150	.018	1.223
	[Age=3.00]	-.939	.694	1.833	1	.176	.391	.100	1.523
	[Age=4.00]	-.669	.629	1.130	1	.288	.512	.149	1.759
	[Age=5.00]	-.314	.589	.284	1	.594	.731	.231	2.316
	[Age=6.00]	-.191	.559	.116	1	.733	.826	.276	2.472
	[Age=7.00]	0[b]	.	.	0	.	.	.	.

[COUNTY METRO/NON METRO STATUS (3-LEVEL)=1]	-.571	.574	.987	1	.321	.565	.183	1.743
[COUNTY METRO/NON METRO STATUS (3-LEVEL)=2]	.315	.529	.354	1	.552	1.370	.486	3.863
[COUNTY METRO/NON METRO STATUS (3-LEVEL)=3]	0[b]	.	.	0	.	.	.	.
[MENTAL OR EMOTIONAL DIFFICULTIES=1]	.030	.748	.002	1	.968	1.031	.238	4.465
[MENTAL OR EMOTIONAL DIFFICULTIES=2]	0[b]	.	.	0	.	.	.	.
[RECODE - IMP.REVISED - TOT FAM INCOME=1]	-18.796	.000	.	1	.	6.873E-9	6.873E-9	6.873E-9
[RECODE - IMP.REVISED - TOT FAM INCOME=2]	-18.046	5513.549	.000	1	.997	1.454E-8	.000	.[c]
[RECODE - IMP.REVISED - TOT FAM INCOME=3]	-1.079	1.543	.489	1	.485	.340	.017	7.000
[RECODE - IMP.REVISED - TOT FAM INCOME=4]	-17.455	3649.700	.000	1	.996	2.628E-8	.000	.[c]

	[RECODE - IMP.REVISED - TOT FAM INCOME=5]	-.323	.909	.126	1	.723	.724	.122	4.304
	[RECODE - IMP.REVISED - TOT FAM INCOME=6]	.578	.440	1.723	1	.189	1.782	.752	4.224
	[RECODE - IMP.REVISED - TOT FAM INCOME=7]	0[b]	.	.	0	.	.	.	.
3-6 Visits (YUMHCRN2 =3-6)	Intercept	-4.665	1.854	6.334	1	.012			
	POVERTY LEVEL (% OF US CENSUS POVERTY THRESHOLD)	-.044	.572	.006	1	.939	.957	.312	2.938
	[Age=2.00]	-.557	.441	1.593	1	.207	.573	.241	1.361
	[Age=3.00]	-2.069	.755	7.514	1	.006	.126	.029	.555
	[Age=4.00]	-1.182	.519	5.189	1	.023	.307	.111	.848
	[Age=5.00]	-.551	.425	1.677	1	.195	.576	.250	1.327
	[Age=6.00]	-.476	.411	1.336	1	.248	.621	.277	1.392
	[Age=7.00]	0[b]	.	.	0	.	.	.	.
	[COUNTY METRO/NON METRO STATUS (3-LEVEL)=1]	.149	.438	.115	1	.734	1.160	.492	2.735
	[COUNTY METRO/NON METRO STATUS (3-LEVEL)=2]	.438	.442	.984	1	.321	1.550	.652	3.684
	[COUNTY METRO/NON METRO STATUS (3-LEVEL)=3]	0[b]	.	.	0	.	.	.	.

	[MENTAL OR EMOTIONAL DIFFICULTIES=1]	.313	.604	.269	1	.604	1.367	.419	4.464
	[MENTAL OR EMOTIONAL DIFFICULTIES=2]	0[b]	.	.	0	.	.	.	.
	[RECODE - IMP.REVISED - TOT FAM INCOME=1]	-17.447	8111.699	.000	1	.998	2.648E-8	.000	.[c]
	[RECODE - IMP.REVISED - TOT FAM INCOME=2]	-.251	1.481	.029	1	.865	.778	.043	14.175
	[RECODE - IMP.REVISED - TOT FAM INCOME=3]	-.021	1.074	.000	1	.985	.980	.119	8.035
	[RECODE - IMP.REVISED - TOT FAM INCOME=4]	.607	.716	.718	1	.397	1.835	.451	7.462
	[RECODE - IMP.REVISED - TOT FAM INCOME=5]	.163	.611	.071	1	.789	1.177	.356	3.898
	[RECODE - IMP.REVISED - TOT FAM INCOME=6]	.132	.376	.123	1	.726	1.141	.546	2.382
	[RECODE - IMP.REVISED - TOT FAM INCOME=7]	0[b]	.	.	0	.	.	.	.
7-24 Visits (YUMHCRN2	Intercept	-6.298	1.966	10.267	1	.001			

=7-24)	POVERTY LEVEL (% OF US CENSUS POVERTY THRESHOLD)	.213	.608	.123	1	.726	1.238	.376	4.074
	[Age=2.00]	.100	.635	.025	1	.875	1.105	.318	3.837
	[Age=3.00]	.006	.635	.000	1	.992	1.006	.290	3.493
	[Age=4.00]	.392	.572	.469	1	.493	1.480	.482	4.545
	[Age=5.00]	.455	.573	.628	1	.428	1.575	.512	4.847
	[Age=6.00]	.883	.529	2.786	1	.095	2.418	.857	6.823
	[Age=7.00]	0[b]	.	.	0	.	.	.	.
	[COUNTY METRO/NON METRO STATUS (3-LEVEL)=1]	.295	.434	.463	1	.496	1.343	.574	3.142
	[COUNTY METRO/NON METRO STATUS (3-LEVEL)=2]	.010	.471	.000	1	.983	1.010	.401	2.545
	[COUNTY METRO/NON METRO STATUS (3-LEVEL)=3]	0[b]	.	.	0	.	.	.	.
	[MENTAL OR EMOTIONAL DIFFICULTIES=1]	-.032	.538	.004	1	.952	.968	.338	2.779
	[MENTAL OR EMOTIONAL DIFFICULTIES=2]	0[b]	.	.	0	.	.	.	.
	[RECODE - IMP.REVISED - TOT FAM INCOME=1]	2.054	1.429	2.065	1	.151	7.801	.474	128.515

	[RECODE - IMP.REVISED - TOT FAM INCOME=2]	-16.331	4389.131	.000	1	.997	8.082E-8	.000	.[c]
	[RECODE - IMP.REVISED - TOT FAM INCOME=3]	1.021	1.016	1.011	1	.315	2.776	.379	20.315
	[RECODE - IMP.REVISED - TOT FAM INCOME=4]	1.064	.730	2.124	1	.145	2.898	.693	12.116
	[RECODE - IMP.REVISED - TOT FAM INCOME=5]	-.149	.791	.035	1	.851	.862	.183	4.061
	[RECODE - IMP.REVISED - TOT FAM INCOME=6]	.514	.377	1.855	1	.173	1.672	.798	3.502
	[RECODE - IMP.REVISED - TOT FAM INCOME=7]	0[b]	.	.	0	.	.	.	.
25 or More Visits (YUMHCRN2 =25-31)	Intercept	-9.479	3.796	6.237	1	.013			
	POVERTY LEVEL (% OF US CENSUS POVERTY THRESHOLD)	.527	1.158	.207	1	.649	1.694	.175	16.377
	[Age=2.00]	.856	1.227	.487	1	.485	2.354	.212	26.073
	[Age=3.00]	1.837	1.082	2.881	1	.090	6.278	.753	52.367
	[Age=4.00]	.649	1.226	.280	1	.597	1.913	.173	21.157
	[Age=5.00]	.759	1.226	.383	1	.536	2.137	.193	23.641
	[Age=6.00]	1.781	1.082	2.712	1	.100	5.937	.713	49.462
	[Age=7.00]	0[b]	.	.	0	.	.	.	.

[COUNTY METRO/NON METRO STATUS (3-LEVEL)=1]	.590	.779	.573	1	.449	1.803	.392	8.304
[COUNTY METRO/NON METRO STATUS (3-LEVEL)=2]	.583	.805	.525	1	.469	1.792	.370	8.674
[COUNTY METRO/NON METRO STATUS (3-LEVEL)=3]	0[b]	.	.	0	.	.	.	.
[MENTAL OR EMOTIONAL DIFFICULTIES=1]	.506	1.049	.233	1	.630	1.659	.212	12.969
[MENTAL OR EMOTIONAL DIFFICULTIES=2]	0[b]	.	.	0	.	.	.	.
[RECODE - IMP.REVISED - TOT FAM INCOME=1]	2.677	2.542	1.109	1	.292	14.537	.100	2118.249
[RECODE - IMP.REVISED - TOT FAM INCOME=2]	-15.806	6169.972	.000	1	.998	1.366E-7	.000	.[c]
[RECODE - IMP.REVISED - TOT FAM INCOME=3]	1.660	1.630	1.037	1	.309	5.259	.215	128.339
[RECODE - IMP.REVISED - TOT FAM INCOME=4]	-16.369	4167.851	.000	1	.997	7.782E-8	.000	.[c]

[RECODE - IMP.REVISED - TOT FAM INCOME=5]	-.181	1.125	.026	1	.872	.835	.092	7.569
[RECODE - IMP.REVISED - TOT FAM INCOME=6]	-.221	.652	.115	1	.735	.802	.224	2.876
[RECODE - IMP.REVISED - TOT FAM INCOME=7]	0[b]	.	.	0	.	.	.	.

a. The reference category is: No Visits (YUMHCRYR=2).
b. This parameter is set to zero because it is redundant.
c. Floating point overflow occurred while computing this statistic. Its value is therefore set to system missing.

For RQ2 a multivariate logistic regression was completed using the variables poverty, income, age, and ever received care. Multivariate logistic regression analysis involves observation and analysis of more than one statistical outcome variable at one time (Statistical Solutions, n.d.). There is no significant association between level of care opportunity, parent's socioeconomic status in rural areas. There was no statistical significance found within the multivariate logistic regression. Due to the *P*-value for the variables being > 0.05, the null hypothesis for RQ2 is accepted and the alternative hypothesis is rejected.

Summary

Section 3 presented the results and findings of my doctoral study. Within this section it included the study purpose, data collection methods, results, influential statistics, RQs and the key findings from analyzing the data chosen to use. The study used the data collected from ICPSR 36361 for the NSDUH 2014 survey; from only using the age group 12-17.

The two RQs are reflective on one another. RQ2 builds on RQ1 by asking whether an adolescent who has been diagnosed with a mental condition has any difficulty receiving adequate care due to parent's socioeconomic status and location. RQ2 is analyzed via the logistic regression model, thus describing the characteristics being investigated. Which in turn allows the researcher to be able to directly identify whether there is an association between the variables.

A detailed analysis and interpretation of the findings presented within the doctoral study is included within section 4. The next section will describe the interpretations, limitations, recommendations, literature associated with the doctoral topic at hand and conclusions that are relevant to this study.

Section 4: Application to Professional Practice and Implication for Social Change

The purpose of my quantitative cross-sectional study was to examine the determinants to bipolar disorder in adolescents and to determine whether factors like location (i.e. rural communities) and parents' socioeconomic status can increase chances of substance abuse like opioids. In the findings from the multivariate logistic regression analysis, I found no significant association between level of care opportunities and parents' socioeconomic status in rural communities. However, there was some form of association within the chi-square test. An association was found between mental health and emotional difficulties and ages between 12 and 17 ($p < 0.05$). Although there was a significance found while conducting a chi-square analysis, the research question could not completely be justified as statistically significant because a significance was not found between all variables at the p value of 0.05. My purpose for this study was to identify whether there was a complete association between age (12-to-17-years-old), bipolar disorder and opioid abuse and whether a parent's socioeconomic status impacts level of care opportunities. Section 4 includes an interpretation of the findings, limitations of the study, recommendations for further study and implication for professional practice and positive social change.

Interpretation of the Findings

My analyses of the NSDUH data indicated significant associations between the variables (age, parent's socioeconomic status, poverty, mental and emotional illness, ever used pain medication non-medically, non-metro/ county location). In the following subsection, I compare findings to the literature and theory of reasoned action and planned behavior theoretical framework.

Findings to Literature

Khazanov et al. (2015), found that there were substantial proportions of youth with bipolar disorder who do not receive treatment. Those adolescents with bipolar disorder who received treatment, not for their specific mental condition but for comorbid conditions (Khazanov et al., 2015). Adolescents aged 12-17 were identified as having current diagnoses of a 4.7% of illicit drug use disorder in the past year (CDC, 2018). Adolescents who were exposed with additional avenues of treatment for their bipolar diagnosis had decreased usage of illicit drugs (CDC, 2018).

Age. Table 2 showed that there was statistical significance between age, 12-to-17-years-old, and drug misuse, which is consistent with the Research Question 1 hypothesis. Some adolescents with bipolar disorder, will abuse alcohol and drugs as they get older (Preidt, 2016). There are missing data in my research to prove that treatment can prevent substance abuse. However, studies have shown that treatment of mental disorders will likely to be an important target for the prevention of substance abuse in youth (Conway et al., 2016). The chi-square test from the NSDUH dataset showed a disassociation between age mental disorders but an association between age and drug misuse. Either new statistical tests should be conducted or an additional dataset should be used.

Parent's socioeconomic status. A direct association was found from the multinomial logistical regression test; the *P* value was .000, which is less than the .05 value of acceptance**.** Blackstock et al. (2018), revealed that financial difficulties are a significant barrier to care because there are direct and indirect costs associated with counseling. This is consistent with the mention of gaps in research that is not present to prove or disprove a direct association between the variables. Table 2 provided information on the association between parents' socioeconomic

status and poverty and the .000 significance level. This correlates with the problem statement that parent's socioeconomic status/ poverty has a potential of impacting youth's overall access to care. Lake and Turner (2017) expressed that poverty is linked to a higher burden of mental illness, with variables such as education, food insecurity, housing, social class, socioeconomic status, and financial stress exhibiting a strong association. Mental health counseling for rural children can be expensive, and paying for it means either parents or a third party has to produce the funds required to obtain or continue care (Blackstock et al., 2018). This can address why there may be a lack in mental health care in rural communities.

Rural communities (non-metro). A higher density of available opioids in rural communities may create opportunities for illegal markets in rural areas because family and friends are a primary distribution source of nonmedical prescription opioids (Keyes et al., 2014). Table 2 showed a significance level of .000 between the variables county metro/ non-metro and mental or emotional difficulties. The significance found in between variables county metro/ non-metro and mental or emotional difficulties indicates that they impact one another. There was not a direct statistical test used within my research to show where location (i.e., rural communities) had an impact on mental or emotional difficulties; instead, a test was done to determine the amount of mental health services used in rural communities. From a population health perspective, the mental health care system in the United States faces two fundamental challenges: (a) a lack of capacity and (b) an inequitable geographic distribution of services (Fortney etal., 2015). There is reduced access to mental health care in specific areas (Fortney et al., 2015). Increased coverage of behavioral health services directly influences the availability, accessibility, and affordability of these services (Wilson, Bangs, & Hatting, 2015). However, approximately half of all states rejected the expansion of Medicaid under the ACA (Wilson et al.,

2015). Certain states will not receive an expansion of federal funds that could finance behavioral health programs that could serve rural areas (Wilson et al., 2015). Although a direct association was not found between rural communities and level of care and mental or emotional difficulties within my study, there may be an increased number of adolescents found in rural communities than their urban counter parts.

Type of care. Physicians who treat adolescents for their bipolar disorder should also look for signs of substance abuse as well (Preidt, 2016). People in rural communities frequently face limited access to behavioral health care providers due to the lengthy travel requirements for obtaining services (Wilson et al., 2015). Table 5 reflected a percentage of only 0.5% of adolescents who had at least one visit with a mental health clinic in the past year, however 92.2% expressed yes to having either mental or emotional difficulties (i.e. mental condition). There is a lack of adolescents seeking care for their mental health condition(s). Collaborative care can be used to increase quality of care in rural communities, which is identified as: the care that results from a practice team of primary care and behavioral health clinicians, working together with patients and families, using a systematic and cost-effective approach to provide patient-centered care for a defined population (Lake et al., 2017). Collaborative care may address mental health and substance abuse conditions, life stressors and crises, stress-related physical symptoms, and ineffective patterns of health care use (Lake et al., 2017).

Findings to Theory of Reasoned Action and Planned Behavior

I applied theory of reasoned action and theory of planned behavior to explain all behaviors over which people have the ability to exert self-control (Boston University, 2018). Theory of reasoned action and theory of planned behavior has been used successfully to be able to predict and explain a wide range of health behaviors that can include smoking, drinking,

health services, substance abuse and many more (Boston University, 2018). Theory of reasoned action and theory of planned behavior are comprised of six constructs to address the attitudes, behavioral intention, subjective norms, social norms, perceived power, and perceived behavioral control. The following sections will explain how the theories where applied in association with this research.

Attitudes. Additional research is needed to advance culturally appropriate evidence-based practices that achieve acceptance in rural communities (Wilson et al., 2015). Some adolescents, along with their parents may have some hesitation with accepting additional help with their mental condition. Table 5 expressed that only 0.5% of youth aged 12-17 years of age went to visit a mental health clinic in the past year. There is some lack of care, or individuals seeking care. Behavioral health professionals may encounter problems related to the acceptability of their services in the rural population (Wilson et al., 2015). Rural residents may be more likely to make use of informal supports such as neighbors, family, churches, and other community groups. Behavioral health professionals trained only in urban settings may be inadequately prepared to understand these rural cultural characteristics (Wilson et al., 2015). Medical professionals and researchers will not be able to directly identify the association between adolescent bipolar disorder (mental illness) and drug abuse if the adolescent does not choose to go to receive help. Understanding a person's attitudes towards his or her mental health illness can impact the route taken to effect a positive social change.

Behavioral intention. An individual's behavior can be analyzed via his or her individual beliefs, knowledge and attitude that can ultimately impact how his or her behavior can change (Hackman et al., 2014). Table 5 expressed that 427 adolescents answered yes to having used drugs non-medically and have mental or emotional difficulties (i.e. bipolar disorder). However in

table 4 no significance was found between every receiving treatment and age. My research is inclusive and further investigation is required to investigate why there was association found, but no direct significance being that the *P* value was higher than .05%. The problem statement expresses the need for research of adolescent bipolar disorder and substance abuse in rural communities, being that there is an increase in individual diagnosed with both a mental condition and substance abuse. This theory was not found to be true; from, the acceptance of the alternative hypothesis and rejection of null hypothesis that there was not significance found between level of care opportunities and parent's socioeconomic status. Altering behavior requires analyzing why an adolescent are using opioids non-medically to cope with their bipolar disorder and not seeking proper medical attention.

Subjective Norms. Under the assumption that if an individual has more positive subjective norms, like being accepted for their bipolar disorder and not ridiculed, than there is a greater chance the individual will be able to control the behavior (Hackman et al., 2014). This was not found within the research; being that one's opinion was not identified into how it impacted one's overall acceptance of his or her disorder and substance abuse. NSDUH research was not conducted to analyze opinion or determine factors like individuals impeding one's mental health care. Instead it was conducted to show changes overtime for mental health and substance abuse. If a person's opinion was analyzed on how their environment affected their ability to accept their mental condition it could skewed. Opinion cannot be fully researched without some bias. A person's opinion could change based on who is asking the questions or time of day, therefore testing of subjective norms could be difficult, but not impossible.

Social Norms. Social stigma associated with seeking specialty mental health services prevents many individuals with depressed mood or other severe mental illnesses from obtaining

adequate care (Lake et al., 2017). Theory of planned behavior and theory of reasoned action suggests that altering a person's perceptions could change a person's behavior which can ultimately affect social norms. Creating an avenue where an adolescent who has bipolar disorder will able to effectively communicate with their peers and community. Being able to positively communicate with his or her community impacts an adolescent's daily routine. It will alter the way he or she sees themselves that can lead to acceptance of who he or she are with bipolar disorder condition. I would like to impact social change by increasing his or her community involvement in understanding mental illnesses.

Perceived Power. Factors can alter his or her behavior. An adolescent residing in a rural community does not feel as though they have access to care or have the understanding they need from parents or medical professionals, it will lower their action to seek care. There are significant differences in health care access between rural and urban areas (Douthit et al., 2015). However, this was not directly identified within the research because of the missing data to conclude a significance association between location i.e. rural communities and level of care. Reluctance to seek health care in rural areas was based on cultural and financial constraints (Douthit et al., 2015). The importance of altering his or her behavior can be impacted by his or her ability of resources. This correlates with my research question 2 and problem statement; that, if a person has decreased financial resources or a negative outlook on his or her mental condition, they will seek care due to fear of acceptance and increased debt.

Perceived Behavior Control. When behavioral health services are provided in the same health care setting as primary care services, people are more likely to take advantage of the behavioral health services (Wilson et al., 2015). When avenues are added to change a person's perception/ behavior on how to cope a specific situation (i.e., using opioids to handle his/ her

bipolar disorder), the chance of changing a person's behavior changes. Stigma is greatly reduced when the behavioral health professional meets with a patient in the same setting as the primary care provider (Wilson et al., 2015). However, NSDUH did not provide evidence that showed there was a lack of health professionals being able to provide care for adolescents. Table 5 shows adolescents who have a mental health condition visited a mental health clinic was only 17.9% in non-metro areas versus large metro areas which was 48.8%.

Summary of Key findings and Interpretations

Conway et al. (2016) found that adolescents with prior lifetime mental disorders had high rates of alcohol (10.3%) and illicit drug abuse (14.9%). Table 6 expressed that there are more adolescents who answered yes than no who uses drugs non-medically. Family history and adversity in childhood are two risk factors for early onset bipolar disorder, but their combined impact has not been adequately studied (Post et al., 2016). The hypothesis that suggested the need to investigate whether parent's socioeconomic status and location (i.e. rural communities) has an impact on care overall. Further research to identify why a high percentage of adolescents said they suffer with a mental health condition but did not seek care needs to be identified. Population size could be a factor as well as adding of additional variables may alter results.

Limitations of the Study

Subramanian et al. (2009) stated that in a cross-sectional study design, the inclusion of multilevel information can be biased due to the ecological fallacy. Subramanian et al. mentioned although the ecological fallacy may be reduced, the population heterogeneity could possibly lead to interpretation problems. The data was gathered in a questionnaire format. The format is typically used to ensure that participants can read and answer questions unbiased. The secondary data chosen that was from NSDUH can lack accuracy in question to answer response. The

researcher and or the data collector does not know of the participant answered the question to the best of their ability or with all honesty. Another limitation of my study was that data was only limited to adolescents in rural communities. Conducting a study using theory of planned behavior and theory of reasoned action framework limits the researcher to the assumption that the person has acquired the opportunities and resources to be successful in performing the desired behavior, which is to not use opioid's illegally for non-medical use (Boston University, 2018). Theory of planned behavior and theory of reasoned action also do not fully take into account the environmental and economic factors that may influence an individual to perform a specific behavior (Boston University, 2018). Theory of planned behavior and theory of reasoned action also consider the result to be linear and does not take into account that the result can change over time (Boston University, 2018).

Recommendations

The study needs to be replicated using data analyses the specifically identifies which drug is used non-medically more than others and which specific method of care was identified as the main means of seeking care for his or her mental health problem. It could be beneficial to directly identify which drug adolescents use who have bipolar disorder and which care could help decrease chances of misuse of drugs. Secondly, the data chosen were limited to non-metro/ county (i.e., rural) areas. The data research should be expanded to also include metro/ city areas, it could have given a chance to show a comparison of what type of care opportunities are being offered in one area versus another. Thirdly, comparing when an adolescent who has bipolar disorder started using opioids versus when they sought care to cope with the addiction, can provide insight to myself at what age should medical professional intervene.

Implications for Professional Practice and Social Change

This section provides recommendation to professional practice and positive social change implication relevant to adolescent's opioid abuse who suffer with bipolar disorder in rural communities. After the increase in opioid abuse within the U.S., there is an opportunity to provide timely efficient care for those adolescent suffering with bipolar disorder to avoid drug abuse.

Professional Practice

I am guiding this investigation to be a good examination for adolescent bipolar disorder who abuse opioids in rural communities and level of care opportunities. I am suggesting the methodological, theoretical and empirical applications to professional practice, within this subsection.

Methodological. Chi-square tests and multivariate logistic regression model were used to analyze the data from NSDUH however, additional techniques could have been used to determine a result. Path analysis could have been to ensure the variability exist to conduct the investigation (Crossman, 2017). Path analysis forces the research to specify relationships between the dependent variable and two or more independent variables (Crossman, 2017). The data used was cross-sectional and not pre or post type of survey questionnaire, it could present to be challenging to conduct a time to event analysis and or survival analysis. Time to event analysis provides an insight to the researcher on how long a change took to occur (In & Lee, 2018). Despite not using path analysis and time to event analysis, it was discovered there was an association between age (12 to 17) and opioid abuse.

Theoretical. Vincent et al. (2015) stated that better understanding the theory of reasoned action and behavior constructs will facilitate the development of interventions. These

interventions alter parents, physicians, nurses etc. attitudes, perceived norms and perceived behavior control to ultimately (Vincent et al., 2015). This implies the need for studies the are focused around human interaction and behavior to predict their intentions.

Empirical. Empirical implication for theory of reasoned action and behavior investigation may help to promote reduction in the abuse of opioids in adolescents with bipolar disorder. Increased coverage of behavioral health services directly influences the availability, accessibility, and affordability of these services (Wilson et al., 2015). If a person knows that they can acquire care and not be judged it can lower opioid abuse. However, approximately half of all states rejected the expansion of Medicaid under the Affordable Care Act (Wilson et al., 2015). Certain states will not receive an expansion of federal funds, that could finance behavioral health programs in rural areas (Wilson et al., 2015). This identifies the need for expansion of programs into rural communities to aide in the efforts of increased adequate and reduction of misuse of opioid abuse.

Positive Social Change

The aim is to use the results to create initiatives to raise awareness of adolescent mental health and to identify risk factors that are associated with access-to-care. At the organizational level there is need for sustaining programs the will promote adequate care for adolescent with bipolar disorder. After conducting this research to lead to future analyses, that will lead to new initiatives to prevent opioid abuse in those adolescents suffering from a mental condition specifically bipolar disorder. Communities need to have effective screening to educate populations about mental health conditions and how to increase opportunities of care. The hope is to decrease opioid abuse and increase adolescents' access to care/ willingness to seek care.

Conclusion

Nonmedical prescription opioid misuse remains a growing public health problem in need of action and is concentrated in areas of U.S. with large rural populations (Keyes et al., 2014). I identified the relationship between age (12-to-17-years-old) and opioid abuse, however no association with mental or emotional problems was found. There should be a push to directly identify the association between which mental illness is highest among those adolescents who use opioids non-medically. There was no association found between level of care opportunities in rural communities and parent's socioeconomic status. Although an association was not found and the null hypothesis was rejected and the alternative hypothesis had to be accepted; research, should be conducted to analyze how opioid misuse in adolescents can be reduced, and increase in care opportunities (i.e., counseling and proper medication). Public health professionals need to integrate mental health care in their daily medical routine, involving check-ups to reduce lack of care and drug misuse. Responding to this public health issue requires the use of new theories to develop hypotheses to increase social change. I propose further research to address the public health concern: adolescent bipolar disorder and opioid abuse in rural communities.

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