

Exploring the Relationship Between Depression and Marijuana Abuse Among Pregnant Women
in California

by

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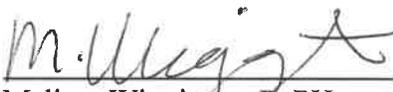
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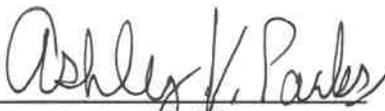
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Abstract

Marijuana abuse and depression during pregnancy has been a major public health concern across the United States. Marijuana abuse leads to many negative effects for both the mother and the fetus. Negative effects include behavioral issues, low birth weight, and neurodevelopment problems. Depression is also a concern because of the consequences that it may have for the mother and baby especially during their bonding time. The purpose of the current study was to understand how pregnancy impacts depression and marijuana use. Understanding the impact of pregnancy between these two factors can lead to increased health education, resources, treatment and policies for women, researchers, and health professionals. This was a cross-sectional study that used the 2017 California Healthy Interview Survey. The survey interviews California residents from various age groups. Demographic and outcome data were analyzed using a Chi-Square Test of Independence. There was a total of 2,048 respondents included in the study, in which 74 reported a pregnancy. The results indicated that 12.2% ($n = 9$) of those who reported being pregnant also reported being depressed compared to 26.7% ($n = 800$) of the sample who reported not being pregnant but experiencing depression. Results indicated a significant relationship between depression and pregnancy ($X^2(1) = 7.907, p < .05$). Those who reported a pregnancy were 62% ($OR = .379$) less likely to report being depressed compared to those who did not report a pregnancy. A Chi-Square Test of Independence was also conducted to analyze the relationship between marijuana abuse and pregnancy. The results indicated that there was no significant relationship between marijuana use and pregnancy ($X^2(1) = 3.022, p > .05$).

Marijuana abuse and depression are important areas that need to be addressed in order to further improve maternal health and birth outcomes across the nation.

Keywords: Marijuana, Depression, Pregnancy, Birth Outcomes

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Review of Literature

Introduction

According to Unger, Metz, and Fischer (2011), drug use among women is a health issue that has become of increasing relevance in past decades. In 2001, a national household survey reported 3.7% of pregnant women used illicit drugs, and by 2009 this number had increased to 4.5% (Unger et al., 2011). According to one national survey conducted in 2012, 5.9% of pregnant women used illicit drugs, 8.5% drank alcohol, and 15.9% smoked cigarettes, which exposed over 380,000 offspring to illicit substances (Forray, 2016). Substance abuse during pregnancy is especially problematic because it affects both mother and child, increasing the likelihood of prematurity, neonatal death, and child maltreatment (Connelly, Hazen, Baker-Ericzen, Landsverk, & Horwitz, 2013). Although birth rates have declined throughout the nation, there is still a high rate of neonates being born to mothers using illicit drugs which is of great concern.

This vulnerable group is also at-risk for various mental illnesses such as depression and anxiety. According to the Center for Disease Prevention ([CDC] 2018), research shows that about one in ten women in the United States experience symptoms of depression. In another recent study, 8-12% of pregnant women met criteria for antenatal major depression, highlighting the important of early screening (Melville, Gavin, Guo, Fan, & Katon, 2010). Depression affects a person's thoughts, feelings, and mood which is why it is important to study this area since depression can impact mother-child bonding in many ways. The aim of this study is to understand the relationship between depression and substance abuse among pregnant women in order to inform future recommendations to prevent any pregnancy and birth complications.

Depression

In recent years, mental health disorders have become a major concern for many health professionals world-wide. According to the CDC (2018), mental illnesses affect a person's thoughts, feelings, mood, and behavior and include diagnoses such as depression, anxiety, bipolar disorder, or schizophrenia. According to the Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-V), a major depressive disorder is characterized by discrete episodes of at least two weeks' duration involving clear-cut changes in affect, cognition, and neurovegetative functions, and inter-episode remissions. Depression, or also known as major depressive disorder, is a common illness that affects how you feel, think, and act. Individuals with depression usually experience feelings of sadness, loss of energy, loss of interest in activities once enjoyed, changes in appetite, trouble sleeping or sleeping too much, difficulty thinking or concentrating as well as thoughts of death or suicide (Parekh, 2017). Depression symptoms can range from mild to severe (Parekh, 2017). According to the CDC (2018), about one out of every six adults will have depression at some time in his/her life. Depression affects about 16 million American adults every year (CDC, 2018). Although this rate is very alarming, there is a specific type of depression that needs special attention.

Antepartum depression is a specific type of depression that affects women during pregnancy (American Pregnancy Association, 2019). According to the American Pregnancy Association (2019), many hormonal changes occur during pregnancy, which can affect the chemicals in the expectant mother's brain. This can worsen during certain situations, such as obstetric complications, inadequate prenatal care, and parenting difficulties, and may lead to depression during pregnancy (Connelly et al, 2013). It is estimated that in the United States rates of antenatal depression are as high as 20% among ethnic minority pregnant women and rates of

substance use are 23% among ethnic minority pregnant women (Salameh, Hall, Crawford, Staten, & Hall, 2019).

In California, one in five women suffer from depression, anxiety, or both while pregnant or after giving birth, negatively impacting the mother and the child (California Health Care Foundation, 2019). According to the Maternal and Infant Health Assessment (MIHA) conducted by the California Department of Public Health (CDPH), 21% of pregnant and postpartum women in California are affected by postpartum depression and/or anxiety (California Health Care Foundation, 2019). One in four African American and Latina mothers in the state report depressive symptoms as well as half of all mothers living in poverty (California Health Care Foundation, 2019). According to Betty J. Kohal (2018) women with a serious mental illness (SMI) during their pregnancy have a higher risk for late prenatal care, pregnancy complications, and poor birth outcomes. Although pregnancy is typically a very special stage for many women, it also comes with a lot of emotional stress due to the hormonal changes that happen during pregnancy. Aside from depression, substance abuse is another concern for many health professionals due to the increasing rates of neonates born to addicted mothers. Marijuana is a substance of major concern due to the increase in availability and open use statewide in California and the nation. This study seeks to understand the relationship between marijuana use and depression among pregnant women.

Substance Abuse During Pregnancy

Substance abuse and mental health disorders among pregnant women pose various public health challenges. Studies show that pregnant women who use illicit substances are especially likely to experience depression (Kuo et al., 2014). Research indicates that 36% to 40% of pregnant patients with substance use disorders also meet criteria for major depressive disorder

(Kuo et al., 2014). Substance abuse and depression can have many negative consequences for pregnant and postpartum women and their children (Kuo et al., 2013). Substance abuse by childbearing women poses a great risk for both the mother and child because it increases the risk of premature births, low-birth weight, intrauterine or neonatal death, and child maltreatment such as neglect and abuse (Connelly et al., 2013). Studies also show that substance use can increase risk for abruption, physiological disorders, preeclampsia, and suicide among pregnant women (Kuo et al., 2014). Further, the numbers of cannabis use during pregnancy increased from 1.95% in 2009 to 3.38% in 2017 (Wolf, Sarovar, Tucker, Conway, Alexeeff, Weisner, Armstrong, Goler, 2019) ; therefore, it is very apparent that substance abuse during pregnancy is a challenging problem needing immediate attention.

Marijuana Abuse

As of November 2017, marijuana has been legalized in 29 states for medical use and eight states for recreational use (Ko, Tong, Bombard, Hayes, Davy, & Perham-Hester, 2018). As marijuana becomes easily accessible, the availability of high-potency strains of cannabis means that pregnant women, and others, now have a potentially higher exposure rate to tetrahydrocannabinol (THC) levels which increases the risk of adverse side effects for both mother and neonates (Schreiber & Pick, 2019). It is also estimated that about 10% of those who have used cannabis in their lifetime will develop cannabis dependence (Schreiber & Pick, 2019). Studies also show that, nationally, 4% of pregnant women reported using marijuana in the past month. Out of those who reported using marijuana, they also reported using alcohol and tobacco use (Kuo et al., 2018). According to another study by Jacques, Kingsbury, Henschke, Chomchai, Clews, Falconer, Abdel-Latif, Feller, and Oei (2014) cannabis is one of the most commonly used drugs during pregnancy and lactation.

Approximately 2.5% of women admit to continued cannabis use even during pregnancy (Jacques et. al., 2014). Marijuana abuse raises many concerns because it poses a risk to the mother and the fetus. Some of the negative effects of prenatal cannabis exposure include a disrupted sleep pattern, low cognitive and executive functions as well as anxiety symptoms throughout the stages of development for the exposed infant (Schreiber et al., 2019). Also, children exposed to cannabis and cigarettes had smaller head circumferences at birth which is associated with intelligence quotient (Jacques et al., 2014). According to the March of Dimes (2017), neonates who are exposed to marijuana have more problems with attention, impulsive behavior, short term memory, academic performance, and difficulty at work as an adult. The American Academy of Pediatrics and the Academy of Breastfeeding advise that breastfeeding mothers avoid using marijuana (March of Dimes, 2017).

Conclusion

Pregnant women are a highly vulnerable group of patients who are at-risk for a wide variety of issues and complications. Pregnant women who abuse illicit drugs are of major concern due to the outcomes and complications occurring during pregnancy and at birth. Women who struggle with addiction are in need of early monitoring, consisting of a team of health professionals, such as pediatricians and social workers. This study is aimed to understand the relationship between substance abuse and depression among pregnant women in order to make informed recommendations regarding improved screenings or treatment options to this vulnerable population.

Purpose of the Study

The purpose of the current study was to understand how pregnancy impacts depression and marijuana use. Understanding the impact of pregnancy between these two factors can lead to

increased health education, resources, treatment, and policies for women, researchers, and health professionals.

Research Questions

The study sought to answer the following two research questions:

1. Is there a relationship between marijuana use and pregnant women?
2. Is there a relationship between depression and pregnant women?

Hypotheses:

H1: It is hypothesized that there is a relationship between marijuana use and pregnancy.

Women who are pregnant are less likely to use marijuana.

H2: It is hypothesized that there is a relationship between depression and pregnancy.

Women who are pregnant are less likely to be depressed.

Methods

Design

This study employed a cross-sectional design, using secondary, de-identified data. This study utilized data from the 2017 California Health Interview Survey (CHIS). CHIS is the largest state health survey in the nation (CHIS, 2017). CHIS conducts interviews over the telephone to survey individuals living across the State of California and provides data on all 58 counties in the state, which helps to provide a picture of the health and needs of Californians. CHIS interviews adults, teenagers, and children each year, and the survey covers dozens of topics such as asthma, obesity, diabetes, and more (CHIS, 2017). CHIS is overseen by the University of California, Los Angeles's Center for Health Policy Research. Survey data is collected on a yearly basis.

California Health Interview Survey

CHIS is a telephone survey intended to collect extensive information for all age groups living in California. Information that is collected in the CHIS survey includes health status, any health conditions, health insurance coverage, access to health care services as well as other health-related issues. The sample is designed to meet two objectives: (1) provide estimates for large- and medium-sized counties in the state and for groups of the smallest counties (based on population size), and (2) provide a statewide estimate for California's overall population, its major racial and ethnic groups, as well as several racial and ethnic subgroups (CHIS, 2017). The CHIS is representative of the non-institutionalized population living in California. Residential households are randomly chosen through a landline telephone, cellphone, address, or a combination of two or more of these lists (CHIS, 2017). Landline telephone numbers were selected by using number banks, which contain 100 landline numbers with the same first eight digits. The CHIS 2017 is a dual-frame design which overlaps by 42.6% (CHIS, 2017). The CHIS

2017 samples included landline phone numbers, cell phone numbers, or both. The CHIS results are used by healthcare professionals, policymakers, federal and state agencies, local public health agencies and organizations, advocacy and community organizations, hospitals, community clinics, health plans and foundations (CHIS, 2017). The data are used for analyses and publications to assess the public's health and to aid in the development of policies to meet the state's needs, budget health care coverage, and plan for various health care services across California (CHIS, 2017).

Data Collection

The 2017 CHIS data was collected between June and December of 2017. To achieve the objectives stated above, CHIS used a random-digital-dial (RDD) sample which included telephone numbers assigned to landline and cellular service (CHIS, 2017). The RDD sample was grouped into 44 geographic sampling strata, and then 14 sub-strata were created within Los Angeles and San Diego counties (CHIS, 2017). For example, Los Angeles county was divided into separate subareas such as the Antelope Valley, San Fernando Valley, San Gabriel Valley, Metro, West, South, and East Bay areas. San Diego county was also divided into separate subareas such as North Coastal, North Central, Central, South, East, and North Inland areas.

Participants

The data collected for this study included adults 18 years and older. Within each household, one adult (age 18 and over) was randomly selected to complete the survey. Within each household, one adolescent and one child of the selected parent/guardian was also randomly selected, and responses were recorded for that child/adolescent. If the adolescent was between the ages of 12 and 17, then he/she was interviewed directly, but if the child was under the age of 12, then the selected adult completed the child's health survey (CHIS, 2017). The sample size

was drawn using G*Power Software, Version 3.1.9.3, with a medium effect size of .3, an alpha level of .05, and a power of 80%, which provided a sample size of 108 participants. All participants were women from California with varying educational levels.

Independent Variable

The study consisted of two independent variables: depression and marijuana use. Depression was measured by the question, "*How often did you feel so depressed that nothing could cheer you up?*", with the response options of "All," "Most," "Some," "A little," "None," "Refused," and "Don't know." This variable was collapsed and recoded to create a dichotomous variable. The responses "All," "Most," "Some," and "A little" were collapsed and recoded to 1; "None" was recoded to 2; and "Refused" and "Don't know" were recoded as system missing.

Marijuana use was measured by the question, "*How long since last marijuana/hashish use?*", with the response options of "Within the past month," "More than 1 month to a year ago," "More than 1 year to 5 years ago," "More than 5 years to 10 years ago," "More than 10 years to 15 years ago," and "More than 15 years ago." The response options were also collapsed to create a dichotomous variable. The response option "Within the past month" was given a value of 1. The other response options, "More than 1 year to 5 years ago," "More than 5 years to 10 years ago," "More than 10 years to 15 years ago," and "More than 15 years ago," were given a value of 2, and all other options were recoded as system missing.

Dependent Variable

This study consisted of one dependent variable. The dependent variable was pregnancy. This was measured by the question, "*To your knowledge, are you now pregnant?*", with the response options of "Yes," "No," "Refused," or "Don't know." This variable was recoded to

eliminate the responses “Refused” and “Don’t know.” This specific variable was recoded so that “1 = Yes” and “2 = no” with the other two options being recoded as system missing.

Data Analysis

For the first research question, “*Is there a relationship between marijuana use and pregnant women?*”, a Chi-Square Test of Independence was used to understand the relationship between marijuana use and pregnancy. For the second research question, “*Is there a relationship between depression and pregnant women?*”, a Chi-Square Test of Independence was also used to understand the relationship between depression and pregnancy. Descriptive statistics were calculated on depression, marijuana, and pregnant women.

Results

Demographics

To evaluate the research questions in this study, data was analyzed in SPSS version 24.0 using the 2017 California Health Interview Survey (CHIS) database. There was a total of 2,048 respondents included in this study. Pregnancy status was the outcome variable in this study, and from the respondents that were evaluated, 2.4% reported that they were currently pregnant (n = 74) and 97.6% reported not being pregnant (n = 2,991). From the participants who reported a pregnancy, 56.8% (n = 42) were White, 52.7% (n = 39) were Latino/Hispanic, 6.8% (n = 5) were American Indian, 2.7% (n = 2.7) were Asian, and 2.7% (n = 2.7) reported Other. Educational attainment was also analyzed. Of those who reported a pregnancy, 20.3% had a high school diploma, 16.2% had some college, 9.5% had an AA or AS degree, 27% had a BA or BS/some grad school, and only 5.4% had a MA or MS degree. Household total income before taxes was also analyzed, and out of those who reported a pregnancy 14.9% reported an income between 20,000-29,999 and 18.9% reported an income between 30,000-39,999. Depression was one of the independent variables in this study, and of the respondents who reported being pregnant, 12.2% reported any depression (n = 9) and 87.8% reported no depression (n = 65). Marijuana was the second independent variable in this study, and of the respondents who reported a pregnancy, 27.3% of the sample (n = 6) reported using marijuana in the last month and 72.7% (n = 16) reported using marijuana more than a year to fifteen years ago.

Marijuana Use among Pregnant Women

One aim of the current study was to determine if there was a relationship between marijuana use and pregnancy. A Chi-Square Test of Independence was used to analyze the variables, and the results indicated that there was no significant relationship between marijuana

use and pregnancy ($X^2(1) = 3.022, p > .05$). When looking at the frequencies, results found that 27.3% ($n = 6$) of women reported being pregnant and using marijuana in the last month compared to 45.9% ($n = 597$) of respondents who reported using marijuana in the last month but were not currently pregnant.

Depression among Pregnant Women

The study aimed to determine if there was a relationship between depression and pregnancy. To test the research question, a Chi-Square Test of Independence was used. The results found that 12.2% ($n = 9$) of respondents who reported being pregnant reported depression compared to 26.7% ($n = 800$) of the sample who reported not being pregnant but reported depression. Results indicated a significant relationship between depression and pregnancy ($X^2(1) = 7.907, p < .05$). Thus, those who reported being pregnant were 62% ($OR = .379$) less likely to report being depressed compared to those who are not pregnant. Therefore, the results indicate that pregnancy may be a protective factor against depression.

Discussion

Summary of Major Findings

The overall purpose of this study was to determine if there was a relationship between depression, marijuana use, and pregnancy. This study surveyed participants living in California with a wide array of ethnic backgrounds and age groups.

For the first question analyzed in this study, “*Is there a relationship between marijuana use and pregnant women?*”, the results were not found to be significant. While the relationship between marijuana use and pregnancy was not found to be significant, frequencies did show that mothers who reported a pregnancy are less likely to use marijuana when compared to women who did not report being pregnant. For those females who reported using marijuana during pregnancy, studies have found that the “self-reported prevalence of marijuana use during pregnancy ranges from 2% to 5% in most studies but increases to 15-28% among young, urban, socioeconomically disadvantaged women” (The American College of Obstetricians and Gynecologists [ACOG], 2017). The same study also found that “34-60% of marijuana users continue use during pregnancy, with many women believing that it is relatively safe to use during pregnancy and less expensive than tobacco” (ACOG, 2017).

The results of the current study are in line with previous literature in that 27.3% of pregnant women in the current study reported using marijuana during their pregnancy. Although, when comparing the frequencies of marijuana use in the past month, women who did not report being pregnant (45.9%) reported higher rates of marijuana use compared to pregnant women (27.3%). This could be because pregnant women, in some cases, have been found to decrease marijuana intake during pregnancy due to the negative health consequences, such as low birth weight and behavioral issues. This is important to the field of public health because it

demonstrates that with education and intervention, it is possible for a woman to stop using marijuana once she learns of her pregnancy. These findings will provide information and evidence for health professionals, politicians, and activists regarding the screenings and policies that are necessary for reducing marijuana intake among pregnant women. Health screenings are essential because health professionals are able to assess and ensure the patient is being treated or seeking help if any signs or symptoms appear or if she self-reports using marijuana.

The second research question analyzed in this study was, “*Is there a relationship between depression and pregnant women?*” The results found a significant relationship between self-reported depression and pregnancy. Specifically, mothers who reported a pregnancy were less likely to be depressed (12.2%) compared to those who reported not being pregnant (26.7%). However, that is not always the consensus. It is often assumed that major life changes, such as a pregnancy, will result in increased rates of depression. This was demonstrated in a study conducted by Schetter and Tanner (2012) who found that “major life events or community catastrophes [were] hypothesized to increase pregnancy anxiety, and long-term chronic strain to increase risk of depression (p.2)” Another study by Wichman and Stern (2015) found that “between 12% and 15% of women meet criteria for depression at some point in their pregnancy (p.6).”

While pregnancy was found to be protective, 12% of the participants still reported being depressed while pregnant, which is in line with the current literature. And, oftentimes, women who report depression during pregnancy are at an increased risk for postpartum depression, which can impact the overall health and wellbeing of both the new mom and the infant. Thus, it is very important to adopt a universal health screening assessment to ensure women are receiving the appropriate treatment during their pregnancy as well as to provide mental health resources

and educational materials during these uncertain times, especially for new and expectant mothers.

Study Limitations

The current research study has several limitations. First, this study was a cross-sectional study, consisting of a one-time measurement of exposure and outcome which makes it difficult to derive any causal relationships. During the course of time, the participants could have either increased or decreased their marijuana intake or their depression symptoms could have also changed. Another limitation was that this study only surveyed individuals in the State of California, and thus, it is not representative of the U.S. in general. The study also had a very small sample size, which could have resulted in a Type II error. Additionally, many of the responses for the questions were categorized as “inapplicable,” which were then recoded as “system missing” when running the analyses. The reason that many of the answers were inapplicable could have been because a participant skipped a question or refused to answer, which often occurs if participants don’t understand the question or don’t want to answer honestly. The respondents could have also had difficulty recalling the information being asked. The survey was also timed, which gave participants a short amount of time to answer each question and could have skewed their responses.

Another limitation of the study was that secondary, self-reported data was used. Self-reported data can potentially cause recall bias and response bias. Recall bias occurs when participants have difficulty remembering the information the questions are asking them to remember, and response bias occurs when participants respond in a way that they believe the researcher would like them to answer or in a way that is socially acceptable. Additionally, because secondary data was used, there is no way to modify questions or responses. In the

current study, there were few questions that specifically measured marijuana use and depression during pregnancy. The question used was worded in a way that makes it difficult to measure current marijuana use.

Public Health Implications

The results of this study found that there was a significant relationship between depression and pregnancy. While the results were not found to be significant for marijuana use and pregnancy, there are still important public health implications with regard to the frequency of marijuana use being reported among pregnant women. When examining the results of the current study, pregnancy was found to be a protective factor when it comes to depression and marijuana use. Of those who reported being pregnant, they were less likely to report using marijuana or being depressed compared to women who reported not being pregnant. These results are very important because they can assist health care professionals in future research and health policy. Specifically, these results can be used to compare the effectiveness of screening tools, educational materials, programs, laws and regulations for pregnant women.

Knowing that pregnancy can act as a protective factor for marijuana use and depression, there is hope that the number of neonates born to marijuana addicted mothers will decrease. As mentioned, neonates born to addicted mothers have a higher risk of developmental and behavioral problems as they age. Although the rate of marijuana use was lower among pregnant women compared to non-pregnant women, the rate of self-reported marijuana use was still high, with 27.3% of pregnant women reporting marijuana use in the last month, which indicates that education and intervention are still needed among women who are newly pregnant or intend to become pregnant. This research can assist health care professionals develop educational materials as well as bring awareness to the seriousness of using marijuana during pregnancy. As

health care professionals, it is our responsibility to make sure women are aware of the negative effects of marijuana use while also educating them about depression and treatment options.

Further research is needed in order to develop effective screenings tools, educational material, and focus on the importance of seeking pre-natal care early.

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Appendix

Table 1

Crosstabulation of Pregnancy Status and Depression

<u>Pregnancy Status</u>							
	Yes	No	X ²	D f	OR	CI (95%)	P Value
Depression							
Any Depression	9 (12.2%)	800(26.7%)	7.097	1	.379	.188, .765	0.005
No Depression	65(87.8%)	2191(73.3%)					

Note n=3065

Table 2

Crosstabulation of Pregnancy Status and Marijuana Abuse

	<u>Pregnancy Status</u>		X ²	D f	OR	CI (95%)	P Value
	Yes	No					
Marijuana Use							
In Last Month	6 (27.3%)	597 (45.9%)	3.022	1	.442	.172, 1.137	0.082
More than 1 year – 15 years since last use	16(72.7%)	704 (54.1%)					

Note n = 1323

Table 3

		<i>n</i>	%
Age	18-25	18	24.3
	26-29	12	16.2
	30-34	20	27.0
	35-39	19	25.7
	40-44	5	6.8
Ethnicity	White	42	56.8
	Latino/Hispanic	39	52.7
	African American	9.5	9.5
	American Indian	5	6.8
	Asian	2.7	2.7
	Other Asian group	2.7	2.7
	Other race	25.7	25.7

Demographics for CHIS Participants (n = 74)

N = sample size, % = percentage. Data Source: 2017 California Health Interview Survey

		<i>n</i>	%
Education	No Formal Education or 1-8 grade	8	10.8
	Grade 9-11	3	4.1
	Grade 12/ H.S. Diploma	15	20.3
	Some College	12	16.2
	Vocational School	4	5.4
	AA or AS Degree	7	9.5
	BA or BS Degree/Some Grad School	20	27.0
	MA or MS Degree	4	5.4
	PH.D. or Equivalent	1	1.4
	Total:	74	100

Table 4

Education for CHIS Participants (n = 74)

N = sample size, % = percentage. Data Source: 2017 California Health Interview Survey