Annual Income and Depression Among Women in Their First Year of College: Does Income Impact Depression?

EDLD 651 Final Project Paper

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Abstract

Many college-aged women experience depression during their first year of college (Medical Education and Research (2020)). Research has also found that lower income rates are associated with higher rates of depression (Akhtar-Danesh (2007)). In this descriptive study, we sought to explore the relationship between personal annual income and severity of depression in freshman college women. We hypothesized that lower income levels would be associated with higher rates of depression. Utilizing a dataset from the ACT Suicide Prevention Study (Levin (2014)), we examined income levels and Beck Depression Inventory-II (BDI, Beck, Steer, and Brown (1996)) scores for 178 18-year-old women attending their first year of college using a series of graphs and descriptive statistics. We found that BDI scores were similar across income levels for our sample population.

Introduction

Our project used data from the ACT Suicide Prevention study (Levin (2014)). This study collected dozens of variables of data, including responses to various assessments, such as the Beck Depression Inventory (Beck, Steer, and Brown (1996)), from participants to determine if the ACT intervention for suicidality in college students was effective. Among the many variables gathered were participants' age, living situation, race/ethnicity, gender, household income, and financial support. Mayo Foundation for Medical Education and Research (2020) found that many college-aged women experience depression during their first year of college. Considering this with the information provided in our dataset, we were interested in looking at the relationship between college-aged female-identifying participants and their annual income and levels of depression. Utilizing these variables, we were able to develop several visual graphs to help interpret the data and the relationships between income and depression. Our research question for this study was "Is there a relationship between annual income level and depression among college-aged women?" Specifically, do BDI scores vary by annual income level among women attending their first year of college? We hypothesized that lower income levels would be associated with higher rates of depression in our sample population. Research has found that lower income rates are associated with higher rates of depression (Akhtar-Danesh (2007)), which is in line with our hypothesis, thus we expected to find similar associations in our sample study.

Methods

Participants

Participants in this study were 178 18-year-old first-time college freshmen attending the University of Nevada, Reno (UNR). The participants' data were collected as part of a larger randomized study, the ACT Suicide

Prevention Study, that evaluated the effectiveness of an intervention aimed at preventing suicidality among college students (Levin (2014)). Between 2008 and 2010, all incoming freshmen at UNR between the ages of 18–20 were invited to participate in the ACT Suicide Prevention Study via mass email. Those who expressed interest in participating were screened with the Acceptance and Action Questionnaire-II (Bond et al. (2011)). Students with AAQ-II scores in the upper 50th percentile were selected for inclusion in the study. The dataset we worked from contained pre-intervention baseline data, including participants' demographic information (e.g., age, race/ethnicity, gender, living situation, working situation, family income, personal income, financial aid) and responses from a wide variety of assessment instruments measuring suicidality, mental health, experiential avoidance, and other theoretically relevant behaviors and views (e.g., values, emotional regulation). There were a total of 972 participants in the pre-intervention baseline dataset from which we sampled, including those who reported their gender as female, male, and transgender.

For the purpose of the present research study, we created a subsample that included participants who were 18 years old, reported their gender as female, and were currently working. Self-reported race and ethnicity demographics for the resulting 178 participants is summarized in Tables 1 and 2. Of participants in the present study, 2% reported themselves as American Indian or Alaska Native, 4% as Asian, 2% as Black or African American, 9% as multiracial, 1% as Native Hawaiian or Pacific Islander, and 74% as White or Caucasian. Approximately 8% of participants chose not to respond. Fifteen percent of respondents were Hispanic or Latino, 83% were not Hispanic or Latino, and 2% opted not to respond.

Table 1: Racial Demographics Self-Reported by Participants

Race	n	Percent
American Indian/Alaska Native	4	2
Asian	7	4
Black or African American	4	2
Multiracial	16	9
Native Hawaiian or other Pacific Islander	2	1
White or Caucasian	131	74
I choose not to answer	14	8

Table 2: Ethnic Demographics Self-Reported by Participants

Ethnicity	n	Percent
Hispanic or Latino	27	15
Not Hispanic or Latino	148	83
I choose not to answer	3	2

Measures and Variables of Interest

Beck Depression Inventory-II

The Beck Depression Inventory-II (BDI, Beck, Steer, and Brown (1996)) is an assessment of severity of depression. The BDI is composed of 21 questions about symptoms and views related to depression that are rated on a scale of 0 to 3. The total score is the sum of responses from the 21 items. It is a continuous variable. Higher total scores are associated with more severe depression.

Annual Income

Among other demographic and socioeconomic variables, participants in the ACT Suicide Prevention Study (Levin (2014)) were asked to provide information regarding their individual personal income. The item

asked, "For yourself, please estimate the gross annual income (before taxes) for the last year. If unknown, choose unknown." Participants could select a response from the following options: (a) less than $5,000, (b) $5,000 - $9,999, (c) $10,000 - $14,999, (d) $15,000 - $19,999, (e) $20,000 - $24,999, (f) $25,000 - $29,999, (g) $30,000 - $49,999, (h) $50,000 or more, (i) unknown, and (j) I choose note to answer. This variable is categorical with 10 levels.

Dataset Preparation and Analysis

Our dataset had been organized and tidied before we received access to it. The dataset was quite large, containing dozens of columns summarizing participants' responses to various assessments and questionnaires. Once we determined which variables we wanted to explore, we created a smaller dataset that only included the variables we would examine. After organizing the data into a table containing the variables of interest, we began a preliminary analysis of the data using several data visualizations. We approached our dataset by first looking at how many female students participated in the study, by age group, and then at distributions of how female participants scored on the BDI, by age. We then filtered the dataset to only include female participants who were 18 years old and reported themselves as currently working.

To evaluate whether the severity of depression varied by level of income, we generated two exploratory data visualizations and calculated a table of descriptive statistics. We first generated a bar graph of the number of participants in each income level. Our second exploratory data visualization was a series of side-by-side boxplots of BDI scores by income level. We also calculated descriptive statistics (n, M, SD, minimum, maximum) for BDI scores by level of reported income.

To accomplish this project and our analyses, we used `R` (R Core Team (2021)) and the `here()` (Müller (2020)), `rio()` (Chan et al. (2021)), `janitor()` (Firke (2021)), `tidyverse()` (Wickham et al. (2019)), and `knitr()` (Xie (2021)) packages.

Results

In our first exploratory data visualization, we generated a bar graph illustrating the number of participants in each income category in order to observe the distribution (see Figure 1). We found that most female participants who were 18 and currently working reported an annual income of $14,999 or lower ($n = 142$), with the vast majority of those reporting an income of $5,000 or less ($n = 105$). There were 29 participants who reported an income of $5,000-$9,999, and eight participants who reported their income as $10,000-$14,999. Thirty-one participants reported their annual income as "unknown," and three participants chose not to answer. One participant reported their income as ranging from $15,000-$19,999, and one reported their income as $50,000 or more. There were no 18-year-old female participants currently working who reported an income of $20,000-$24,999 or $25,000-$29,999.

To evaluate whether severity of depression depended on income level, we generated a series of side-by-side boxplots of BDI scores by income level (see Figure 2) and calculated descriptive statistics of BDI scores by income level (see Table 3). This allowed us to visually compare mean scores, distributions, and outliers of BDI scores (Beck, Steer, and Brown (1996)), as well as associated descriptive statistics across income categories.

Overall, we found that severity of depression did not appear to significantly vary across income levels when taking sample size into consideration. The average BDI scores of participants earning less than $5,000 per year ($n = 105$), $5,000-$9,999 ($n = 29$), and those who reported their income as unknown ($n = 31$) appeared to be similar ($M = 9.17$, $M = 9.93$, $M = 8.80$, respectively). Participants who reported their income as $10,000-$14,999 and those who opted not to respond had lower BDI scores ($M = 5.12$, $M = 6.00$, respectively). However, the sample sizes for these two groups were very low ($n = 8$, $n = 3$). Participants in the $15,000-$19,999 and $50,000+ income categories had the highest BDI scores ($M = 12.00$, $M = 23.00$), but each category only had one participant.

Figure 1

Participants' Annual Income

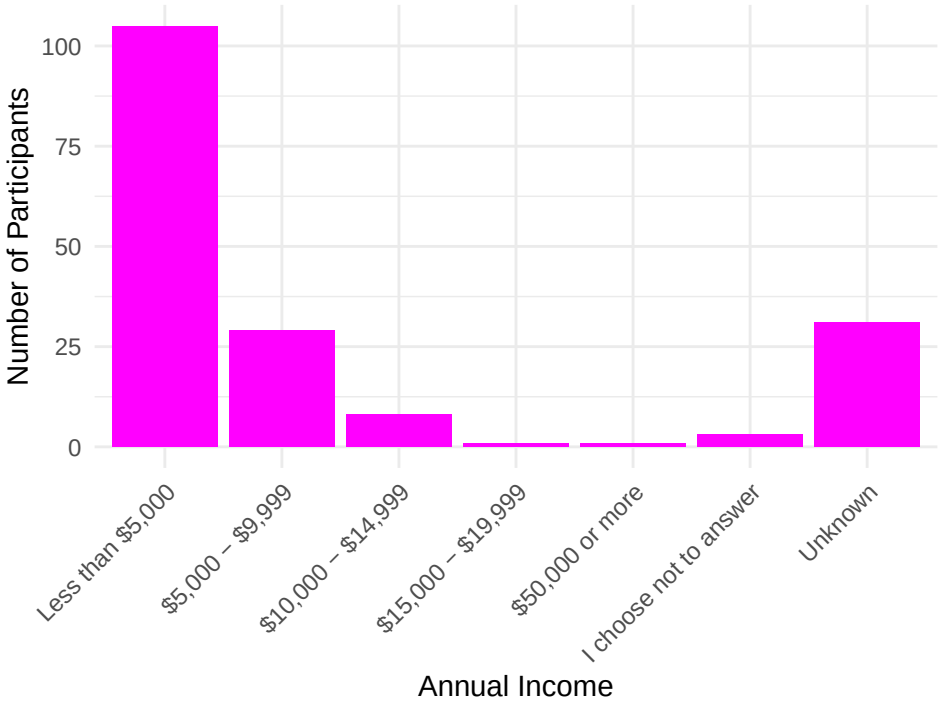

Figure 2

Beck Depression Inventory (BDI) Scores by Annual Income

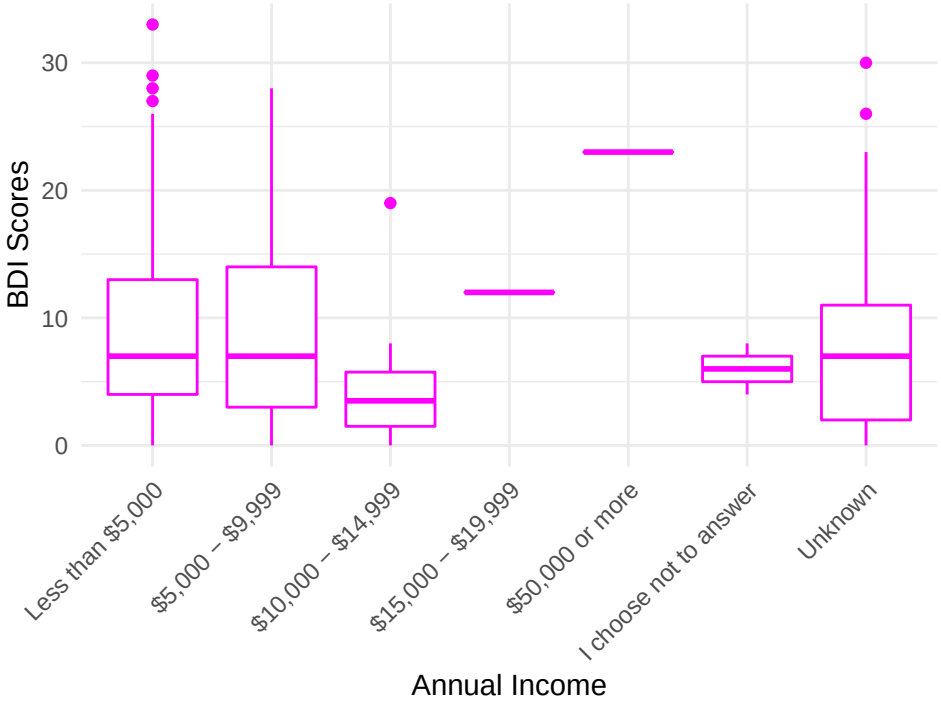

Table 3: Descriptive Statistics of Participants' Beck Depression Inventory (BDI) Scores by Income Level

Annual Income	n	M	SD	Min	Max
Less than $5,000	105	9.17	7.54	0	33
$5,000 - $9,999	29	9.93	8.24	0	28
$10,000 - $14,999	8	5.12	6.24	0	19
$15,000 - $19,999	1	12.00	NA	12	12
$50,000 or more	1	23.00	NA	23	23
I choose not to answer	3	6.00	2.00	4	8
Unknown	31	8.80	8.49	0	30

Discussion

Implications

The findings of this study suggest that income levels and depression may not be significantly related for first-year female college students. This may be for various reasons. First, there are several variables that may play greater roles in depression among this population, for example, moving out of their family home, not having established routines or social groups, and academic stress. Second, for the purposes of this study, we only examined personal income levels of participants, and we did not look at their family income. If income impacts depression, as previous studies have shown, it is possible that family or parental income plays a much larger role in depression rates among college students than their own individual income levels. Should the relationship between income levels and depression be studied using this dataset again, analyzing additional income-related variables, such as parental income or financial aid, may provide further insight.

Limitations

There were two main limitations of this study. First, given that our sample was from a single university campus with participants who were predominantly White and not Hispanic or Latino, we cannot conclude that our findings were representative of first-year female students on a national level. Ideally, when selecting a sample, one would randomly select participants from the entire population of first-year female college students. Due to this limitation, the findings are not necessarily generalizable to the population as a whole. Future research should aim to include a more representative sample.

Additionally, income for first-year college students is a difficult and complex variable to evaluate. Many students, particularly freshmen, do not always support themselves solely through employment. In this study, we examined only one variable related to income, which would not necessarily align with perceived or experienced economic stress (e.g., the extent to which a participant in the originating study worried or experienced stress about income or financial stability). Further research including additional or expanded measures of income is suggested in order to more accurately evaluate the perceived level of economic stress and how it relates to depression.

Future Research

For the purposes of this study, we opted to narrow our focus to examining gender, age, income level, and depression scores. In the future, it would be interesting to look at the relationship between income levels, race and ethnicity, and depression rates for women.

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