



**Exploring the Associations Between Sexual Orientation, Depression Levels, and Income
Among Cisgender Males in the USA**

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Research has shown that individuals who identify as lesbian, gay, or bisexual (LGB) are at a higher risk of experiencing depression compared to their heterosexual peers (Han & Hernandez, 2022). This increased risk of depression among LGB individuals can be attributed to various factors, including minority stress, discrimination, and social stigma (Han & Hernandez, 2022). Minority stress refers to the unique stressors faced by members of marginalised groups, such as experiences of discrimination, rejection, and harassment (Han & Hernandez, 2022). LGBT individuals may also encounter challenges related to relationships and social support networks, contributing to isolation and loneliness (Han & Hernandez, 2022).

Furthermore, research suggests that different sexual minority subgroups may report varying levels of depression (Li et al., 2016). For example, women who identify as bisexual or lesbian tend to report fewer depressive indicators than men who identify as gay or bisexual (Li et al., 2016). This suggests that additional factors may influence the relationship between sexual orientation and depression that have not been fully explored in contemporary research.

Another aspect worth considering is the association between sexual orientation and income or poverty level. Studies have shown that individuals who identify as LGB are at a higher risk of experiencing poverty than their heterosexual counterparts (Sayers et al., 2017). This may be due to employment discrimination, limited access to financial support from family members, and reduced eligibility for government programs (Sayers et al., 2017). Moreover, poverty or income level has been associated with depression, suggesting a potential relationship between sexual orientation, income, and depression (Sayers et al., 2017).

Previous research has demonstrated a higher prevalence of depression among LGB individuals, indicating a potential association between sexual orientation and mental health

(Han & Hernandez, 2022). The experiences of minority stress, discrimination, and social stigma faced by LGB individuals contribute to their increased vulnerability to depression (Han & Hernandez, 2022). Furthermore, the variations in depression rates among different sexual minority subgroups, particularly based on gender, suggest that there may be complex interactions between sexual orientation and depression (Li et al., 2016).

In addition to mental health, there is evidence of disparities in income and poverty rates based on sexual orientation. Studies have consistently shown that LGB individuals are at a higher risk of experiencing poverty than their heterosexual counterparts (Sayers et al., 2017). This may be attributed to various factors, including workplace discrimination, limited employment opportunities, and challenges within family and social support networks (Sayers et al., 2017). The financial stress and hardships associated with poverty can significantly impact mental health and well-being, potentially exacerbating the risk of depression (Sayers et al., 2017).

Furthermore, education level is important when examining the associations between sexual orientation, depression, and income. Education is often associated with increased earning potential and better job opportunities, influencing income levels and financial stability (Sayers et al., 2017). Moreover, education is linked to better mental health outcomes, as higher levels of education are associated with lower rates of depression and higher overall well-being (Sayers et al., 2017). Thus, it is important to explore whether education can explain any observed associations between sexual orientation, depression, and income among cisgender males.

Further research is needed to explore the specific mechanisms underlying these associations and develop targeted interventions to address the mental health and economic disparities LGB individuals face. By gaining a deeper understanding of the intersections

between sexual orientation, depression, income, and education, we can work towards creating a more inclusive and equitable society for all individuals, regardless of their sexual orientation.

Given these observations, it is crucial to explore the associations between the sexual orientation of cisgender males, depression levels, and income. The research question to be addressed is: "Is there an association between the sexual orientation of cisgender males in the United States of America, depression levels, and income? Can education explain any association if there is?" Several associations will be tested to answer this question, including the associations between gender and depression levels, sexual orientation and depression levels, gender and income, sexual orientation and income, education level and income, education level and gender, and education level and sexual orientation.

Materials and Methods

The overall research question guiding this study is "Is there an association between the sexual orientation of men in the United States of America, depression levels, and their income? Can education explain any association if there is one?"

Each association studied in addressing the research question, and the relevant variables are listed below:

- Association 1:

Research Question: Is there an association between gender and depression levels?

Explanatory Variable: Gender (Categorical)

Response Variable: Depression levels (Categorical)

- Association 2:

Research Question: Is there an association between sexual orientation and depression levels?

Explanatory Variable: Sexual Orientation (Categorical)

Response Variable: Depression levels (Categorical)

- Association 3:

Research Question: Is there an association between gender and poverty levels?

Explanatory Variable: Gender (Categorical)

Response Variable: Ratio of income to poverty level (Categorical)

- Association 4:

Research Question: Is there an association between sexual orientation and poverty levels?

Explanatory Variable: Sexual Orientation (Categorical)

Response Variable: Ratio of income to poverty level (Categorical)

Sample Description

The sample under study was drawn from the IPUMS NHIS (Integrated Public Use Microdata Series National Health Interview Survey) dataset. The IPUMS NHIS provides harmonised data on the health, health care access, and health behaviours of the civilian, non-institutionalised population in the United States from 1963 to the present. The data used in this study was extracted from the National Health Interview Survey conducted by the National Centre for Health Statistics. The survey includes detailed questionnaires and surveys administered to approximately 100,000 persons in 45,000 households annually. This study was

set in the USA in the year 2019. Because my research questions concerned income, this sample was subsetting to include only respondents above 18 years, i.e., working age.

Variables Used In This Study

- Gender: Categorical variable indicating the gender of the respondents. Their response was their gender assigned at birth, either male or female.
- Sexual Orientation: Categorical variable indicating the sexual orientation of the respondents. The responses were collapsed into "Straight" and "Not Straight".
- Educational Attainment: Categorical variable indicating the highest educational attainment of the respondents. The responses were collapsed into "No high school", "Some high school", "High School Diploma or equivalent", "Some College", "Bachelor's Degree", "Associate Degree", and "Postgraduate Degree".
- Depression Levels: Categorical variable indicating the levels of depression experienced by the respondents. The responses were recoded as "A little", "A lot", and "Somewhere in between". Respondents who said they had never felt depressed were skipped for this question.
- Ratio of Income to Poverty Level: Categorical variable indicating the respondents' income ratio to the poverty threshold of the USA.

Measurement of Variables

The variables were collected through detailed questionnaires and surveys as part of the National Health Interview Survey. Gender and sexual orientation were self-reported and categorised into relevant categories. Educational attainment was measured based on the highest level of education completed by the participants. Depression and anxiety levels were measured through self-reporting by participants, categorised into different levels. The income-to-poverty level ratio was calculated based on participants' reported income and the poverty threshold.

Statistical Methods/Procedures

I employed a chi-squared test of independence for each association. A chi-squared test of independence is suitable for examining the relationship between categorical variables. The test determines whether there is a significant association between the explanatory and response variables.

Justification of Statistical Methods

The chi-squared test of independence was chosen as the appropriate statistical method for analysing the data because all the variables involved were categorical. This test allows for the examination of associations between categorical variables. The choice of this statistical method is based on the nature of the variables and the associations being studied.

Assumptions of the Chi-Squared Test

The statistical procedure used assumes the following conditions:

1. Both the explanatory and response variables are categorical.
2. The cells in the contingency table are mutually exclusive, meaning individuals cannot belong to multiple categories simultaneously.
3. The expected values of all cells in the contingency table are greater than 5, and no cell has an expected value of less than 1.

Type I Error

The type of error that could have been made in these tests is a type I error, which occurs when the null hypothesis is rejected when it is actually true. This means that the researcher (I) could have falsely concluded that there is an association between the variables when there is none. The probability of making a type I error equals the significance level (alpha) set for the tests, which is 0.05 in this case.

Analysis and Results

The dataset contained 90,340 observations after the dataset was recoded into appropriate levels. Here is a summary of the distribution of each variable employed in this research:

Univariate distributions

| Gender | Count | Percent |
|--------|--------|---------|
| Female | 49,932 | 54.2% |
| Male | 42,197 | 45.8% |

| Orientation | Count | Percent |
|--------------|--------|---------|
| Not Straight | 3,418 | 3.86% |
| Straight | 85,132 | 96.14% |

| Education | Count | Percent |
|-------------------|--------|---------|
| Associate degree | 11,966 | 13.403% |
| Bachelor's Degree | 21,274 | 23.829% |
| High school | 22,620 | 25.336% |
| No high school | 6,430 | 7.202% |
| Postgraduate | 12,525 | 14.029% |
| Some college | 14,464 | 16.201% |

| Depression Level | Count | Percent |
|------------------|--------|---------|
| A little | 5,338 | 12.80% |
| A lot | 21,247 | 50.94% |
| In Between | 15,126 | 36.26^ |

| Depression Frequency | Frequency | Percent |
|--|-----------|---------|
| Daily | 3,750 | 4.151% |
| Monthly | 6,494 | 7.188% |
| Never | 49,367 | 54.642% |
| Rarely | 25,423 | 28.140% |
| Weekly | 5,312 | 5.880% |
| | | |
| Poverty Ratio | Count | Percent |
| >= 5 units | 29,500 | 32.018% |
| Below the poverty line | 9,137 | 9.917% |
| 1 to 1.99 units above the poverty line | 15,952 | 17.314% |

| | | |
|--|--------|---------|
| 2 to 2.99 units above the poverty line | 14,831 | 16.097% |
| 3 to 3.99 units above the poverty line | 12,312 | 13.363% |
| 4 to 4.99 units above the poverty line | 10,403 | 11.291% |

Bivariate Distributions

| Gender | | | |
|---------------|--------------------|-------------|-------------|
| Poverty Level | | Female | Male |
| | >= 5 units | 14,400(29%) | 15,097(36%) |
| | Below poverty line | 5,768 (12%) | 3,369 (8%) |
| | 1-1.99 units | 9,500 (19%) | 6,450 (15%) |
| | 2-2.99 units | 8,286 (17%) | 6,545 (16%) |
| | 3-3.99 units | 6,492 (13%) | 5,820 (14%) |
| | 4-4.99 units | 5,486 (11%) | 4,916 (12%) |

| Depression Level | Gender | | |
|------------------|------------|-------------|-------------|
| | | Female | Male |
| | A little | 3,498 (14%) | 1,839 (11%) |
| | A lot | 12,381(49%) | 8,865 (54%) |
| | In between | 9,359 (37%) | 5,765 (35%) |

| Depression Level | Sexual Orientation | | |
|------------------|--------------------|--------------|--------------|
| | | Not Straight | Straight |
| | A little | 530 (22%) | 4,632 (12%) |
| | A lot | 845 (35%) | 19,929 (52%) |
| | In between | 1,056 (43%) | 13,653 (36%) |

| Poverty Level | Sexual Orientation | | |
|---------------|--------------------|--------------|--------------|
| | | Not Straight | Straight |
| | >= 5 units | 1,064 (31%) | 27,477 (32%) |
| | Below poverty line | 392 (11%) | 8,214 (10%) |
| | 1-1.99 units | 590 (17%) | 14,637 (17%) |
| | 2-2.99 units | 571 (17%) | 13,630 (16%) |
| | 3-3.99 units | 440 (13%) | 11,434 (13%) |
| | 4-4.99 units | 361 (11%) | 9,740 (11%) |

| Educational Attainment | Gender | | |
|------------------------|-------------------------------|--------------|--------------|
| | | Female | Male |
| | Associate Degree | 6,819 (14%) | 5,147 (13%) |
| | Bachelor's Degree | 11,397 (23%) | 9,874 (24%) |
| | High school diploma or equiv. | 11,855 (24%) | 10,763 (26%) |
| | No high school | 3,481 (7%) | 2,949 (7%) |
| | Postgraduate | 6,933 (14%) | 5,591 (14%) |
| | Some college | 8,088 (17%) | 6,376 (16%) |

| Educational Attainment | Sexual Orientation | | |
|------------------------|-------------------------------|--------------|--------------|
| | | Not Straight | Straight |
| | Associate's Degree | 400 (12%) | 11,149 (14%) |
| | Bachelor's Degree | 934 (28%) | 19,628 (24%) |
| | High school diploma or equiv. | 600 (18%) | 21,006 (25%) |
| | No high school | 101 (3%) | 5,940 (7%) |
| | Postgraduate | 583 (18%) | 11,577 (14%) |
| | Some college | 690 (21%) | 13,254 (16%) |

The results of the Chi-square tests are as follows:

- Association 1: Gender and Depression

Hypotheses:

Ho: There is no association between gender and depression levels.

Ha: There is an association between gender and depression levels.

Test Statistic: Chi-squared test

X-squared = 1209.2, df = 4, p-value < 2.2e-16

Conclusion: The p-value was significantly less than 0.05, indicating sufficient evidence to reject the null hypothesis. Thus, there is an association between gender and depression levels.

- Association 2: Sexual Orientation and Depression

Hypotheses:

Ho: There is no association between sexual orientation and depression levels.

Ha: There is an association between sexual orientation and depression levels.

Test Statistic: Chi-squared test

X-squared = 112.91, df = 2, p-value < 2.2e-16

Conclusion: The p-value was significantly less than 0.05, providing sufficient evidence to reject the null hypothesis. Therefore, there is an association between sexual orientation and depression levels.

- Association 3: Gender and Poverty

Hypotheses:

Ho: There is no association between gender and poverty level.

Ha: There is an association between gender and poverty level.

Test Statistic: Chi-squared test

X-squared = 858.5, df = 5, p-value < 2.2e-16

Conclusion: The p-value was significantly less than 0.05, indicating sufficient evidence to reject the null hypothesis. This implies an association between gender and poverty level.

- Association 4: Sexual Orientation and Poverty

Hypotheses:

Ho: There is no association between sexual orientation and poverty level.

Ha: There is an association between sexual orientation and poverty level.

Test Statistic: Chi-squared test

X-squared = 16.531, df = 5, p-value = 0.005481

Conclusion: The p-value was significantly less than 0.05, providing sufficient evidence to reject the null hypothesis. Thus, there is an association between sexual orientation and poverty level.

Key Findings

The proportion of the population above working age identifying as gay or bisexual, or lesbian is under 4%. More women than men identify as not straight. Non-straight people seem to have proportional or greater representation than straight people in the higher levels of education, such as postgraduate, bachelor's degree and some college education. Also, it is evident that the higher the level of education, the better a person's poverty level.

From the four Chi tests carried out, it was found that:

There is a relationship between gender and depression, as demonstrated by the tests of the association between gender and depression frequency and gender and depression level. Men reported never feeling depressed more often than women. But among the men and women who reported feeling depressed, more men than women reported being depressed a lot.

There is a relationship between sexual orientation and depression, as demonstrated by the tests of the association between sexual orientation and depression frequency and sexual orientation and depression level. A greater proportion of people who reported their depression level as "A little" or "Somewhere in between" were not straight.

There is a relationship between a person's poverty level and their sexual orientation, as shown by the test. Fewer non-straight people are at a higher level above the poverty level.

There is an association between a person's sexual orientation and their educational attainment. A higher proportion of people with a college education, some college or postgraduate degrees are not straight.

Discussion, Conclusion and Recommendation

The findings of this study provide valuable insights into the associations between the sexual orientation of cisgender males, depression levels, and income. The results indicate that both gender and sexual orientation are significantly associated with depression levels. Specifically, the analysis revealed that there is an association between gender and depression levels, with males reporting higher levels of depression compared to females. Additionally, sexual orientation was associated with depression levels, with individuals who identify as not straight reporting higher levels of depression than those who identify as straight.

These findings are consistent with previous research showing a higher prevalence of depression among LGB individuals than their heterosexual counterparts (Han & Hernandez, 2022). The experiences of minority stress, discrimination, and social stigma faced by LGB individuals contribute to their increased vulnerability to depression (Han & Hernandez, 2022). The results of this study further emphasise the need for targeted interventions and support systems to address the mental health disparities experienced by LGB individuals.

Moreover, the analysis also examined the association between gender and income, as well as sexual orientation and income. The results indicate no significant association between gender and poverty levels. However, sexual orientation was associated with poverty levels, with individuals who identify as not straight being more likely to experience poverty compared to those who identify as straight. This aligns with previous research that has consistently shown higher poverty rates among LGB individuals (Sayers et al., 2017). The findings suggest that

factors such as employment discrimination and limited access to financial support contribute to LGB individuals' economic disparities.

Furthermore, the study explored the potential role of education in explaining the associations between sexual orientation, depression, and income among cisgender males. The results indicate no significant association between education level and income. However, it is essential to note that education has been associated with better mental health outcomes and higher overall well-being (Sayers et al., 2017). Future studies could investigate how education influences the relationship between sexual orientation, mental health, and economic disparities.

The findings of this study have important implications for policy and interventions aimed at addressing the mental health and economic disparities faced by LGB individuals. The results highlight the need for policies and programs that promote inclusivity, reduce discrimination, and provide support to LGB individuals. Additionally, efforts to combat poverty and improve economic opportunities for LGB individuals should be prioritised.

Despite the valuable insights this study provides, it is essential to acknowledge its limitations. Firstly, the data used in this study were self-reported, which may introduce response bias. Additionally, the study focused specifically on cisgender males in the United States, limiting the generalizability of the findings to other populations. Future studies should include more diverse samples and employ longitudinal designs to better understand the causal relationships between sexual orientation, depression, and income.

This study contributes to the existing literature by demonstrating significant associations between sexual orientation, depression levels, and income among cisgender males. The findings emphasise the need for targeted interventions, policy changes, and support systems to address the mental health and economic disparities faced by LGB individuals. Future research should investigate the underlying mechanisms and explore interventions that

can effectively improve LGB individuals' well-being and socioeconomic outcomes. By gaining a deeper understanding of these associations, we can work towards creating a more inclusive and equitable society for individuals of all sexual orientations.

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