Mental Health Between Generational Age Groups

Objective

Mental health includes our emotional, psychological, and social well-being, and poor mental health is an increasingly common problem in the United States. This analysis statistically examines the relationship between increased levels of poor mental health (outcome variable) and generational age groups (exposure variable), after controlling for sex, race, and income.

Introduction

Mental health has been a trending topic because the rates of mood disorders and suicide-related outcomes have increased significantly among adolescents and young adults. In 2019, suicide ranked as the 10th leading cause of death among Americans (CDC, 2021). It is responsible for more than 47,500 deaths in America. Moreover, 12 million American adults have seriously thought about suicide, 3.5 million planned a suicide attempt, and 1.4 million attempted suicide (CDC, 2021). Mental health plays a major role because it affects how we handle stress, relate to one another, and make decisions. Analyzing generational age groups is important because it helps researchers analyze changes in views over time. It can provide a way to understand how different experiences shape people's views of the world. This includes world events, such as the September 11 attacks, or science/technology advances, like self-driving cars. This analysis wants to answer the question: does the generational group that you're born in have a relationship with increased levels of poor mental health?

This analysis will be using the 2018 Behavioral Risk Factor Surveillance System (BRFSS) data. The Behavioral Risk Factor Surveillance System (BRFSS) is a collaborative

project between all states in the United States that collects data using health-related telephone surveys. BRFSS collects data on adults (≥ 18 years) residing in the United States regarding health risk behaviors, chronic diseases and conditions, access to health care, and use of preventative health services related to the leading causes of death and disability in the United States (Overview: BRFSS, 2018). BRFSS has been widely used in studies and state health departments, such as proposing legislation for health initiatives and designing public health programs (Overview: BRFSS, 2018). Jin Liu conducted a similar study to this analysis by assessing mental healthcare disparities using the 2006 and 2008 BRFSS dataset. His findings found that racial minority groups were less likely to be diagnosed or treated for mental health problems (Liu, 2018).

Methods

This study will examine whether there is a relationship between increased levels of poor mental health and generational age groups using BRFSS 2018 survey data from over 400,000 adult Americans (≥ 18 years old). Logistic regression will be used to estimate the relationship between generational age groups and increased levels of poor mental health using the following variables: mental health status, age, sex, race, and income. SAS Studio, version 3.8 (Enterprise Edition), was used to complete all statistical analyses.

Poor mental health was defined using the mental health variable in the BRFSS 2018 data. This variable was created by asking participants if their mental health (this includes stress, depression, and problems with emotions) has not been good for the past 30 days. If participants answered this question indicating their mental health was not good, it was coded as a “1”. If participants indicated that their mental health was fine, it was coded as a “0”. Generational

groups are defined using the age variable: The Silent Generation (Born 1928-1945) was coded as "5", Baby Boomer (Born 1946-1964) was coded as "4", Generation X (Born 1965-1980) was coded as "3", Millennials (Born 1981-1996) was coded as "2", and Generation Z (Born 1997-2012) was coded as "1". The sex variable was split into 2 categories: male (coded as "0") and female (coded as "1"). The race variable was split into four categories: White (coded as "1"), African American (coded as "2"), Asian (coded as "3"), and Other race (coded as "4"). The income variable is based on participants' annual income and is split into five categories: < $15,000 (coded as "1"), $15,000 to less than $25,000 (coded as "2"), $25,000 to less than $35,000 (coded as "3"), $35,000 to less than $50,000 (coded as "4"), and $50,000 or more (coded as "5").

Table 1 contains the descriptive statistics on the population characteristics for: sex, race, and income by the exposure variable, generational age group. Pearson's Chi-Square test statistic for independence was used to calculate p-values. Table 2 contains the descriptive statistics on the population characteristics for: sex, race, and income by the outcome variable, mental health. Similarly to Table 1, Pearson's Chi-Square test statistic for independence was used to calculate p-values. Table 3 contains the logistic regression results comparing the association between generational age groups and poor mental health, after controlling for sex, race, and income. Adjusted odds ratios and their corresponding 95% confidence intervals are included in Table 3.

Table 1. Characteristics of 360,665 BRFSS 2018 participants by generational age group category.

	Population		Generation Z		Millennial		Generation X		Baby Boomer		Silent Generation		
Variable	N	%	n	%	n	%	n	%	n	%	n	%	p value *
	360,665	100.0%	9,703	2.7%	63,667	17.7%	83,498	23.2%	146,002	40.5%	57,795	16.0%	
Sex													
Male	168,587	46.7%	5,509	56.8%	31,622	49.7%	39,118	46.9%	67,723	46.4%	24,615	42.6%	
Female	192,078	53.3%	4,194	43.2%	32,045	50.3%	44,380	53.2%	78,289	53.6%	33,180	57.4%	<0.0001
Race													
White	291,985	81.0%	7,032	72.5%	46,682	73.3%	64,288	77.0%	122,640	84.0%	51,343	88.9%	
African American	31,778	8.8%	1,007	10.4%	6,741	10.6%	8,449	10.1%	12,127	8.3%	3,454	6.0%	
Asian	8,702	2.4%	562	5.8%	2,917	4.6%	2,400	2.9%	2,177	1.5%	646	1.1%	<0.0001
Other race	28,200	7.8%	1,102	11.4%	7,327	11.5%	8,361	10.0%	9,058	6.2%	2,352	4.1%	
Income													
< $15,000	34,689	9.6%	1,484	15.3%	5,621	8.8%	7,162	8.6%	14,658	10.0%	5,764	10.0%	
$15,000 - $25,000	57,905	16.1%	2,187	22.5%	10,535	16.6%	10,374	12.4%	21,742	14.9%	13,067	22.6%	
$25,000 - $35,000	37,748	10.5%	1,081	11.1%	7,142	11.2%	6,346	7.6%	14,232	9.8%	8947	15.5%	
$35,000 - $50,000	49,485	13.7%	1,215	12.5%	9,312	14.6%	8,999	10.8%	20,039	13.7%	9920	17.2%	
>$50,000	180,838	50.1%	3,736	38.5%	31,057	48.8%	50,617	60.6%	75,331	51.6%	20097	34.8%	<0.0001

* p values based on Pearson chi-square test of association

Table 2. Characteristics of 360,665 BRFSS 2018 participants by presence of poor mental health.

	Population		Poor Mental Health - No		Poor Mental Health - Yes		
Variable	N	%	n	%	n	%	p value *
	360,665	100.0%	240,585	66.7%	120,080	33.3%	
Age							
Generation Z	9,703	2.7%	4,234	1.8%	5,469	4.6%	
Millennial	63,667	17.7%	34,292	14.3%	29,375	24.5%	
Generation X	83,498	23.2%	51,688	21.5%	31,810	26.5%	
Baby Boomer	146,002	40.5%	103,696	43.1%	42,306	35.2%	
Silent Generation	57,795	16.0%	46,675	19.4%	11,120	9.3%	<0.0001
Sex							
Male	168,587	46.7%	121,933	50.7%	46,654	38.9%	
Female	192,078	53.3%	118,652	49.3%	73,426	61.2%	<0.0001
Race							
White	291,985	81.0%	195,256	81.2%	96,729	80.6%	
African American	31,778	8.8%	20,755	8.6%	11,023	9.2%	
Asian	8,702	2.4%	6,087	2.5%	2,615	2.2%	
Other race	28,200	7.8%	18,487	7.7%	9,713	8.1%	<0.0001
Income							
< $15,000	34,689	9.6%	18,654	7.8%	16,035	13.4%	
$15,000 - $25,000	57,905	16.1%	35,686	14.8%	22,219	18.5%	
$25,000 - $35,000	37,748	10.5%	24,833	10.3%	12,915	10.8%	
$35,000 - $50,000	49,485	13.7%	33,393	13.9%	16,092	13.4%	
>$50,000	180,838	50.1%	128,019	53.2%	52,819	44.0%	<0.0001

* p values based on Pearson chi-square test of association

Table 3. Logistic regression analysis comparing the adjusted odds ratio of poor mental health in 4,234 Generation Z BRFSS 2018 participants when compared to Silent Generation participants after controlling for sex, race, and income.

	Poor Mental Health - No		Poor Mental Health - Yes		OR*	95% CI
Variable	n	%	n	%		
	240,585	66.7%	120,080	33.3%	-----	-----
Age						
Silent Generation	46,675	19.4%	11,120	9.3%	-----	-----
Baby Boomer	103,696	43.1%	42,306	35.2%	1.921	1.875 - 1.968
Generation X	51,688	21.5%	31,810	26.5%	3.121	3.041 - 3.203
Millennial	34,292	14.3%	29,375	24.5%	4.315	4.201 - 4.432
Generation Z	4,234	1.8%	5,469	4.6%	6.370	6.081 - 6.672
Sex						
Female	118,652	49.3%	73,426	61.2%	-----	-----
Male	121,933	50.7%	46,654	38.9%	0.604	0.595 - 0.613
Race						
African American	20,755	8.6%	11,023	9.2%	-----	-----
Asian	6,087	2.5%	2,615	2.2%	0.833	0.789 - 0.878
Other race	18,487	7.7%	9,713	8.1%	0.943	0.911 - 0.977
White	195,256	81.2%	96,729	80.6%	1.235	1.204 - 1.267
Income						
< $15,000	18,654	7.8%	16,035	13.4%	-----	-----
$15,000 - $25,000	35,686	14.8%	22,219	18.5%	0.733	0.713 - 0.754
$25,000 - $35,000	24,833	10.3%	12,915	10.8%	0.616	0.597 - 0.636
$35,000 - $50,000	33,393	13.9%	16,092	13.4%	0.558	0.542 - 0.575
>$50,000	128,019	53.2%	52,819	44.0%	0.443	0.432 - 0.454

* 95% confidence intervals are for reports odds ratios.

Results

Of the 437,436 BRFSS 2018 participants, 360,665 (82.4%) had complete data for the objective. The demographic characteristics of this population are compared in Table 1. Of the entire population, 53.3% were female, 81.0% were White, and 50.1% had an annual income of over $50,000. There were proportionately more females than expected in the Silent Generation group: 57.4% vs. 53.3% ($p<0.0001$). There were proportionately more Asians than expected in the Generation X group: 2.9% vs. 2.4% ($p<0.0001$). There were proportionately more people with an annual income between $15,000-$25,000 than expected in the Silent Generation group: 22.6% vs. 16.1% ($p<0.0001$).

The demographic characteristics of the BRFSS 2018 population are compared in Table 2 with respect to poor mental health. Overall, 33% of the entire population had poor mental health. There were proportionately higher Generation Z participants than expected with poor mental health (4.6% vs. 2.7%; $p<0.0001$) and proportionately fewer Silent Generation participants than expected with poor mental health (9.3% vs. 16.0%; $p<0.0001$). With respect to sex, there were proportionately higher females with poor mental health than expected (61.2% vs. 53.3%; $p<0.0001$). But there were there proportionately less males with poor mental health than expected (38.9% vs. 46.7%; $p<0.0001$). With respect to race, there were proportionately more African Americans than expected with poor mental health (9.2% vs. 8.8%; $p<0.0001$). While White participants, conversely, had proportionately less than expected poor mental health (80.6% vs. 81.0%; $p<0.001$). With respect to annual income, there were proportionately more participants making <$15,000 than expected with poor mental health (13.4% vs. 9.6%; $p<0.0001$).

Table 3 presents the adjusted odds ratios for the study on the association between generational groups and poor mental health in the BRFSS 2018 population. Those who were in the Generation Z group had the highest odds (537%) of having poor mental health than those who were in the Silent Generation group, after controlling for sex, race, income (OR = 6.370; 95% CI = 6.081-6.672). Millennials also had substantially greater odds (332%) of having poor mental health than those who were in the Silent Generation group, after controlling for sex, race, income (OR = 4.315; 95% CI = 4.201-4.432). Males had lower odds (40%) relative to females of having poor mental health, after controlling for age, race, and income (OR = 0.604; 95% CI = 0.595-0.613). Those who were Asian had less odds (17%) of having poor mental health compared to African Americans, after controlling for age, sex, income (OR = 0.833; 95% CI = 0.789-0.878). Those who had an annual income of >$50,000 had lower odds (56%) of having poor mental health compared to those who had an annual income of <$15,000, after controlling for age, sex, and race (OR = 0.443; CI = 0.432-0.454).

Confounding variables were tested with respect to the exposure variable, age. The general rule is that when a control variable is removed from the model, and the odds ratio of the exposure variable changes >10%, then the removed control variable will be identified as a confounding variable. In this model, no confounding variables were found because no percent changes did not exceed 10%. Multicollinearity among variables can lead to coefficient standard errors being too large, so multicollinearity presence was tested in the model by assessing the variance inflation factor (VIF). Large VIF's greater than 10 (but should start to get concerned around 5) indicate multicollinearity. In this model, the highest VIF reported was 1.04 from the income variable; therefore, there is no presence of multicollinearity. The c-statistic is a measure of the goodness of fit the model, and this model's c-statistic was calculated to be 0.659. This

indicates the model is a good fit, and does well at predicting yes/no for the outcome variable, poor mental health.

Strengths

The BRFSS is administered and supported by the Center of Disease Control (CDC) under the Population Health Surveillance Branch, and has been collecting data since 1984. The BRFSS collects hundred thousands of data each year by landline and cellular telephone from all 50 states, the District of Columbia, Guam, and Puerto Rico. BRFSS data is also used by state health departments, which help them identify demographic variations in health-related behaviors. This dataset contains over 400,000 rows of data, which makes it a well sized dataset to conduct an analysis. States collect and submit data to the CDC each month, and the BRFSS performs routine data processing on a constant basis. This especially helps with the quality of the data. The CDC also performs cumulative data quality checks, identify any potential problems with the data, and execute data cleanup tasks. The BRFSS has a data weighting procedure, which helps make the data more representative of the population from where the data is collected. By having a data weighting process, it incorporates the design of the BRFSS survey and characteristics of the population, which further improves the quality of the data.

Limitations

There are some limitations using the 2018 BRFSS data to evaluate the association between generational age groups and poor mental health. Since the mental health question in the 2018 BRFSS survey is self-reported, it may be subject to bias reporting. Since poor mental health is not a clinical diagnosis from a professional medical examiner, participants could have

not be truthful in their survey. Having poor mental health is also not something everyone is willing to admit, and participants' perception of stress, depression, and problems with emotions could vary.

Conclusion

The purpose for this analysis was to assess if the generational age group that people are born in have a relationship with increased levels of poor mental health, after controlling sex, race, and income. The results show there is a relationship between generational age group and poor mental health. As generational age groups become more current, it is more likely that poor mental health is present. After each generation the odds of having poor mental health steadily increases relative to the Silent Generation, after controlling sex, race, and income. There are many political, societal, economic, and technology factors that could be contributing to the rise of poor mental health in generational age groups. However, it's important to view generational age groups as an output of societal change, instead of a "label" term to scrutinize the newer or older generations. Society is always evolving. Understanding how it changes can help people better understand how to support the current generation. For future studies, it could be interesting to include additional questions in the BRFSS survey, such as: How many hours do you spend using your smartphone? On average, how many hours do you work? Smartphone usage and working hours could be interesting additional control variables that could make an impact on mental health.

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