RACIAL DISPARITIES IN THE EFFECTS OF POST-STROKE ISOLATION: THE UNINTENDED CONSEQUENCES OF SOCIAL DISTANCING ON ADULTS WITH COMMUNICATION DEFICITS

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— ABSTRACT —

This study investigated the prevalence and severity of depression among individuals with chronic communication disorders (CCDs). The study was designed to examine disparities among racial and ethnic groups who are traditionally less likely to receive mental health services. Evidence informs the unintended impact of social distancing on individuals with CCDs. Chi-squared tests and ordered logistic regression models evaluated the association severity of depression, chronic communication disorders and race/ethnicity controlling for income, insurance and demographic characteristics. Results indicated that individuals with CCDs have significantly higher levels of depression than those without CCD. African Americans with CCD have higher levels of depression than other CCD groups. Individuals with insurance, higher income, larger households and who see a speech pathologist or therapist had significantly lower depression levels. This study found a higher prevalence of depression among African Americans living with chronic communication disorders. Recently issued "shelter-in-place" directives forcing Americans to isolate to prevent the spread of COVID-19, have heightened the risk of depression among racial-ethnic minorities living with CCD. Combined with the innate tendency for individuals with CCD to be isolated from society, clinicians should take additional measures to ensure persons with aphasia (PWA), particularly those from racial-ethnic minority backgrounds, are monitored closely to ensure they maintain stable emotional well-being.

Keywords: COVID-19, depression, stroke, communication disorders

Introduction

Beginning in March of 2020, shelter-in-place and stay-at-home orders were issued throughout the United States to stop the rapid spread of the Novel Coronavirus, 2019 (COVIDCOVID-19). As the coronavirus advances across the country, more Americans are staying in their homes and avoiding social interaction. While "social distancing" is considered essential to slowing the spread of the virus and easing the burden on the beleaguered health infrastructure, isolation can have negative effects on mental and emotional health (Franck, et al. 2016). Isolation has been linked to heightened level of anxiety, depression and negative behavioral tendencies (Chow, et al. 2017). However, the pathways by which social networks and social supports influence mental health are not uniform across groups in society. Gender differences in support derived from social network participation have been observed (Kawachi & Berkman 2001). Individuals with low income or reduced socioeconomic status are more likely to experience higher levels of mental distress. The exposure of African Americans to greater inequalities within social and economic environments has been linked to psychological distress, depression and anxiety (Watkins, et al. 2006).

Individuals with functional communication deficits also exhibit higher incidences of mood disorders such as depression. Studies find that the incidence of depression among those with CCD is 62 to 70 percent higher than those without CCD (Worrall, et al. 2016). Furthermore, the severity of the deficit is directly related to the decline in mood state (Shehata, et al. 2015). While the social isolation and reduced social support that results from impaired communication is linked to increased risk of depression, research has yet to consider the unintended consequences of the COVID-19 quarantine among this vulnerable group. The reduced social contact and increased isolation resulting from shelter-in-place mandates could exacerbate feelings of loneliness. Social distancing places individuals with communication deficits at greater risk for mental and emotional distress.

While it is too early to evaluate the impact of the COVID-19 quarantine on the mental health of Americans, early evidence suggests that the unprecedented strict quarantine measures in China resulted in a wide variety of psychological problems, such as panic disorder, anxiety and depression (Qui, et al. 2020). This study examined the relationship between depression severity and communication deficits identifying those factors that contribute to the relative risk of worsening depression. Given the strong association between race/ethnicity and depressive tendencies, analysis tests for disparate tendencies among African Americans and Hispanics with CCD. In advance of the phased re-opening of society, results will highlight potential unintended consequences of social distancing on individuals with communication deficits and disorders.

Theoretical Framework: Research indicates that COVID-19 spreads primarily among people who are in close contact (within about 6 feet) for a prolonged period. Evidence suggests that that infected persons who do not display symptoms may still transmit the virus. The rapid spread of this virulent virus necessitated the closing of businesses, places of worship and schools throughout the country. The need to social distance left individuals to remain at home, physically isolated.

The focus of this study was on adults with post-stroke communication disorders. Individuals with post-stroke chronic communication disorders often experience isolation and social exclusion at the infrastructural, interpersonal, and personal levels due to the nature of their condition (Parr 2007). These issues were common even prior to the onset of COVID-19 and have the potential to magnified during the pandemic. Social exclusion and isolation can manifest in physical, emotional and psychological outcomes and often hinder treatment of their condition (Shehata, et al. 2015). However, the impact of a pandemic-induced quarantine on the emotional health of individuals with CCD is not known. Already isolated by their hindered communication, how will individuals with chronic communication deficits contend with increased isolation and ostracization?

While it is too early to determine the extent of the impact, this study will explore the prevalence of depression among adults with CCD. Not only with it explore the prevalence and severity of depression, but it will also evaluate relative risk factors for depression exploring potential demographic disparities among NHIS respondents with CCD.

Methods

Data: Data from the National Health Interview Survey (NHIS) includes information on the health of the civilian noninstitutionalized population of the United States. Collected by the National Center for Health Statistics (NCHS), NHIS monitors the health of the United States population through the collection and analysis of data on a broad range of health topics. A major strength of this survey lies in the ability to display these health characteristics by many demographic and socioeconomic characteristics. NHIS contains data on health conditions, events and health services utilization collected annually. NHIS is well-suited for this study given its inclusion of a

wide variety physical, mental and emotional health indicators. This study used individuals 18 years and older who completed the adult sample questionnaire.

Key Outcome Variables:

Race/Ethnicity: Binary indicators for African American Hispanic ethnicity are included in the model. Roughly 20 percent of the sample was African American, and 12 percent was Hispanic. While racial and ethnic groups do not present statistically different levels of depression (Wyman, et al. 2020), they are more likely to experience conditions or hardships that lead to depressive symptoms (Bailey, et al. 2019). Depressive tendencies are often exacerbated by sociodemographic characteristics, preexisting vulnerabilities, social support, and trauma-specific factors. For example, 86 percent more African Americans experienced depression post hurricane Katrina than whites (Ali, et al. 2017).

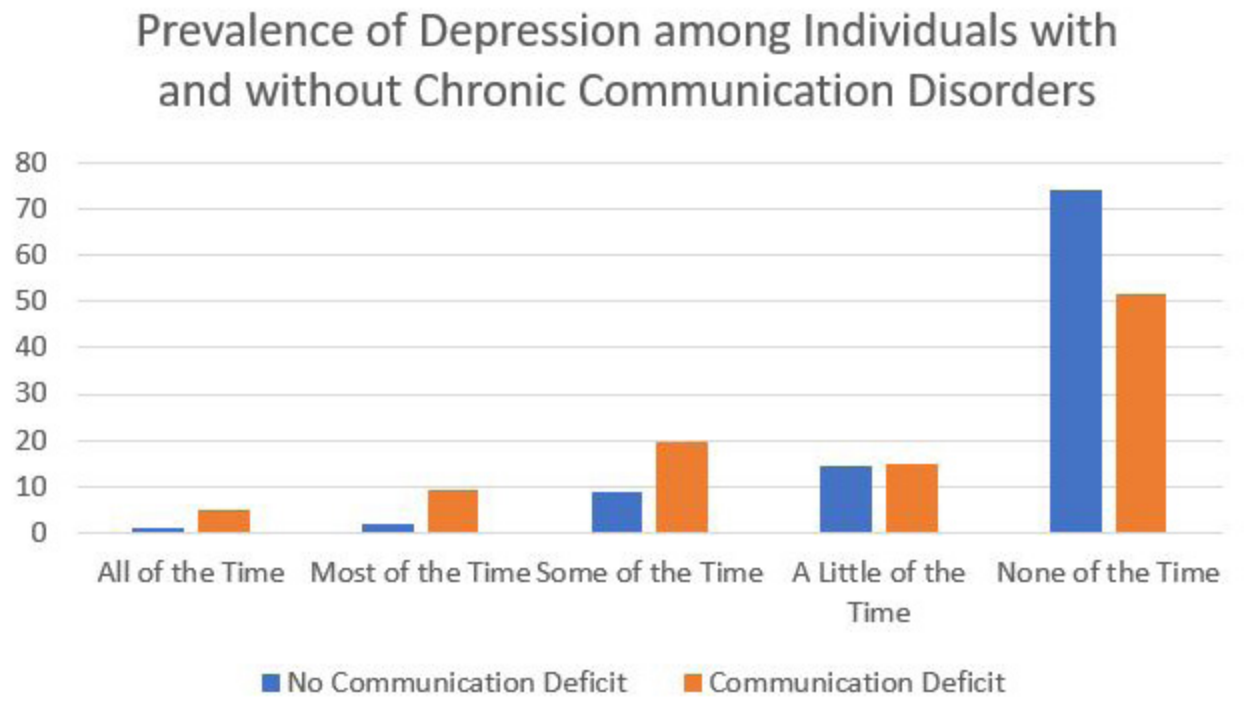
Age: Respondents ranged in age from 18 to 85 with an average age of 47. While age has not been shown to significantly correlated with depression severity, studies show conflicting results regarding the age-related trajectory of depression (Snowdon 2001).

Sex: The sample is 54 percent female and 46 percent male. Studies indicate that depression is more prevalent among women than men due to the higher risk of first onset, not to differential persistence or recurrence. These gender differences usually emerge in puberty with other experiences related to changes in sex hormones have little influence major depression (Kessler, 2003).

Depression Level: The level of depression is measured using five levels indicating how frequently respondents report feeling "So sad nothing cheers you up, past 30 days." Responses are limited to five frequency levels including (1) all the time (2) most of the time, (3) some of the time, (4) a little of the time and (5) none of the time. Below, Figure I illustrates the prevalence of depression levels among individuals with and without CCD. Those with CCD have over five times higher prevalence of feeling depression either all of most of the time. While nearly 75 percent of non-CCD adults report never feeling depressed, only half of those with CCD are never depressed.

Income/Poverty Ratio: Rather than using the exact income amount to control for socioeconomic differences, this study utilizes the ratio of a family's income to the Federal poverty threshold in the prevailing year. Values range from zero, indicating no earned income, to 20, indicating an income roughly 20 times higher than the poverty threshold. Numerous studies have documented the relationship between higher income and lower prevalence of depression, but the mitigating impact of post-stroke communication disorders is unclear (Miech & Shanahan 2000).

Figure I. Prevalence of Depression among Individuals with and without Chronic Communication Disorders



Family Size: The NHIS defines a family as an individual or a group of two or more related persons who are living together in the same occupied housing unit (i.e., household) at the time of the survey. In some instances, unrelated persons sharing the same household may also be considered as one family, such as unmarried couples who are living together. In this study, family size ranged from one to 13 with an average of three people in a family. While previous studies showed no association between household size and depression, the impact of household size on depression among those with communication disorders has not been determined (England & Sim, 2009).

Insurance: Each respondent indicated whether, at any point in the previous 12 months, they did not have health insurance coverage. Most respondents had health insurance coverage for the entire year. Only 0.05 percent report being without insurance during the past year. Evidence suggests that depressive symptoms are more severe among the uninsured. Additionally, individuals without health insurance experience a higher risk of developing severe depressive symptoms than those with health insurance (Zimmerman, et al. 2018)

Chronic Communication Disorder: NHIS does not specifically identify any specific type of communication disorder. To identify those respondents with post-stroke chronic communication disorders, two survey elements were used. First, respondents had a stroke-related problem that was classified as chronic. Second, respondents classified their degree of difficulty communicating using usual language as "A lot of difficulty" or "Cannot do at all/unable to do." Over 450 respondents, 0.17 percent of the sample, met both requirements indicating that they suffered from a chronic stroke-related disorder and experienced a high degree of difficulty communicating using usual language. It is not possible using the NHIS data to determine whether the communication difficulty is a direct result of stroke, the classification describe provides the closest approximation that can be obtained. All patients classified as suffering from a post-stroke chronic communication disorder had experienced a stroke, had a stroke-related chronic condition and difficulty communicating.

Seen/talked to therapist: Each NHIS respondent indicates whether they have seen or talked to a physical therapist, speech therapist, respiratory therapist, audiologist or occupational therapist in the previous year. While only 10 percent of the sample has sought treatment from a clinician, it is necessary to control for potential receipt of care for a communication deficit. A summary of all key outcome variables is reported in Table 1.

Table I: Descriptive Statistics for NHIS 2018 Adult Sample

	N	Mean	Median	Std Dev	Min	Max
Black	62765	0.116	0	0.320	0	1
Hispanic	62765	0.157	0	0.364	0	1
White	62765	0.744	0	0.432	0	1
Age	62765	46.645	44	17.950	18	85
Female	62765	0.539	1	0.498	0	1
Depression Level	62765	4.590	5	0.807	1	5
Income/Poverty	62765	3.894	3.054	3.160	0	20.426
Size of family	62765	3.003	3	1.738	1	13
No health coverage past 12 months	56540	0.047	0	0.211	0	1
Chronic Communication Deficit	62765	0.007	0	0.083	0	1
Seen to therapist, past 12 months	62750	0.113	0	0.317	0	1

Empirical Analysis: Since the response variable, level of depression, is ordinal in nature, group-level differences were tested using the chi-squared score test for proportional odds assumption. These tests evaluated the independence of depression level and race, ethnicity, gender, insurance status, communication deficit and receipt of treatment in the previous 12 months. Because chi-squared tests can be highly sensitive to sample size differences, an ordered logit model is used to fit the ordinal response variable. Ordered logit models are based on the cumulative probabilities of the response variable: in particular, the logit of each cumulative probability is assumed to be a linear function of the covariates with regression coefficients constant across response categories. Ordinal logit models provide inference regarding the ability of independent variables to predict the dependent as well as the unit contribution of continuous independent variables to changes in outcome variable. In this study, the ordered logistic regression model examined the odds of experiencing depression more frequently with None of the Time" serving as the reference category.

Results

The results of the chi-square tests are reported in Table II below. As indicated, all results are highly significant, suggesting that the level of depression is not independent. In other words, depression levels among African American, Hispanics, females, uninsured people and those with CCD are systematically different than depression levels in the general population. These differences indicate that depression level is likely related to ethnicity, gender, insurance status and/or communication disorders.

The results of the logistic regression are displayed in Table III on page 35. The results suggest that being female, older and without health insurance increases the odds of being in a lower depression category—more frequently depressed. Women and older individuals, particularly those without insurance, will experience depression more frequently. As expected, family size, income and receipt of therapy/treatment decrease the odds of being in a lower ordered category. Those individuals with larger households and higher income levels are less likely to experience frequent depression as are those who have seen a clinical professional in the previous year. African American and Hispanics have lower odds of experiencing a high frequency of depression. This is congruent with previous studies suggesting that the prevalence of depression among minority groups is between five and 10 percent, compared to 17 percent in the general population. However, studies relying on self-reported depressive symptoms may be biased by under reporting resulting from stigmatization of mental illness in some racial and ethnic groups.

Those with a post-stroke chronic communication disorder have higher odds of experiencing frequent depression. The isolation and narrowing of social networks that often occur post-stroke have been linked to depression, anxiety and feelings of loneliness. African Americans and Hispanic, however, have different post-stroke depression frequencies. Hispanics with CCD have lower odds of frequency depression than those non-Hispanics without CCD. This could be due to an enhanced system of social and community support provided during recovery. Conversely, African Americans with CCD have significantly higher odds of experiencing frequent depression compared to the reference group. These findings could indicate

Table II: Chi-Square Test of Independence between Level of Depression and Demographic Group

Chi-Square Test for Categorical Independence		
	Chi-Square	**Prob**
Seen a therapist, past 12 months	2385260	<.0001
Uninsured, past 12 months	959314	<.0001
Chronic Communication Disorder	1110848	<.0001
Female	2568916	<.0001
Hispanic	262100	<.0001
African American	521613	<.0001
Categorical Reference: Level of Depression		
1- All of the time, 2- Most of the time, 3- Some of the time, 4- A little of the time, 5- None of the time		

Table III: Ordered Logit Model Testing Relative Risk for Depression

Chi-Square AIC	2263718.01* 415148275			
	Ordered Logistic Estimates			
	Estimate	Std. Err.	Chi-Square	Odds Ratio
Black	-0.00054*	0.000	1.54	1.00
Hispanic	-0.0308*	0.000	5268.92	0.97
Age	0.00184*	0.000	51555.29	1.00
Female	0.4277*	0.000	2065441.50	1.53
Income/Poverty	-0.126*	0.000	5174916.61	0.88
Family Size	-0.0778*	0.000	761136.13	0.93
No health insurance coverage	0.3967*	0.001	431405.10	1.49
Chronic Communication Deficit	0.8195*	0.002	218532.14	2.19
Seen Speech Pathologist/Therapist	-0.5811*	0.000	1946799.49	1.79
Black*Chronic Communication Deficit	0.2124*	0.003	3733.49	
Hispanic*Chronic Communication Deficit	-0.8101*	0.005	26504.79	

Dependent Variable: Frequency of Depression in the Last 30 Days
*= Significant at 95%
Probabilities modeled are cumulated over the lower Ordered Values.

increased odds of depression, severity of depression of both among this group suggesting a different circumstance for racial and ethnic groups post-stroke.

Discussion

The goal of this study was to examine the depression, communication disorders and potentially confounding factors. Results indicated that depression, particularly frequent depression, was more common among those with chronic, post-stroke communication disorders. Race, ethnicity, gender, insurance status and receipt of treatment were also highly correlated with the level of depression. Given the isolating nature of post-stroke CCD, regression analysis tested for disparities among African American and Hispanics with CCD. While Hispanics with CCD showed lower frequency of depression, African Americans with CCD were significantly more likely to experience frequent depression. Risk magnitudes for African Americans with CCD were equivalent that of family size and income. Additionally, females—a group more prone to depression—were also at increased risk.

Research shows that stroke survivors are isolated or tended to stay isolated—a factor that is predictive of depressive symptomatology (Morris, et al. 1990). While causality is outside the scope of this study, it cannot be determined whether social isolation is the outcome of depression or whether depression leads individuals to isolate themselves, it is clear that more research into the relationship between communication disorders, race/ethnicity and depression risk is needed. Furthermore, clinicians, caregivers, family members and SLPs who treat those with CCD should be aware of the racial disparities in depression risk and heighten their efforts to ensure stable emotional well-being. Assessments of depressive symptomatology and address of social isolation poststroke would be an important, low-cost implementation into treatment protocol. Results from this study suggest that family size, income and treatment decrease the probability of severe depression. While these elements might not be present in the lives of all post-stroke survivors, financial support, close social networks and professional care should be provided to the extent possible.

This study has several limitations which should be noted. First, given the available data, it was not possible to directly identify patients with communication disorders caused by stroke. Individuals who had 1) experienced a stoke and 2) reported a chronic

communication deficit were considered to have post-stroke CCD. However, it is possible that the communication disorder existed prior to the stroke event or that the CCD was entirely unrelated to stroke. Nevertheless, the identified group did report difficulty communicating and would likely be at greater risk for depressive symptoms irrespective of the cause of their disorder.

Second, the NHIS does not directly indicate whether respondents had been treated by a SLP or any professional trained to directly work with speech and language. Instead they indicate whether respondents have seen or talked to a physical therapist, speech therapist, respiratory therapist, audiologist or occupational therapist in the previous year. It is likely that post-stroke recovery would include one or all of the aforementioned forms of rehabilitation, but it is not possible to determine whether the clinical intervention was targeted at speech or another physical aspect. Furthermore, it is not possible to determine if the treatment was related to post-stroke impairments. While the inclusion of this control does capture the willingness to seek treatment and the ability to utilize health services, it lacks the specificity needed for further interpretation.

Third, it was not possible to control for home-based healthcare, domestic nursing care or residence in a nursing home or rehabilitation facility. Family size, defined as the number of related individuals living together in a single housing unit, was used as an indicator of the household community, but it did not capture the immediate social network outside the home.

Finally, communication disorders can vary widely in severity and impact. There are varying degrees of impairment and difficulty using, processing and formulating language. It was not possible. While it is logical, given earlier results, to questions the association between the severity of the disorder and the frequency of depression, it was not possible to control for the degree of the deficit or the relative ability to communicate. However, the association between then degree of impairment and frequency of depression symptoms should be explored in future research.

Results indicated that African Americans with CCD have higher odds of experiencing more frequent depression, while Hispanics with CCD have lower odds. While the causality behind these results is outside the scope of this analysis, it could stem from varying cultural identities and how these cultural identities are related to mental health (Tikhonov, et al. 2019). One possible explanation could consider the relationship between racial identity, psychological distress and the way that mental ill is perceived (Wilson, et al. 2017). While racial and ethnic identity has been shown to play a role in disability, rehabilitation and recovery, the exact nature of its influence is not well understood (Alston, et al. 1996).

Conclusions

It is too early to determine the full impact of the coronavirus pandemic, but it has reshaped nearly every aspect of life nearly instantaneously. Not only will the way Americans receive healthcare be forced to change in a post-COVID-19 world, but the types of care they will need are also likely to change. This study has explored one potential unintended consequence of the COVID-19 quarantine—depression—and how the mandated social isolation could affect individuals with post-stroke, chronic communication disorders. Already limited in their ability to participate in society, those with CCD were forced into an increasingly severe state of isolation as the coronavirus spread throughout the county.

The goal of this study was to examine depression among individuals with communication deficits and explore additional risk factors for depression severity. Using data from the 2018 NHIS, results indicated the African Americans, females and those without insurance had the highest risk for depression or increasing severity of depression. Among those, African Americans with appeared to be the most vulnerable to depression or worsening depression frequency. In other words, being an African American with CCD puts you at similar risk for depression as those with income or family loss.

These results should serve to inform clinicians of the potential for increased depression or depression severity post-COVID. Those who treat patients with post-stroke communication disorders should be mindful of the increased risk for depression among these patients and the potential impact of mandated social isolation. When the world begins to emerge from a global lockdown, the impact of isolation, increased solitude and loneliness will remain. It is importation that these concerns not go overlooked and be addressed as a fundamental component of their treatment.

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