Investigating the Link Between Chronic Health Conditions and Mental Health Symptoms Among Low-income, Latine Patients Seen at a Student-Run Free Clinic

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Abstract

Background: Individuals with chronic health conditions (CHCs) experience more anxiety and depression symptoms than those without CHCs. However, there is a dearth of research examining these relationships among low-income and minoritized populations. This current study investigated whether specific CHCs (i.e., diabetes, hypertension, hyperlipidemia) are linked to greater depression and anxiety symptoms among low-income, uninsured, and primarily Latine adults seen at a student-run free clinic (SRFC).
Methods: Participants were 149 adults (aged 19-78 years) seen at a SRFC serving low-income community members. Participants were primarily female (63.0%) and Spanish-speaking (67.0%). Anxiety and depressive symptoms were measured using the Generalized Anxiety Disorder-7 (GAD-7) and the Patient Health Questionnaire-9 (PHQ-9). The presence of CHCs were extracted from participant medical records.
Results: The presence of CHCs were associated with lower anxiety symptoms and the presence of hypertension and hyperlipidemia were linked to lower depression symptoms.
Conclusions: Overall, this study demonstrates the importance of investigating relationships between mental and physical health conditions using understudied samples as findings observed among mostly White, higher income samples may not generalize. Research conducted in SRFCs may improve knowledge of understudied populations, such as low-income and ethnically diverse patients. Cultural factors may have contributed to these unexpected results (e.g., stigma-related underreporting of mental health symptoms, inadequate methods to assess culture-specific symptoms). These findings suggest the need for future research to explore alternative methods of assessing mental health symptoms among low income, ethnically diverse populations.

Introduction

Individuals with chronic health conditions (CHCs) are at an elevated risk for developing mental health problems such as anxiety and depression.[1] Low-income populations are at heightened risk of developing both mental health disorders and CHCs.[2] Research investigating the risk of comorbidity between CHCs and mental health symptoms is limited among low-income patients, though initial evidence suggests that low-income patients may be more vulnerable to comorbid CHC and mental health disorders. One study that used data from a national survey of self-reported health problems demonstrated that, among patients with CHCs, lower-income patients were more likely to have comorbid mental health problems compared to higher-income patients.[3] Similarly, among low-income patients at a student-run free clinic (SRFC), those with a psychiatric diagnosis were more likely to have a medical condition compared to patients without

a psychiatric diagnosis.[4] This current study sought to replicate this finding by examining three specific CHCs (diabetes, hypertension and hyperlipidemia) among patients who visited a SRFC serving a low-income and primarily Latine community.

Depression and Chronic Health Conditions

Depression symptoms are a common comorbidity of many CHCs with much research focused on the relationship between depression symptoms and diabetes, specifically.[5] Epidemiological research suggests the rates of depression may be three times higher among individuals with diabetes compared to individuals without diabetes.[6] In a review of the comorbidity between depression symptoms and diabetes, Bowser and colleagues urged more research with lower-income and minoritized samples, as the majority of research focuses on higher-income and White populations.[7] Stress is a common mechanism that likely contributes to the development of both disorders, which may be especially prevalent for low-income and minoritized populations given the higher levels of stress they experience relative to higher-income and White populations.[6,8] For instance, among a Latine sample, low-income status and ethnic discrimination, two stressors common in minoritized populations, were significant predictors of comorbid depression symptoms and diabetes.[9] However, this association between depression symptoms and diabetes has not been replicated in all studies of low-income and ethnically minoritized adults. Among a large, primary care sample of Black patients aged 40 and older, no differences in depressive symptoms were observed between those with and without diabetes.[10] Research examining understudied populations is critical to determine the robustness of findings observed primarily in higher income and White populations.

Similar to diabetes, the presence of cardiovascular disease (i.e., hypertension, hyperlipidemia) has been associated with depression, and the experience of depression can increase risk for cardiovascular disease.[11,12] The comorbidity has been observed in low-income adults. One study demonstrated that, among low-income adults, those with depressive symptoms had a higher likelihood of developing hypertension compared to those without depressive symptoms.[13] Hyperlipidemia has also been associated with an increased risk for depression symptoms in low-income adults.[14] Evidence of the comorbidity between cardiovascular disease and depression in minoritized populations is mixed. Among women from the National Health Interview Survey, the association between hypertension and depression was stronger for Black and Latine women compared to their White counterparts.[15] However, in the Women's Health Initiative, there was no relationship between baseline depressive symptoms and hypertension three years later among Latine women.[16]

Anxiety and Chronic Health Conditions

Anxiety symptoms appear to be elevated among individuals with CHCs.[17] A recent meta-analysis reported a positive association between anxiety symptoms and the presence of diabetes.[18] The impact of low-income status on the link between anxiety and diabetes has received limited attention, yet a few studies support a comparable, and potentially a stronger relationship. One study demonstrated lower income status was linked to greater anxiety symptoms among Chinese adults with diabetes.[19] Among a low-income sample of United States (US) adults, participants with diabetes were twice as likely to have a comorbid anxiety disorder compared to participants with a chronic illness other than diabetes.[20] Further, among a Dutch sample of patients with diabetes, ethnic minority patients reported higher levels of anxiety and diabetes-distress compared to native Dutch patients.[21] Whether the association between diabetes presence and anxiety is observed in American ethnic minorities deserves further study.

Similar to diabetes, cross-sectional and longitudinal studies have found consistent relationships between hypertension and elevated anxiety symptoms, a link that has also been observed among a low-income sample.[13,22-24] Although the relationship between hyperlipidemia and anxiety symptoms has not been examined, one study found severe anxiety symptoms at baseline were associated with risk factors for hyperlipidemia.[25] There have been no studies, to our knowledge, that have investigated the link between anxiety and hyperlipidemia using a low-income and

minoritized sample.

Current Study

In the general population, CHCs appear to be associated with depression and anxiety symptoms. However, few studies have examined this relationship among low-income, uninsured, and minoritized populations.[7,10,14,20] Extending research to understudied populations is essential to confirm that findings observed in commonly examined populations replicate. In addition to providing healthcare to underserved patients, SRFCs provide researchers with opportunities to explore whether these commonly observed effects replicate among understudied samples. This current study improved upon past research by examining the relationship between three CHCs and depression and anxiety symptoms among a sample of low-income, uninsured, and primarily Latine patients seen at a SRFC. We hypothesized that individuals with *each* type of CHC (diabetes, hypertension, hyperlipidemia) will report higher levels of depression and anxiety symptoms than individuals without *any* CHC.

Methods

Participants

Participants included patients seen between January 1, 2019, and December 31, 2019, at a SRFC in the US that offers free healthcare to uninsured, low-income adults. A total of 149 patients were included in the final sample. Participants ranged in age from 19 - 78 years (M = 48.50, SD = 12.21). The sample was composed of mostly female participants (63.0%) and participants who identified Spanish as their primary language (67.0%). Most participants reported having a high school degree or less (79.3%), having either a part-time job or were unemployed (64.4%), and having a yearly household income of $30,000 or less (80.6%).

Procedures

All new clinic patients were required to complete a depression and anxiety screening measure as part of their intake paperwork, and annually thereafter. Since most patients at this clinic endorse Spanish as their primary or preferred language, measures were completed in English or Spanish. Data extracted from the medical record included participant age, educational status, employment status, yearly household income, gender, primary language, presence of CHCs, and scores on mental health screening measures.

Measures

Patient Health Questionnaire-9 (PHQ-9).[26] The PHQ-9 is a 9-item, self-report screening measure of depression symptoms widely used in outpatient settings. Participants rated on a Likert scale ranging from 0-3 how much they endorse each symptom in the past two weeks. The PHQ-9 is a reliable and valid screener of depression symptoms in different patient populations.[27] The Spanish language version of the PHQ-9 was used when participants preferred completing the measure in Spanish; this version also demonstrates adequate reliability and validity.[28] In our current sample, the mean PHQ-9 score was 5.71 (SD = 6.11), with an omega of .90, which is considered "strong" internal consistency.[29]

General Anxiety Disorder – 7 (GAD-7).[30] The GAD-7 is a 7-item self-report questionnaire designed to screen for anxiety symptoms that has demonstrated good construct and concurrent validity.[31] Participants rated on a Likert scale ranging from 0-3 how much they endorsed each symptom over the last two weeks. The Spanish language version of the GAD-7 has also demonstrated adequate validity and reliability.[32] The mean GAD-7 score in our sample was 3.37 (SD = 4.55), with an omega of 0.92, which is considered "strong" internal consistency.[29]

Identification of CHCs. Data on whether the participant received a diagnosis of diabetes, hypertension, and hyperlipidemia was extracted from the medical record. All participants were coded as either not having a diagnosis (0) or having a diagnosis (1) for each CHC. Trained raters followed a standardized procedure for coding CHCs based on International Classification of Diseases, 10th Revision (ICD-10) codes in the patient's medical record. Data were coded by two different raters and discrepancies were resolved during coding meetings.

Analytic Plan

Depression and anxiety symptom total scores

were Winsorized (i.e., transformed the data to reduce the impact of extreme values).[33] Participant gender, primary language, and age were initially considered as covariates in the analyses. A covariate was used in analyses if it was associated with the outcome variable, but not associated with the predictor variable.[34]

Independent samples t-tests were conducted to determine if the presence of each CHC was associated with PHQ-9 scores or GAD-7 scores. Specifically, individuals with a diagnosis of diabetes (N = 46), hypertension (N = 45), and hyperlipidemia (N = 38) were compared to individuals without any CHC (N = 66). Because neither PHQ-9 scores or GAD-7 scores were normally distributed, all primary analyses were conducted using bootstrap confidence intervals (BCIs), a non-parametric method that is robust against assumption violations (e.g., normality). All analyses were conducted using SPSS (Version 27, IBM, Armonk, NY).

Results

Preliminary Analyses

Participant gender was not associated with PHQ-9 scores ($t(147) = -1.64$, $p = 0.10$) or GAD-7 scores ($t(147) = -1.82$, $p = 0.07$). Primary language was not linked to PHQ-9 scores ($t(147) = -0.51$, $p = 0.61$) or GAD-7 scores ($t(81.81) = 0.81$, $p = 0.42$). Although age was not associated with PHQ-9 scores ($r = -.12$, $p = 0.16$), it demonstrated a negative relationship with GAD-7 scores ($r = -.18$, $p = 0.03$). However, age was associated with the presence of diabetes ($t(109.80) = -5.00$, $p < 0.001$), hypertension ($t(109) = -3.75$, $p < 0.001$), and hyperlipidemia ($t(102) = -3.64$, $p < 0.001$). Therefore, participant gender, primary language, and age were not included as covariates.

Primary Analyses

Means and standard deviations for each of the CHC groups are presented in Table 1. PHQ-9 scores did not differ between those with and without diabetes ($t(110.00) = 1.40$, $p = 0.15$, $BCI = [-0.55, 4.06]$, $d = 0.27$). However, PHQ-9 scores did differ between those with and without hypertension ($t(108.44) = 2.20$, $p = 0.03$, $BCI = [0.37, 4.57]$, $d = 0.41$) and hyperlipidemia ($t(102.00) = 1.88$, $p = 0.05$, $BCI = [0.09, 4.95]$, $d = 0.38$). GAD-7 scores

Table 1. Means and standard deviations of depression and anxiety symptoms for CHC groups*

CHC group	Depression symptoms, mean (SD)	Anxiety symptoms, mean (SD)
Diabetes	5.20 (5.87)	2.20 (3.59)
Hypertension	4.41 (5.04)	1.87 (3.09)
Hyperlipidemia	4.50 (5.39)	2.50 (3.68)
No CHC	6.94 (6.90)	4.69 (5.17)

Values reflect non-transformed data.
CHC: chronic health condition; SD: standard deviation.

were significantly lower among participants with diabetes ($t(110.00) = 3.01$, $p = 0.01$, $BCI = [0.83, 4.05]$, $d = 0.54$), hypertension ($t(107.40) = 3.60$, $p < 0.001$, $BCI = [1.25, 4.33]$, $d = 0.64$), and hyperlipidemia ($t(97.27) = 2.51$, $p = 0.014$, $BCI = [0.46, 3.97]$, $d = 0.47$) compared to those without a CHC. Effect sizes between 0.20 and 0.50 were considered small effects, while effect sizes between 0.50 and 0.80 were considered medium effects.[35]

Discussion

The presence of CHCs was not associated with greater depression or anxiety symptoms, which is inconsistent with predictions and the majority of previous research. In fact, most relationships between CHCs and depression/anxiety symptoms were in the opposite direction to what was predicted, such that the presence of CHCs were linked with *fewer* depression/anxiety symptoms. Our results differed from another study conducted at a SRFC in which patients with any psychiatric diagnosis were more likely to have a medical condition than those without a psychiatric diagnosis.[4] The discrepancy between these two studies may be due, in part, to this current study using a sample of primarily Latine patients whereas the other study utilized a majority White sample. The results of this current study are somewhat consistent with another study that found no relationship between the presence of diabetes and depression symptoms among low-income Black adults.[10]

We consider four potential explanations for why this current study's results differ from other studies. First, lack of healthcare access or high healthcare costs cause significant stress for uninsured individuals.[36] However, this sample had

access to healthcare via a SRFC, which may have alleviated some of the stress associated with CHCs for this sample. Access to free healthcare may provide patients with greater support for their CHCs, which could prevent or alleviate mental health symptoms like depression and anxiety. This notion is consistent with the findings of this current study, as low depression and anxiety scores were observed. Examining whether the relationships between CHCs and anxiety/depression symptoms differ for uninsured individuals depending on access to healthcare may further contextualize our results.

Second, due to a limitation in the data extraction procedures, it is unknown if the CHC diagnosis occurred prior to or during the medical appointment in which they completed the mental health screening questionnaires. Since 20-46% of adults are unaware that they have a chronic health condition like diabetes or hypertension,[37-38] patients may have completed these measures prior to learning about their CHC. Future research should seek to examine how the relationship between CHCs and anxiety/depression symptoms may change in response to a diagnosis of CHC and proper management of a CHC.

Third, individuals of low SES (vs high SES) and Latine adults (compared to White adults) experience elevated rates of stress, often related to economic and racial disparities, which could increase depression and anxiety symptoms.[8] The presence of a CHC may not incrementally increase stress and, in turn, increase the risk of developing psychopathology among low SES, minoritized populations due to the high levels of stress individuals from these populations already face. Therefore, the positive relationships between physical health and mental health conditions evidenced among higher SES and majority White samples may be attenuated in lower SES and minoritized samples. Future exploration into this question could involve moderation analyses to determine if the relationship between CHCs and mental health symptoms differ as a function of ethnicity or SES.

Fourth, the stigma of mental health is particularly strong among Latine populations.[39] Latine adults have lower levels of mental health literacy and higher levels of stigma compared with non-Latine, White adults, which contributes to cultural barriers to mental health care access.[40] Since our population was largely Latine, patients may have underreported their anxiety and depression symptoms. For example, some patients underreport symptoms to avoid follow-up questioning and Latine patients may be more susceptible to this reporting style, relative to White patients, given the greater likelihood of perceived difficulty communicating their mental health symptoms to medical providers due to language barriers.[41] Latine adults with low English proficiency, compared to White adults, are also more likely to overestimate the addictiveness of psychotropic medication which may further lead to underreporting of symptoms out of fear they will ultimately be prescribed and pressured to adhere to these types of medications.[42]

Additionally, Latine participants may differ in mental health symptom reporting due to discrepancies in how these symptoms are expressed compared to White participants.[43] The PHQ-9 and GAD-7 may not have adequately captured culturally significant symptoms (e.g., "ataque de nervios") which could also contribute to underreporting. Future research is encouraged to utilize more culturally sensitive measures of mental health symptoms or qualitative methods in order to more accurately assess depression and anxiety symptoms among a Latine sample.

It is unclear what factors could have contributed to the finding that participants with a CHC reported *fewer* depression/anxiety symptoms, as this finding is inconsistent with past research and theoretical understanding. One potential explanation for this unexpected finding is that patients may have anticipated receiving a CHC diagnosis given factors such as a family history of CHCs. These patients may have felt little control over their health outcomes and the receiving of a diagnosis may have been, in some sense, relieving. Therefore, having a diagnosis of a CHC may have led to reduced depression and anxiety symptoms as this diagnosis was consistent with their expectations. However, replication of this unexpected finding among independent samples is essential to understand if this link reflects a unique relationship between CHCs and depression/anxiety symptoms among low income, uninsured adults or merely a coincidental finding related to study-specific factors.

The findings of this current study also provide evidence for the importance of mental health screening during medical appointments as brief, easily administered measures such as the PHQ-9 and GAD-7 can provide information about how CHCs could be contributing to mental health symptoms, and vice versa. For example, although clinicians should not assume all patients with a CHC are going to be experiencing depression and anxiety symptoms, the early identification of mental health symptoms could be critical to preventing the development of a CHC, given the connection between depression and anxiety and CHCs. The use of mental health screening tools during SRFC appointments may be especially important for underserved populations as they may have limited access to mental health resources in the community. Even if these patients are being seen for a medical appointment, the use of mental health screeners can provide clinicians with a glimpse of their mental health functioning which could inform medical interventions. By doing so, the implementation of mental health screeners help contribute to a comprehensive approach to treatment for underserved populations. However, the findings of this current study also raise the possibility that these screenings may not adequately capture mental health symptoms among Latine adults and highlight the need for SRFCs to consider alternative approaches to more accurately assess mental health concerns among their most underserved populations.

Limitations and Future Directions

Several factors limit the inferences that can be made based on this current study's findings. First, this current study had a relatively small sample size which limits the generalizability of findings. Since the sample was collected from a SRFC that primarily serves a Latine population, the findings cannot generalize to other ethnic populations which also limits the external validity of the study's findings. Replication of this study in other student-run clinics with access to larger and more diverse samples is encouraged to evaluate the robustness of the unexpected findings. Second, this current study collected data at a single time point, and cross-sectional designs are unable to make claims about causality. For example, given the research design, this current study

cannot claim whether the presence of diabetes causes a reduction in anxiety symptoms, or vice versa. Relatedly, because data extraction procedures prevented a definitive understanding of when the CHC diagnosis occurred relative to the completion of the mental health screeners, this current study is further hindered from making inferences about the timing of this relationship. Future research employing longitudinal designs is encouraged to investigate how these relationships change over time, and to explore whether causality can be demonstrated. Third, Spanish-translated versions of the PHQ-9 and GAD-7 were administered to patients who endorsed Spanish as their preferred language. Although studies suggest that the Spanish translations are reliable and valid, they were not designed to assess depressive and anxiety symptoms among Latine populations.[28,32] Measurement invariance testing is recommended to determine if the English and Spanish versions of these assessments are being answered equivalently. Given differential understandings of how mental health symptoms manifest between White and Latine populations, future replication studies may benefit from utilizing culturally specific measures, or conducting qualitative studies to more accurately capture how CHC impacts the mental health of low-income Latine individuals.

Conclusions

This current study found negative associations between CHCs and depression/anxiety symptoms in a low-income and largely Latine sample from a SRFC. These findings suggest the link between CHCs and mental health symptoms may be inversely related in uninsured, Latine patients with access to healthcare. Alternatively, these findings also highlight the possibility of a problem in how mental health symptoms among Latine populations are assessed in SRFCs. Broadly, this study emphasizes the importance of investigating the relationship between physical and mental health conditions in diverse ethnic and racial populations, to determine if previous research utilizing primarily White populations replicates. By doing so, this study contributes to an improved understanding of health disparities and provides insight into the importance of

considering mental health in the treatment of CHCs among low-income, uninsured, and primarily Latine adults.

This current study also demonstrated the value of using samples collected from SRFCs for empirical research. Patients that utilize services from SRFCs often come from low-income and diverse backgrounds making their participation in research appealing for investigators interested in examining understudied populations. Although SRFCs represent a valuable resource for providing healthcare to underrepresented groups, this current study also sheds light on how SRFCs are useful for research purposes, which can be used to further understand and improve methods of delivering healthcare to this population. Although conducting research in SRFC settings comes with challenges, it also brings unique opportunities to test specific questions among understudied populations which ultimately moves research forward.

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Disclosures

The authors have no conflicts of interest to disclose.

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