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Research paper

Relationship between adverse childhood experiences and perceived discrimination in adulthood

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ABSTRACT

Background: Adverse Childhood Experiences (ACEs) and perceived discrimination impact health overtime, however little is known about their association.
Methods: Data for 6,325 participants in the Midlife in the US (MIDUS) study were analyzed across three waves of data. ACEs included emotional or physical abuse, household dysfunction, or financial strain in childhood. Generalized Linear Models with Generalized Estimating Equation approach was used to test the unadjusted and adjusted associations for ACEs and perceived discrimination and perceived inequality.
Results: Individuals with ACEs reported significantly higher perceived inequality in work (β = 0.05, 95%CI 0.02–0.07), in home (β = 0.06, 95%CI 0.04–0.09), in family relationships (β = 0.09, 95%CI 0.06–0.11), perceived daily discrimination (β = 0.77, 95%CI 0.58–0.96), and perceived lifetime discrimination (β = 0.24, 95%CI 0.18–0.30). ACE types were significantly associated with more perceived inequality and perceived discrimination. . Abuse was independently associated with all outcomes after adjusting for household dysfunction, financial strain, age, sex, race/ethnicity, education, marital status, and income.
Limitations: Findings cannot speak to the temporal relationship between ACEs and discrimination. It should not be assumed that ACEs cause perceived discrimination, but rather that there is an important association that warrants further investigation.
Conclusions: These findings represent the first step in better understanding the relationship between ACEs and perceived discrimination. As both influence health across the lifespan, understanding the relationship, mechanisms, and pathways for intervening are of great importance from a population health perspective. Efforts to incorporate discussions on experiences with discrimination and inequality may be warranted as a part of treatment for ACEs to address psychosocial stressors across the lifespan.

Introduction

Adverse childhood experiences (ACEs) are widespread, with approximately 61% of US adults reporting exposure to one or more ACEs prior to the age of 18 (Preventing Adverse Childhood Experiences Violence Prevention Injury Center CDC, 2020). ACEs commonly occur across multiple domains, such as the home and social setting, throughout early development and include family dysfunction, abuse, and neglect (Felitti et al., 1998). The sequelae of ACEs span into later adulthood increasing risk for poor health behavior, chronic disease, and early mortality (Felitti et al., 1998; Felitti, 2009; Kalmakis and Chandler, 2014; Dong et al., 2004; Danise et al., 2009; Hughes et al., 2017; Bellis et al., 2015; Brown et al., 2009; Campbell et al., 2016; Campbell et al., 2018a, 2018b; Rich-edwards et al., 2010). Due to recent work examining risk factors for ACEs, and the mechanisms through which ACEs influence health across the lifespan, public health initiatives are increasing for primary, secondary, and tertiary prevention (Oral et al., 2016; Tink et al., 2017; Kuhlman et al., 2018). This includes, 1) ACE surveillance at the community, clinic, and population level; 2) ACE curriculum for health care professionals; and 3) intervention development to minimize the risk for chronic disease later in life (Oral et al., 2016; Tink et al., 2017; Kuhlman et al., 2018).

Critical to the ACE prevention literature is the understanding of ACE correlates and the influence on health over time, including psychosocial stressors that may increase risk for poor health. Psychosocial stressors are an area of increased interest given evidence that stress pathways confer risk for poor health later in life through increased allostatic load (Danese et al., 2009; Miller et al., 2007). Work on psychosocial stressors

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such as unemployment (Liu et al., 2013), social or familial strain (Steele et al., 2016), incarceration (Reavis et al., 2013), and economic factors (Steele et al., 2016) show that when present with ACEs, health outcomes worsen as compared to experiencing these stressors in isolation (Liu et al., 2013; Reavis et al., 2013; Larkin et al., 2012) As this body of evidence continues to evolve, understanding how ACEs are associated with a variety of psychosocial stressors will allow for the development of preventive measures at the clinic level to improve health outcomes.

An area that has been widely understudied is the relationship between ACEs and perceived discrimination as a psychosocial stressor. Perceived discrimination is a psychosocial construct that can be defined as the differential treatment of certain members of a society or the belief that negative attitudes, judgment or unfair treatment is directed towards members of a specific group of individuals (Pascoe and Richman, 2009; Mays, 1995; Williams and Mohammed, 2009). The effect perceived discrimination has on health has been well documented and includes an increased risk for cardiovascular disease, alcohol and substance abuse, and poor health behaviors that lead to poor physical health (Pascoe and Richman, 2009).

ACEs and perceived discrimination, when presenting together, may exacerbate the stress response in individuals whose system may already be in a state of hyperarousal (Felitti et al., 1998; Pascoe and Richman, 2009), leading to a disproportionate risk for poor health and disease over time. However, limited data is available on the association between these two factors. Given the independent relationship that ACEs and perceived discrimination have on health alone (Felitti et al., 1998; Pascoe and Richman, 2009), efforts to develop a composite mental health screening tool assessing trauma history and discrimination, along with other psychosocial stressors are being tested for primary care implementation (Liu et al., 2015). Liu and colleagues found that when developing and testing the Life Adversity Screener (LADS), the composite score was predictive of both depression and anxiety in a sample of urban adults (Liu et al., 2015). However, this scale does not account for lifetime discrimination and is limited to childhood sexual abuse and ever experiencing family violence. Additionally, existing evidence has examined the association between ACEs and revictimization across the life course and demonstrates that individuals with a history of ACEs are more likely to experience victimization during youth and adulthood compared to those who do not have a history of ACEs (Widom et al., 2008; Honings et al., 2017). Specifically, Widom et al., 2008 showed that individuals who experienced childhood abuse and neglect were more likely to experience revictimization over the life course across a wide spectrum of events that capture emotional and physical victimization. More recently, Honings et al., 2017 examined the associations between childhood victimization, psychotic experiences, and adult victimization finding that among adults who experienced childhood victimization were more likely to experience adult victimization (Honings et al., 2017). While the existing body of literature has not specifically examined the relationship between ACEs and discrimination and perceived inequality, the evidence presented here suggests that similar to ACEs and revictimization, ACEs may increase risk for experiencing exp discrimination and inequality during adulthood.

Taken together, a greater understanding of how lifetime perceived discrimination, perceived inequality and ACEs are related will add to the field and inform the development and implementation of screening and treatment of psychosocial stressors at the individual and community level.

While some scholars may consider perceived discrimination to be an ACE itself (Bruner, 2017; Cronholm et al., 2015), perceived discrimination is a psychosocial stressor that may be present across phases of life from childhood through adulthood, whereas ACEs occur throughout developmental phases of life (Pascoe and Richman, 2009; Mays, 1995; Williams and Mohammed, 2009; Felitti et al., 1998). This paper represents a first step in understanding the relationship between ACEs and lifetime perceived discrimination and perceived inequality in adulthood using data from a 20-year longitudinal study. Using the existing evidence base on ACEs and adult revictimization, this paper hypothesizes that individuals who experienced ACEs will report be more likely to experience perceived discrimination and inequality in adulthood.

Methods

Sample and study population

This analysis used three waves of data from the Midlife Development in the United States (MIDUS) study. The MIDUS study is a nationally representative survey of non-institutionalized American adults aged 20–75. The first wave of data was collected in 1995, 1996. A total sample of 6,325 respondents completed both the telephone and mail questionnaire. Participants completed both telephone interview and self-administered surveys at the second wave in 2004–2006 totaled 4,041. A total of 2,717 participants then completed both telephone and self-administered surveys at the third wave in 2013–2014. We included participants who answered both telephone and mail questionnaire in MIDUS 1 for this study and followed their information forward through waves 2 and 3. Two people without age information were excluded from analysis, so the final analytic sample consists of 6,323 respondents.

Adverse childhood experiences (ACEs)

Measures of ACEs were constructed by using all the related childhood background and childhood family background information asked during the MIDUS 1 phone interview and self-administered questionnaire. We defined ACEs in three ways based on the MIDUS recommendations: abuse, household dysfunction, and financial strain. Items used to assess abuse (emotional and physical abuse) were derived from childhood family background questions, with a dichotomous variable recoded as 1 indicating experience of either adversity, reported "often". Items covering the household dysfunction (not lived with biological parents including parental divorce or never lived together, death of a parent, adopted; lack of male head in the household; parental alcohol or drug use; parental mental illness), were derived from childhood background questions with a dichotomous variable recoded as 1 indicating experience with any of the adversities. Items covering financial strain (receipt of welfare; reported of being 'worse off' than other families; less than a high school education for father, or mother where father was not present), were derived from childhood background and childhood family background questions. As with household dysfunction, any given adversity in the category of financial strain was coded as 1 for the overall category.

Covariates

Covariates included sex (dichotomized as male and female), age (grouped as 20–39 years; 40–54 years; 55–75 years for baseline; >75 years for waves 2 and 3), race/ethnicity (grouped as White; Black; and Other Minority), education (dichotomized as high school diploma or less and higher education), marital status (dichotomized as married and not married), household total income (grouped as less than $25,000; $25,000–< $75,000; and $75,000+). All demographic variables are collected from MIDUS 1 to 3 when outcomes were measured.

Outcome variables: perceived inequality and perceived discrimination

All outcome variables were taken from self-administered questionnaires from MIDUS Waves1 to 3.

Perceived inequality was measured with three instruments of 6-items each using a 4-point scale separately for perceived inequality in the workplace, at home, and within the family. Example questions for perceived inequality at work included, "I feel cheated about the chances I have had to work at good jobs". Example questions for perceived inequality in home included "Most people live in a better neighborhood

than I do". Example questions for perceived inequality in family included "It seems to me that family life with my children has been more negative than most people's". Across each instrument, participants indicated how well the items described them. The scales were constructed by calculating the mean of the values of the items set. Items were recoded so that high scores reflect higher levels of perceived inequality.

Perceived discrimination questions were developed by MIDUS from the racial discrimination study in Detroit (Williams et al., 1997). The questions were based largely on the results of previous qualitative studies of discrimination (Essed, 1991; Feagin, 1991) and include events that capture perceived daily discrimination based on a general perception that is not based on an individuals' demographic characteristics such as age, sex, gender identity, socioeconomic status, race, ethnicity, or religion. For example, daily discrimination was measured using 9-items each using a 4-point scale that measure perceived day-to-day interpersonal discrimination and assess the frequency with which individuals encounter unfair treatment. Participants reported their perception of how often they were 1) treated with less courtesy than other people; 2) treated with less respect than other people; 3) received poorer service than other people; people acted as if they were 4) not smart, 5) afraid of them, 6) dishonest, 7) not as good as they were; 8) they were called names or insulted; and 9) they were threatened or harassed. The scale was constructed by calculating the sum of the values of the items. Items were re-coded so that high scores reflect greater frequency of perceived discrimination. Lifetime discrimination was measured using an 11-item instrument. Participants were asked to report how many times in their life they experienced being discriminated against because of their race, ethnicity, gender, age, religion, physical appearance, sexual orientation, or other characteristics. Participants' perceived reason for experiencing lifetime discrimination (i.e. race, ethnicity, gender, age, religion, physical appearance, sexual orientation, or other characteristics) was not captured. Each item is answered by number of times it occurred. The scale was constructed by taking the count of items with number of "1 or higher" responses.

Statistical analysis

To investigate the possibility that various types of ACEs may have distinct effects, we approached ACEs in three different ways: (1) ACE as dichotomous indicating any exposure to adversity present; (2) ACE as a continuous count of the three ACE types, with a score of 0,1,2 or 3 for each individual; (3) ACE as 3 separate dichotomous variables: abuse, household dysfunction, and financial strain indicating presence of that particular ACE type. We first examined baseline perceived inequality and perceived discrimination scales for each ACE approach by general linear models. Then to account for the repeated measures, we conducted Generalized Linear Models (GLM) with Generalized Estimating Equation (GEE) approach to test the unadjusted and adjusted associations for ACEs and each outcome. Unadjusted GEE models for each ACE approach were run first, then adjusted GEE models with each ACE approach controlling for demographic covariables and survey wave were run. Each outcome was run as a separate model. All analyses were performed using SAS version 9.4 (SAS institute, Cary NC).

Results

A total of 6,323 adults completed 1995-1996 first wave, and followed through 2004 – 2006 and 2013 – 2014 waves of MIDUS questionnaires. Sample demographics for all participants are shown in Table 1. The median age for the sample was 46 years, 53% were female, and 56% reported at least one ACE. Approximately 89% of the sample was White, 62% had at least 13 or more years of education, 68% were married, and 44% had a total household income of $25,000–$75,000.

Table 2 provides information on baseline Perceived Inequality and Perceived Discrimination scales. Individuals with ACEs had a higher mean score compared to those without ACEs for perceived inequality in work (1.75 ± 0.58 with ACE vs. 1.68 ± 0.55 no ACE, $p = 0.0002$), home (1.54 ± 0.54 with ACE vs. 1.46 ± 0.49 no ACE, $p < 0.0001$), and family (1.68 ± 0.53 with ACE vs. 1.55 ± 0.47 no ACE, $p < 0.0001$), as well as for perceived daily discrimination (13.32 ± 5.08 with ACE vs. 12.33 ± 4.25 no ACE, $p < 0.0001$) and lifetime discrimination (0.83 ± 1.48 with ACE vs. 0.58 ± 1.14 no ACE, $p < 0.0001$),. Those with a higher ACE count, ACEs ranging from 0–3, perceived more inequality and discrimination. Those with abuse, household dysfunction, and financial strain perceived more inequality and discrimination as well, except financial strain for perceived inequality in work.

Table 1
Sample Demographics

	Baseline (MIDUS 1)
Count	6323
Gender	
Male	3003 (47.49%)
Female	3320 (52.51%)
Age group (years)	
Median (IQR)	46 (36–57)
20-39	2103 (33.26%)
40-54	2345 (37.09%)
55-75	1875 (29.65%)
Race	
White	5651 (89.37%)
Black	336 (5.31%)
Other Minority	266 (4.21%)
Education level	
High school diploma or less	2387 (37.75%)
Higher education	3923 (62.04%)
Marital status	
Married	4272 (67.56%)
not Married	2050 (32.42%)
Household total income category	
Less than $25k	1226 (19.39%)
$25k–<$75k	2776 (43.90%)
$75k +	2106 (33.31%)

Table 3 shows results from the multivariable GEE regression estimates for the relationship between ACEs and Perceived Inequality and Perceived Discrimination. Individuals with ACEs reported significantly higher perceived inequality in work (β = 0.05, 95%CI 0.02–0.07), in home (β = 0.06, 95%CI 0.04–0.09), in family relationships (β = 0.09, 95%CI 0.06–0.11), perceived daily discrimination (β = 0.77, 95%CI 0.58–0.96), and perceived lifetime discrimination (β = 0.24, 95%CI 0.18–0.30). When investigating ACE as a count, more ACE types were associated with more perceived inequality and perceived discrimination significantly. Finally, when investigating the three ACE categories as separate variables, abuse was independently associated with all outcomes after adjusting for household dysfunction, financial strain in childhood, age, sex, race/ethnicity, education level, marital status, and household income. Household dysfunction was independently associated with perceived inequality at home and in the family, as well as lifetime discrimination. Financial strain in childhood was independently associated with perceived inequality in the home and family.

Discussion

This study found that over a 20-year period, adults with a history of ACEs had significantly higher reports of perceived inequality across three domains (work, home, and family relationships) compared to individuals who reported no history of ACEs. Additionally, adults with a history of ACEs were more likely to report experiences of perceived daily discrimination and lifetime discrimination compared to those without a history of ACEs. Individuals experiencing multiple ACEs reported higher levels of perceived inequality and perceived discrimination compared to those with only one ACE. Finally, when considering the specific ACE category, individuals who experienced abuse, reported significantly higher experiences of both perceived inequality and

Table 2
Baseline Perceived Inequality and Perceived Discrimination Scales

	Perceived Inequality						Perceived Discrimination			
	Perceived Inequality in Work		Perceived Inequality in Home		Perceived Inequality in Family		Daily Discrimination		Lifetime Discrimination	
Scale range	1-4		1-4		1-4		9-36		0-11	
	N	Mean (SD)	N	Mean (SD)	N	Mean (SD)	N	Mean (SD)	N	Mean (SD)
Overall	4566	1.72 (0.57)	6252	1.50 (0.52)	5079	1.63 (0.51)	6147	12.89 (4.75)	6040	0.72 (1.35)
Childhood adversity										
no ACE	2119	1.68 (0.55)	2758	1.46 (0.49)	2182	1.55 (0.47)	2714	12.33 (4.25)	2679	0.58 (1.14)
with ACE	2447	1.75 (0.58)	3494	1.54 (0.54)	2897	1.68 (0.53)	3433	13.32 (5.08)	3361	0.83 (1.48)
Childhood adversity count										
0	2119	1.68 (0.55)	2758	1.46 (0.49)	2182	1.55 (0.47)	2714	12.33 (4.25)	2679	0.58 (1.14)
1	1708	1.72 (0.56)	2425	1.48 (0.50)	2022	1.64 (0.51)	2390	12.84 (4.76)	2341	0.72 (1.37)
2	586	1.80 (0.62)	861	1.64 (0.60)	704	1.77 (0.56)	839	14.35 (5.56)	820	1.06 (1.70)
3	153	1.85 (0.63)	208	1.69 (0.62)	171	1.78 (0.57)	204	14.75 (5.72)	200	1.15 (1.63)
Childhood adversity composite										
Abuse (emotional or physical)										
No	3600	1.69 (0.55)	4961	1.47 (0.50)	4068	1.60 (0.48)	4887	12.44 (4.41)	4798	0.61 (1.22)
Yes	930	1.83 (0.61)	1229	1.62 (0.59)	960	1.74 (0.57)	1206	14.69 (5.56)	1193	1.16 (1.71)
Household dysfunction										
No	3600	1.70 (0.56)	4907	1.48 (0.51)	3998	1.60 (0.49)	4825	12.66 (4.56)	4749	0.66 (1.27)
Yes	965	1.78 (0.60)	1344	1.59 (0.56)	1080	1.72 (0.55)	1321	13.73 (5.33)	1290	0.93 (1.60)
Financial strain										
No	3121	1.72 (0.57)	4053	1.49 (0.51)	3175	1.60 (0.50)	3993	12.84 (4.67)	3941	0.72 (1.33)
Yes	1444	1.71 (0.57)	2198	1.53 (0.54)	1903	1.68 (0.52)	2153	12.98 (4.91)	2098	0.73 (1.37)

perceived discrimination compared to those who did not experience abuse after accounting for sociodemographic covariates. Individuals experiencing financial strain in childhood reported more family and home related inequality in adulthood but did not report more discrimination after adjusting for sociodemographic covariates compared to those who did not experience financial strain.

This is one of the first studies, to our knowledge, that examines the association between ACEs and perceived discrimination and inequality in

Table 3
Multivariable GEE Regression model of the relationship between ACEs and perceived inequality and discrimination

	Perceived Inequality						Perceived Discrimination			
	Perceived Inequality in Work		Perceived Inequality in Home		Perceived Inequality in Family		Daily Discrimination		Lifetime Discrimination	
	Estimate (95% CI)	P Value	Estimate (95% CI)	P Value	Estimate (95% CI)	P Value	Estimate (95% CI)	P Value	Estimate (95% CI)	P Value
Childhood adversity		0.0005		<.0001		<.0001		<.0001		<.0001
no ACE	Ref		Ref		Ref		Ref		Ref	
with ACE	0.05 (0.02–0.08)		0.06 (0.04–0.09)		0.09 (0.06–0.11)		0.77 (0.58–0.96)		0.24 (0.18–0.30)	
Childhood adversity count		0.0019		<.0001		<.0001		<.0001		<.0001
0	Ref		Ref		Ref		Ref		Ref	
1	0.04 (0.01–0.07)		0.04 (0.01–0.06)		0.06 (0.03–0.09)		0.44 (0.23–0.64)		0.15 (0.08–0.21)	
2	0.08 (0.03–0.13)		0.13 (0.10–0.17)		0.15 (0.11–0.19)		1.52 (1.18–1.86)		0.46 (0.35–0.57)	
3	0.08 (-0.01–0.16)		0.12 (0.05–0.19)		0.16 (0.08–0.24)		1.86 (1.21–2.51)		0.54 (0.33–0.74)	
Childhood adversity composite										
Abuse (emotional or physical)		<.0001		<.0001		<.0001		<.0001		<.0001
No	Ref		Ref		Ref		Ref		Ref	
Yes	0.09 (0.05–0.12)		0.08 (0.05–0.11)		0.11 (0.07–0.14)		1.76 (1.48–2.04)		0.50 (0.41–0.59)	
Household dysfunction		0.10		<.0001		<.0001		0.06		0.0027
No	Ref		Ref		Ref		Ref		Ref	
Yes	0.03 (-0.01–0.07)		0.06 (0.03–0.09)		0.06 (0.03–0.10)		0.24 (-0.01–0.49)		0.13 (0.04–0.21)	
Financial strain		0.72		0.0287		0.0071		0.33		0.7715
No	Ref		Ref		Ref		Ref		Ref	
Yes	-0.01 (-0.04–0.03)		0.03 (0.00–0.05)		0.04 (0.01–0.06)		0.11 (-0.11–0.32)		0.01 (-0.06–0.08)	

Adjusted for age, sex, race/ethnicity, education level, marital status, household total income, survey wave.

a national cohort of adults. A recent study out of Poland found that among college students, cumulative trauma and gender specific discrimination were related to poor mental health in women (Kucharska, 2018), however, the relationship between trauma and discrimination were not specifically examined and the assessment of trauma was not limited to ACEs, but rather lifetime experiences of traumatic events and the impact on mental health. Salokangas and colleagues examined the impact of ACEs on perceived negative attitudes and its relationship to depression among adults in Finland and found that ACEs have an impact on the perceived attitudes of others; however, perceived discrimination was not examined (Salokangas et al., 2018). These findings add new knowledge to both the ACE literature and the perceived discrimination literature as the association between these two life experiences has limited investigation. Specifically, these findings show that ACEs are differentially associated with perceived discrimination and perceived inequality such that abuse was associated with both perceived inequality and perceived discrimination, whereas financial strain was associated with perceived inequality in adulthood only. While this study did not examine mechanisms, this data suggests that experiencing financial strain during childhood may exert influence on adult outcomes differently compared to abuse. Additionally, these data represent a first step in understanding the relationship between ACEs and perceived discrimination and have implications for public health prevention at the secondary and tertiary level as well as the clinical treatment of adults who have experienced ACEs and perceived discrimination.

As the literature shows that both ACEs and experiences with discrimination and inequality confer psychosocial stress, treatment interventions may be adapted to address the effects of ACEs and perceived discrimination concurrently. For example, ACE-informed care approaches, or trauma-informed care, are increasingly being implemented in clinic settings to address the role that ACEs play in adult health (Schulman and Menschner, 2018). Among these approaches include the education and training of health care professionals on the impact of ACEs, creating patient-provider feedback loops for patient voices to have a presence in the clinic decision making process, and institution wide ACE awareness initiatives that inform on the role of toxic stress (Schulman and Menschner, 2018). These ACE initiatives have implications for interventions to address perceived discrimination. For example, incorporating experiences with discrimination and inequality into the care process may allow for treatment plans to address the psychosocial stress that may impact patient self-care. Using evidence-based treatment, such as cognitive-behavioral therapy (CBT), integrative services may enable patients and providers to address experiences of perceived discrimination using ACEs as a model. For example, CBT is among the most effective treatments in adults with exposure to ACEs at the psychosocial level (Korotana et al., 2016). Evidence shows that in comparison to mindfulness-based treatment, interpersonal therapy, emotion focused therapy, as well as expressive writing, CBT showed reduced symptoms of depression and anxiety, as well as risky health behaviors among individuals with a history of ACEs (Korotana et al., 2016). Additionally, evidence suggests that irrespective of the type of ACE an individual was exposed to, CBT is effective in improving outcomes such as lowering depression, decreased anxiety and worry, and improving quality of life. This suggests that use of CBT as a mode of treatment for adults with a history of ACEs may be integral to disrupting the health consequences known to occur and given the correlation between perceived discrimination and ACEs, may be adapted to treat the co-occurrence of both.

Current efforts to address discrimination in the healthcare system recommend incorporating education, awareness, and policy changes to address the deleterious health effects that occur as a result of perceived discrimination (Williams and Rucker, 2000). This is reflected by the 2017 World Health Organization joint statement with the United Nations to address discrimination at the healthcare level and set forth an agenda for systematic change (WHO, 2017). Among these priorities is developing a systematic approach to addressing discrimination at the healthcare level, however little has been done to offer recommendations on how to implement these priorities. The development of the LADS scale is one of the first efforts to develop and implement a tool that addresses both trauma and discrimination, however further testing to incorporate a broad range of ACEs and lifetime discrimination may be warranted (Liu et al., 2015). Such screening tools and data on correlates of ACEs and perceived discrimination provide a process for providers to incorporate discussions about experiences with discrimination and may offer a way to implement these recommendations; providing a way for patients to address multiple psychosocial stressors within the same healthcare visit.

Limitations

While this study is strengthened by its novel findings, longitudinal data, and large sample size, there are several limitations that are worth mentioning. First, both measures for ACEs and perceived discrimination are based on self-report scales and may be influenced by some recall bias. It has been shown that traumatic experiences have higher levels of recall, so this may be less of a concern given the topic of these scales (Widom and Shepard, 1996). Secondly, the study population was approximately 89% non-Hispanic White and is thus lacking in diversity and may not be representative of the general population. While these findings offer new insight into perceived discrimination, future work examining these associations in a more diverse sample is highly warranted. Thirdly, this data was limited by not including diverse categories of ACEs, such as sexual abuse and neglect; therefore, a next step should be to examine the role of other forms of ACEs, and their relationship with psychosocial stressors. Additionally, these findings cannot speak to the temporal relationship between ACEs and discrimination. The authors would caution readers not to assume that ACEs cause perceived discrimination, but rather that there is an important association that warrants further investigation. Finally, this analysis did not examine any comorbid mental health disorders that may exist such as depression which may present some overlap with perception of discrimination and inequality. However, the constructs of perceived discrimination and perceived inequality available in MIDUS are well validated scales for measuring perceived discrimination and perceived inequality.

Conclusions

These findings represent the first step in better understanding the relationship between ACEs and perceived discrimination. As both experiences influence health across the lifespan, understanding the relationship, mechanisms, and pathways for intervening are of great importance from a population health perspective. Given the findings of this study, efforts to incorporate discussions on experiences with discrimination and inequality may consider examining the potential mediating role of depression between ACEs and perceived discrimination and perceived inequality to further understanding of these stressors and subsequent impact on health overtime .

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Compliance with Ethical Standards

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Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Author contribution: LEE, and RJW designed this analysis. EG acquired the data and analyzed the data. JAC drafted this manuscript. JAC, RJW, EG, AZD, JSW, and LEE critically revised the manuscript for intellectual content. All authors approved the final manuscript.

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