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Social connectedness in older Urban African-American adults during the COVID-19 pandemic: the roles of education and partnership

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ABSTRACT

Objective: This study examined education, partnership status, and the moderating role of the lockdown period on social connectedness during the COVID-19 pandemic in a sample of urban African-American older adults.

Methods: Five hundred thirty-four African-American adults living in Detroit (91.0% female, $M_{\text{age}} = 74.53$) reported demographic information pre-pandemic and answered one social connectedness questionnaire between April and December 2020.

Results: Participants interviewed after the lockdown (post-June 2020) reported more loneliness than those interviewed during the lockdown (April–June, 2020). Married/partnered participants reported less loneliness and social isolation. Loneliness did not differ between those with high education levels interviewed during the lockdown compared to post-lockdown. However, among individuals with low education levels, those interviewed after the lockdown reported more loneliness than those interviewed during the lockdown period.

Conclusion: Our findings suggest partnership status is associated with more social connectedness during the pandemic and education accentuates the effects of forced isolation related to loneliness among urban African-American older adults.

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In the United States (US), COVID-19 infection and death rates were disproportionately high amongst African Americans (AAs) in 2020 (Millett et al., 2020; Yancy, 2020). In Detroit, 80% of those who died in the first three months of the pandemic were AA (Rorai et al., 2021), leaving behind grieving family and community members and potentially exacerbating inequities in social connectedness (Gauthier et al., 2021). Social isolation and loneliness are two related, but distinct, forms of social disconnection. Social isolation has been defined as the objective condition of having limited social contacts, while loneliness is the subjective feeling of dissatisfaction with one's current degree of social contact (Holt-Lunstad & Steptoe, 2022).

Loneliness and social isolation have been associated with health risks including coronary heart disease, type 2 diabetes, stroke, and premature mortality (Christiansen et al., 2021; Holt-Lunstad et al., 2015; Steptoe et al., 2013; Valtorta et al., 2016). Loneliness and social isolation have also been linked to increased risk of infections (Elovainio et al., 2023), engagement in harmful health-related behaviors (Kobayashi & Steptoe, 2018; Shankar et al., 2011), and increases in health-related risk factors such as blood pressure and systemic inflammation (Nersesian et al., 2018; Shankar et al., 2011). In short, loneliness and social isolation are associated with various health risks within the general population.

Attention to loneliness and social isolation is particularly crucial within AA older adults. AA communities experienced disproportionately large losses of family and community members in the first year of COVID-19 (Millett et al., 2020), and the number of older AA adults without kin has been projected to rapidly increase between 2015 and 2060 (Verdery & Margolis, 2017). Thus, social isolation and loneliness may be particularly

prevalent within AA older adults in the wake of COVID-19. In studies focusing on AA samples, social disconnection remains associated with all-cause mortality, cardiovascular disease mortality, depressive symptoms, psychological distress, self-rated health, and chronic health conditions (Alcaraz et al., 2019; Taylor, 2022; Taylor et al., 2020). In light of the physical and mental health correlates of social disconnection in AAs and the effects of COVID-19 on AA communities and families, determining which AA older adults may be most at risk for experiencing loneliness and social isolation following the COVID-19 pandemic is crucial.

Though social disconnection increased ubiquitously during the COVID-19 pandemic, older adults—particularly those in urban areas—were uniquely affected (Archambault et al., 2020; Donovan & Blazer, 2020). Technological barriers experienced by this age group exacerbated the impact of social distancing measures (Seifert et al., 2021). In the US, the early period of the pandemic was characterized by forced lockdown, which has been linked to elevated loneliness (Killgore et al., 2020). In Michigan, the state-mandated lockdown was in place from March 23, 2020 until June 1, 2020 (Exec. Order No. 2020-21, 17). Meta-analytic evidence indicates loneliness continued to increase as the pandemic progressed, rather than peaking in this period (Su et al., 2023). Therefore, examination of social connectedness during and after a statewide mandated lockdown is warranted, particularly amongst older adults.

Even before the pandemic, few studies of social connectedness focused exclusively on AA older adults. Those addressing their experiences found AAs disproportionately experience circumstances that increase the risk of social disconnection, such as chronic disease and neighborhood disadvantage

(Caraballo et al., 2022; Doshi et al., 2017; Jamalishahni et al., 2023; Kowitt et al., 2020; Williams & Collins, 2001). Kowitt and colleagues found that perceived neighborhood environment mediated the indirect relationship between neighborhood poverty and loneliness in older adults. Though social disconnection is a risk factor for chronic disease, the relationship can be bidirectional, such that chronic disease also leads to increased loneliness through limited mobility, elevated need for involved care, and stigma associated with a chronic disease (Ahmed et al., 2023). Furthermore, the presence of pre-existing chronic conditions is a strong risk factor for COVID-19 disease severity and mortality; thus, individuals with chronic conditions may further limit social contact to protect their health (Wang et al., 2020). Finally, bereavement is a key risk factor for loneliness (Fried et al., 2015; Vedder et al., 2022). As COVID-19 has disproportionately affected AA communities (Millett et al., 2020; Yancy, 2020), older AA adults are more likely to mourn family, friends, and community members. In sum, older AA adults experience a variety of risk factors that may predispose them to social disconnection during the COVID-19 pandemic.

There is some evidence that older AA adults experience more social isolation than White older adults (Alcaraz et al., 2019; Umberson & Donnelly, 2023; Yang et al., 2013), though one study has found the opposite (Cudjoe et al., 2020). Studies have shown AA adults tend to have smaller social networks and those networks include a larger proportion of family members compared to white adults (Ajrouch et al., 2001). In addition to family and friends, religious networks often act as sources of social support for older AA adults (Taylor et al., 2016a) and were likely disrupted by the COVID-19 pandemic (Chatters et al., 2020). Evidence of racial disparities in the impacts of the pandemic on social networks further suggests the pandemic exacerbated existing inequities in social connectedness (Gauthier et al., 2021). Although small social networks can be strong and high-quality, they are more likely to be unstable and vulnerable to perturbations within the network (Holt-Lunstad & Steptoe, 2022). For example, because individuals with smaller social networks are relying on fewer people to meet their needs for support and connection, small changes in the network (i.e., loss of a single network member) are more likely to have severe impacts on an individual's ability to meet those needs.

During the pandemic, few examinations of correlates of pandemic-related social connectedness have focused on AA older adults. However, some pre-pandemic studies suggest education and partnership status are associated with social connectedness in AA older adults. A meta-analysis of loneliness in older AA adults suggested that being in a relationship was protective against loneliness, partly due to relationships providing feelings of importance, security, and enhanced well-being (Ojembe et al., 2022). Married AA older adults also tend to be more socially connected to family, friends, and church members and are less likely to live alone than their unmarried counterparts (Taylor et al., 2016b). Therefore, being married or being in a romantic relationship may be protective against loneliness and social isolation during the pandemic.

The effect of education on social connectedness in AA adults is mixed. Some work suggests higher education is associated with more social connectedness (Ojembe et al., 2022; Taylor et al., 2016b). Others suggest that AA adults with more education tend to be more isolated from their children and family yet more connected to members of non-family networks (Taylor et al., 2023). Still others found that AAs with more education

were less connected to neighborhood groups, less aware of groups in their neighborhood, and more likely to live alone (Taylor et al., 2019). Taylor and colleagues hypothesize that increased social mobility and related relocations may explain higher levels of isolation from family, children, and neighborhoods among AA adults with higher levels of education. Therefore, it is less clear if education level is protective against social isolation and loneliness in the wake of COVID-19. In light of the dearth of studies on social connectedness in older AA adults (Taylor et al., 2023), we aimed to investigate the roles of education and partnership in relation to social connectedness in this population during the pandemic. To do so, we examined these sociodemographic correlates of loneliness and social isolation during the pandemic in a sample of AA older adults. Study hypotheses and analyses were preregistered on the Open Science Framework: https://osf.io/ztcaw/?view_only=8d59a39c157647db8a6d7bffa62b8499.

Materials and methods

Participants and procedure

Participants were drawn from the Telephone Outreach Project (TOP; Rorai & Perry, 2020) conducted from April to December 2020 with a sample of older AA adults living in Metro Detroit recruited through the Healthier Black Elders Center (see Chadiha et al., 2011; Mitchell et al., 2020). Participants were contacted *via* phone and responded to questions assessing pandemic-related social connectedness. As part of the TOP, 1,242 Healthier Black Elders Center participant registry members were contacted, and 557 agreed to complete surveys as part of the current project. The most common reason for not participating ($n=411$) was that members were left a message but did not return the call (Rorai et al., 2021). Demographic data were provided before the pandemic *via* regular check-ins. For participants with multiple check-ins, demographic information was drawn from the most recent check-in prior to the pandemic (the average time between check-in and TOP was 1.3 years). Procedures were approved by Wayne State University IRB, and all participants provided informed consent prior to participation in the study. As 23 participant surveys contained incomplete demographic data, a final sample of 534 participants completed the TOP and had previously provided demographic data (91.0% female, $M_{\text{age}} = 74.53$ years).

Measures

Loneliness

Participants completed the 10-item UCLA Loneliness Scale (Russell, 1996) gauging how often they experienced feelings of loneliness using a 4-point Likert scale (1 = Never, 4 = Always). The scale was scored in line with standard practice (Russell, 1996) with higher scores indicating more loneliness. The reliability of the scale was acceptable within the study sample ($\alpha = 0.78$).

Social isolation

Participants completed a 6-item version of the Lubben Social Network Scale (Lubben & Gironde, 2003) reporting the number of friends and relatives they frequently saw or felt they could rely on for support on a 6-point Likert scale (0 = None, 5 = Nine or more). Items were reverse-scored and averaged. Higher

values indicated more isolation, and good reliability was observed within the study sample ($\alpha = 0.81$).

Lockdown period

Participants who completed the survey during Michigan's government-mandated lockdown (March 23, 2020 until June 1, 2020; Exec. Order No. 2020-21, 17) were coded as 0 (during lockdown). Individuals who completed the survey after June 2, 2020 were coded as 1 (post-lockdown). Individuals were surveyed only once.

Education

Participants indicated their education level on a 7-point scale from 0 (never attended school) to 6 (college, 4+ years).

Partnership status

Participants reported if they were currently married. Participants who were unmarried then reported if they were part of an unmarried couple, widowed, separated, divorced, or single. Those in a married or unmarried couple were coded as 1; all others were coded as 0.

Employment status

Before the pandemic, participants reported their current employment status by selecting if they were employed for wages, self-employed, unemployed, a student, retired, disabled, or a homemaker. No participants reported that they were students. Those who reported they were employed for wages or self-employed were coded as 1. Those who were unemployed, retired, disabled, or a homemaker were coded as 0.

Statistical analyses

First, we ran two Ordinary Least Square (OLS) regression models, adjusting for sex and age, with education, partnership status, and their interaction as predictors of loneliness (Model 1a) and social isolation (Model 1b).¹ Then, two OLS regression models examined two- and three-way interactions between the lockdown period, education, and partnership status on loneliness (Model 2a) and social isolation (Model 2b). Analyses were conducted controlling for sex and age using a hierarchical approach (i.e., Step 1: main effects only, Step 2: main effects and two-way interactions, Step 3: main effects, two-way interactions, and three-way interaction). Secondary un-preregistered analyses

Table 1. Descriptive statistics during and after lockdown.

Variable	Mean (SD) or N (%)	
	During lockdown	After lockdown
Partnership status		
Not a member of a couple	140 (77.8)	281 (79.4)
Married or unmarried couple	40 (22.2)	72 (20.3)
Education	5.13 (0.83)	5.11 (0.83)
Sex		
Female	165 (91.7)	321 (90.7)
Male	15 (8.3)	33 (9.3)
Age	74.22 (7.29)	74.67 (8.36)
Employment		
Employed	6 (3.3)	15 (4.2)
Not employed	174 (96.7)	339 (95.8)
Social Isolation	1.97 (0.83)	2.11 (0.92)
Loneliness	1.75 (0.50)	1.85 (0.48)

Note. Education: 0 = Never attended school, 6 = 4 years of college or more.

also included employment status as a covariate. Loneliness and social isolation had the highest levels of missing data (5.8% and 5.1%, respectively). For continuous variables, the expectation-maximization algorithm was used to handle missing data, and mode imputation was used for categorical variables (Enders, 2001).²

Results

Descriptive results

Descriptive characteristics of the study sample are included in Table 1. Loneliness and social isolation in the sample were moderate; the average participant reported being lonely "sometimes" and frequently saw or sought support from 3 to 4 people. Overall, 37.5% and 11.2% of participants exceeded cut points for severe loneliness and social isolation, respectively. Participants who completed the survey during lockdown did not significantly differ from those who completed the survey during lockdown with regards to age [$t(532) = -0.621, p = 0.535$], education level [$t(532) = 0.174, p = 0.862$], partnership status [$\chi^2(1, N = 534) = 0.255, p = 0.613$], or sex [$\chi^2(1, N = 534) = 0.143, p = 0.706$]. Participants who completed the survey post-lockdown reported more loneliness and social isolation than those who completed the survey during lockdown (see Figure 1); however, these differences were statistically significant only for loneliness [Loneliness: $t(532) = -2.174, p = 0.030$; Social isolation: $t(532) = -1.852, p = 0.065$].³

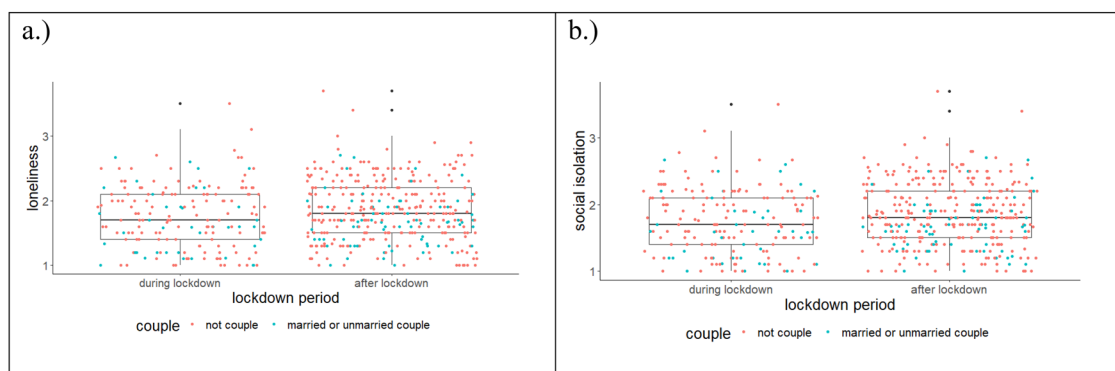


Figure 1. Differences in loneliness (a) and social isolation (b) between the lockdown and post-lockdown periods. Blue points represent raw values for participants who are a member of a couple. Orange points represent raw values for participants who are not a member of a couple. Grey box plots represent the overall distribution of responses for an outcome at the timepoint of interest.

Education, partnership status, and social connectedness

Steps 1 of Models 1a and 1b revealed that partnership status, but not education, was associated with social isolation (Partnership status: $b = -0.244, p = 0.009$; Education: $b = -0.060, p = 0.184$) and loneliness (Partnership status: $b = -0.205, p < 0.001$; Education: $b = 0.001, p = 0.983$; See Table 2). Members of couples reported less social isolation and loneliness compared to unpartnered participants. Step 2 of Models 1a and 1b revealed non-significant interactions between education and partnership status (Social isolation: $b = 0.194, p = 0.087$;

Table 2. Results of OLS regression models for loneliness and social isolation.

Variables	Loneliness		Social isolation	
	Model 1a Step 1	Model 1a Step 2	Model 1b Step 1	Model 1b Step 2
Partnership	-0.21 (0.05)***	-0.46 (0.33)	-0.24 (0.09)**	-1.26 (0.60)*
Education	0.00 (0.03)	-0.01 (0.03)	-0.06 (0.05)	-0.10 (0.05)
Age	0.00 (0.00)	0.00 (0.00)	0.01 (0.01)	0.01 (0.01)
Sex	-0.12 (0.07)	-0.12 (0.07)	-0.12 (0.13)	-0.11 (0.13)
Partnership X Education	—	0.05 (0.06)	—	0.19 (0.11)

Note. Unstandardized coefficients (standard errors) are presented. Partnership was coded as 0=Not a member of a married or unmarried couple and 1 = member of a married or unmarried couple; sex was coded as 0=Male and 1=Female. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Loneliness: $b = 0.048; p = 0.436$). When employment status was also included as a covariate, the model predicting loneliness did not meaningfully change. In the model predicting social isolation, the effect of education level on social isolation became significant in Step 2 of the model ($b = -0.10, p = 0.041$) when employment status was included as a covariate.

The moderation effects of lockdown period

The lockdown period did not interact with education or partnership status to predict social isolation (Lockdown X Partnership status: $b = -0.346, p = 0.071$; Lockdown X Education: $b = -0.101, p = 0.285$) or partnership status to predict loneliness (Lockdown X Partnership status: $b = -0.059, p = 0.570$; See Table 3). Lockdown period did moderate the effect of education on loneliness ($b = -0.116, p = 0.025$; See Figure 2)⁴. For individuals with a college degree, loneliness did not significantly differ between those interviewed during the lockdown and those interviewed after. Within individuals with a high school degree or less, loneliness was significantly higher in those interviewed post-lockdown compared to during the lockdown. Three-way interactions were non-significant (Social isolation: $b = 0.090, p = 0.718$; Loneliness: $b = 0.044; p = 0.746$). The patterns of

Table 3. Results of OLS regression models for loneliness and social isolation moderated by lockdown period.

Variables	Loneliness			Social isolation		
	Model 1b Step 1	Model 1b Step 2	Model 1b Step 3	Model 1b Step 1	Model 1b Step 2	Model 1b Step 3
Partnership	-0.20 (0.05)***	-0.45 (0.33)	-0.29 (0.59)	-0.24 (0.09)*	-1.07 (0.61)	-0.74 (1.09)
Education	0.00 (0.02)	0.07 (0.04)	0.07 (0.05)	-0.06 (0.05)	-0.03 (0.08)	-0.02 (0.08)
Age	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Sex	-0.12 (0.07)	-0.11 (0.07)	-0.11 (0.07)	-0.12 (0.13)	-0.12 (0.13)	-0.12 (0.13)
Lockdown	0.09 (0.04)*	0.70 (0.27)*	0.74 (0.29)*	-0.14 (0.08)	0.73 (0.49)	0.81 (0.54)
Partnership X Education	—	0.06 (0.06)	0.02 (0.11)	—	0.20 (0.11)	0.14 (0.21)
Education X Lockdown	—	-0.12 (0.05)*	-0.12 (0.06)*	—	-0.10 (0.10)	-0.12 (0.11)
Lockdown X Partnership	—	-0.06 (0.10)	-0.29 (0.71)	—	-0.35 (0.19)	-0.81 (1.31)
Partnership X Education X Lockdown	—	—	0.04 (0.14)	—	—	0.09 (0.25)

Note. Unstandardized coefficients (standard errors) are presented. Partnership was coded as 0=Not a member of a married or unmarried couple and 1 = member of a married or unmarried couple; sex was coded as 0=Male and 1=Female; Lockdown was coded as 0=during lockdown and 1=post-lockdown. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

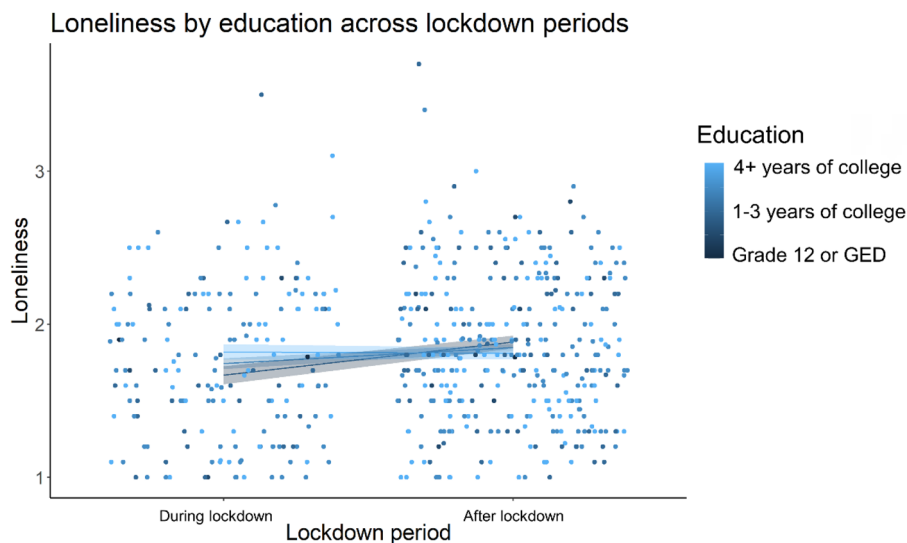


Figure 2. Associations between lockdown period and loneliness as a function of education level. To ease interpretation, education is graphed separately for three clusters of participants. Those who completed 4 or more years of college are represented by the lightest blue points and line. Those who completed 1–3 years of college are represented by the medium blue points and line. Those who completed grade 12 or a GED are represented by the darkest blue points and line. These values approximate slopes at 1 standard deviation above the sample mean, at the sample mean, and 1 standard deviation below the mean, respectively. Error bars represent the standard error of the mean.

associations between social isolation, loneliness, and the primary predictors were not meaningfully affected by the inclusion of employment status in either model.

When Models 1a and 1b were run separately for those interviewed during lockdown or post-lockdown, significant main effects of partnership status emerged only post-lockdown for loneliness ($b = -0.226, p < 0.001$) and social isolation ($b = -0.369, p = 0.002$). Effects of partnership status during lockdown were non-significant (Social Isolation: $b = -0.001, p = 0.993$; Loneliness: $b = -0.157, p = 0.078$). The addition of employment status as a covariate did not affect the pattern of results. No other main effects or interactions were significant ($ps > 0.096$).

Discussion

We examined education and partnership status as predictors of social connectedness in a sample of AA adults during two stages of the COVID-19 pandemic. We found that married/partnered participants were more socially connected than unpartnered participants. While social isolation did not differ between people interviewed during and after the lockdown, individuals interviewed post-lockdown reported significantly higher loneliness than those interviewed during the lockdown. However, this effect was driven by those with lower education levels. For participants with lower education levels, loneliness was significantly higher in those interviewed post-lockdown compared to those interviewed during lockdown. Loneliness did not differ by lockdown period for those with high education levels.

Though we found higher loneliness post-lockdown, social isolation was stable across the two periods. In contrast, a meta-analysis found social isolation was higher in older adults after June 2020 compared to throughout the first three months of the pandemic (Su et al., 2023), aligning with the Michigan lockdown time periods examined here. The discordant results may emerge from differences in the study populations. Our sample consisted of AA older adults in Metro Detroit, while Su et al. included cross-national and cross-cultural studies. Evidence from Su et al. and the present study together suggests social disconnection persisted and even increased, in some cases, as the pandemic went on. There is evidence that the frequency, intensity, and duration of loneliness are highly correlated; longer durations of loneliness are experienced more frequently and intensely (Qualter et al., 2021). It is possible that elevated loneliness following the lockdown period may reflect a shift from acute to chronic experiences of loneliness. However, longitudinal research is needed to test this hypothesis.

Consistent with previous findings (Hajek & König, 2022; Liu et al., 2023), married/partnered participants reported less social disconnection during the pandemic. Hajek and König hypothesized the presence of a spouse buffered pandemic-related social disconnection by providing and maintaining access to social contacts. Consistent with this, married older adults reported more social participation and contact during the pandemic than unmarried older adults, although social participation did not fully account for differences in loneliness between married and unmarried older adults (Liu et al., 2023). Studies of AA samples before the pandemic also suggest that individuals who are married or in romantic relationships tend to be less socially isolated, particularly from family and friends, and less likely to live alone (Taylor et al., 2019; Taylor et al., 2016b). Furthermore, currently married AAs have been found to have higher levels of religious participation than those who are widowed or divorced (Taylor

et al., 2014), and a study of AA women in Detroit has found religious participation to be correlated with increased feelings of social support (Olphen et al., 2003). Partnership status may then be related to increased social connection in the present sample *via* increased social and religious participation.

Consistent with work in a subsample of AA older adults (Adepoju et al., 2021), we found no main effects of education on social connectedness in our primary analyses. Taylor et al. (2023) reported that AAs with higher education tended to be more socially isolated from family but less socially isolated from other social groups. While educational differences in social isolation may exist for some relationship types, overall differences in isolation may not emerge if patterns of isolation in distinct contexts oppose one another. Indeed, consistent with the present study, Taylor and colleagues found that education level was not significantly associated with overall social isolation as measured by the Social Network Index, despite significant associations between education level and isolation within specific contexts. Future work would benefit from examining social connectedness within specific contexts.

Although individuals with high education showed no differences in loneliness from during- to post-lockdown, individuals with lower education who were interviewed post-lockdown were significantly lonelier than those interviewed during lockdown. Older adults with lower education may have experienced more pandemic-related distress, including distress related to finances and mental health (Jiang et al., 2022), depleting material, social, and emotional resources needed to combat loneliness. This pattern is consistent with previous work suggesting those with lower socioeconomic status (SES) have fewer physical and psychosocial resources available to cope with stressors (Gallo & Matthews, 2003). Furthermore, both AA adults and adults with lower SES had elevated incidence and death rates from COVID-19 (Karmakar et al., 2021). Individuals with lower education levels may have experienced higher rates of bereavement than those with more education, which may then have contributed to higher rates of loneliness as the pandemic continued. Continued examination of the role of education in social connectedness is warranted within AAs (Byrd et al., 2022).

Our study has several limitations. First, we used a between-subject design in our analyses, precluding any conclusions about within-person changes in social connectedness. Second, our sample was also predominantly women. In general, women tend to be more willing to participate in research than men (Glass et al., 2015; Wild et al., 2001), and participation has been higher in women than men in the Healthier Black Elders Center participant registry. Furthermore, there are more women than men in the AA older adult population (Administration on Aging, 2021; Tucker et al., 1993), which may explain the higher levels of participation of women compared to men in the present study. Given differences in social connectedness between AA men and women (Taylor et al., 2023; Taylor et al., 2019), replication in samples with larger proportions of men would ensure our findings are generalizable across genders. Education was the primary measure of SES in the study. The pandemic led to fluctuations in income and occupation (Montenovo et al., 2022). Thus, measuring education, rather than income, reduced the potential confounding of SES, lockdown, and our key outcomes. It is important to note, however, that education and income may be differently related to social connectedness within AA older adults (Taylor et al., 2019); therefore, the associations between education and social connectedness within

the present study may not generalize to other indicators of SES. Finally, because the COVID-19 vaccine was not available until after December 2020, many participants likely continued to isolate post-lockdown.

Conclusion

The present study examined two predictors of pandemic-related social connectedness in AA older adults. Married/partnered participants reported more social connectedness than their unpartnered counterparts, and individuals reported significantly more loneliness following the three-month lockdowns compared to during the lockdowns. This effect was driven by those with lower education levels, suggesting social connectedness may be especially precarious for this group as the pandemic goes on. By targeting groups of older AA adults most at risk for social disconnection, such as unpartnered older AA adults or those with lower education levels, future intervention work aimed at ameliorating social isolation and loneliness interventions could be used to bolster social connection in these groups (Giwa et al., 2020).

Notes

1. These analyses were pre-registered for only data collected during lockdown, but analyses focusing on the full data collection period and the lockdown period, specifically, are described.
2. The patterns of results obtained from the imputed database did not change in significance or direction compared to the results obtained from listwise deletion.
3. Three outliers more than 3 standard deviations from the mean were found in loneliness and one in social isolation. Removal of outliers did not change the observed associations. Analyses are presented with the outliers retained.
4. Education was analyzed as a continuous moderator. To probe the interaction, education was recentered at 1 standard deviation above the mean (which corresponds to 4+ years of college) and 1 standard deviation below the mean, which corresponds to high school graduate/GED).

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Disclosure statement

No potential conflict of interest was reported by the author(s).

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Data availability statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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