Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Impact of COVID-19 Mitigation Measures on Inner-City Female Youth in New York City

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A B S T R A C T

Purpose: New York City (NYC) was the global epicenter of the COVID-19 pandemic in spring 2020. A "shelter in place" mandate was issued in March 2020. The effect on vulnerable populations of adolescent and young adult females has not been well documented.
Methods: We administered a monthly online survey between May and November 2020 to adolescent and young adult females participating in a longitudinal study at Mount Sinai Adolescent Health Center. Surveys asked about death of loved ones, financial impacts, social interactions, exposure to dangerous situations, and mental health impacts. Differences in responses by age, race/ethnicity, and living situation were assessed, and compared to data obtained on the same cohort prior to the pandemic.
Results: Four hundred seventeen females aged 15–28 years completed at least one survey, 94% of whom were youth of color. A third of responders (33%) had lost relatives or other people they were close to (loved ones). Most (68%) reported one or more financial losses, and 21% reported food insecurity, with those not living with parents or a guardian experiencing significantly higher rates. One in 10 reported experiencing sexual abuse or interpersonal partner violence during the "shelter in place" period. Over a third (37%) reported symptoms of clinical depression, which represented a significant increase compared to before the pandemic ($p = .01$). The negative financial impacts and higher proportion of patients with depressive symptomatology remained elevated for adolescents without support at home.
Conclusions: The COVID-19 pandemic had unprecedented negative short-term financial and psychosocial health impacts on inner-city female youth with potential long-term negative impacts.

IMPLICATIONS AND CONTRIBUTION

Inner-city minority adolescent and young adult women experienced unprecedented negative financial and psychosocial impacts during the pandemic in 2020, including financial losses, exposure to abuse and interpersonal violence, and depression. Findings highlight the importance of providing culturally aware and sensitive health care, as well as screening for mental health conditions and safety.

Conflicts of interest: The authors have no financial relationships to disclose, or potential conflicts, real and perceived, relevant to this article.
Author Contributions: Drs. Diaz, Schlecht, and Burk conceptualized and designed the study, conceived and conducted the larger study as principal investigators, interpreted the results, and drafted and revised the manuscript. Dr. Nucci-Sack conceptualized and designed the study, interpreted the results, and provided substantive revisions of the manuscript. Ms. Colon and Drs. Guillot, Hollmann, and Brunelli contributed to data curation and critically reviewed the manuscript.

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New York City (NYC) was the global epicenter of the novel COVID-19 pandemic in the spring of 2020, and the virus disproportionately affected some neighborhoods in NYC and across the U.S., specifically those where Latinx and African American communities reside [1–4]. There has been much written about the immediate impact of the pandemic focusing on the first wave of infections, rates of testing, antibody levels, and vaccine development [5–7]. Although this is all very critical research, less attention has been paid to the socioeconomical and psychosocial impacts on inner-city minority youth [8–11] including, in particular, the effects of mitigation efforts like the extended "shelter in place" mandate that was imposed in NYC from March until June 8, 2020, and during the immediate months following where many restrictions remained [12,13].

As NYC experienced multiple waves of the pandemic, many schools and nonessential businesses remained closed, with social distancing measures imposed for much of 2020. The pandemic has also revealed rooted inequities that affected especially youth of color [11,14,15]. It therefore is important to understand the impacts on populations that were particularly affected during the first shutdown, and the lingering socioeconomical and psychosocial effects in inner-city minority youth.

Adolescents and young adults (AYAs) are at increased risk of adverse health outcomes during natural disasters [16,17]. These events disrupt structure in their lives including social, academic, and health-related domains that can significantly affect their well-being. Moreover, there is a growing recognition of the short- and long-term health consequences of COVID-19 mitigation efforts, particularly among young women of color, including on social determinants (food insecurity, interrupted education, loss of jobs, loss of housing) [18,19] and mental health (anxiety and depression) [16,20–23]. In addition, there were unintended effects like increased exposure to potentially dangerous, predatory environments and domestic violence [24–28]. Coinciding with a period of time of racial reckoning and "Black Lives Matter" protests that were occurring nationally and within NYC (beginning May 28, 2020), the effects on mental health were compounded among youth of color [14,29].

The year 2020 presented a confluence of events that affected inner-city and minority youth populations deeply. To understand the impact of the COVID-19 pandemic and mitigation policies on inner-city AYA women, we leveraged a prospective cohort investigation conducted at one of the largest adolescent health centers in the U.S., located in NYC, where physical and mental health status obtained prior to the pandemic could be compared to recent events. We developed an online survey to track risk exposures and health impacts of the pandemic during "shelter in place" mandate on AYA women.

Methods

Study population and study design

The study population included inner-city AYA females (aged 15–28 years) who were participating in a prospective cohort study on human papillomavirus and sexually transmitted infection risk at Mount Sinai Adolescent Health Center (MSAHC) located in NYC [30]. The center is a unique, youth-centered program that provides confidential, comprehensive, and integrated care to young people ages 10–26 at no cost to patients. Services include integrated medical, family planning, sexual and reproductive health, nutrition, dental, optical, health education, behavioral and mental health, and legal services, as well as a range of specialized programs (www.teenhealthcare.org). All the participants in the human papillomavirus cohort who participated in the COVID-19 survey were also patients at MSAHC.

The online COVID-19 impact survey was administered starting May 1, 2020 through a secure MyChart™ portal using Research Electronic Data Capture, a Health Insurance Portability and Accountability Act compliant research electronic data capture system. Participants were also invited to complete follow-up surveys each month (sent out at 30-day intervals) to assess changes in exposures and behaviors over a period of 6 months ending November 1, 2020. Participants were compensated for completing each monthly survey in the form of a $10 electronic gift card.

To assess potential exposure and track incidence of positive cases, we asked screening questions for COVID-19-related symptoms, testing, and use of health services [31]. The survey also asked about financial impacts, social interactions, sexual behaviors, and potential exposure to abuse and other violence during the "shelter in place" period. For example, changes in symptoms of depression and anxiety were assessed using a 10-item version of the Center for Epidemiologic Studies Depression scale [32] and the Patient-Reported Outcomes Measurement Information System Emotional Distress-Anxiety item bank [33]. Questions on abuse, neglect, and interpersonal violence were abstracted from established Adverse Childhood Experiences scales [34,35]. Questions overlapped with the surveys administered in our longitudinal study at MSAHC in which the current study respondents were also participants [30,36]. Positive responses to questions about abuse, violence, depression, or lack of psychosocial support triggered an email to a licensed clinical social worker on staff who contacted the responders within one business day. Responders were informed before beginning the survey that their responses could warrant contact from a provider and were asked to give their consent electronically before completing the survey. Institutional Review Board approval for the online survey was obtained from the Icahn School of Medicine at Mount Sinai. A waiver for parental consent was approved for participants $<$18 years of age.

Statistical analyses

Descriptive statistics included assessment of frequency distributions of continuous and categorical variables. To assess whether some female youths were more vulnerable than others during the "shelter in place" period, we examined demographic characteristics (e.g., age, race/ethnicity, and living situation) as primary risk factors. Multivariable logistic regression for repeated data was used to test for statistical differences between subgroups adjusting for age, race/ethnicity, and living situation. We compared behaviors during the COVID-19 "shelter in place" period with corresponding metrics reported by study participants prior to March 2020 when sheltering in place began in NYC.

Results

A total of 417 participants (out of 500 contacted) completed at least 1 online survey, and 322 completed 2 or more. The survey sample included 38% who identified as Hispanic, 37% as non-Hispanic black/African American, 19% as both African American and Hispanic, and 6% as non-Hispanic white or another race

(Table 1). Participants' ages at the time of completion of the first online survey ranged from 15 to 28 years (median = 22.3); 7% (N = 28) were younger than 18, 30% (N = 127) were 18–20, 30% (N = 123) were 21–23, and 33% (N = 139) were 24–28 years of age. The average response rate on the monthly follow-up surveys was 75.9% (range 65%–82%), with no significant change in race or ethnic distribution detected between responders and non-responders over time, although compliance was better among older compared to younger responders (24–28 vs. 15–20 years of age, $p < .001$) and among those who reported getting tested for COVID-19 (yes vs. no, $p < .001$).

Living circumstances and social behaviors among adolescent and young adult females at the start of COVID-19 pandemic in New York City

During the "shelter in place" period that lasted until early June 2020 in NYC, most (66%) of the AYA female responders reported living with a parent, guardian, or grandparents, while many others stayed with a sexual partner (19%), stayed with other family or friends (10%), or lived alone (5%). The survey sample also included 43 (10%) young mothers who reported living with their children. Most of those who lived with their own children (56%) were older (24–28 years of age) and lived with parents or relatives (65%). Excluding those living with children, proportionately more responders stayed with a sexual partner during the "shelter in place" period compared to before the pandemic, irrespective of age, race, or ethnicity (age and race/ethnicity adjusted odds ratio [aOR] 1.94, 95% confidence interval [CI] 1.25–3.06). After the "shelter in place" mandate was lifted, most respondents (61%) continued to live with a parent or guardian through the summer and into the fall, whereas the proportion of AYA females living with a partner increased somewhat (to 21%).

During the "shelter in place" period, the responders reported being very compliant with social distancing recommendations. Of the youth who completed the survey, 95% reported doing at least the five following recommended practices: self-distanced; avoided public spaces or public transportation; wore a mask if sick or while outside; washed hands more frequently, and cleaned or disinfected surfaces. Additionally, most (88%) respondents reported staying at home except for essential needs (food, gas, medical), while 74% avoided seeing friends and family in person and 44% reported avoiding physical contact with sexual partners.

A total of 110 responders (26%) were tested for COVID-19 RNA over the 6 months following the start of the "shelter in place" period, and 33 of those were tested more than once. The rate of testing remained low throughout the 6 months. Among the 110 first tests, 89 were negative, 13 (12%) were positive, and 8 results were not reported. Among the 33 who had more than 1 test, only 2 were positive. Of the 13 who reported positive results when first tested, 5 (38%) were asymptomatic, 4 (31%) reported 1–2 COVID-19-related symptoms, and another 4 (31%) reported at least 3 symptoms. The most common reported symptoms included headache (46%), diarrhea (31%), loss of sense of smell (31%), feeling of chills (31%), and aches and pains (31%). One symptomatic individual was hospitalized due to COVID-19 but recovered.

Approximately a third of responders (31.8%) had lost relatives, friends, teachers, or other people they were close to (i.e., loved ones) during the "shelter in place" period. There were no significant differences across racial and ethnic groups. However, those who lived with parents or relatives were more likely to know somebody who died than those who lived alone or with friends or a partner (37% vs. 24%; age aOR 1.90, 95% CI 1.09–3.29).

Psychosocial and economic impacts of the pandemic on adolescent and young adult females

Responders reported multiple negative impacts on their social and economic conditions during the "shelter in place" period. Most (68%) AYA females reported one or more financial difficulties: 65% of whom reported that a member of their household either had lost their job or were working fewer hours than usual, 32% reported it was harder to pay for basic needs including food and heat, 29% reported having to work with potential exposure because they were essential workers, and 13% reported losing other sources of financial support. Of note, 4% of AYA females reported losing their housing during this 6-month period. Women 21 years or older were more likely to report losses than those who were younger (aOR 1.91, 95% CI 1.19–3.05). Independent of age, Hispanic AYA females were more likely to report losses than those who were non-Hispanic black/African American or both Hispanic and non-Hispanic black (aOR 2.00, 95% CI 1.09–3.36 and aOR 2.36, 95% CI 1.15–4.85, respectively). Hispanic women were also less likely to continue going to work during the "shelter in place" period than African Americans (aOR .88, 95% CI .79–.97).

Overall, those who lived with parents, relatives, or guardians fared better than those who did not (Figure 1). Those who lived with parents were less likely to have difficulty meeting basic needs (aOR .52, 95% CI .32–.84), less likely to report food insecurity (aOR .54, 95% CI .31–.98), less likely to lose health insurance (aOR .50, 95% CI .28–.91), and less likely to lose their housing (aOR .32, 95% CI .11–.94). Young mothers living with children experienced more negative financial impacts than those who did not have children or were not living with their children, regardless of whether they also lived with a parent, relative, or partner, although the differences were not statistically significant.

Table 1
Demographic characteristics of AYA female participants responding to online surveys during period of observation

	n	%
Age at first survey (in years)		
15–17	28	6.7
18–20	127	30.5
21–23	123	29.5
24–28	139	33.3
Race/ethnicity		
Hispanic	156	37.5
African American, not Hispanic	153	36.7
African American, Hispanic	80	19.2
Other race, not Hispanic	24	5.8
Living situation at the start of "shelter in place" period		
With a parent or guardian	275	65.9
With a partner	78	18.7
Alone	21	5.0
Other	43	10.3
Living with own children		
No	374	89.7
Yes	43	10.3

Totals may not add up to 417 due to missing data.
AYA = adolescent and young adult.

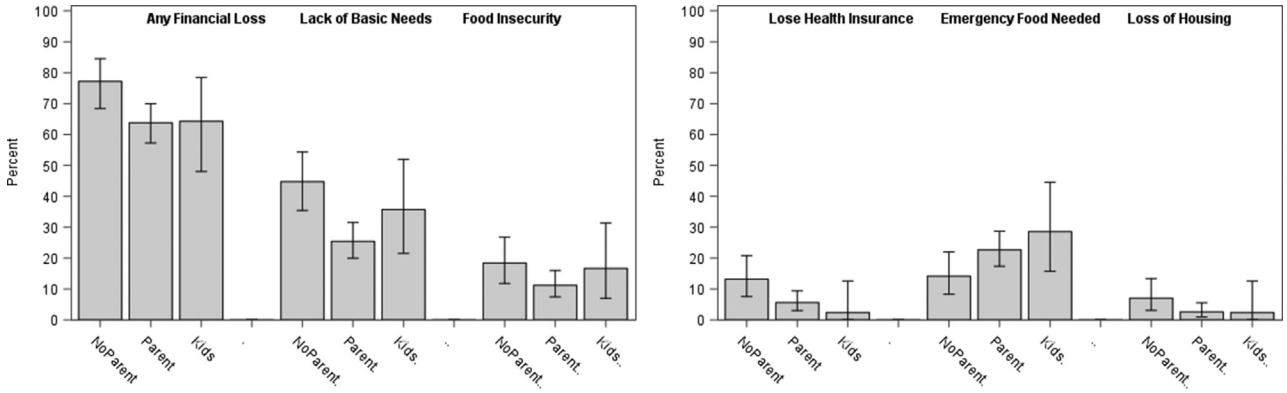

Figure 1. Financial impacts during pandemic by living situation. Shown are the proportions (with 95% CI) of AYA females reporting any financial loss, lack of basic needs, and food insecurity (left), and loss of health insurance, emergency food needed, and loss of housing (right) during "shelter in place" period. "Kids" = young mothers living with kids; "No Parent" = AYA females living alone, with a partner or friends (but not a parent or guardian); "Parent" = living with a parent or guardian.

Fourteen percent of responders reported experiencing food insecurity, which after controlling for age and living situation, reflected an increase compared to the 12% who reported food insecurity before the "shelter in place" period (aOR 1.36, 95% CI .95–1.95). One in three (34%) of those who reported food insecurity reported having received emergency food from a church, food pantry, or food bank. Those who reported food insecurity before the pandemic were also more likely to report financial impacts during the "shelter in place" period than those who did not experience food insecurity before the pandemic (aOR 4.54, 95% CI 1.49–13.83).

Although the negative financial impacts eased slightly as NYC reopened during the summer after the "shelter in place" period, food insecurity remained a problem, especially for those living alone or without a parent or guardian (Figure 2). The proportion reporting food insecurity remained significantly higher compared to AYA women living with parents or a guardian for most of the 6-month period from May to October of 2020 (aOR 2.26, 95% CI 1.22–4.21).

Exposure to interpersonal violence and abuse during the pandemic

Among AYA females responding to our survey, 26 (6%) reported sexual victimization during the pandemic, which included one or more of the following: being pressured or forced to have sex or do sexual acts (n = 16); exchanging pornography for money, drugs, shelter, or food (n = 10); and/or having sex in exchange for food, shelter, money, drugs, or other needs (n = 8). All reports of abuse or violence were followed up by a licensed clinical social worker who contacted the responders within one business day and were connected to appropriate services for intervention and care at the MSAHC. Unfortunately, victims of prior sexual abuse or interpartner violence before the pandemic were more likely to be victims of abuse again during the pandemic (aOR 2.31, 95% CI 1.07–4.96). History of sexual abuse and intimate partner violence before the pandemic was reported by 20% of responders. AYA women who had a sexual partner 5 or more years older than them were more likely to experience sexual victimization during the "shelter in place" period of the pandemic compared to those whose partners were of similar age (aOR 1.68, 95% CI 1.68–5.07) (Figure 3).

Lingering mental health impacts of the pandemic on inner-city female youth

Not surprisingly, female youth in our population experienced significant negative mental health effects during the "shelter in place" period; 65% reported that they felt more stressed and/or anxious than before the pandemic. Using standardized threshold scores, 37% were found to be clinically depressed at the beginning of the pandemic, coinciding with the "shelter in place" period, which represented a significant increase (p = .01) compared to the 30% who were identified as clinically depressed using the longer (20 item) version of the same CES-D scale before the pandemic. Those who knew somebody who died were more likely to be clinically depressed than others, even after accounting for depressive symptoms reported before the pandemic (aOR 2.06, 95% CI 1.16–3.64).

Proportionately, women younger than 21 years of age were more likely to report symptoms of clinical depression than those aged 21–28 years (Figure 4), although the difference was not significant after accounting for depressive symptoms before the pandemic (aOR 1.05, 95% CI .65–1.68). Although the proportion of responders 21–28 years of age exhibiting symptoms of clinical depression decreased somewhat shortly after the "shelter in place" restrictions were lifted, the prevalence remained elevated (above 30%) into July 2020 for women under 21 years. Beginning with the fall months, symptoms of depression appeared to increase again, although the changes were not significant for either age groups.

Discussion

As subsequent waves of the COVID-19 virus spread through NYC and the nation, implementation of mitigation efforts, such as full shutdowns with "shelter in place" mandates, were being considered again. These efforts have significant deleterious effects on youth. MSAHC's patients have been deeply impacted by the COVID-19 pandemic. As the pandemic progressed through NYC neighborhoods especially Harlem and the Bronx, which experienced the highest numbers of COVID-19 infection at the peak in April and May [4], over a quarter of the AYA females who completed our survey, many of whom live in these same neighborhoods, reported being exposed to COVID-19 or experiencing COVID-19-related symptoms.

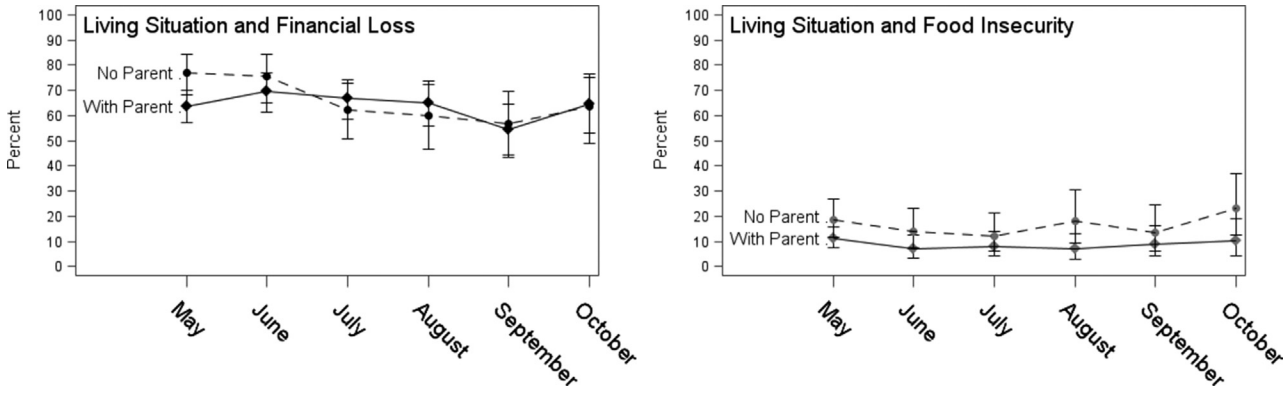

Figure 2. Financial loss and food insecurity during pandemic by living situation. Shown are the proportions (with 95% CI) of AYA females reporting any financial loss (left) and food insecurity (right) over the 6-month period following the start of the pandemic, excluding young mothers with children. "No Parent" = AYA females living alone, with a partner or friends (but not a parent or guardian), dashed line with circles; "With Parent" = living with a parent or guardian, solid line with diamonds.

The pandemic may have a more substantial impact on the mental health of adolescents from lower socioeconomic conditions [22]. The financial impact of the pandemic has been particularly striking in our population, with two thirds (68%) experiencing some form of financial loss, including over 4% losing their home. National poll results suggested that 9% of 18- to 29-year-olds moved due to the coronavirus, while 8% of all adults moved due to job loss, and another 10% had other financial reasons for moving [19]. These disparities in pandemic-related socioeconomic impacts paralleled racial disparities among young adults responding to the U.S. Census Bureau's Household Pulse Survey, with almost 30% of young non-Hispanic black adults reporting not working during the pandemic compared to 19%–26% of young adults of other racial or ethnic groups [13]. Our responders were mostly (94%) black and brown, and the majority were low income and uninsured [30]. Our survey data also suggested that 66% of AYA female respondents moved in with, or remained with, parents or relatives during the "shelter in place" period, while 24% lived alone or with a sexual partner, which was a change compared to before the pandemic. Negative financial impacts during the pandemic were significantly higher in the latter group. Much of the reporting occurred during the "shelter in place" period, while extra protections against evictions were in place. With some of those protections set to expire, these signs may only lead to further impacts, especially if economic and pandemic conditions accumulate.

The psychosocial effects experienced by AYA females during the "shelter in place" period included anxiety, depressive symptoms [23], and exposure to interpersonal violence and abuse [27]. Specific stressors have included greater duration of confinement, having inadequate supplies (e.g., food, water, clothes, accommodation, or family planning), difficulty securing medical care and medications, and resulting financial losses. Unfortunately, types of living situations and relationships before and during the pandemic may also have created opportunities for exposure to abuse and interpersonal violence in our population. Young women already in potentially dangerous relationships, including those with partners who were 5 or more years older than themselves, may have been susceptible to victimization during the "shelter in place" period. These living situations are a place where dynamics of power can be distorted by those who abuse and often without scrutiny [37]. This was a potential consequence of a loss of access to safety net services and social support. High school and college closures or transitioning to

Figure 3. Reports of abuse and interpersonal violence since start of pandemic. Shown are the proportions (with 95% CI) of AYA females reporting any partner or interpersonal violence (left) and sexual victimization or abuse alone (right) over the 6-month period following the start of the pandemic. Results are shown separately for AYA females with a partner who was 5 or more years older than them (dashed line; "Partner Older") and those whose partners were of similar age to them (solid line; "Partner Same Age").

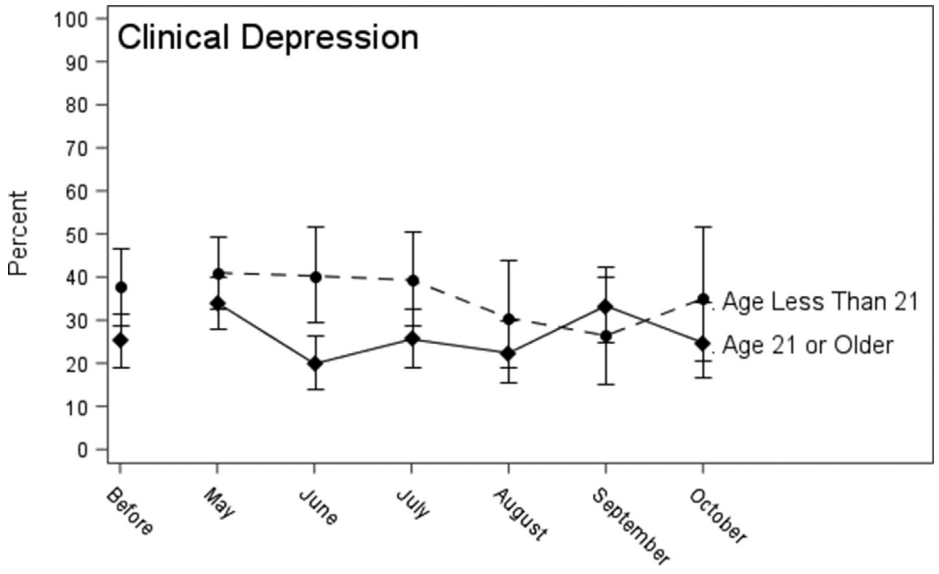

Figure 4. Proportion of inner-city AYA females with symptoms of clinical depression during the pandemic. The graph shows the proportions (with 95% CI) of AYA females reporting symptoms of clinical depression (based on the 10-item CES-D scale) over the 6-month period following the start of the pandemic. The results depicted as "Before" reflect the proportion of the AYA females reporting symptoms of clinical depression at the last study visit conducted before the pandemic measured using the 20-item version of the CES-D. Results are shown separately for females less than 21 years of age (dashed line) and females 21 years or older (solid line).

online learning likely played a role in that social isolation [38,39].

The COVID-19 pandemic led to a confluence of conditions including loss of loved ones, negative financial conditions, and increased exposure to abuse and interpersonal violence. This trifecta, in the context of the pandemic, and the racial unrest that coincided with the "shelter in place" period, may have had negative impacts on female youth, especially those of color [14,29]. A limitation of this survey, however, was that respondents were not asked about interactions with police or racism. Moreover, the study size and scope limited analysis of combined exposures or contextual pressures likely experienced by inner-city minority AYA.

Rituals and routines are very important for the development of young people [17]. During the pandemic, the rituals of mourning the loss of loved ones were suspended as were the routines of attending school and socializations. This sense of loss, especially under these conditions, is associated with tremendous grief that very likely contributed to increased perceptions of isolation, or loss of emotional connections and meaningful practices, resulting in depressive symptomatology and anxiety identified in the survey.

Young women who reported symptoms of clinical depression and interpersonal violence were contacted by a licensed clinical social worker and reported being receptive to the mental health provider's call, sharing their appreciation for concern on behalf of the MSAHC. Many reported that their responses for the surveys were influenced by personal losses, which included death of someone close to them or a family member and/or loss of employment, benefits, housing, and so on. All the participants were patients at the MSAHC, which provides comprehensive, confidential, and integrated medical care, sexual and reproductive health, dental, optical, behavioral, and mental health care, health education, and legal services. The mental health provider assessed individual needs and offered to connect them to our behavioral and mental health services, medical services, or any other one of our other services, while at the same time assessing financial stressors. The provider bore witness to each individual woman's story, each very similar in terms of concrete needs, but different in terms of her emotional response to the very different circumstances associated with the pandemic.

The impact of the COVID-19 pandemic itself and associated mitigation protocols have had downstream deleterious effects for our youth in NYC, and this is likely generalizable to other inner-city AYA populations. Politicians, policy makers, and those in leadership and power positions in these communities should be aware of this, and additional social support and safety net systems should be considered for AYA populations. These should include access to medical, mental health, and sexual health services [40]. In addition, mechanisms for surveillance, reporting, and intervention of domestic violence and abuse should also be implemented [16]. With restricted movement imposed by prolonged mitigation efforts, the physical and emotional impacts of limited access to social services and of suppressed social patterning behaviors in NYC youth have been unprecedented [8–10].

The pandemic exposed disparities that resulted from centuries of structural, systemic, institutional, and interpersonal racism that have existed in our society, which will likely amplify the negative impacts on youth development and mental health [41]. In addition to the ongoing challenges our patients already faced before 2020, the intersectionality of the COVD-19 pandemic, financial crisis, and racial reckoning affected our youth deeply. More than ever, it is essential for health care professionals to understand the impact of the social determinants in the lives of youth including in their health. This impact often leads to the health inequities observed based on race, class, gender, gender identity, and sexual orientation [42]. Clinicians

need to consistently provide a patient-centered approach, culturally aware and sensitive care, and screen regularly for social determinants, health, mental health conditions, and safety [43], and to adopt active antiracist practices including pushing back against institutional forms of racism. The long-term health consequences of the pandemic on youth of color have yet to be determined but should be anticipated. There is a need for continued research on the effects of the pandemic and public health interventions, including the impact that containment and mitigation protocols have had on the lives of AYA women of color.

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Supplementary Data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jadohealth.2021.10.015.

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