


Prospective association between receipt of the economic impact payment and mental health outcomes

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ABSTRACT

Background The Coronavirus Aid, Relief, and Economic Security Act of 2020 provided 'economic impact payments' (EIPs) of \$1200 to US adults with annual personal income of \$75 000 or less. This study examined the prospective association between EIP receipt and mental health outcomes.

Methods A nationally representative sample of 3169 middle-income and low-income US adults completed a baseline assessment of their health and well-being in May–June 2020 and a 3-month follow-up assessment during the period of the COVID-19 pandemic when EIPs were distributed.

Results Controlling for sociodemographic characteristics, EIP recipients had higher odds of reporting a positive COVID-19 test, endorsing a history of post-traumatic stress disorder and reporting any illicit drug use in the past month than participants who did not receive EIP. Participants who did not receive EIP were more likely to report a history of anxiety disorder or alcohol use disorder and recent suicidal ideation than EIP recipients. There was no association between EIP receipt and financial distress, although over one-third to over half of EIP recipients were not employed at baseline. Between baseline and 3-month follow-up, receipt of EIP was significantly associated with reduced medical conditions and alcohol use problems, but increased depression, suicidal ideation and COVID-19 era-related stress.

Conclusion The EIP provided a brief income stimulus to many adults in need but was not associated with improvements in financial distress or mental health among middle-income and low-income recipients. Long-term income security and employment may be more important to improving and sustaining positive mental health outcomes.

Mental health and poverty may have a cyclic nature, with one reinforcing the other.^{1–4} Both employment and financial assistance programmes can improve mental health and psychological well-being.^{4–6} For example, one study of 100 adults with severe mental illness who received a \$73 financial stipend monthly for 9 months showed significant improvements in depression and anxiety, social support, and sense of self compared with a group who did not receive the stipend.⁷ There has been a small body of literature on the impact of US safety net programmes like minimum wage policies, earned income tax credits (EITCs) and other income supplements on mental health, which has

reported mixed results. Some studies have found these programmes can reduce symptoms of mental illness and non-drug-related suicides and improve subjective well-being,^{8–10} while other studies report no impact on general health, mental health, substance abuse or health behaviour outcomes.^{8 11} Several experimental studies of negative income tax programmes in the 1960s–1980s in the USA and Canada were also inconclusive and collected little empirical data on mental health outcomes.¹²

An international review of studies on the effect of poverty alleviation interventions in countries with middle and low incomes reported that the effects of these interventions on mental health were inconclusive, although some conditional cash transfer and asset promotion programmes had mental health benefits.² Nonetheless, the review concluded that improvements in economic status were associated with improvements in clinical symptoms, creating a 'virtuous cycle of increasing returns' (p1508).² Another review that focused on the causal evidence linking poverty to mental health symptoms concluded that negative economic shocks cause mental illness, and antipoverty programmes including conditional and unconditional cash transfers can improve mental health.⁴ However, not all studies have found that cash transfers lead to better mental health or less psychological stress.¹³ Notably, most of the studies on cash transfers have been conducted in developing countries, and there have only been a few studies in the USA, which have mostly focused on guaranteed incomes and tax credits rather than limited cash transfers.

The Coronavirus Aid, Relief, and Economic Security Act of 2020 provided an 'economic impact payment' (EIP) to middle-income and low-income US adults beginning in April 2020. The EIP was provided as financial assistance during the COVID-19 pandemic, which led to morbidity and mortality as well as an economic downturn and high rates of unemployment.^{14–17} The unemployment rate reached 14.8% in April 2020, which was the highest rate observed in US history.¹⁸ The negative impact of the pandemic has particularly affected racial/ethnic minority, low-income, homeless and military veteran populations^{15 19–21}; for example, unemployment rates for black and Hispanic adults were 17.6% and 33.1% higher than white adults during the pandemic,²² and low-income groups are more likely to have chronic medical conditions which put them at great risk for mortality during the pandemic.²³



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Table 1 Baseline comparison between adults who received EIP early, later and not at all (n=3169)

Predictors	Received EIP before June, n=2612	Received EIP after June, n=149	Did not receive EIP, n=408	Test of difference F, X
	n (weighted %)/mean (SD)	n (weighted %)/mean (SD)	n (weighted %)/mean (SD)	
Age†	54.10 (16.64)	63.21 (23.77)	51.66 (21.20)	$F(2,5776)=51.14^{***}$
Gender‡				$\chi(2)=6.49^*$
Male	964 (37.8)	78 (33.9)	182 (33.4)	
Not male	1648 (62.2)	71 (66.1)	226 (66.6)	
Race/ethnicity‡				$\chi(8)=32.66^{***}$
Non-Hispanic white	1941 (74.6)	91 (74.9)	245 (66.3)	
Non-Hispanic black	221 (6.9)	18 (4.7)	58 (9.5)	
Hispanic	199 (8.8)	21 (11.4)	56 (13.7)	
Asian/Pacific Islander	186 (3.3)	14 (2.6)	38 (4.1)	
Other	65 (6.4)	5 (6.4)	11 (6.4)	
Education‡				$\chi(4)=221.42^{***}$
Some college or below	778 (35.4)	37 (14.3)	132 (23.8)	
Associate's/bachelor's degree	1335 (48.0)	89 (73.4)	219 (42.0)	
Advanced degree	499 (16.6)	23 (12.3)	57 (34.3)	
Student status‡				$\chi(4)=47.75^{***}$
Not a student	2273 (92.0)	128 (92.4)	301 (84.5)	
Part-time	132 (3.5)	9 (2.9)	34 (5.1)	
Full-time	207 (4.5)	12 (4.7)	73 (10.3)	
Marital status‡				$\chi(4)=121.20^{***}$
Single	770 (21.9)	55 (22.6)	223 (35.4)	
D/S/W	373 (28.6)	10 (46.6)	27 (26.4)	
Married/LWP	1469 (49.5)	84 (30.8)	158 (38.2)	
Minors in household‡				$\chi(2)=2.70$
No	1639 (73.9)	77 (75.7)	278 (76.7)	
Yes	973 (26.1)	72 (24.3)	130 (23.3)	
Work status‡				$\chi(4)=78.69^{***}$
Half/full-time	1685 (48.8)	103 (33.3)	230 (44.6)	
Self-employed	255 (13.3)	18 (7.9)	43 (8.3)	
Not working	672 (37.9)	28 (58.8)	135 (47.1)	
Personal income†	35 891.06 (20 261.14)	39 782.37 (20 279.55)	32 927.09 (22 028.10)	$F(2,5776)=13.26^{***}$
State of residence‡				$\chi(6)=200.23^{***}$
Northeast	495 (17.9)	31 (9.3)	81 (12.7)	
Midwest	563 (23.9)	26 (10.2)	66 (14.1)	
South	1023 (39.0)	61 (62.1)	167 (36.7)	
West	531 (19.3)	31 (18.4)	94 (36.4)	
Veteran status‡	174 (12.9)	9 (4.4)	15 (4.5)	$\chi(2)=59.39^{***}$
Medical Outcomes Study/Social Support Survey†	21.34 (6.70)	20.59 (6.01)	21.12 (6.75)	$F(2,5776)=2.25$
Financial distress score‡	0.25 (0.82)	0.30 (0.90)	0.29 (0.81)	$F(2,3150)=0.67$

Continued

Table 1 Continued

Predictors	Received EIP before June, n=2612	Received EIP after June, n=149	Did not receive EIP, n=408	Test of difference F, X
	n (weighted %)/mean (SD)	n (weighted %)/mean (SD)	n (weighted %)/mean (SD)	
COVID-19 status ‡				$\chi(4)=9.87^*$
Untested	1999 (78.6)	94 (84.8)	301 (80.1)	
Positive	41 (1.2)	3 (0.6)	5 (0.6)	
Negative	572 (20.2)	52 (14.6)	102 (19.3)	
Number of medical conditions†	2.12 (1.98)	2.69 (1.89)	1.91 (2.01)	$F(2,5776)=17.87^{***}$
History of psychiatric disorders‡				
SSD	36 (0.9)	5 (1.8)	6 (1.3)	$\chi(2)=3.06$
PTSD	231 (6.9)	8 (2.3)	30 (5.1)	$\chi(2)=13.19^{**}$
Bipolar disorder	127 (3.5)	10 (3.2)	22 (4.8)	$\chi(2)=3.06$
Anxiety disorder	783 (22.2)	45 (15.8)	138 (26.8)	$\chi(2)=16.43^{***}$
Major depression	391 (11.7)	20 (7.9)	72 (12.7)	$\chi(2)=5.43$
AUD	121 (3.5)	17 (7.0)	24 (5.8)	$\chi(2)=18.02^{***}$
Drug use disorder	67 (1.9)	9 (2.3)	13 (2.0)	$\chi(2)=0.43$
TBI	34 (0.8)	2 (0.9)	6 (0.7)	$\chi(2)=0.07$
Positive screen for COVID-19 era-related stress‡	359 (8.8)	34 (9.9)	87 (13.1)	$\chi(2)=13.32^{**}$
Positive screen for major depression‡	741 (22.2)	47 (21.3)	139 (22.7)	$\chi(2)=0.26$
Positive screen for generalised anxiety disorder‡	756 (21.3)	52 (18.7)	137 (24.2)	$\chi(2)=4.60$
Suicidal ideation in the past 2 weeks‡	427 (10.2)	42 (14.6)	108 (19.0)	$\chi(2)=480.13^{***}$
Positive screen for AUD‡	813 (28.1)	55 (21.1)	151 (27.7)	$\chi(2)=7.92^*$
Any illicit drug use in the past month‡	372 (13.0)	26 (51.2)	54 (9.5)	$\chi(2)=385.36^{***}$

* $P<0.05$, ** $P<0.01$, *** $P<0.001$.

†Continuous variable with weighted mean (and weighted SD) shown.

‡Categorical variable with raw count (weighted percentage) shown.

AUD, alcohol use disorder; D/S/W, divorced/separated/widowed; EIP, economic impact payment; LWP, living with partner; PTSD, post-traumatic stress disorder; SSD, schizophrenia spectrum disorder; TBI, traumatic brain injury.

In response to the pandemic, the federal government provided for US adults with annual taxable personal income up to \$75 000 to be eligible to receive the full EIP amount of \$1200. Adults with annual income above \$75 000 but less than \$99 000 were eligible to receive a prorated EIP amount, which was phased out at a rate of \$5 per \$100 of income above \$75 000. Individuals who filed jointly with a spouse or had dependents were also eligible to receive additional EIP funds. Legal immigrants with social security numbers, including workers on visas and immigrants with temporary protected status, were eligible for EIP. EIP funds were automatically distributed by direct deposit or mailed check to eligible adults. Further eligibility and processes about the EIP have been described by the Internal Revenue Service.²⁴ Please note that there have been two additional EIPs provided, but this study's time frame focuses on the first EIP that started in April 2020 (the second EIP was distributed on 29 December 2020). The EIP can be conceptualised as a one-time unconditional cash transfer and presents a unique opportunity to study the effects of cash transfers on mental health and functioning.

In the current study, we aimed to contribute to gaps in the literature and enhance understanding of how cash transfer programmes like the EIP can improve outcomes. We focused on middle-income and low-income US adults (ie, annual income

≤\$75 000) who were eligible to receive the full individual \$1200 EIP amount. Using a nationally representative sample, we collected data on EIP receipt at two different time points and assessed the association between receipt of EIP and changes in mental health with a 3-month period. We hypothesised that EIP receipt would be associated with improvements in mental health.

METHODS

A national sample of 3169 middle-income and low-income US adults completed a baseline assessment in May–June 2020 and a 3-month follow-up assessment in September–October 2020 as part of a project to track health and social well-being during the COVID-19 pandemic. Eligibility criteria were adults who were at least 22 years old, living in the USA and reported an annual personal gross income of \$75 000 or less. Assessments were self-administered online surveys conducted in English. A total of 9760 individuals initially agreed to participate, but 6607 (67.7%) met the eligibility criteria, fulfilled the validity checks and completed the baseline assessment. This study focused on the 3169 (48% of baseline sample) who completed both baseline and 3-month follow-up assessments. Compared with participants lost at 3-month follow-up, the retained sample were

Table 2 Logistic regression of characteristics associated with any EIP receipt (n=3169)

Predictors	Received EIP Adjusted OR (95% CI)
Age	1.01 (1.00 to 1.01)
Male	1.12 (0.92 to 1.35)
Race/ethnicity	
Non-Hispanic white	Reference
Non-Hispanic black	0.66 (0.49 to 0.93)**
Hispanic	0.57 (0.43 to 0.75)***
Asian/Pacific Islander	1.18 (0.76 to 1.83)
Other	1.09 (0.76 to 1.55)
Education	
Some college or below	Reference
Associate's/bachelor's degree	0.76 (0.62 to 0.94)*
Advanced degree	0.31 (0.24 to 0.39)***
Work status	
Half/full-time	Reference
Self-employed	1.12 (0.81 to 1.54)
Not working	0.67 (0.53 to 0.83)***
Marital status	
Single	Reference
D/S/W	1.35 (1.04 to 1.76)*
Married/LWP	1.79 (1.45 to 2.20)***
Personal income	1.00 (1.00 to 1.00)*
State of residence	
Northeast	Reference
Midwest	1.14 (0.83 to 1.56)
South	0.81 (0.62 to 1.06)
West	0.44 (0.33 to 0.58)***
Veteran status	2.53 (1.70 to 3.77)***
COVID-19 status	
Untested	Reference
Positive	3.12 (1.09 to 8.95)*
Negative	1.05 (0.85 to 1.32)
Number of medical conditions	1.03 (0.98 to 1.09)
History of PTSD	1.52 (1.03 to 2.24)*
History of anxiety disorder	0.74 (0.60 to 0.92)*
History of alcohol use disorder	0.71 (0.48 to 1.07)
Positive screen for COVID-19 era-related stress symptoms	1.08 (0.84 to 1.40)
Suicidal ideation in the past 2 weeks	0.49 (0.37 to 0.64)***
Positive screen for AUD	0.93 (0.77 to 1.14)
Any illicit drug use in the past month	2.08 (1.56 to 2.78)***

*P<0.05, **P<0.01, ***P<0.001.

AUD, alcohol use disorder; D/S/W, divorced/separated/widowed; EIP, economic impact payment; LWP, living with partner; PTSD, post-traumatic stress disorder.

significantly older, reported higher income, were more likely to be female, white, divorced/separated/widowed, were less likely to have been a veteran, tested positive for COVID-19, or to have current or past mental health problems (online supplemental file 1).

Participants were recruited and compensated through Amazon Mechanical Turk (MTurk), an online labour market with over 500 000 participants across 200 countries that has become a popular method for conducting surveys and online

interventions. To ensure data quality, only participants who had completed ≥ 50 approved previous human intelligence tasks (HITs) and had an HIT approval rating $\geq 50\%$ were invited. HITs include various tasks, from conducting data validation and research to subjective tasks like survey participation and content moderation. Cross-sample investigations have demonstrated that survey data obtained from MTurk have the same level of quality or higher than that collected from traditional subject pools such as community samples, college students and professional panels, especially when eligibility requirements and validity checks are implemented.²⁵ Further details about MTurk are available from Amazon.²⁶

To maximise generalisability of our findings, we used statistical raking procedures to create sample weights for each participant based on how each participants' age (male, female, other), race (white, black, Native American/Alaskan Native, Asian/Pacific Islander, other), ethnicity (Hispanic or non-Hispanic) and geographical region (Northeast, Midwest, South and West) compared with the most recent data available from the US Census Bureau (ie, 2018 American Community Survey) for adults matching the study inclusion criteria (≥ 22 years old and $\leq \$75\ 000$ personal annual income). These poststratification weights were applied to the full sample across time periods.

Measures

At baseline, sociodemographic information was assessed using a sociodemographic questionnaire. Participants were asked about veteran status and homeless history since they represent vulnerable populations. Veteran status was defined as 'ever served on active duty in the U.S. military', and history of homelessness was defined as 'ever did not have a stable night-time residence (such as staying on streets, in shelters, cars, etc.)'.

Economic impact payments

Receipt of EIP was assessed at baseline and at 3-month follow-up. At baseline, participants were asked: 'Have you heard of the coronavirus stimulus checks (also called 'economic impact payments')? These are checks up to \$1200 per individual that the government is sending to individuals in response to the coronavirus and city shutdown'. Participants were provided with three response options: 'Yes, I've heard of it and have received mine', 'Yes, I've heard of it but have not received mine' and 'No, I've never heard of it'.

At 3-month follow-up, participants were asked: 'In the past 3 months, did you receive a stimulus check from the government?' with the following response options: 'Yes', 'Yes, in the mail', 'Yes, by direct deposit', 'Yes, by another method' and 'No'. The follow-up question was different from the baseline question since the EIP had already been described and 'stimulus check' was a common term used to describe the EIP at that time.

Health status

At baseline and 3-month follow-up, a number of self-report health measures were administered. COVID-19 testing and infection status were assessed by asking participants whether they have been tested for COVID-19 and what the outcome was (ie, positive, negative, not tested).

Psychiatric history was assessed by asking participants whether they have ever been diagnosed with any of nine psychiatric or substance use disorders.

Physical health status was assessed by asking participants whether they have ever been diagnosed with any of 22 different medical conditions (eg, cancer, heart disease, arthritis) and the

total number of medical conditions was summed.²⁷ Current mental health and substance use were assessed with the Patient Health Questionnaire-2 (PHQ-2),²⁸ the Generalized Anxiety Disorder-2 (GAD-2)²⁹ and the Alcohol Use Disorders Identification Test-Consumption (AUDIT-C).³⁰ Recent suicidal ideation was assessed with an item from the Mini-International Neuropsychiatric Interview,³¹ which asked participants whether they considered 'hurting yourself, felt suicidal, or wish that you were dead' over the last 2 weeks. Responses were dichotomised into 'Not at all' versus 'Several days/More than half the days/Nearly every day'. COVID-19 era-related stress was assessed with the Posttraumatic Stress Disorder Checklist for the Diagnostic and Statistical Manual for Mental Disorders, Fifth Edition (PCL-5),³² asking participants to refer to 'your experience with COVID-19 and the current situation' as an index stressor event. A positive screen for COVID-19 era-related stress was determined by PCL-5 responses that met the diagnostic criteria for post-traumatic stress disorder (PTSD).³³ Participants were also asked whether they used any illicit drugs in the past month. For this study, Cronbach's $\alpha=0.83$ for the PHQ-2, $\alpha=0.84$ for the GAD-2, $\alpha=0.74$ for AUDIT-C and $\alpha=0.98$ for the PCL-5.

Psychosocial status

Social support was assessed with the Medical Outcomes Study Social Support Survey-Short Form,³⁴ which consists of six items that are summed for a total global score of functional social support.

A financial distress score was calculated by asking participants 'in the past month, did you run out of money to pay for any of the following?' and included response categories for rent/mortgage, utilities, food, transportation, clothing and medical care. The total number of categories endorsed was calculated for a total score.

Data analysis

First, participants were divided into three groups: those who reported receiving the EIP at baseline (May–June 2020), those who reported receiving the EIP at 3-month follow-up (September–October 2020) and those who did not receive the EIP at either time period. Second, analyses of variance and χ^2 tests were used for bivariate comparisons between groups on baseline sociodemographic, clinical and psychosocial characteristics. Third, to understand factors related to any receipt of EIP, a logistic regression was conducted among participants who did and did not receive EIP to identify baseline characteristics associated with any EIP receipt. An additional logistic regression analysis was conducted to compare baseline characteristics between early and later EIP recipients. Fourth, to examine the effect of EIP on clinical outcomes, a regression analysis was conducted using the panel data feature of the survey data with participants who did not receive EIP at baseline included in the first panel and participants who received the EIP at or before the 3-month survey included in the second panel. Based on the Breusch and Pagan Lagrange multiplier test and Hausman test, fixed effect regression was used to estimate the impact of the change in receipt of stimulus check on clinical outcomes. Details about this fixed effect analysis and the temporality of the variables included are outlined in online supplemental file 2.

RESULTS

Table 1 shows the baseline characteristics of the three groups: participants who received the EIP at baseline (early EIP recipients), participants who received the EIP at 3-month follow-up

(later EIP recipients) and participants who did not receive the EIP at other time periods (non-EIP recipients). Among those who received the EIP at all ($n=2761$), only 5.4% report receiving the EIP later. Compared with other groups, later EIP recipients were older, reported higher personal income, reported a greater number of medical conditions, and were more likely to be white, divorced/separated/widowed, not working, located in the South, have history of alcohol use disorder, and to report recent illicit drug use. At the same time, early EIP recipients were more likely to be male, veterans, to test positive for COVID-19, have history of PTSD and to screen positive for current alcohol use disorder. Participants who did not receive EIP were more likely to be students, have an advanced degree, have history of anxiety disorder, and to screen positive for COVID-19 era-related stress and recent suicidal ideation. Notably, there was a high proportion of participants who were not working across all three groups: over one-third of early EIP recipients, over half of later EIP recipients and nearly half of adults who did not receive EIP at all were not working.

As shown in table 2, a logistic regression that compared those who did and did not receive EIP at all found that EIP recipients were more likely to have tested positive for COVID-19, had a history of PTSD, reported any illicit drug use in the past month, and to be white, a veteran, with no college degree, working, married/living with partner, living in the Northeast, and to have reported a higher personal income. Participants who reported a history of anxiety disorder or who reported suicidal ideation in the past 2 weeks were less likely to have received EIP.

A supplementary analysis found that among all EIP recipients, later EIP recipients were significantly less likely to be unmarried/uncoupled (OR=0.58) and more likely to be older (OR=1.02), male (OR=1.41), have an associate's/bachelor's degree (OR=2.35), not working (OR=1.46), higher income, (OR=1.00), living in the South (OR=2.04), had a history of alcohol use disorder (OR=1.93), and to screen positive for recent suicidal ideation (OR=1.69) and recent illicit drug use (OR=5.68) than early EIP recipients (online supplemental file 3).

Table 3 shows changes in mental health measures between participants who received the EIP later and participants who did not receive the EIP at all. The fixed effect analyses showed that EIP receipt was significantly associated with reduced number of medical conditions (marginal effect=-0.35) and alcohol use problems (marginal effect=-0.46), but increased depression (marginal effect=0.26), suicidal ideation (OR=6.83) and COVID-19 era-related stress (marginal effect=2.20). There was no significant association between EIP receipt and change in financial distress, generalised anxiety or recent illicit drug use between baseline and 3-month follow-up.

DISCUSSION

In a nationally representative sample of middle-income and low-income US adults, our findings suggest that many adults of low socioeconomic status with health vulnerabilities received EIP. Specifically, adults with no college degree, those who tested positive for COVID-19, and those with a history of PTSD or recent illicit drug use were more likely to have received EIP. However, we did find disparities in EIP receipt among those with certain mental health problems, such as those with a history of anxiety disorder, alcohol disorder or recent suicidal ideation, who were less likely to have received EIP. It may be that adults with certain mental health or substance abuse problems experience particular administrative difficulties accessing or completing procedures

Table 3 Changes in health status between adults who did and did not receive EIP at 3-month follow-up

Health status	Received EIP by follow-up, n=149		Did not receive EIP, n=408		Panel data: fixed effect regression†, n=552
	Baseline	3-month follow-up	Baseline	3-month follow-up	
Financial distress score	0.30 (0.90)	0.41 (1.01)	0.29 (0.81)	0.33 (0.91)	0.05‡ (−0.11 to 0.21)
Number of medical conditions	2.69 (1.69)	2.27 (1.65)	1.91 (1.90)	1.83 (1.54)	−0.35*‡ (−0.54 to −0.16)
PCL-5 scores	15.65 (21.13)	16.84 (21.18)	16.78 (18.78)	15.05 (18.40)	2.20*‡ (0.22 to 4.17)
PHQ-2 scores	1.22 (1.83)	1.39 (1.88)	1.46 (1.86)	1.30 (1.86)	0.26*‡ (0.04 to 0.48)
GAD-2 scores	1.11 (1.81)	1.15 (1.91)	1.51 (1.82)	1.34 (1.77)	0.17‡ (−0.05 to 0.38)
AUDIT-C scores	2.19 (2.40)	3.79 (2.17)	1.93 (2.38)	4.06 (1.95)	−0.46*‡ (−0.91 to −0.00)
Any illicit drug use in the past month	26 (51.2)	32 (13.0)	54 (9.5)	33 (6.4)	2.22§ (0.37 to 13.47)
Any suicidal ideation in the past 2 weeks	42 (14.6)	57 (18.7)	108 (18.9)	97 (16.1)	6.83*§ (1.89 to 24.71)

Health status was measured after EIP receipt and other covariates included in the analysis (age, marital status, number of minors at home, employment status, income, veteran status, social support score, COVID-19 positive screen, psychiatric history and survey wave) occurred before or concurrently with measurement of health status.

*P<0.05.

†All fixed effect regressions were adjusted for age, marital status, number of minors at home, employment status, income, veteran status, MOS social support score, COVID-19 positive screen, psychiatric history and survey wave.

‡Regression coefficients from fixed effects linear regression with 95% CI.

§OR from fixed effect logistic regression with 95% CI.

AUDIT-C, Alcohol Use Disorders Identification Test-Consumption; EIP, economic impact payment; GAD-2, Generalized Anxiety Disorder-2; MOS, Medical Outcomes Study; PCL-5, Posttraumatic Stress Disorder Checklist for the Diagnostic and Statistical Manual for Mental Disorders, Fifth Edition; PHQ-2, Patient Health Questionnaire-2.

to receive their EIP, which could involve various tasks (eg, tax filing, obtaining social security number, accessing bank for direct deposit, sorting through personal mail). While the EIP was mostly an automatic payment that was provided, it may be like other forms of government benefits such as Supplemental Security Income that may be challenging to navigate and access for adults with psychiatric disorders and accompanying cognitive impairments.^{35 36} Our findings suggest mental health problems can exacerbate poverty since it may hinder one's ability to access income support, as some international studies have found.⁴

We found that receipt of EIP was associated with subsequent decreased medical conditions and alcohol use problems, which was encouraging. However, contrary to our hypothesis, receipt of EIP was not associated with subsequent improved mental health and in fact was associated with slight increases in depression, suicidal ideation and COVID-19 era-related stress. Thus, those who received EIP had poorer mental health before receiving EIP and this poorer mental health continued even after EIP receipt. This finding stands in contrast to some previous studies that have found mental health improvements after provision of income support. However, many of these previous studies were not based on a one-time stimulus but a regular stipend over a period of time⁷ or a guaranteed minimum income.¹² Also many previous studies were conducted in middle-income and low-income countries outside of the USA,^{2 4} where the impact of income-based interventions may have more tangible effects on mental health and quality of life.

Our finding that EIP was not associated with improved mental health is in line with previous studies that found no reductions in mental health symptoms after cash transfers¹³ and provision of EITCs.^{8 11} It may be that the EIP only provides a brief stimulus but does not have enduring mental health benefits. Two recent studies using data from the Household Pulse Survey found that receipt of unemployment insurance and other support programmes that may have provided longer-term income support during the COVID-19 pandemic were associated with better mental health and fewer unmet social needs.^{37 38} There was also a high proportion of EIP recipients who were unemployed, and another possible explanation is that it is not only income per se, but employment that is important to mental health. In our sample of early EIP recipients, 38%

were not working, and among later EIP recipients 59% were not working. It is important to recognise that the pandemic was a unique situation given the risk of COVID-19 exposure, the closing of many businesses and the public health measures taken. Many adults who were unemployed may have otherwise been employed if not for the pandemic and some may have chosen to be unemployed to avoid exposure risks. Many studies have pointed to the detrimental effects of unemployment on anxiety, depression, psychological distress and suicide.^{39–41} The literature on supported employment has also demonstrated through rigorous trials that employment can improve mental health.^{41 42} We are not suggesting there should have been greater efforts to obtain or maintain employment at the risk of health during the pandemic, but rather our findings suggest it may not only be short-term income support but also employment that has downstream effects on mental health. Taken together, our findings suggest more long-term income security and stable employment may be needed to improve and sustain positive mental health outcomes among middle-income and low-income US adults.

What is already known on this subject

- ▶ Mental health can have causal effects on income security and some cash transfer programmes have been found to improve mental health.
- ▶ There has been inadequate examination of one-time unconditional cash transfers like the economic impact payment offered during the COVID-19 pandemic.

What this study adds

- ▶ This study found that the economic impact payment was associated with improved physical health and alcohol use, but declining mental health suggesting one-time cash transfers during a catastrophic event do not ensure sustained positive mental health outcomes.

There were several study limitations to note. We only had data at 3-month follow-up and any changes beyond that time period are currently unknown. Our analysis examining EIP-associated changes in mental health only included later EIP recipients and those who completed 3-month follow-up, who might be unique from other EIP recipients, so the generalisability of our results may be limited. Moreover, our study was conducted during the COVID-19 pandemic, which was a historic event that had incredibly wide-ranging economic impacts, and it is unknown whether our results generalise to other contexts. Our data on EIP were based on self-report and our findings need to be replicated with more objective data. We did not include adults with annual income above \$75 000 who received prorated EIP amounts and we treated participants as individuals rather than households. Since the study was only conducted in English, potential participants who were not English speakers/readers may have been excluded, which is an important study limitation given the large proportion of Spanish-speaking adults in the USA. Individuals who were eligible to receive different EIP amounts and examination of household effects that included dependents may provide further insight and lend themselves to examine any dose-response effects. The study relied on survey-based data collection over a short period of 3 months and certain covariates were collected at the same time as outcome variables, so temporal precedence of the covariates and mediation are difficult to establish. These limitations were counterbalanced by the strengths of the study, including a nationally representative sample with data at two time points, inclusion of important sociodemographic and clinical variables, and results that provide timely information during the COVID-19 pandemic. Although some of the findings were unexpected and did not support the hypothesis, they contribute nonetheless to the literature on unconditional cash transfers. Further research is needed on the long-term effects of EIPs, ways to build on their benefits and how to help sustain financial independence and mental health in vulnerable populations.

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