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Do Conditional Cash Transfers Improve Mental Health? Evidence From Tanzania's Governmental Social Protection Program

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A B S T R A C T

Purpose: Cash transfer interventions broadly improve the lives of the vulnerable, making them exceedingly popular. However, evidence of impacts on mental health is limited, particularly for conditional cash transfer (CCT) programs. We examined the impacts of Tanzania's government-run CCT program on depressive symptoms of youth aged 14–28.
Methods: We utilized cluster randomized controlled trial data of 84 communities (48 intervention; 36 control). The intervention administered bimonthly CCTs to eligible households, while control communities were assigned to delayed intervention. The analysis included youth with measurements of depression (10-item Centre for Epidemiological Studies Depression Scale) at baseline and 18 months later. We determined impacts using analysis of covariance models, adjusting for youth characteristics (including baseline depression), district-level fixed effects, and community-level random effects. Differential effects by sex and baseline social support were also estimated.
Results: Although no evidence was found to suggest that the intervention impacted depressive symptoms among the full sample (n = 880) (effect −.20, 95% confidence interval [CI] −.88 to .48, $p = .562$), subsample results indicated that depressive symptoms were reduced 1.5 points among males (95% CI −2.56 to −.04, $p = .007$) and increased 1.1 points among females (95% CI .11–2.09, $p = .029$). Females 18+ years old (effect 1.55, 95% CI .27–2.83, $p = .018$) and females with children (effect 1.32, 95% CI −.13 to 2.78, $p = .074$) drove this negative impact. Social support did not moderate impacts.

IMPLICATIONS AND CONTRIBUTION

The study found that a government-implemented conditional cash transfer targeted to poor households in Tanzania positively impacted the mental health of young males and negatively impacted young females, particularly older adolescent girls/young women. Results suggest that the gendered burden of conditional payments may lead to poorer outcomes for young women.

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Trial Registration: This nonclinical trial was registered with the Registry for International Development Impact Evaluations: RIDIE-STUDY-ID-582619c939168.

Ethics approval and consent to participate: Ethics approval for the study was granted by the Tanzania Commission for Science and Technology (COSTECH). Informed assent and caregiver/parental consent was obtained for all adolescents ages 14–17 years and informed consent was obtained from all youth aged 18–28 years.

Authors' Contributions: LP carried out analyses and lead the drafting of the manuscript. TP was responsible for the research design. All authors contributed to interpretation of statistical analyses, revising and writing the manuscript, and approved the final version. Members of the evaluation team further contributed to study design and data collection.

Conflicts of interest: The authors have no conflicts of interest to disclose.

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Conclusions: Despite no overall intervention effects, results suggest that receiving a CCT has differential effects on mental health by sex. Although males benefited from the intervention, conditions which rely on stereotypically female roles may result in negative consequences among women.

Poverty and poor mental health are mutually reinforcing. Food insecurity and lack of resources increase stress and depression [1], while mental health-related disabilities perpetuate poor economic outcomes [2]. Young people suffer disproportionately from poor mental health, with depression causing the largest burden of disease in adolescents globally [3]. Evidence on monitoring mental health in low- and middle-income countries remains scant [4], despite increased attention through many global platforms [5–7].

Cash transfer (CT) programs are a popular intervention in low- and middle-income countries due to consistent impacts on poverty-related outcomes, such as reducing food insecurity, improving resiliency against economic shocks, and increasing school enrolment [8,9]. CTs have been highlighted as having the potential to facilitate healthier transitions into adulthood through reductions in early marriage [10] and adolescent pregnancy [11], as well as improved mental health [11–17].

The potential of CTs to improve longer term outcomes may be sensitive to program design components, such as inclusion of conditions (cash conditional upon behavioral requirements) and implementation systems (governmental vs. private). For example, conditions requiring behavioral changes may pose a larger burden on those with less access to services/more time constraints. Governmental programs may have lasting benefits as they are considerably more stable and scalable than non-governmental and other private organizations.

Evidence of impacts on mental health is mixed among different types of CTs as well as by recipient age and sex. A pilot among female youth in Zomba, Malawi showed large positive impacts on mental health for schoolgirls receiving an unconditional cash transfer (UCT), but these impacts were lower for schoolgirls receiving a conditional cash transfer (CCT). No impacts were found for female dropouts [18]. Two large-scale government UCT programs, the Malawi Social Cash Transfer Programme (SCTP) and Kenya's Cash Transfer for Orphans and Vulnerable Children (CT-OVC), reduced depressive symptoms among youth, with larger impacts on adolescent females than males in Malawi's SCTP [19] and impacts only among young men in Kenya's CT-OVC [20]. These differential impacts might be expected as females consistently show higher rates of depression through young adulthood regardless of nationality or culture [21] and express and cope with depression differently [22], suggesting that biological factors or widespread gender norms may contribute to experiences of depression. Furthermore, a recent literature review which examined heterogeneous effects of CT programs on health, found substantial evidence that intervention effects may vary based on participant characteristics, including age and sex, and concluded that heterogeneous results by such characteristics are necessary to better target CT programs [23].

Social support also plays a major role [24], with a recent systematic review finding strong protective effects of increased perceptions of emotional support on mental health [25]. However, evidence on how social support might moderate the effects of a CT program is limited. In the Malawi SCTP, higher perceived social support was correlated with better mental health, but moderating effects of social support on program impacts were not tested [19].

This is the first study, to our knowledge, that examines the effect of a government-implemented, large-scale CCT on mental health of youth in sub-Saharan Africa (SSA) using a cluster randomized controlled trial (cRCT) design. As a primary analysis, we examined whether household enrolment in Tanzania's Productive Social Safety Net (PSSN) decreases depressive symptoms in youth aged 14–28 years. Considering prior differential impacts by sex, we examined heterogeneous impacts. As a secondary analysis, we examined whether social support moderated intervention effects on depressive symptoms such that higher levels of support might help maximize potential for impact.

Methods

Intervention

Initiated in 2013 by the Government of the United Republic of Tanzania, the PSSN targets the poorest 10% of the population, aiming to increase income, allow households to meet their basic needs, improve vulnerable populations' ability to cope with shocks and invest in human capital, and increase access to services. The main element of the program is a monthly CT (Figure 1), wherein a base household transfer, larger for households with children, is unconditional, while additional amounts are contingent on fulfilling requirements related to children's school attendance (80% attendance in school) and health care visits (half-yearly for children <5 years; monthly for children <24 months). Although the transfer amount varies based on adherence to conditions for each eligible child, the maximum is 38,000 Tanzania shillings (or approximately $18 USD) per month, and the average CCT transfer represents 21% of preprogram monthly consumption among recipient households [26]. The CCT is complemented with a public works program (PWP), wherein temporary paid work is made available for one able-bodied adult (aged 18 years and older) per beneficiary household, during the lean season (up to 4 months per year). PSSN utilized a three-stage targeting process for inclusion; first, targeting the poorest districts; second, identifying vulnerable households through knowledgeable community members; and third, confirming eligibility using basic household characteristics as a proxy for poverty.

Main study design

The present study was nested within a main study, led by the Tanzanian research institution REPOA, which examined PSSN

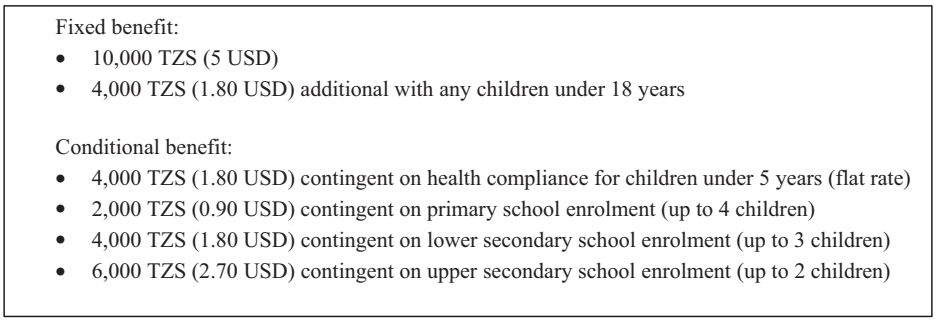

Figure 1. Cash transfer amounts per month reported in Tanzania shillings (TZS) with approximate USD value in parentheses. Note: The maximum monthly payment for upper and secondary school combined is 12,000 TZS.

impacts on women's empowerment. The REPOA study consisted of 102 communities (clusters) within 8 mainland districts (Misungwi, Kahama, Kilosa, Kisarawe, Handeni, Mbogwe, Itilima, Uyui) and 1 district in Zanzibar. Dual adult- (male/female) and female-headed households were sampled. Each district included between 10 and 13 communities, with an average of 180 eligible households per community. Per community, 15–18 eligible households were randomly selected for the REPOA evaluation.

Randomization

The main study utilized a cRCT design, in which REPOA randomized 102 communities via lottery into 3 arms: 35 CCT only, 26 CCT plus PWP, and 41 control (intervention delayed until after the study). Unbalanced allocation of intervention to clusters is attributed to lack of capacity to implement PSSN (particularly PWP) to an equal number of communities as control during the study period. Prior to cluster randomization, the 9 study districts were randomly selected from 16 (out of 99 total implementation districts) which the government had selected for a simultaneous evaluation by the World Bank and the National Bureau of Statistics [26]. Communities included in the World Bank/National Bureau of Statistics evaluation were excluded from the REPOA evaluation prior to study design to prevent survey fatigue among respondents [27].

Present study design

The present study was conducted among a sub-sample of households in the REPOA study with at least one youth aged 14–28 years from the mainland districts. Zanzibar was excluded due to budget limitations, resulting in 84 study communities, 48 intervention, and 36 control. Impacts were estimated on the pooled intervention arms due to delays in implementation of the PWP.

Data collection

REPOA independently conducted baseline household surveys from May to July 2015, and subsequently, household members aged 14–28 were identified for the present study. This age range was chosen to maximize the number of youth sampled within a fixed sample of existing households and to include respondents who fall within the government's definition of youth (defined as ages 15–35 years) at endline. Youth surveys were administered from August to September 2015, followed by a "mop-up" data collection in October 2015. Endline data collection was conducted jointly for the REPOA and present study between April and June 2017. Youth surveys, which focused on a range of outcomes related to youth safely transitioning into adulthood [28], were translated to Swahili, pilot tested, and implemented by same-sex enumerators using Census and Survey Processing System data entry. Informed consent was obtained from all youth aged 18–28 years, and caregiver/parental consent and youth assent was obtained for all minors.

Outcome and moderator variables

The primary outcome for this study, depressive symptoms, was measured at baseline and endline using a shortened version of the Centre for Epidemiological Studies Depression Scale (CES-D). The CES-D10 includes 10 questions regarding feelings and behaviors over the past 7 days (Appendix Table A1) that focus on the affective component of depressed mood, and has been validated among adolescents in Tanzania and other African countries [29]. The CES-D10 ranges from 0 to 30, with higher scores indicating more depressive symptoms. Cronbach's alpha was .73 at baseline and .75 at endline, indicating good reliability. The study was not originally powered to assess impacts on mental health as this was not a primary outcome of the REPOA evaluation.

In a secondary analysis, we examined how social support moderates impacts on CES-D10, based on the hypothesis that program impacts might differ by levels of social support (i.e., people with greater levels of social support might be able to leverage the CTs to a larger extent for more benefits). We measured social support using a modified version of the Multidimensional Scale of Perceived Social Support (MSPSS), constructed from eight questions on familial or friend support (Appendix Table A2). The modified MSPSS excluded four items on romantic support in consideration of instrument length. However, both family and friend subscales have been validated in similar populations [30]. We averaged the scores across all questions at baseline (range: 1–5) to construct a scale where higher scores indicate higher social support [31]. We created a binary indicator from the scale to signify high ($\geq$mean) and low ($<$mean) social support for descriptive purposes.

All models were rerun using a binary CES-D10 indicator created from the scale ($\geq$10 CES-D10) as an extended analysis. Although not a diagnostic measure, this threshold has been recommended to screen at-risk individuals for clinically relevant

levels of depressive symptoms [32], and is used here to identify the percentage of youth exhibiting depressive symptomatology. The addition of a categorical measurement provides complementary evidence to the scale measurement.

Statistical analyses

First, we examined the internal validity of our study design by testing the baseline balance of covariates, outcome, and social support indicators between intervention and control for our analytic sample. We did this by running a regression analysis at baseline, with the outcome or characteristic of interest as dependent variable and intervention dummy as independent variable, adjusting for district, community-level random effects, and robust standard errors.

To estimate impacts, we used an analysis of covariance (ANCOVA) model wherein impacts were estimated as a function of the intervention indicator and a set of covariates, as well as the baseline value of depressive symptoms. Covariates included age in years, sex, household size, whether the youth lived in a female-headed household, household dependency ratio (number of nonworking aged population divided by the working age population), adult highest education level in household, and wealth, as defined by a principal component-based wealth index created using durable consumer goods, other assets, and housing conditions [33]. Autocorrelation of the outcome in our study was .14, well below the threshold of .20 required for ANCOVA modeling [34].

The ANCOVA model was specified as follows:

$$Y_{1ij} = \beta_0 + \beta_1 T_j + \beta_2 Y_{0ij} + \beta_3 X_{ij} + \alpha_j + \varepsilon_{ij} + \delta_j \qquad \text{(Model 1)}$$

where Y_{1ij} is the endline CES-D10 for adolescent i living in community j. T_j is the intervention dummy variable. Y_{0ij} represents the baseline CES-D10, while X_{ij} represents a vector of covariates. Finally, α_j represents district-level fixed effects, ε_{ij} is the error term, and δ_j represents community-level random effects. Robust standard errors were included to correct for heteroscedasticity. The estimated coefficient of interest is $\widehat{\beta_1}$, representing the intervention impact.

To test for heterogeneous effects by sex, we introduced an interaction term between sex and intervention status:

$$Y_{1ij} = \beta_0 + \beta_1 T_j + \beta_2 Y_{0ij} + \beta_3 X_{ij} + \beta_4 (T_j \times F_i) + \beta_5 F_i + \alpha_j + \varepsilon_{ij} + \delta_j \qquad \text{(Model 2)}$$

where F_i represents a binary variable for sex, β_1 represents the intervention impact for $F_i = 0$ (males), and $\beta_1 + \beta_4$ represents the intervention impact for $F_i = 1$ (females). Differential effects are represented by β_4. All other terms remain the same as in Model 1.

Finally, we tested for differential impacts for youth with low and high social support at baseline:

$$Y_{1ij} = \beta_0 + \beta_1 T_j + \beta_2 Y_{0ij} + \beta_3 X_{ij} + \beta_4 (T_j \times SS_i) + \beta_5 SS_i + \alpha_j + \varepsilon_{ij} + \delta_j \qquad \text{(Model 3)}$$

Model 3 tests our secondary hypothesis by including a continuous measure of social support at baseline (SS_i). Therefore, β_4 represents the moderating effect of each additional point of social support to the impact of the intervention. All other terms remain the same as in equations for Models (1) and (2).)

We conducted post hoc analyses by examining impacts by age group (<18 years and ≥18 years) and child-bearing status (ever had a child) for females (Models 4 and 5, respectively), and by age group for males (Model 6), as age and caregiver status are proposed mechanisms for differential effects. Equations for Models 4–6 (not shown), mirror Model 2 but replace the interaction term for sex with age group or child-bearing status for respective subgroups.

Ethics

The PSSN Youth Evaluation received ethical clearance from the Tanzania Commission for Science and Technology (COSTECH), reference number RCA 2017/53. The study is registered in the International Initiative for Impact Evaluation's (3i.e.) Registry for International Development Impact Evaluations (RIDIE-STUDY-ID-582619c939168).

Results

Sample characteristics

From the 48 mainland communities assigned to intervention, 1,085 individuals were identified as eligible from REPOA households, of which 769 were interviewed (Figure 2). From the 36 mainland communities assigned to control, 793 REPOA household members were identified, and 588 were interviewed. Approximately 74% were reinterviewed, with no difference between the intervention (73%) and the control (74%) samples ($p = .920$). Although youth lost to follow-up were older, lived in households with fewer adults with any secondary school education, and had higher depressive symptoms than the analytic sample (Appendix Table A3), no differences were found between study arms at the 5% level among those lost to follow-up in the full sample (Appendix Table A4). In the subsamples, only level of social support was found to be differential by intervention status: female youth lost to follow-up had higher social support in the intervention arm than the control arm, while male youth lost to follow-up had lower levels in the intervention arm compared to control. The analytic sample consisted of 880 youth (50% female) with nonmissing values for all variables at both baseline and endline. Approximately 12% of panel youth with a nonresponse (do not know/refused) for at least one CES-D10 item at baseline were dropped from the analysis. Nonresponders were slightly younger than those from our sample (Appendix Table A3).

The sample was balanced at baseline for all characteristics (except age) overall, and by sex (Table 1). The youth were, on average, 19.16 years old, with PSSN youth slightly older (19.48) than control youth (18.76; $p = .035$); a result driven by males (19.19 vs. 18.18; $p = .017$). Average household size was 7.39, with one in four youth living in female-headed households. Over half (58%) lived in households where the highest educated adult had completed primary school, and an additional 23% lived in households where an adult had gone on to complete at least some secondary school. There were no differences in household composition, wealth, or levels of social support by intervention status.

CES-D10 was similar between intervention and control at baseline (11.73 and 11.29, respectively; $p = .446$) and at endline

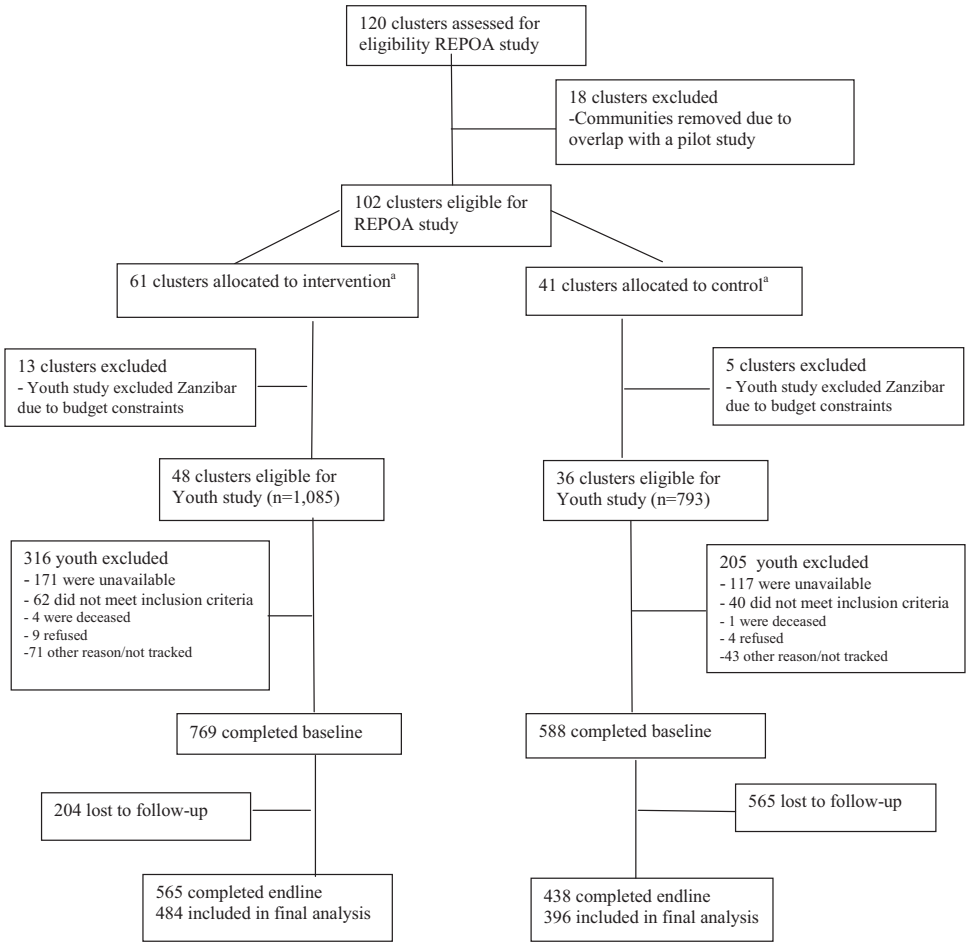

Figure 2. Trial profile. [a]In the District of Kisarawe, two communities (clusters) were switched due to administrative error during the implementation of intervention, resulting in a reclassification from intervention to control and vice versa for these communities. When these communities are excluded from the analysis or classified as their original treatment allocation, results are consistent.

(11.06 and 11.43, respectively; $p = .783$), with the majority of youth (61%) exhibiting depressive symptomatology (≥10 CES-D10) at both waves (61% at baseline; 59% at endline) (Table 2). Among females and males separately, there were no differences in CES-D10 between intervention and control at baseline, but differences emerged at endline. Intervention females had higher scores on the CES-D10 than controls (10.96 vs. 10.03; $p = .021$), while intervention males had lower scores than controls (11.16 vs. 12.77; $p = .024$). There were no discernible differences in CES-D10 between study arms among youth with low or high levels of social support, and the percentage of youth exhibiting depressive symptomatology did not differ by study arms for any subsamples.

Impacts on depressive symptoms

The PSSN had no overall impact on depressive symptoms (effect −.20, 95% confidence interval [CI] −.88 to .48, $p = .562$) (Table 3). However, we found a *protective* impact on CES-D10 for males of −1.5 points (95% CI −2.56 to −.40, $p = .007$) and an *adverse* impact on females of +1.1 points (95% CI .11–2.09, $p = .029$) (interaction $p = .001$). This translates to a decrease in depression by eight-percentage points for males and an eight-percentage point increase for females when using the binary outcome (Appendix Table A5). Social support did not moderate impacts on depressive symptoms (Table 3; effect .05, 95% CI −.65 to .75, $p = .893$).

The detrimental impact was driven by PSSN females ≥18 years old, who experienced a 1.6 point increase in CES-D10 (95% CI .27–2.83, $p = .018$), while no impacts were found for younger females (effect .10, 95% CI −1.28 to 1.49, $p = .888$) (p interaction = .135). PSSN females with at least one child also exhibited a 1.3 increase (95% CI −.13 to 2.78, $p = .074$), with no impacts for childless females (effect .60, 95% CI −.62 to 1.81, $p = .481$) (p interaction = .441). As an extended analysis, we tested differential effects by age group; while adjusting for having a child, the results were very similar to Model 4 (Appendix Table A6). When mutually corrected for each other (i.e., differential effect by age irrespective of parental status, and differential effect by parental status irrespective of age), results suggest that age is more important than child status. The impacts on males did not differ by age group.

Discussion

Our study is the first to examine impacts of a national CCT program on depression of youth in SSA. We find no impacts on mental health for the full sample, but heterogeneity analyses

Table 1
Baseline characteristics by intervention status

Variables	Unadjusted mean (SD)			Intervention-control *p*-value
	Full sample	Intervention	Control	
Full sample				
Age in years	19.16 (4.28)	19.48 (4.28)	18.76 (4.25)	.035
Female	.50 (.50)	.50 (.50)	.49 (.50)	.521
Household size	7.39 (2.58)	7.30 (2.49)	7.50 (2.68)	.290
Female-headed household	.25 (.44)	.25 (.43)	.26 (.44)	.880
Dependency ratio	1.26 (.92)	1.19 (.88)	1.34 (.96)	.089
Highest education for adults is primary completed	.58 (.49)	.60 (.49)	.56 (.50)	.855
Highest education for adults is at least some secondary	.23 (.42)	.23 (.42)	.23 (.42)	.990
Wealth Index	.10 (1.01)	.08 (1.09)	.12 (.90)	.356
Social support[a]	3.35 (.93)	3.34 (.92)	3.36 (.94)	.427
n	880	484	396	
Females				
Age in years	19.60 (4.34)	19.78 (4.12)	19.37 (4.61)	.633
Household size	7.22 (2.63)	7.12 (2.53)	7.35 (2.75)	.186
Female-headed household	.26 (.44)	.26 (.44)	.25 (.43)	.398
Dependency ratio	1.38 (1.02)	1.31 (.93)	1.47 (1.12)	.119
Highest education for adults is primary completed	.58 (.49)	.61 (.49)	.54 (.50)	.525
Highest education for adults is at least some secondary	.22 (.41)	.19 (.39)	.25 (.43)	.475
Wealth Index	.01 (.93)	−.02 (.95)	.05 (.90)	.310
Social support	3.05 (.94)	3.03 (.93)	3.08 (.97)	.467
n	437	243	194	
Males				
Age in years	18.73 (4.18)	19.19 (4.43)	18.18 (3.81)	.017
Household size	7.56 (2.52)	7.48 (2.44)	7.65 (2.61)	.630
Female-headed household	.25 (.44)	.24 (.43)	.27 (.44)	.505
Dependency ratio	1.14 (.79)	1.07 (.81)	1.22 (.77)	.314
Highest education for adults is primary completed	.58 (.49)	.58 (.49)	.58 (.49)	.797
Highest education for adults is at least some secondary	.24 (.43)	.26 (.44)	.22 (.41)	.466
Wealth Index	.19 (1.07)	.19 (1.21)	.19 (.89)	.530
Social support	3.64 (.81)	3.65 (.79)	3.62 (.82)	.846
n	443	241	202	

Bivariate regressions test difference between the intervention and control groups. Models use district-level fixed effects, community-level random effects, and robust standard errors. Means shown are unadjusted. *p*-value shows the level of significance of difference between groups (lower value representing higher statistical difference).

MSPSS, Multidimensional Scale of Perceived Social Support; SD, standard deviation.

[a] Social support is represented by the modified MSPSS scale of self-perceived social support.

indicate that the program had protective effects among males and adverse effects among females. Social support did not moderate intervention impacts. Our findings suggest that CCT programs provided to households can improve the mental health of young males but may negatively impact females. The levels of depressive symptoms in this study are higher than in other similar populations in SSA [29]. Reasons for these differences are not clear from our data, but they do suggest that this is a particularly vulnerable population and that efforts to address mental health should be a priority.

There are some caveats to our findings. Given the sample size at endline, an assumed power of .8, and other parameters of our population (cluster size, ratio of intervention to control, etc.), the minimum detectable effect size for impacts on the CES-D10 scale using ANCOVA methods was .97. Thus, our observed effect of −.20 is not statistically significant, and we conclude that the intervention had no impacts on depressive symptoms in the pooled sample. In addition, our analysis of sub-groups introduces the potential for Type I errors (because we examine a larger number of differences), and hence there is a small chance that our conclusion that the treatment negatively affected women and positively affected men may be due to a Type I error. Alternatively, and more likely, these sub-sample analyses may be subject to Type II errors (because of lower power in the sub-samples as sample size is reduced). However, the fact that we do find statistically significant treatment impacts in the sub-samples, also supported by the theory and practice around responsibilities for compliance with conditions, suggests that these are in fact real program impacts.

Differential impacts underscore the importance of program characteristics in influencing effects on mental health. Although the positive findings for males are consistent with previous research in Kenya, the same study found no increase in depressive symptoms in females [20]. Our adverse effect on females also contrasts the results from Malawi's SCT program, which showed a decrease in depressive symptoms for all youth, with even stronger effects on females [19]. Nevertheless, the potential for negative impacts of conditions on mental health is somewhat supported with the Zomba study in Malawi. Although mental health improved among schoolgirls in the CCT arm (contingent on school attendance), the magnitude of these impacts decreased with each additional dollar transferred to her family. The authors postulated that when the family grew to depend on the adolescent girl for an important source of income, this burden could be detrimental to her mental health [18].

Although our data lacked adequate measures to test whether intervention females experienced a higher burden of poor mental health related to conditionality among our sample, authors of a recent qualitative gender assessment of the PSSN determined that compliance to co-responsibilities were mostly performed by women, regardless of recipient status. They concluded that conditions may have negative implications for

Table 2
Balance of mental health indicators by intervention status, at baseline and endline

Variables	Unadjusted mean (SD)			Intervention-control *p*-value
	Full sample	Intervention	Control	
Full sample				
Depressive Symptom Scale (0–30)[a]				
Baseline	11.53 (5.68)	11.73 (5.51)	11.29 (5.88)	.446
Endline	11.23 (5.05)	11.06 (4.81)	11.43 (5.32)	.783
Exhibits depressive symptomatology[b]				
Baseline	.61 (.49)	.64 (.48)	.58 (.49)	.101
Endline	.59 (.49)	.59 (.49)	.60 (.49)	.858
n	880	484	396	
Females				
Depressive Symptom Scale (0–30)[a]				
Baseline	12.45 (5.46)	12.89 (5.26)	11.90 (5.66)	.158
Endline	10.55 (4.87)	10.96 (5.02)	10.03 (4.63)	.021
Exhibits depressive symptomatology[b]				
Baseline	.69 (.46)	.73 (.45)	.65 (.48)	.296
Endline	.56 (.50)	.59 (.49)	.52 (.50)	.074
n	437	243	194	
Males				
Depressive Symptom Scale (0–30)[a]				
Baseline	10.63 (5.75)	10.56 (5.52)	10.71 (6.03)	.758
Endline	11.90 (5.14)	11.16 (4.60)	12.77 (5.60)	.024
Exhibits depressive symptomatology[b]				
Baseline	.54 (.50)	.56 (.50)	.51 (.50)	.364
Endline	.62 (.49)	.58 (.49)	.67 (.47)	.133
n	443	241	202	
High social support				
Depressive Symptom Scale (0–30)[a]				
Baseline	10.39 (5.37)	10.61 (5.24)	10.12 (5.54)	.585
Endline	11.39 (5.03)	11.16 (4.74)	11.69 (5.37)	.578
Exhibits depressive symptomatology[b]				
Baseline	.54 (.50)	.57 (.50)	.49 (.50)	.222
Endline	.59 (.49)	.58 (.49)	.60 (.49)	.961
n	496	277	219	
Low social support				
Depressive Symptom Scale (0–30)[a]				
Baseline	13.01 (5.73)	13.23 (5.52)	12.75 (5.97)	.503
Endline	11.01 (5.07)	10.94 (4.91)	11.10 (5.26)	.977
Exhibits depressive symptomatology[b]				
Baseline	.72 (.45)	.74 (.44)	.68 (.47)	.201
Endline	.60 (.49)	.59 (.49)	.60 (.49)	.881
n	384	207	177	

Bivariate regressions test difference between the intervention and control groups. Models use district-level fixed effects, community-level random effects, and robust standard errors. Means shown are unadjusted.
SD, standard deviation.
[a] Depressive Symptom Scale refers to the Center for Epidemiological Studies Depression Scale 10-item (CES-D10).
[b] Exhibiting clinically relevant levels of depressive symptomatology defined as ≥10 CES-D10.

women by adding additional workloads and reinforcing gender stereotypes related to unpaid domestic work [35]. We hypothesize that activities related to program conditions may increase women's psychological distress, also explaining the higher levels of self-perceived stress for females in the intervention arm than the control arm at endline [28]. Taking children for health check-ups or ensuring children's school attendance can be laborious, especially in remote communities; and with younger children in school, females may receive less support for domestic duties. Half of our female sample had a least one child by endline, and among those aged 18 or older at baseline, nearly all (89%) were mothers, suggesting that these women would be responsible for ensuring compliance with conditions for their children, which may add to general stress levels. Finally, while recipients may feel the most pressure, monetary penalties for noncompliance affect the entire household.

Our findings suggest that the negative impacts of the CCT on females' mental health were driven by the sub-sample of women aged 18 years and over. This conclusion is supported by findings from several other studies. For example, a number of studies have found that adult women are more likely to increase time spent on domestic chores, which may decrease their mental health, with an increase in younger children's time in schooling (i.e., a substitution effect) as a result of CT programs [9]. Another recent ethnographic study of Peruvian women highlighted that CCTs often ignore women's time as inherently valuable by increasing their unpaid labor responsibilities, which is further compounded by hidden costs related to accessing services [36]. In fact, although the larger PSSN World Bank study found improvements on several economic outcomes related to food security, poverty, and productive assets, they also found increases of 2.6 percentage points for females engaged in unpaid work, with the largest shifts in labor activities found in young females [37]. Taken together, all of these suggest that conditions may increase women's time poverty and contribute to reduced mental health.

Table 3
Intervention impacts on depressive symptoms

		Intervention effect	Lower 95%	Higher 95%	*p*-value of effect	*p*-value of interaction
Model 1	Pooled (n = 880)	−.20	−.88	.48	.562	NA
Model 2	Females (n = 437)	1.10	.11	2.09	.029	.001
	Males (n = 443)	−1.48	−2.56	−.40	.007	
Model 3[a]	Social support moderation (n = 880)	.05	−.65	.75	.893	
Model 4	Females under 18 years (n = 169)	.10	−1.28	1.49	.888	.135
	Females 18 or older (n = 268)	1.55	.27	2.83	.018	
Model 5	Females with child (ever) (n = 219)	1.32	−.13	2.78	.074	.441
	Females never had child (n = 216)	.60	−.62	1.81	.337	
Model 6	Males under 18 years (n = 216)	−1.21	−2.49	.07	.064	.607
	Males 18 or older (n = 227)	−1.65	−3.07	−.23	.022	

All regressions control for the following covariates at baseline: gender, age, female-headed household, household head highest education, household size, as well as depressive symptoms at baseline. Models use district-level fixed effects, community-level random effects, and robust standard errors.
MSPSS, Multidimensional Scale of Perceived Social Support; NA, not applicable.
[a] Represents the change in intervention effects for each increase of one on the MSPSS scale for social support.

Although we found no overall intervention effects on mental health despite evidence from other CT evaluations, it has been argued that UCTs have the potential for a wider range of impacts across nontraditional domains (like mental health) as compared to CCTs [38]. By imposing conditions, CCTs incur hidden, gendered costs and devalue women's time while reinforcing gender stereotypes around caregiving and childrearing [36,39], and may have led to null results. It is also possible that the lack of positive impacts on mental health may be a consequence of other unobserved mechanisms. For example, while we do not have evidence to test this theory, participation in public works among our sample may have mitigated any mental health benefits. Although the WB study also did not assess the PWP due to delays in implementation, participation in public works was reported to exacerbate time poverty among some female beneficiaries in the gender assessment study. Additionally, factors related to transfer size, duration and frequency of payments, or messaging around program features, may have contributed to diminished effects. Considering the relatively high levels of depressive symptoms, we also tested to see if baseline CES-D10 influenced our results; however, differential effects were not found when stratifying by baseline levels of baseline depression in the full sample, nor for males and females separately (results not shown).

Although we originally hypothesized that those with higher levels of social support might experience even greater program impacts on mental health, the results did not support our theory. Thus, because we did not find overall impacts on mental health, it is not surprising that we fail to find moderating effects of social support on program impacts.

When developing and evaluating programs intended to improve youth well-being, it is important to consider how sex and age may moderate impacts. The risk factors of poor mental health are amplified throughout adolescence by changes in hormones, which affect females more acutely than males, resulting in an, on average, higher stress sensitivity in adolescent females [40] and increased vulnerability to stress [41]. Furthermore, individuals are influenced (and often limited) by the households and communities in which they live, and thus gendered roles/task distributions related to the conditions may generate unintended consequences. Future CCT evaluations should include detailed questions regarding the burden of conditions.

Despite the rigorous evaluation design, there were several considerations. First, there was a 26% attrition from baseline, which could potentially bias the study's internal validity. Although there were some differences in baseline characteristics among youth lost to follow-up and the analytic sample, the balance between study arms was retained for all variables (except for a small age difference in males), suggesting that internal validity was unlikely to have been affected. Another consideration was the use of a self-reported measure of depressive symptoms. Nevertheless, this measure has been shown to have strong psychometric properties and is considered a reliable measure of depression among disadvantaged youth in SSA [29]. A strength of the study was the use of ANCOVA modeling. The more conservative difference-in-difference method is likelier to underestimate intervention effects in an RCT [42]. ANCOVA modeling was chosen for its capacity to maximize power [34] and improve efficiency and consistency of point estimates [43] in balanced RCT designed studies [44], such as this one. However, since ANCOVA relies on adjusting for baseline values of the outcome, we lost over 100 youth from our sample. As these youth were similar to the analytic sample in all characteristics except for age (we hypothesize that younger respondents may have been more reluctant to discuss their emotions), we concluded that the improved precision and power to estimate impacts was worth the loss in sample.

In conclusion, our findings are an important contribution as this program currently reaches 10.5% of Tanzania's 57 million population. Although CT programs can contribute to improved mental health of vulnerable youth, our results suggest that benefits may be dependent on the demographic of the population and requirements for compensation. Although we are not able to test this hypothesis directly, conditions which place the burden of benefit eligibility on females may have unintentional negative impacts on their mental health. Some suggestions to mitigate these potential burdens include providing childcare mechanisms and other support systems for beneficiaries, conducting community sessions to address gender inequities and stereotypes, and removing conditions (i.e., making the CTs unconditional).

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Supplementary Data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jadohealth.2021.04.033.

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