Impact of Graduating to Resilience on Child Development in Uganda
Pre-Analysis Plan
IPA-2022-UG
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Background

This study is an intervention trial that aims to estimate the impact of the Graduating to Resilience (G2R) program on child development in Uganda. In previous trials, the G2R program has generated large, positive impacts on household assets, consumption, income and food security. The investigators will revisit a sample of households enrolled in a G2R trial conducted in Uganda in 2019-2021 (AEARCTR-0004080) and assess children born during the intervention period.

A large body of evidence demonstrates that early exposure to poverty and related adverse experiences, including toxic stress, malnutrition, and psychosocial deprivation, impedes child brain development and skill formation [1,2]. A similarly robust literature shows that the negative effects of poverty-related adversity can be mitigated through early-life intervention [3]. The holistic nature of the G2R program may be particularly beneficial to early childhood development.

Randomization

In the G2R trial in Uganda, villages were randomly assigned to either treatment or control villages. Within treatment villages, participants were randomly assigned at the household-level to one of three intervention conditions or a control condition:
- T1, "Individual, asset": consumption support, cash asset transfer, coaching in individual household visits
- T2, "Group, asset": consumption support, cash asset transfer, coaching in group setting and all other aspects of program
- T3, "Individual, no asset": consumption support, *no* cash asset transfer, coaching in individual household visits and all other aspects of program
- C1, "Control in treatment villages": no intervention

For this study, investigators will revisit T1, T2, and C1 households within treatment villages. Based on the results of the G2R trial, within-village spillovers are expected to be minimal.

Empirical strategy

In the main analysis, the investigators will estimate average treatment effects of the G2R program on all primary and secondary outcomes using an intention-to-treat approach. The investigators will combine T1 and T2 groups into a single intervention group for the analysis. The results of the G2R trial indicate that impacts on household assets, consumption, income, and food security were similar in T1 and T2.

The investigators will also examine heterogeneity in treatment effects by the duration of program exposure *in utero*. The relative contributions of poverty-related adversity experienced *in utero* versus post-birth on child development is an important research question. The investigators will also estimate impacts within refugee and host (i.e., non-refugee) strata, as the population of the G2R trial was drawn from these two communities.

Analysis

The investigators will fit a set of unadjusted and adjusted linear regression models to estimate average treatment effects. All models will include variables used for stratification in the original randomization procedure. Adjusted models will include the following additional covariates to improve precision: child age in months and gender; caregiver age and education; and measures of household consumption and food insecurity measured at baseline of the G2R trial.

Primary outcomes

Primary outcomes are domain-specific child development scores measured using the Bayley Scales for Infant and Toddler Development version III (BSID-III). The BSID-III assesses five domains of skill development: cognitive, language, motor, social-emotional, and adaptive behavior. Each domain will be examined as a separate primary outcome. Domains include a set of age-appropriate tasks that the child is asked to complete. The BSID-III will be adapted to the local context and a team of assessors will undergo three weeks of training prior to the start of assessments. For each domain, raw data will be converted to norm-referenced z-scores using the Bayley-III Scoring Assistant software.

Secondary outcome

Secondary outcomes are domain-specific child development scores measured using the Caregiver Reported Early Development Instruments (CREDI). Like the BSID-III, the CREDI assesses cognitive, language, motor, and social-emotional skills. While the BSID-III relies on direct assessments of children, the CREDI is based on caregiver reporting on child skills. Raw item data will be converted to norm-referenced z-scores for each domain using the CREDI scoring procedure [4].

References

1. Johnson SB, Riis JL, Noble KG. State of the art review: poverty and the developing brain. *Pediatrics* 2016;137(4).
2. Nelson III CA, Gabard-Durnam LJ. Early adversity and critical periods: neurodevelopmental consequences of violating the expectable environment. *Trends in Neurosciences* 2020;43(3):133-43.
3. Britto PR, Lye SJ, Proulx K, Yousafzai AK, Matthews SG, Vaivada T, Perez-Escamilla R, Rao N, Ip P, Fernald LC, MacMillan H. Nurturing care: promoting early childhood development. *Lancet* 2017;389(10064):91-102.

4. Waldman M, McCoy DC, Seiden J, Cuartas J, CREDI Field Team, Fink G. Validation of motor, cognitive, language, and socio-emotional subscales using the caregiver reported early development instruments: an application of multidimensional item factor analysis. *International Journal of Behavioral Development* 2021;45(4):368-77)