Background In Ethiopia, 50% of the population is younger than 19 years. However, 88% of children and adolescents experience multi-dimensional challenges across health, nutrition and education. Rolled out in 2003, the Ethiopian Government’s national Health Extension Programme (HEP) provides primary health, sanitation, and family planning services to disadvantaged groups. We evaluated the effects of HEP on five dimensions of adolescent development.

Methods We used four rounds of data from a cohort of 1000 young people between 2000–2013. The study exposure was self-reported receipt of HEP following programme rollout in 2003. Outcomes were measured when participants were 19 years and included eight binary indicators: not underweight, very good health, school enrolment, <3 hours on domestic tasks per day, >4 hours in paid work per day, family planning knowledge, no teen marriage, no teen pregnancy; and two continuous scores: literacy, and maths. In statistical analyses, we balanced baseline covariates between exposure groups using propensity scores; and evaluated associations between HEP and study outcomes using \( \text{propensity score weighted regression} \) stratifying by sex, and adjusting for economic shocks. We corrected for multiple hypothesis testing, and calculated adjusted risk differences (ARDs) and adjusted mean differences (AMDs) with 95% confidence intervals (CIs) for significant associations.

Results Ninety-six participants were lost to follow up, and 130 were excluded for residing in Addis Ababa where HEP was not rolled out during the study. Of 774 included participants, 45.7% were female, and baseline mean age was 7.9 years (SD: 0.3). Fifty-five percent of boys and 44.9% of girls reported HEP exposure over follow up. Baseline predictors of exposure included lower caregiver education (p=0.015), lower household wealth (p=0.001), and residence in rural areas (p<0.001), and the Tigray region (p<0.001). Propensity score weighting yielded good balance between exposure groups. In boys and girls, HEP was associated with higher probability of school enrolment (ARD: +12.3ppts, 95% CI: 2.1ppts - 22.5ppts, and ARD: +20.2ppts, 95% CI: 8.4ppts - 32.0ppts, respectively). In girls, HEP was also associated with higher probability of no teen marriage (ARD: +23.2ppts, 95% CI: 12.5ppts - 33.9ppts), and no teen pregnancy (ARD: +12.3ppts, 95% CI: 6.3ppts - 18.4ppts); and higher mean math (AMD: 13.7). Propensity score weighting yielded good balance between exposure groups. In boys and girls, HEP was associated with higher probability of school enrolment (ARD: +12.3ppts, 95% CI: 2.1ppts - 22.5ppts, and ARD: +20.2ppts, 95% CI: 8.4ppts - 32.0ppts, respectively). In girls, HEP was also associated with higher probability of no teen marriage (ARD: +23.2ppts, 95% CI: 12.5ppts - 33.9ppts), and no teen pregnancy (ARD: +12.3ppts, 95% CI: 6.3ppts - 18.4ppts); and higher mean math (AMD: 13.7). Propensity score weighting yielded good balance between exposure groups. In boys and girls, HEP was associated with higher probability of school enrolment (ARD: +12.3ppts, 95% CI: 2.1ppts - 22.5ppts, and ARD: +20.2ppts, 95% CI: 8.4ppts - 32.0ppts, respectively). 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