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Impact of Cash Transfers on Child Health Status by Gender in Kenya

Jared Masini Ichwara, Tabitha W. Kiriti-Ng'ang'a, Anthony Wambugu

Department of Economics and Development Studies, University of Nairobi,

Abstract

Diarrhoea and malnutrition are major problems afflicting children in Kenya and other developing countries. This is detrimental to human capital development and child well-being. This paper aims at evaluating the potential impact of cash transfers on nutritional status and incidence of diarrhoea among children below five years and differentiated by gender in Kenya. Because the cash transfers are not randomly assigned, propensity score matching methods were applied to a nationally representative household survey to examine whether unconditional cash transfers aid child human capital development. We provide empirical evidence that children in cash transfer-receiving households differ from those in non-recipient households. Second, we show that the unconditional cash transfers have potential to influence human capital development. However, girls are generally in an underprivileged situation in Kenya. Whereas cash transfers reduced the incidence of diarrhoea and malnutrition for boys in cash transfer-receiving households, in the case of girls the impact of cash transfers was not significant in case of diarrhoea or it was significant but adversely affected nutritional status. These results are comparable to other evaluations of unconditional cash transfers around the world. The results suggest there is scope for cash transfer programmes to promote human capital development among vulnerable households. Consequently, there is a case for expanding the cash transfers and ensuring efficient and effective administrative structure for targeting, disbursement and accountability.

Keywords: *gender, cash transfers, human capital development, nutritional status, diarrhoea.*

1. Introduction

The health of a population affects economic growth through its effect on human capital accumulation and productivity of labour (Bloom, Canning, and Sevilla, 2004, Schultz, 2003; and Barro and Lee, 1994). Grossman (1999) terms health as a durable capital stock that yields healthy time for the production process. Becker (2009) and Sweetland (1996) terms health as a dimension of human capital neglected in the empirical literature as the dimension of education and training received a lot of attention. This neglect, might be because as Schultz (1993) suggests it is more difficult to assess health and nutritional investments than educational investments. Human capital accumulation through investment in health has been found in the existing empirical literature (Bloom, Canning, and Sevilla, 2004; Schultz, 2003; Grossman, 1999; Sweetland, 1996) to increase labour productivity and enhance utility of labour.

It is widely accepted that child health is a key form of human capital. To guide future investment in Human Capital Development (HCD) through health capital formation, Huang et al. (2017);

*Corresponding authors. *E-mail address: jmichwara@hotmail.com; tkiriti@yahoo.co.uk; tkiriti@uonbi.ac.ke; anthony.wambugu@uonbi.ac.ke*
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Bryant (2009); Rawlings and Rubio (2005); and Gertler (2004) concentrated on the effect of children health and nutritional investment to boost future labour productivity. These studies argue that children growing up in poor families tend to have poorer health than children from nonpoor families. Consequently, they lack the health capacity needed in adulthood to take up productive income generating opportunities to escape poverty. Further, these studies argue that child mortality associated with malnutrition and illness such as diarrhoea are a threat to future investment in human capital.

To help vulnerable households reduce childhood malnutrition and incidence of child illness such as diarrhoea, governments in the developing world have designed social protection mechanisms. Cash Transfer (CT) programmes, in particular, increase household income, cushion vulnerable families from income shocks and improve access to quality basic social services (Aber and Rawlings, 2011; Barham, 2011; and Attanasio et al., 2005). Based on international best practices and lessons from some African, Latin American and Asian countries on the impact of CTs in poor housholds, the Government of Kenya in collaboration with development partners established four CT programmes, collectively, the National Safety Net Programme (NSNP)(Republic of Kenya, 2016, 2011; National Gender and Equality Commission (NGEC), 2014). These are: Cash Transfer to Orphans and Vulnerable Children (CT-OVC), launched in 2004 to cater for the needs of children orphaned and made vulnerable by HIV/AIDS and poverty; Persons with Severe Disabilities Cash Transfer (PWSD-CT) to enhance the capacities of care givers and improvement of the livelihoods of PWSD; and Older Persons Cash Transfer (OPCT) to offer regular and predictable CTs to poor and vulnerable persons aged 65 years and above in needy households; the Hunger Safety Net Programme (HSNP) to cushion poor families and vulnerable households against hunger in arid areas. The HSNP aims to reduce vulnerability and extreme hunger through regular and unconditional CTs to targeted households. It targets households unable to meet basic needs and to invest in human capital; lack capital assets; are likely to sink into poverty during extreme shocks; have harmful coping mechanisms to shocks; with dependent family members who are elderly or with severe disability; and are unable to participate in productive income generating activities. Education Bursary Funds are also a form of CTs to cushion children from poor families against dropping out of school though not classified under the NSNP.

The CT programmes, under the NSNP, have similar objectives of improving the livelihoods of households; cushioning households against shocks to reduce poverty; promoting household food consumption and food security; and promoting HCD in children through an increase in schooling of children aged 6-17 years, and reducing under-five mortality and morbidity through increased uptake of health care especially in immunization, growth monitoring and vitamin-A supplementation.

CT programmes have been linked to improvements in human capital investments and outcomes. At the international level, CTs have been linked to improved maternal and child health care use and outcomes including antenatal visits, delivery at a health facility, skilled attendance at birth, and vaccination for mothers and reduced incidences of low birthweight in children (Glassman et al., 2013); reduction in mortality in children under five and women (Richterman et al., 2023); consumption smoothing and expenditure sustainability (Fisher et al., 2017); enhanced school enrolment and attendance (Armand and Carneiro, 2018; and Kilburn et al., 2017) and overall societal well-being (Sutisna and Qibthiyyah, 2023; Pace et al., 2022; and Chikoko et al., 2021). In Kenya, CT programmes are associated with improved mental health (Kilburn et al., 2016), delay in sexual encounter (Handa et al., 2014), decrease in early pregnancies (Handa et al., 2015), increased labour supply (Asfaw et al., 2014), increased spending on health and food (The Kenya CT-OVC Evaluation Team, 2012a), and enhanced school enrolment and attendance (The Kenya CT-OVC Evaluation Team, 2012b).

2. Justification of the Study

This study contributes empirical evidence on issues that have been fronted at the international level to mitigate gender inequality to address the challenge of poverty. The Sustainable Development Goals (SDGs) underscore the policies that have been formulated to address the problems of gender inequality and poverty facing women and girls. The Republic of Kenya (2007) emphasizes on investment in the people through the provision of education and health care to build quality human capital to spur economic growth, reduce poverty, and address gender differences. In as much as the Government of Kenya has pronounced itself on building human capital that is gender neutral, gender gaps in school enrolment and access to health care remain (Republic of Kenya, 2013). Gender disparities have been considered in the existing literature (Twerefou, Senadza, and Owusu-Afriyie, 2014) as one of the factors that undermine the realization of poverty reduction strategies.

Developing countries are increasingly using CTs with the aim of reducing poverty and supporting investments in child human capital. However, De Groot et al (2017) found inconclusive evidence on impact of CTs on child nutrition, while a systematic review of the literature(Manley, Alderman, and Gentilini, 2022) found only modest impact of CTs on children health and nutrition outcomes. Previous studies of impact of CTs in Kenya focus on child schooling and attendance (Muthuri, 2016; Kisurulia, Katiambo and Tanui, 2015; Merttens et al., 2013; Asfaw et al., 2012b; and Ward et al., 2010), consumption and psychological well-being (Haushofer and Shapiro, 2016), poverty reduction (Kang'ethe, 2018), health insurance (Motanya, 2018), incidence of upper respiratory illness (Huang, et al, 2017) and labor allocation and asset accumulation (Asfaw et al, 2014). There is dearth of literature on the impact of CTs on child nutrition and incidence of illness such as diarrhea in Kenya. Moreover, it is not clear whether CTs have differentiated impact on the health and nutrition of boys and girls.

We provide evidence on the potential impact of Kenya government CT programmes on two major child health problems in Kenya: nutritional status and incidences of diarrhoea in children under five years. Wangia and Wanjala (2022) report that diarrhoea is the major cause of death among children under five years. Undernutrition is also an issue of concern. According to the Kenya Nutrition Action Plan, undernutrition is a public health problem and set the goal to eliminate it by 2030 (Government of Kenya, 2018).This is important to policy as early investments in health for children under five will lead to enhanced life expectancy, a healthy population and a productive labour force. Existing literature (Owusu-Addo and Cross, 2014; and Ferré and Sharif, 2014) posits that children who receive good health and nutrition early in life are more likely to have better health and nutrition outcomes compared to those who receive the same later in their growth process. The objective of this paper is to determine whether there are gender differences on children nutritional status and incidences of diarrhoea, and estimate the impact of CTs on children nutritional status and incidences of diarrhoea for boys and girls in Kenya, as a core of HCD.

3. Literature review

Becker (1962) identified health as a form of human capital among other forms of human capital such as knowledge and skills acquired from education and on the job training. But it was Grossman (1972) who developed a model of demand for health capital. Individuals derive utility from being healthy, good health increases total time available for allocation to work and nonwork activities, and enhances labour productivity. The household is viewed as a unit that makes household production and consumption decisions (Becker, 1965; Becker, 1981; Schultz, 1984; Himmelweit et al. 2013). The household model derives utility from market purchased goods and home-produced commodities, such as good health. Household own and market purchased health and nutrition inputs are combined with local health environment and child specific endowments to produce child health and nutritional status (Ponce, Gertler, and Glewwe, 1998).

Studies of the impact of cash transfers use a variety of methods and focus on various child health and nutrition outcomes. Huang et al. (2017) focused on respiratory illness and health seeking in Kenya. Panel data from a cluster randomized Kenya CT-OVC programme were analyzed. Children in treatment group were 1.8 times less likely to have upper respiratory illness. The impact was larger for boys than girls. Aker et al. (2016) used a Random Control Trial (RCT) to estimate the treatment effect of an unconditional mobile CT programme in Niger. The study found the mobile CT increased both dietary diversity and food consumption of children (0-7 years) in beneficiary households. The mobile CT was also associated with increased bargaining power of women mobile CT recipients. Similarly, Akresh, Walque and Kazianga (2016) use a RCT with both conditional and unconditional CTs in rural Burkina Faso. They found the CTs to significantly increased health checks and reduced incidence of illness among children (0-5 years) in beneficiary households.

Luseno et al. (2014) undertook a randomized evaluation study of an unconditional CTs in Malawi. The analysis focused on children (7-16 years) in a sample of households. Children in beneficiary households had lower chances of illness and higher chances of health care use than children in non-beneficiary households.

Grogan and Moers (2021) used UNICEF-WHO-World Bank data to present estimates of real income on child health indicators in SSA. They found significant association between changes in real incomes, child mortality, stunting, and underweight. Ferré and Sharif (2014) used panel data from a pilot project in Bangladesh. Estimates from a difference in difference methodology show that for the cohort aged 10-22 months at the onset of the pilot project, the CT significantly reduced the prevalence of wasting. Baird, McIntosh, and Özler (2019) examine impact of an Unconditional Cash Transfer (UCT) targeted at females in Malawi aged 13 to 22 years in 2007. The study found the UCT significantly reduced stunting among children born to the programme beneficiaries.

Haushofer and Shapiro (2016), UNICEF (2015), and Handa and Park (2012) show the positive association of CTs in health, food security, nutrition, HIV/AIDS, adolescent wellbeing, social cohesion, and early childhood development. These findings are contradicted by Ward et al. (2010) and Merttens et al. (2013) who found the CT-OVC programme in Kenya not to have any impact on child health indicators. Similarly, Soares, Ribas and Osório (2010) used decomposition by factor components and found Brazil's Bolsa Família CT programme not to have any impact in health and nutritional status of beneficiary children except in the reduction of stunting and wasting in infants.

A number of survey studies have been conducted. Fernald, Gertler, and Hidrobo (2012) concluded conditional CTs had significant reductions in reported diarrhoea cases and nutritional deficiencies in children. A systematic review of the literature by Owusu-Addo and Cross (2014) found conditional CTs improved children's health status in terms of lower morbidity risk, improved nutritional outcomes, utilization of health services, and immunization coverage. Another systematic review by Siddiqi, Rajaram, and Miller (2018) found unconditional CTs had positive impacts on health outcomes such as reduced infant mortality and increased birth weights. Using meta-analysis, Manley, Gitter, and Slavchevska (2013) find that on average CTs had positive but insignificant impact on height-for-age, and girls benefited more than boys, and marginalized areas more than non-marginalized areas.

4. Methodological Framework

This study argues that CTs to poor households may be used to invest in health capital formation. Asfaw et al. (2012a) provide the transmission channels of transfers to households. The channels assume that through capital accumulation and enhancement, CTs improve HCD, productivity and employability that will lead to poverty reduction. In this case, the CTs enter the household demand function to improve child HCD through an income effect that enables the households to afford quality and nutritious foods and health care for the children.

The potential mechanisms through which CTs impact recipient's decision making on household expenditures include change in household preferences on investments in child health and relaxation of the household budget constraint, which allows the household to change its expenditure composition. The mechanism also assumes that parents are altruistic toward investments in children's HCD as they make intertemporal decisions about the future of their children. It is expected that the capital accumulation will bring the household out of poverty and help to minimize intergenerational poverty transmission.

4.1. Theoretical Model

The household health production function (Rosenzweig and Schultz,1983) and employed by Mwabu (2008) is presented in this section. A household maximizes its utility, U, represented by function (1).

$$\max(U) = U\left(X_i, Y_j, H\right), i = 1, \ldots, n; j =, \ldots m \tag{1}$$

where H represents child health, X_i are health neutral goods that yield household utility but do not affect child health and Y_j are goods demanded by the household that affect child health. The household child health production can be described by function (2).

$$H = H\left(Y_j, Z_k, \mu\right), k = 1, \dots\dots\dots, r \tag{2}$$

where Z_k are health inputs such as medical care that do not augment utility directly but through their effects on H while μ are family-specific health endowments such as genetic, initial child health or environmental factors. The family faces a budget constraint in terms of the r purchased goods represented by function (3).

$$I = \sum_t F_t p_{t'} \quad t = 1, \dots\dots.., r \tag{3}$$

Where I is the household income, F_t is a vector of goods demanded by the household at time t while p_t is a vector of prices of goods at time t. Function (1) was simplified by Mwabu (2008) to function (4), which is the normal budget constraint function.

$$I = F(X, Y, Z, P) = XP_x + YP_y + ZP_z \tag{4}$$

Where I is income, that enters the household demand function exogenously, P_x, P_{y,P_z} are exogenous prices and F = $X \cup Y \cup Z$. The union subset depicts a set of goods that affect child health and increase household utility. The household demand function (1.5) is a reduced form for the r goods and n health inputs derived from the utility maximization of (1) subject to (2) and (3).

$$I = F_t(p, I, \mu), \quad t = 1, \dots.., r, \tag{5}$$

Where μ is an error term. The reduced form demand function for the health outcome becomes function (6).

$$H = \psi(p, I, \mu) \tag{6}$$

In this study, the CTs enter the household budget constraint exogenously to relax the budget constraint that poor households face.

4.2. Model Specification

This study uses propensity score matching(PSM), a quasi-experimental design to evaluate the impact of CTs on nutritional status and incidence of diarrhoea among children aged under five years in Kenya. Quasi-experimental (non-randomized) design and experimental designs have been used to evaluate CTs in Sub-Saharan Africa (SSA). A review of methodological approaches by Owusu-Addo, Renzaho and Smith (2018) noted that the practice is consistent to CTs evaluation approaches used in Latin America. The quasi-experimental design adopted for this study, allows for impact evaluation of programmes in the absence of random assignment. The design involves the creation of a comparison (control) group as it is not possible to randomize households into treatment or control groups after the intervention. The control group has similar baseline characteristics to the treatment group (Todd, 2007; and Heckman, Ichimura and Todd, 1998). The control group depicts the counterfactual effects if the CT programme had not been implemented.

In order to delineate the two groups, Todd (2007); and Heckman, Ichimura and Todd (1998) set two imaginary world states that represent the state of being with and without the treatment effect, denoted by 1 and 0, respectively. Let C represent a person in the quasi-experiment, where C=1 represents an individual who receives the treatment (CTs) and C=0 for a person who did not receive the treatment. Let the outcome of the treatment be Y1 and that of the untreated as Y0.

Then, there exists Y (Y1, Y0) that represents the outcome that is associated with each person in each state. Since any one person can only be in one state at a time, only one potential outcome can occur at any given point in time. The outcome that can be observed is represented by function (7).

$$Y = CY_1 + (1 - C)Y_0 \tag{7}$$

The change in outcome of an individual moving from one state to the other is represented by function (8).

$$\Delta Y = Y_1 - Y_0 \tag{8}$$

Since only one state is observed at a time, the treatment effect cannot be directly observed hence it requires solving the missing data problem. To solve the missing data problem, Propensity Score Matching (PSM) is used. The PSM creates a valid control group for comparison with treatment group. It is widely used in impact evaluation literature in the absence of experimental data. It corrects for biases in treatment effect due to observed covariates, that result from confounding due to non-random assignment of the treatment (Bonell, Hargreaves, and Cousens, 2011; and Rosenbaum and Rubin, 1983).

4.3. Binary Logit Model

The Logit model for child health equation was used to explore the potential impact of CT on the probability of child having diarrhea and of a child being undernourished, controlling for a set of observable covariates. The logit model is represented in function (9).

$$PrPr\left(y_i = 1 \mid X\right) = \Lambda\left(\beta_0 + \sum_{i=1} \beta_i X_i + \lambda T_i\right) \tag{9}$$

Where $y_i = 1$ if the child has diarrhea, $y_i = 0$ otherwise; $y_i = 1$ if the child was undernourished, $y_i = 0$ otherwise; β_i are unknown parameters; X_i is child, household and environmental characteristics.; T_i is a dummy variable for receipt of CT; Λ is the cumulative logistic distribution. However, cash transfers are not randomly assigned. This means the estimate of λ would be biased. In the next section, a PSM methodology is outlined to address this problem.

4.4. Propensity Score Matching Methods

PSM methodology creates experimental conditions using observational data where beneficiaries and non-beneficiaries of a treatment are not randomly selected to permit estimation of a causal relationship between outcome and treatment variables (Asfaw et al., 2012a). The problem is unobserved counterfactuals, that is, the outcome for non-beneficiaries had they been treated and the outcome for beneficiaries had they not been treated are not observable. The key feature of PSM procedure is to match individuals on their propensity score that represents their likelihood of being in treatment group given their observable characteristics (Bonell, Hargreaves, and Cousens, 2011; and Rosenbaum and Rubin, 1983). Conditioning on observable variables in PSM eliminates bias (Heckman and Navarro-Lozano, 2004). The average difference in the outcomes of interest between treatment and control group can then be estimated. The PSM procedure rests on the assumptions of common support and conditional independence (Asfaw et al., 2012b; and Caliendo and Kopeinig, 2008). The conditional independence assumption is that there exists a set of covariates, X, that are not affected by participation so that the probable outcome is not dependent on the treatment. Consequently, the expected outcome would be given by function (10).

$$E\left[(Y(1)_{t=0} \mid X, T = 1)\right] = E\left[(Y(0)_{t=0} \mid X, T = 0)\right] \tag{10}$$

Thus, conditional on observable covariates, the expected outcome of non-treated is identical to that of the treated, had they not been treated. The assumption of common support necessitates the propensity score is bounded between 1 and 0 .

Several matching techniques are available characterized by trade-off between bias and efficiency (Caliendo and Kopeinig, 2008). These include nearest-neighbour, calliper/radius, and kernel/local linear techniques. PSM weights the characteristics of control group observations using weights equal to the inverse of their propensity score while characteristics of treatment group have a weight equal to one. This means larger weights on control variables that are similar to the treatment group and lower weights on control observations that are not similar to treatment group.

We estimated the conditional probability of receiving CT or the propensity scores P(x) using observed covariates (x) and a logit model. Individuals with similar observable characteristics are expected to have similar propensity scores, even if their household did not receive CTs. Comparable groups are constructed using their similarity in propensity scores. The comparable groups are individuals with similar propensity scores P(x) but where one group received CTs while the other did not receive a CT. Once the propensity scores are obtained the mean outcome for each group was calculated. The estimated impact of CTs, referred to as the average treatment effect on the treated (ATT) is computed as the difference in average outcomes between the treated and non-treated.

4.5. Definition of Variables

Table 1 presents the variables used in this study of the impact of CTs on child health. These variables are divided into dependent variables and covariates. The covariates are based on the existing literature and available data.

5. Empirical Analysis; Data Sources, Sample Size, Results and Discussions

The study asks whether there are gender differences in child nutritional status and incidences of diarrhoea, and whether any impact of CTs on these health outcomes differ between boys and girls in Kenya. Econometric analyses were carried out to answer the research questions. The study used the most recent representative household-level data from the Kenya Integrated Household Budget Survey (KIHBS), conducted by the Kenya National Bureau of Statistics (KNBS) in 2015/16 and published in 2017. The KNBS (2017) describes KIHBS as a source of rich data that was conducted over a period of 12-months across the country. The survey provides sufficient information to estimate indicators at the national and county levels, by gender, place of residence, and other individual characteristics (KNBS, 2017).

5.1. Sample Size

The study classified households that received Kenya government CTs as treatment group and those that did not receive the CT as the control group. We further dermacated the children under five according to their nutritional status into undernourished (underweight, stunted or wasted) or otherwise and according to whether or not they had a diarrhoea episode. In total, there are 11,975 and 712 children under five years in the control and treatment groups, respectively in the pooled sample. Of these children, there are 337 and 5,877 female children in the treatment and control groups while there are 375 and 6,098 male children in the treatment and control groups, respectively. Eighty six (86) children under five years had diarrhoea and 209 were undernourished in the treatment group compared to 980 and 3,123 children in the control group, respectively.

5.2. Descriptive statistics: Children with and without Diarrhea

Table 2 presents characteristics of treatment and control groups by gender for children with and without diarrhoea. Tests of gender differences in means of variables are also reported. There are hardly any significant differences between boys and girls either in the treatment or control group. Only the difference in particpation in community nutritional programmes and growth monitoring clinics in the treatment group is significant at one percent.

Table 1. Definition of variables

Variables	Definitions	Justification of Variables
Diarrhoea	=1 if child had diarrhoea and 0 otherwise	
Nutritional Status	=1 if child is either under-weight, stunted or wasted and 0 otherwise	
Explanatory Variables		
Household received CTs	=1 if household received CTs and 0 otherwise	Household that received CTs can smoothen their consumption, produce human capital through proper nutrition and diarrhoea management and undertake interventions that reduce poverty. CTs will enable mothers to take children to hospital or buy oral rehydration salts to manage and reduce diarrhoea incidences. CT will improve children nutritional status as the recipient households will have income to buy food and other nutritional supplements. Children in recipient households likely to have better nutritional outcomes
Age of child	Number of months the child has lived	Older children are likely to have better nutritional status and less likely to have diarrhoea.
Gender of the child	=1 if a girl child and 0 otherwise	Gender differences in nutritional status and incidence of diarrhoea are likely and the impact of CTs is also likely to differ by gender.
Area of Residence	=1 for rural residence and 0 for urban residence	Child health may vary by area of residence Children in rural areas likely to have poorer nutritional status and higher incidence of diarrhoea. Impact of CTs are expected to vary by area of residence.
Household size	Number of individuals in the household	Large households tend to be poorer than small households. Thus, household size and child health are likely negatively related
Low maternal education	=1 for mother with low level of and 0 otherwise	education (primary or less) Child health is likely to be enhanced by having a better educated mother. Hence, low education of the mother is associated with poor child nutrition and high incidence of diarrhoea. Educated mothers may also have greater bargaining power within household resource allocation.
Female household head	=1 for female headed household and 0 otherwise	Female household headship may enhance or be detrimental to child health. Female headed households tend to be poorer than others. But female headship may also mean enhanced control over resources.

Table 1. continue... Definition of variables

Variables	Definitions	Justification of Variables
Poverty status of the household	=1 for poor household and 0 otherwise	Poverty is likely to be associated with undernutrition and higher incidence of diarrhoea.
Latrine	=1 for unhygienic and shared toilet/ latrine facility and 0 otherwise	Children in households with unhygienic toilet facilities are likely to experience worse nutritional status and higher incidence of diarrhoea.
Hand washing	=1 for poor hand wash practice and 0 otherwise	Poor hand washing facilities are likely to worsen child nutritional status and incidence of diarrhoea.
Solid waste disposal	=1 for poor disposal of waste and 0 otherwise	Poor disposal of household solid waste likely to be associated with poor child nutritional status and higher incidence of diarrhoea.
Safe drinking water	=1 for clean and safe drinking water and 0 otherwise	Children in households with clean and safe drinking water likely to record better child nutritional status and fewer incidences of diarrhoea.
Nutrition and Monitoring programmes	=1 for child participating in any community nutrition programme or growth monitoring clinics and 0 otherwise	Participation in community nutrition programmes and growth monitoring clinics will enhance the child's nutritional status and reduce incidence of diarrhoea.
Breastfeeding	=1 for a exclusively breastfed child and 0 otherwise	An exclusively breastfed child is likely to have better nutritional status and lower chances of diarrhoea episodes

Table 2. Descriptive statistics by treatment status and gender: children with and without diarrhoea

Variables	TREATMENT			CONTROL		
	Boy Mean	Girl Mean	Diff diff	Boy Mean	Girl Mean	Diff diff
Age of child	26.20	20.48	5.72	23.35	22.53	0.83
	(3.465)	(2.952)	(4.651)	(0.658)	(0.678)	(0.947)
Poverty status of the household	0.680	0.667	0.013	0.389	0.355	0.034
	(0.095)	(0.105)	(0.142)	(0.02)	(0.022)	(0.031)
Area of Residence	0.680	0.810	-0.130	0.655	0.664	-0.010
	(0.095)	(0.088)	(0.131)	(0.02)	(0.022)	(0.030)
Female household head	0.920	0.952	-0.032	0.737	0.711	0.026
	(0.055)	(0.048)	(0.075)	(0.01)	(0.021)	(0.029)
Household size	6.600	7.762	-1.162	5.68	5.520	0.162
	(0.507)	(0.749)	(0.881)	(0.10)	(0.107)	(0.150)
Low maternal education	0.520	0.524	-0.004	0.286	0.265	0.021
	(0.102)	(0.112)	(0.151)	(0.02)	(0.021)	(0.029)
Latrine	0.840	0.952	-0.112	0.793	0.792	0.001
	(0.075)	(0.048)	(0.093)	(0.01)	(0.019)	(0.026)
Hand washing	0.955	1.000	-0.045	0.882	0.902	-0.020
	(0.045)	(0.000)	(0.049)	(0.01)	(0.014)	(0.020)
Solid waste disposal	0.920	1.000	-0.080	0.950	0.947	0.003
	(0.055)	(0.000)	(0.061)	(0.01)	(0.011)	(0.014)
Safe drinking water	0.600	0.524	0.076	0.527	0.572	-0.046
	(0.100)	(0.112)	(0.150)	(0.02)	(0.023)	(0.032)
Nutrition and Monitoring programmes	0.680	1.000	-0.320	0.856	0.890	-0.034
	(0.095)	(0.000)	(0.104) ***	(0.01)	(0.015)	(0.021)
Breastfeeding	1.000	1.000	0.000	0.996	0.991	0.005
	(0.000)	(0.000)	(0.000)	(0.00)	(0.004)	(0.005)

Standard Errors (SE) are in parenthesis. ***, **, * are significant levels at 1%, 5% and 10%, respectively.

5.3. Descriptive statistics: undernourished and well-nourished children

Table 3 presents characteristics and tests of gender differences for treatment and control groups for undernourished and well-nourished children. From the data analysis, we note that there are no significant differences between male and female children except in the gender of the household head and participation in community nutritional programmes and health monitoring clinics with a 10 percent significant level each in favour of female children.

Table 3. Descriptive statistics by treatment status and gender: undernourished and well-nourished children

Variables	TREATMENT			CONTROL		
	Boy Mean	Girl Mean	Diff diff	Boy Mean	Girl Mean	Diff diff
Age of child	47.01	46.96	0.05	47.31	46.85	0.47
	(0.776)	(0.703)	(1.045)	(0.225)	(0.212)	(0.309)
Poverty status of the household	0.622	0.577	0.046	0.458	0.465	-0.007
	(0.049)	(0.047)	(0.068)	(0.013)	(0.013)	(0.018)
Area of Residence	0.765	0.685	0.081	0.740	0.728	0.012
	(0.043)	(0.044)	(0.062)	(0.011)	(0.011)	(0.016)
Female household head	0.876	0.901	-0.025	0.795	0.802	-0.007
	(0.034)	(0.028)	(0.044)	(0.010)	(0.010)	(0.014)
Household size	7.378	7.279	0.098	6.179	6.075	0.104
	(0.217)	(0.246)	(0.332)	(0.060)	(0.055)	(0.081)
Low maternal education	0.378	0.405	-0.028	0.269	0.296	-0.027
	(0.049)	(0.047)	(0.068)	(0.011)	(0.011)	(0.016) *
Latrine	0.827	0.865	-0.038	0.789	0.797	-0.008
	(0.038)	(0.033)	(0.050)	(0.010)	(0.010)	(0.015)
Hand washing	0.955	0.916	0.039	0.901	0.912	-0.011
	(0.022)	(0.027)	(0.036)	(0.008)	(0.007)	(0.011)
Solid waste disposal	0.990	0.991	-0.001	0.966	0.968	-0.002
	(0.010)	(0.009)	(0.014)	(0.005)	(0.004)	(0.006)
Safe drinking water	0.337	0.405	-0.069	0.525	0.523	0.002
	(0.048)	(0.047)	(0.067)	(0.013)	(0.013)	(0.018)
Nutrition and Monitoring programmes	0.643	0.752	-0.109	0.806	0.797	0.008
	(0.049)	(0.042)	(0.064) *	(0.010)	(0.010)	(0.014)
Breastfeeding	1.000	1.000	0.000	0.994	0.994	0.000
	(0.000)	(0.000)	(0.000)	(0.002)	(0.002)	(0.003)

Standard Errors (SE) are in parenthesis. ***, **, * are significant levels at 1%, 5% and 10%, respectively.

5.4. Impact of CTs on incidence of diarrhea

The regressions on the impact of CTs on children diarrhoea have been carried out using two estimators of logit and PSM to address the issues of robustness of the results. We estimated alternative model specifications to assess sensitivity of the results by including different regressors. The PSM and logistic regressions were run separately for pooled, girls' only and boys' only samples.

5.4.1. Logit regression estimates: diarrhoea equations

The estimates in Table 4 show logit estimates of the incidence of diarrhea equation. The sign of the coefficient of CT variable is negative but statistically insignificant across the regressions.

This maybe because there is no significant impact or because treatment is nonrandom. We return to this shortly. Gender has a negative and insignificant marginal effect. Poverty has insignificant coefficients as well. The household size variable has negative and significant coefficients across the regressions. The larger the household the lower the probability of a child having diarrhea holding other factors constant.

The coefficient of child age and child age squared are positive and negative respectively. They are also statistically significant. This means that the probability of having diarrhoea and child age may have a concave relationship. Younger children are likely to experience diarrhoea more as they face a new environment and during teething. Children in female headed households (FHHs) do not have significantly different probability of having diarrhoea.

The coefficient of unhygienic latrine use are positive and statistically significant. Use of latrine increases the chances of having diarrhoea in pooled sample, and in the girls sample. The coefficients of the variables for poor hand washing, poor solid waste disposal and safe drinking water have insignificant coeffiecients. In the pooled sample, low maternal education increases the probability of a child dirrhoea. The coefficient is positive and statistically significant. However, while the effect is statistically significant for boys, it is not for girls.

The coefficient of rural residence dummy are insignificant except for the boys sample. The incidence of diarrhoea among boys was lower in rural than urban areas holding other factors constant. Particpation in community nutrition programmes and growth monitoring clinics has a significant positive coefficient. It suggests the clinics were successful in identifying children with diarrhoea. Exclusive breastfeeding has a negative but statistically insignificant coefficient.

5.4.2. Propensity score matching results: incidence of diarrhea equation

The propensity scores for the diarrhea equation were estimated using logit model of the probability of receiving a CT. The estimates are reported in Table 5. Household size, use of unhygienic latrine, low maternal education and female headed households are associated with higher probability of receiving a CT. Their coefficients are positive and statistically significant. Rural residence, safe drinking water and participation in community nutrition programme or growth monitoring clinic are associated with lower probability of being beneficiaries of a CT. The coefficients of these covariates are negative and statistically significant.

The PSM analysis was based on the nearest neighbour (NN), radius, and kernel matching estimators. The pooled sample and sub-samples are large to support matches and also ensure the highest total number of balanced covariates to estimate the ATT. Using the three matching estimators helps assess robustness of the ATT estimate as none is superior to the other. We enforce the condition of common support restriction to increase the quality of our matches although Lechner (2001) suggests that imposition of the common support restriction may not necessarily improve the quality of the estimates. The NN matches pairs children in the beneficiary group with their counterparts in the non-beneficiary group such that those with closest propensity scores are paired to construct counterfactual outcomes. The Radius matching pairs the treated children with only their control counterparts whose propensity scores fall within a certain predetermined radius of the propensity score of the treated children. On the other hand, Kernel matching is premised on a weighted average to pair all the recipient children with their non-recipient counterparts with similar weights to construct a counterfactual outcome.

Table 6 reports ATT estimates obtained by NN, radius, and kernel estimators. According to the PSM results, receipt of CT reduced the probability of diarrhoea among boys but not among girls. The estimates indicate that CT reduced the probability of a boy in CT receiving household having diarrhea by 2%-4.2% on the matching estimator.

5.5. Impact of CTs on Child Nutritional Status

We conduct analysis similar to that of the incidence of diarrhoea for the child nutrition outcome variable. This section presents results on the impact of CT on child nutritional status. The propensity scores are estimated from logit model.

Table 4. Binomial logit estimates: diarrhoea equation

Variables		Pooled Sample		Girls Sample		Boys Sample
	Coef. Mean	dy/dx Mean	Coef. diff	dy/dx Mean	Coef. Mean	dy/dx diff
Household received CTs	-0.181 (0.169)	-0.013 (0.012)	-0.116 (0.249)	-0.008 (0.017)	-0.238 (0.231)	-0.018 (0.018)
Nutritional Status	0.155 (0.121)	0.011 (0.009)	0.237 (0.177)	0.016 (0.012)	0.088 (0.165)	0.007 (0.013)
Poverty status of the household	-0.078 (0.076)	-0.006 (0.006)	-0.173 (0.113)	-0.012 (0.008)	0.011 (0.103)	0.001 (0.008)
Age of child	0.026 (0.008) ***	0.002 (0.001) ***	0.031 (0.012) ***	0.002 (0.001) ***	0.021 (0.011) **	0.002 (0.001) **
Age of child squared	-0.001 (0.000) ***	0.000 (0.000) ***	-0.001 (0.000) ***	0.000 (0.000) ***	-0.001 (0.000) ***	0.000 (0.000) ***
Gender of the child	-0.101 (0.068)	-0.007 (0.005)				
Area of Residence	-0.124 (0.077)	-0.009 (0.006)	-0.019 (0.113)	-0.001 (0.008)	-0.216 (0.104) **	-0.016 (0.008) **
Household size	-0.051 (0.016) ***	-0.004 (0.001) ***	-0.058 (0.024) **	-0.004 (0.002) **	-0.046 (0.022) **	-0.004 (0.002) **
Female household head	0.065 (0.075)	0.005 (0.005)	-0.029 (0.111)	-0.002 (0.008)	0.155 (0.102)	0.012 (0.008)
Latrine	0.203 (0.087) **	0.015 (0.006) **	0.261 (0.127) **	0.018 (0.009) **	0.161 (0.119)	0.012 (0.009)
Hand washing -0.003	0.107 (0.116)	0.008 (0.008)	0.278 (0.178)	0.019 (0.012)	-0.036 (0.154)	-0.003 (0.012)
Solid waste disposal	0.134 (0.161)	0.010 (0.012)	0.234 (0.235)	0.016 (0.016)	0.044 (0.221)	0.003 (0.017)
Safe drinking water	0.000 (0.071)	0.000 (0.005)	0.100 (0.105)	0.007 (0.007)	-0.097 (0.097)	-0.007 (0.007)
Nutrition and Monitoring programmes	0.500 (0.103) ***	0.036 (0.008) ***	0.752 (0.164) ***	0.052 (0.011) ***	0.308 (0.134) **	0.023 (0.010) **
Breastfeeding	-0.425 (0.441)	-0.031 (0.032)	-0.877 (0.557)	-0.061 (0.038)	0.134 (0.745)	0.010 (0.057)
Low maternal education	0.156 (0.082) *	0.011 (0.006) *	0.055 (0.119)	0.004 (0.008)	0.250 (0.114) **	0.019 (0.009) **
_cons	-2.241 (0.500) ***		-2.354 (0.654) ***		-2.435 (0.811) ***	
Pseudo R^2	0.0381		0.0522		0.0307	
Log likelihood	-3248.6132		-1516.994 1		-1721.114 4	
LR $^2p - value$	0.0000		0.0000		0.0000	
Number of obs	12,034	12,034	5,902	5,902	6,132	6,132

Standard Errors (SE) are in parenthesis. ***, **, * are significant levels at 1%, 5% and 10%, respectively.

Table 5. Logit estimates for PSM analysis: Incidence of diarrhoea

Variables	Pooled Sample Coef.	Girls Sample Coef.	Boys Sample Coef.
Nutritional Status	0.133(0.123)	-0.135(0.250)	-0.059(0.176)
Poverty status of the household	0.013(0.089)	-0.013(0.126)	0.036(0.125)
Age of child	0.012(0.010)	0.009(0.014)	0.014(0.014)
Age of child squared	0.000(0.000)	0.000(0.000)	0.000(0.000)
Gender of the child	-0.019(0.083)		
Area of Residence		-0.542(0.129) ***	-0.327(0.129) ***
Household size	0.236(0.015) ***	0.264(0.023) ***	0.218(0.021) ***
Female household head	0.614(0.086) ***	0.568(0.125) ***	0.690(0.121) ***
Latrine	0.218(0.109) **	0.381(0.161) **	0.148(0.150)
Hand washing	0.236(0.162)	0.077(0.222)	0.478(0.241) **
Solid waste disposal	0.288(0.273)	0.722(0.405) *	0.359(0.381)
Safe drinking water	-0.228(0.084)***	-0.283(0.122)**	-0.280(0.119) **
Nutrition and Monitoring programmes	-0.527(0.095)***	-0.317(0.140)**	-0.655(0.130)***
Breastfeeding	-0.736(0.482)	-0.883(0.652)	-0.388(0.750)
Low maternal education	0.485(0.120) ***	0.701(0.184) ***	0.384(0.160) **
_cons	-4.544(0.593) ***	-4.924(0.820) ***	-4.629(0.892) ***
Log likelihood	-2321.2323	-1117.9412	-1186.6949
Number of obs	12,036	5,902	6,132
LRχ^2 *p-value*	0.0000	0.0000	0.0000
Pseudo R^2	0.0802	0.0929	0.0808

SE are in parenthesis. ***, **, * are significant levels at 1%, 5% and 10%, respectively.

5.5.1. Logit regression results

Table 7 reports logit regression results. The results indicate that holding other factors constant, CTs have insignificant effect on nutritional status for children under five except for girls. Among girls, CT is associated with higher probability of poor nutrition. In the pooled model, girls are more likely than boys to have poor nutritional status. The coefficient of gender variable is negative and statistically significant. Poverty is a strong hindrance to HCD. Children in poor households are more likely than those in nonpoor households to be undernourished. The coefficients are statistically significant at one percent across all the samples. The effect is larger for girls than boys. Child age and square of age have statistically significant coefficients. They imply that younger children are more likely to suffer malnutrition than older children.

Children in rural residence are more likely than children in urban areas to have poor nutritional status. The coefficient of rural dummy is positive and statistically significant at one percent across all the samples. The effect is larger for boys than girls. Household size has negative but statistically insignificant effect on child nutritional status. Low maternal education is unfavourable for children HCD. The coefficients and marginal effects are statistically significant across the samples. The adverse effect of low maternal education is larger for boys than girls.

Female household headship is associated with higher chances of child malnutrition. The coefficients of female household head dummy is positive and statistically significant. The effect of this variable is larger for boys than girls Unhygienic latrines, poor hand washing practices after defecation, and poor solid waste disposal are associated with child malnutrition. The coefficients of these variables are all positive and statistically significant for girls. For boys, only use of unhygienic latrines has significant effect. On the other hand, safe and clean drinking water is a booster for children's nutritional development. The coefficient is significant at one percent for the pooled and boys' only samples and five percent for the girls' only sample. Participation in community nutrition programmes and growth monitoring clinics improve children's nutritional development.

Table 6. ATT estimates: Incidence of diarrhoea

Estimator	Sample	Treated	Controls	Diff
Pooled Sample				
NN (1)	ATT	0.063	0.051	0.012(0.014)
NN (2)	ATT	0.063	0.065	-0.002(0.013)
NN (3)	ATT	0.063	0.074	-0.011(0.012)
NN (4)	ATT	0.063	0.075	-0.011(0.012)
NN (5)	ATT	0.063	0.075	-0.011(0.011)
Radius (0.01)	ATT	0.063	0.072	-0.009(0.010)
Radius (0.005)	ATT	0.063	0.071	-0.007(0.010)
Radius (0.0025)	ATT	0.063	0.071	-0.008(0.010)
Kernel (0.01)	ATT	0.063	0.073	-0.010(0.010)
Kernel (0.005)	ATT	0.063	0.072	-0.008(0.010)
Kernel (0.0025)	ATT	0.063	0.071	-0.008(0.010)
Girls Sample				
NN (1)	ATT	0.06	0.06	0.000(0.021)
NN (2)	ATT	0.06	0.057	0.003(0.018)
NN (3)	ATT	0.06	0.058	0.002(0.016)
NN (4)	ATT	0.06	0.064	-0.004(0.016)
NN (5)	ATT	0.06	0.066	-0.006(0.016)
Radius (0.01)	ATT	0.06	0.068	-0.008(0.015)
Radius (0.005)	ATT	0.061	0.07	-0.010(0.015)
Radius (0.0025)	ATT	0.061	0.073	-0.011(0.015)
Kernel (0.01)	ATT	0.06	0.068	-0.008(0.014)
Kernel (0.005)	ATT	0.06	0.069	-0.009(0.015)
Kernel (0.0025)	ATT	0.06	0.07	-0.010(0.015)
Boys Sample				
NN (1)	ATT	0.066	0.108	-0.042(0.023) **
NN (2)	ATT	0.066	0.102	-0.036(0.020) **
NN (3)	ATT	0.066	0.092	-0.026(0.018) *
NN (4)	ATT	0.066	0.09	-0.024(0.017) *
NN (5)	ATT	0.066	0.093	-0.027(0.016) *
Radius (0.01)	ATT	0.066	0.087	-0.021(0.015) *
Radius (0.005)	ATT	0.067	0.087	-0.020(0.015) *
Radius (0.0025)	ATT	0.067	0.09	-0.023(0.015) *
Kernel (0.01)	ATT	0.066	0.086	-0.020(0.015) *
Kernel (0.005)	ATT	0.066	0.086	-0.020(0.015) *
Kernel (0.0025)	ATT	0.066	0.088	-0.022(0.015) *

SE are in parenthesis. ***, **, * are significant levels at 1%, 5% and 10%, respectively.

The coefficient is negative and statistically significant except for boys.

5.5.2. Propensity score matching results: Nutritional status

Table 8 reports logit estimates of the probability of a child being in CT receiving household. Rural residence was associated with lower probability of receving CT. This is indicated by the negative statistically significant coefficient of rural dummy. Household size was positively associated with chances of receiving CT. The coefficient of household size is statistically significant. Female headed households increased the probability of a household receiving CTs than male headed households to be CT beneficiaries. Similarly, low maternal education was associated with higher probability of being in a CT beneficiary household. Whereas the government CTs are supposed to be poverty sensitive, the results do not support this holding other factors constant. The coefficient of poverty dummy is statistically insignificant. It may be due to biasness in placement, political considerations, and administration errors in choosing who should benefit from CTs. Poor targeting of beneficiaries might also explain this finding. Other variables that are associated with higher probability of receiving CTs are female headship, use of unhygienic latrines, poor hand washing for boys only, poor solid waste disposal for girls only. On the other hand, children's participation in community nutritional programmes and growth monitoring clinics, safe drinking water are associated with lower probability of receiving CT.

The PSM estimates of the impact of CT on child nutritional status are reported in Table 9. According to the radius and kernel matching estimators, the impact of CT on girls' nutritional status was positive and statistically significant. CT increased the probability of child malnutrition. The probability of girls in CT beneficiary households having malnutrition was reduced by about 4%. On the other hand, according to the NN estimator, the impact of CT on boys' nutritional status was negative and statistically significant. This implies that CT reduced the probability of malnutrition among boys. The probability of boys in CT beneficiary households having malnutrition was reduced by about 3.7%-5.7% depending on number of neighbours considered.

5.6. Discussion of Results

The objective of the study was to evaluate the impact of the Kenya government CTs on HCD through reduction of child illness and improved nutrition. Logit estimates of the incidence of diarrhea and of malnutrition with a CT dummy as an explanatory variable indicate insignificant effect of CT. The logit results are similar to Merttens et al. (2013), Soares, Ribas and Osório (2010) and Ward et al. (2010) who find no impact of CT on nutritional status of children. The PSM estimates indicate that CTs reduce the incidence of diarrhoea disease among boys in beneficiary households. Similarly, CTs reduce the probability of malnutrition among boys in beneficiary households. In contrast, CTs have insignificant impact on incidence of diarrhea disease among girls in beneficiary households. CTs also significantly incraese the probability of malnutrition in beneficiary households. These results are consistent with those of Fernald, Gertler, and Hidrobo (2012) who find significant reductions in reported diarrhoea incidences while Attanasio et al. (2005) find mixed results on the impact of CTs on children diarrhoea. Our PSM results confirms Grogan and Moers (2021) and Ferré and Sharif (2014), and Owusu-Addo and Cross (2014) who find positive impact of CTs on child nutrition.

6. Conclusion and Policy Recommendations

Cash transfers have become a key feature of Kenya's economic landscape. This paper used non experimental data to evaluate the impact of Kenya government CTs on child health (child nutritional status and incidence of diarrhoea) by gender. We employed descriptive statistical analyses to examine differences in health status and other characteristics between boys and girls within treatment and control groups. We start by estimating a binary logit equation for child health with a dummy for CT receipt, child and household characteristics. We find insignificant coefficient of the CT dummy. Although households that received CTs and those that did not are observed, a direct comparison will not yield the impact of CTs on child health. We therefore apply

Table 7. Binomial logit estimates: nutritional status equation

Variables	Pooled Sample		Girls Sample		Boys Sample	
	Coef.	dy/dx	Coef.	dy/dx	Coef.	dy/dx
Household received CTs	0.123	0.013	0.360	0.038	-0.107	-0.011
	(0.125)	(0.013)	(0.179) **	(0.019) **	(0.179)	(0.018)
Diarrhoea	0.181	0.019	0.285	0.030	0.087	0.009
	(0.126)	(0.013)	(0.186)	(0.019)	(0.172)	(0.017)
Poverty status of the household	0.384	0.040	0.468	0.049	0.311	0.031
	(0.063) ***	(0.006) ***	(0.089) ***	(0.009) ***	(0.009) ***	
Age of child	0.278	0.029	0.374	0.039	0.202	0.020
	(0.021) ***	(0.002) ***	(0.034) ***	(0.003) ***	(0.026) ***	(0.003) ***
Age of child squared	-0.002	0.000	-0.003	0.000	-0.001	0.000
	(0.000) ***	(0.000) **	(0.000) ***	(0.000)**	(0.000) ***	(0.000) ***
Gender of the child	0.154	0.016		-		
	(0.057)***	(0.006) ***	-	-	-	
Area of Residence	0.297	0.031	0.230	0.024	0.367	0.037
	(0.065)***	(0.007) ***	(0.093) ***	(0.010) ***	(0.093) ***	(0.009) ***
Household size	0.008	0.001	-0.009	-0.001	0.024	0.002
	(0.013)	(0.001)	(0.019)	(0.002)	(0.018)	(0.002)
Female household head	0.028	0.003	0.070	0.007	-0.026	-0.003
	(0.064)	(0.007)	(0.090)	(0.009)	(0.092)	(0.009)
Latrine	0.224	0.023	0.229	0.024	0.219	0.022
	(0.070) ***	(0.007) ***	(0.098) **	(0.010) **	(0.100) **	(0.010) **
Hand washing	0.179	0.018	0.279	0.029	0.093	0.009
	(0.096) *	(0.010) *	(0.135) **	(0.014) **	(0.137)	(0.014)
Solid waste disposal	0.444	0.046	0.625	0.065	0.267	0.027
	(0.143) ***	(0.015) ***	(0.200) ***	(0.021) ***	(0.207)	(0.021)
Safe drinking water	-0.203	-0.021	-0.169	-0.018	-0.232	-0.023
	(0.059) ***	(0.006) ***	(0.084) **	(0.009) **	(0.084) ***	(0.008) ***
Nutrition and Monitoring programmes	-0.138	-0.014	-0.105	-0.011	-0.188	-0.019
	(0.076) *	(0.008) *	(0.107)	(0.011)	(0.108) *	(0.011) *
Breastfeeding	0.104	0.011	0.469	0.049	-0.349	-0.035
	(0.409)	(0.042)	(0.542)	(0.057)	(0.610)	(0.061)
Low maternal education	0.478	0.049	0.410	0.043	0.555	0.056
	(0.071) ***	(0.007) ***	(0.101) ***	(0.011) ***	(0.100) ***	(0.010) ***
_cons	-10.485		-12.724		-8.466	
	(0.617) ***	-	(0.924) ***	-	(0.836) ***	-
Pseudo R^2	0.4451		0.4521		0.4419	
Log likelihood	-3828.1646		-1887.9379		-1925.1557	
LR $^2p - value$	0.0000		0.0000		0.0000	
Number of obs	12,034	12,034	5,902	5,902	6,132	6,132

SE are in parenthesis. ***, **, * are significant levels at 1%, 5% and 10%, respectively.

Table 8. Logit estimates for PSM analysis: Nutritional status

Variables	Pooled Sample	Girls Sample	Boys Sample
	Coef.	Coef.	Coef.
Diarrhoea	-0.192(0.170)	-0.135(0.250)	-0.261(0.232)
Poverty status of the household	0.017(0.089)	-0.013(0.126)	0.031(0.124)
Age of child	0.012(0.010)	0.009(0.014)	0.015(0.013)
Age of child squared	0.000(0.000)	0.000(0.000)	0.000(0.000)
Gender of the child	-0.019(0.083)		
Area of Residence		-0.542(0.129) ***	-0.331(0.129)***
Household size	0.235(0.015)***	0.264(0.023) ***	0.217(0.021)***
Female household head	0.613(0.086)***	0.568(0.125) ***	0.694(0.121)***
Latrine	0.223(0.109)**	0.381(0.161) **	0.151(0.151)
Hand washing	0.242(0.162)	0.077(0.222)	0.479(0.241) **
Solid waste disposal	0.294(0.273)	0.722(0.405) *	0.350(0.381)
Safe drinking water	-0.231(0.084) ***	-0.283(0.122) **	-0.281(0.119) **
Nutrition and Monitoring programmes	-0.523(0.095)***	-0.317(0.140)**	-0.651(0.130) ***
Breastfeeding	-0.733(0.482)	-0.883(0.652)	-0.378(0.750)
Low maternal education	0.493(0.120)***	0.701(0.184)***	0.385(0.160)**
_cons	-4.549(0.593)***	-4.924(0.820)***	-4.607(0.892)***
Log likelihood	-2321.0669	-1117.9412	-1186.0823
Number of obs	12,034	5,902	6,132
$LR\chi^2$ *p-value*	0.0000	0.0000	0.0000
Pseudo R^2	0.0802	0.0929	0.0813

SE are in parenthesis. ***, **, * are significant levels at 1%, 5% and 10%, respectively.

PSM method to the KIHBS data to investigate the impact of CTs on child health status across the three samples. PSM simulates an experimental situation from non-experimental data.

The logit estimates indicate insignificant association between CTs and the incidence of diarrhea and of malnutrition. But according to the PSM estimates, we find that CTs reduced the incidence of diarrhoea disease for boys in CT receiving households. Similarly, receiving a CT reduced the probability of a boy in beneficiary household being malnoursished. In contrast, CTs had insignificant impact on incidence of diarrhea disease among girls in beneficiary households. CTs also significantly increased the probability of malnutrition of girls in beneficiary households.

We draw the following conclusions from the findings of this paper. First, there are notable differences between chidren in CT receiving households and non-receiving households. There are also some differences between boys and girls within the two groups. Second, unconditional CTs can aid households in human capital formation through improvement of health status of children under five years. CTs can support poor families to manage out-of-pocket expenditures when the children fall sick with diarrhoea. CTs can also be allocated to purchase nutritous food and to diversify sources of food. Third. girls are generally in an underprivileged situation in terms of the impact of CTs on the two health status variables considered in this study.

The results in this paper suggest that the government intervention through CTs to the most vulnerable is beneficial to children in receiving households. Therefore, stakeholders and the Government Ministry responsible for social protection programmes should continue to ensure that the CT programmes are administered effectively. The results also provide support for expanding CT programme by the National Treasury subject to budgetary constraints. However, not all children benefit. The results show that girls are disadvantaged on both dimensions of health HCD considered. Therefore, there is need to examine intrahousehold resource allocation in CT receiving households.

Table 9. ATT estimates: Nutritional status

Estimator	Sample	Treated	Controls	Diff
Pooled Sample				
NN (1)	ATT	0.297	0.28	0.017(0.027)
NN (2)	ATT	0.297	0.285	0.012(0.023)
NN (3)	ATT	0.297	0.287	0.010(0.022)
NN (4)	ATT	0.297	0.284	0.012(0.021)
Radius (0.01)	ATT	0.297	0.287	0.010(0.019)
Radius (0.005)	ATT	0.298	0.29	0.008(0.019)
Radius (0.0025)	ATT	0.3	0.292	0.007(0.019)
Kernel (0.01)	ATT	0.296	0.286	0.011(0.019)
Kernel (0.01)	ATT	0.296	0.287	0.009(0.019)
Kernel (0.01)	ATT	0.296	0.289	0.007(0.019)
Girls Sample				
NN (1)	ATT	0.335	0.291	0.045(0.039)
NN (2)	ATT	0.335	0.318	0.018(0.034)
NN (3)	ATT	0.335	0.298	0.037(0.032)
NN (4)	ATT	0.335	0.296	0.039(0.031)
Radius (0.01)	ATT	0.335	0.293	0.042(0.028) *
Radius (0.005)	ATT	0.334	0.297	0.037(0.028) *
Radius (0.0025)	ATT	0.333	0.296	0.037(0.029) *
Kernel (0.01)	ATT	0.332	0.291	0.041(0.028) *
Kernel (0.01)	ATT	0.332	0.293	0.039(0.028) *
Kernel (0.01)	ATT	0.332	0.292	0.040(0.029) *
Boys Sample				
NN (1)	ATT	0.262	0.319	-0.057(0.037) *
NN (2)	ATT	0.262	0.318	-0.056(0.032) **
NN (3)	ATT	0.262	0.306	-0.044(0.030) *
NN (4)	ATT	0.262	0.299	-0.037(0.029) *
Radius (0.01)	ATT	0.262	0.27	-0.008(0.026)
Radius (0.005)	ATT	0.262	0.271	-0.008(0.026)
Radius (0.0025)	ATT	0.265	0.274	-0.009(0.026)
Kernel (0.01)	ATT	0.262	0.27	-0.008(0.025)
Kernel (0.01)	ATT	0.262	0.271	-0.009(0.026)
Kernel (0.01)	ATT	0.262	0.269	-0.007(0.026)

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8. Competing Interest Declaration

No competing interests, either financially or technically have influenced this paper.

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