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Effect of Cash Transfers on Food Expenditure, Dietary Diversity and Nutrition Status of Beneficiary Households

Foreign, Commonwealth & Development Office

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Effect of Cash Transfers on Food Expenditure, Dietary Diversity and Nutrition Status of Beneficiary Households

Social Protection

Samuel Kipruto, Davis Milimo, Richard Obiga, Isabella Kiplagat, Mary Karumba, Martin Kabaya, Irene Nyamu and Eric Macharia.

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Abbreviations and Acronyms

CCTs	Conditional Cash Transfer(s)
UCTs	Unconditional Cash Transfer(s)
CT-OVC	Cash transfer to Orphaned and Vulnerable Children
OPCT	Older Persons Cash Transfer
HSNP	Hunger Safety Net Programme
PWsD-CT	Persons with Severe Disability Cash Transfer
NSNP	National Safety Net Programme
KNBS	Kenya National Bureau of Statistics
FAO	Food and Agriculture Organization
SDG	Sustainable Development Goal
WFP	World Food Programme
NICHE	Nutrition Education through Cash and Health Education
PMT	Proxy Means Testing
OLS	Ordinary Least Square
HDDS	Household Dietary Diversity Score

Definition of Terms

Cash transfers: Regular and predicable direct payments of money to an eligible population.

Disability: Long-term physical, mental, intellectual, and sensory disabilities, which may prevent an individual from fully and effectively participating in society on an equal basis with others.

Household: All persons who occupy a single housing unit, eat, and live together, regardless of their relationship to one another.

Malnutrition: Deficiencies, excesses, or imbalances in a person's intake of energy or nutrients.

Severe disability: A deficit in one or more areas of functioning that significantly limits an individuals' performance of major life activities.

Social assistance: Cash or in-kind social transfer subsidies or fee waivers targeted at low-income or vulnerable groups and funded out of general taxation or other (non-contributory sources).

Abstract

Cash transfers are among the most popular social protection instruments that can improve nutrition status by alleviating poverty and cushioning poor and vulnerable households from shocks and risks that affect their livelihoods. However, in Kenya, these programmes are predominantly not designed within a nutrition-sensitive approach, despite proposals to integrate nutrition interventions. This study examines the impact of cash transfers on key nutrition-related outcomes: household food expenditure, dietary diversity, and stunting among children under five years old. The study used data from the 2015/16 Kenya Integrated Household Budget Survey (KIHBS) and applied linear regression models in the analysis of effect of cash transfers on food expenditure and dietary diversity and Probit models in analyzing the effect of cash transfers on child stunting status. The findings reveal that beneficiary households receiving cash transfers exhibit a 10.6 per cent lower expenditure on food and consume 0.5 fewer food groups compared to non-beneficiary households. This could be attributed to the unconditional nature of the transfers and their failure to keep pace with inflation, with the Ksh 2000 value of cash transfers per month adjusted for inflation standing at Ksh 874 in 2022. Interestingly, when cash transfers are adequate to meet the food poverty line, food expenditure and household dietary diversity scores increase significantly by 27.8 per cent and 0.22 units, respectively. In addition, receipt of cash transfers reduces the likelihood of stunting among children under five years by 2.6 per cent in beneficiary households, pointing to the need to leverage cash transfer programmes as effective tools not only for poverty reduction but also for improving nutrition outcomes.

Introduction

Broadly, social protection refers to a range of public and private initiatives, programmes and policies that seek to address chronic and shock-related poverty, and to reduce livelihood risks among the poor by providing them with income or consumption transfers (Banda and Ellis, 2009). Social protection can be broadly classified into contributory and non-contributory schemes. Cash transfers fall within non-contributory forms of social assistance. Contributory schemes include social insurance schemes; that is, social security and social health insurance for people in employment.

Globally, social protection mechanisms have existed for a long time, and gained more credence especially during the COVID-19 pandemic, where a majority of countries adopted cash transfers as a means of social protection (Awojobi et al., 2023; Robles and Rossel, 2022; ILO, 2021). Cash transfer refers to the provision of regular and predictable cash stipend to an eligible vulnerable population (Van Daalen et al., 2022) either as a targeted scheme or as a universal individual benefit provided to a whole category of an identified population (De Groot et al., 2017). Cash transfers are among the most popular instruments of social protection to support poor and vulnerable households against malnutrition by helping them to meet their immediate basic consumption needs; cushioning them from various shocks and risks that may affect their lives and livelihoods and helping prevent households from falling deeper into poverty (Dietrich, 2021; Arnold, 2011; Fiszbein et al., 2009). Cash transfers are also used in different contexts, such as under emergency and non-emergency situations (Government of Kenya, 2017).

Cash transfers are categorized as either conditional or unconditional. Conditional Cash Transfers (CCTs) require that an individual or a household complies with predetermined performance requirements for them to access the cash (Baird et al., 2011). These conditions may include enrolling children into public schools, attending regular check-ups in health facilities, getting vaccinations, going for nutrition counselling among others (Hanna and Karlan, 2017). On the other hand, Unconditional Cash Transfers (UCTs) provide cash without specific co-responsibilities for beneficiaries. UCT do not require any specific actions to be undertaken by targeted beneficiaries for them to benefit (Hemsteed, 2018). They may spend the cash as they wish as in the case of the Hunger Safety Net Programme (World Bank, 2015). Studies have found CCTs to be more effective at delivering specific outcomes, implying that they can be a useful means for graduating beneficiaries to better socio-economic outcomes (Mathers and Slater, 2014). CCTs have also been found to be better than UCTs at delivering schooling outcomes (Alderman and Vemtsov, 2014; Baird et al., 2011).

Existing empirical evidence demonstrates direct linkages between cash transfers and food and nutrition security. In a 2018 study commissioned by the World Food Programme, Sabates-Wheeler et al. (2018) argue that while food insecurity is the inability to meet what is needed for subsistence, social protection tools such as cash transfers provide the means to enable those subsistence needs to be fulfilled. Thus, cash transfers provide an immediate pathway to supporting households with basic consumption requirements such as food purchases and coping with emergencies or shocks. Good nutritional and food security status is vital for ensuring that individuals and households, especially the vulnerable population remain healthy and productive (FAO, 2015). The centrality of this goal to overall development is recognized in the national and global development agenda. Sustainable Development Goal (SDG) 2 targets to: (i) end hunger and ensure access to safe, nutritious and sufficient food by all people, in particular the poor and people in vulnerable situations; (ii) by 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under five (5) years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons. Available data shows that food insecurity and malnutrition remain a persistent and costly problem in Kenya. The possibility of lacking food or money to buy food was observed to decrease with increasing household wealth, with 53 per cent of households in the lowest wealth quintile lacking enough food or money to purchase food (KNBS and ICF, 2023). Prevalence of stunting in Kenya was estimated at 18 per cent compared to the World Health Assembly target of 12.6 per cent by the year 2025, calling for concerted action if the country is to realize the set global targets (KNBS and KIPPRA, 2021).

Food insecurity and malnutrition mostly affect individuals who need social protection in the first place. According to World Food Programme (WFP) (2016), households that manifest food insecurity are likely to be poor, elderly, without education and therefore unstable, or with non-existent earnings. In a cross-sectional study carried out in Peru, women headed households, households with children, and household where the head did not complete high school education were found to be at a higher risk of being food insecure (Santos et al., 2022). These household profiles largely fit those that need some form of social protection such as cash transfers (Jimu and Msilimba, 2019). This implies that cash transfer programmes can support measures to improve food security and nutrition with the aim of graduating the beneficiaries out of poverty. The design of cash transfer programmes that are food or nutrition-sensitive could potentially address multiple objectives of social protection, reduction of food insecurity and address malnutrition in Kenya. Segura-Perez et al. (2016) observed an improvement in child health and nutrition outcomes from a review of CCTs programmes in Brazil, Colombia, and Mexico. Households that benefited from Familias en Acción in Colombia significantly increased consumption of food items rich in protein, such as milk, meat, and eggs (Attanasio and Mesnard, 2006). While the study shows diversity of food choices, the food classification is the same, that is animal rich proteins). In middle- and low-income countries, cash transfers improved food security, which in turn impacted child growth and development (Legarde et al., 2007). In Malawi, beneficiary children of cash transfer experienced gains in height, reduced stunting, and reported fewer illnesses compared to children in the control group (Miller et al., 2011).

The impact of a given social protection programme in one country may be different in another country (Daidone et al., 2015 and Fiszbein et al., 2014). There are limited studies examining the relationship between food security, nutrition, and cash transfers within the Kenyan context, largely because cash transfers have not been programmed with deliberate considerations of these impacts. The existing studies have been conducted mostly at case study levels and in socio-economically different contexts. Consequently, their reliability for purposes of modifying the existing cash transfers in Kenya is therefore limited. Cash transfer programmes in Kenya continually face challenging decisions regarding adequacy of transfer amounts. This is largely due to budgetary constraints and a high demand given the number of people living below the poverty line. Therefore, the need to prioritize coverage over higher transfer values takes priority.

The value of cash transfer amounts is assumed to have significant implications on beneficiaries' ability to access and afford adequate and diverse foods, supporting their nutritional requirements and overall developmental and socio-economic benefits at both the household and aggregate levels (Daidone et al., 2019). The adequacy of these transfer values is determined by their effectiveness in helping people meet their basic needs (Government of Kenya, 2017). Adequacy of transfer values is determined by how effective they are in assisting people to meet their basic needs (Government of Kenya, 2017). Whether cash transfer amounts are adequate to improve nutritional status is a matter of much debate. The question on whether the cash grants are adequate or not adequate has not been fully examined due to variability of the socio-economic contexts of the different beneficiaries. Adequacy is influenced by geographical location, health and nutritional status, household composition, market prices in different regions, and personal tastes and preferences, among others. There is limited information on whether the beneficiaries can meet their financial needs or not and whether their socio and economic well-being has improved (Gelders and Kidd, 2020).

To address these knowledge gaps, this study seeks to: examine the effect of cash transfers on food expenditure patterns, dietary diversity, and nutrition status; establish the relationship between the adequacy of cash transfer benefit (amount) on food expenditure patterns, dietary diversity, and nutrition status among beneficiary households; and draw policy implications, which will inform imminent reforms in the current cash transfer programmes as tools for social protection.

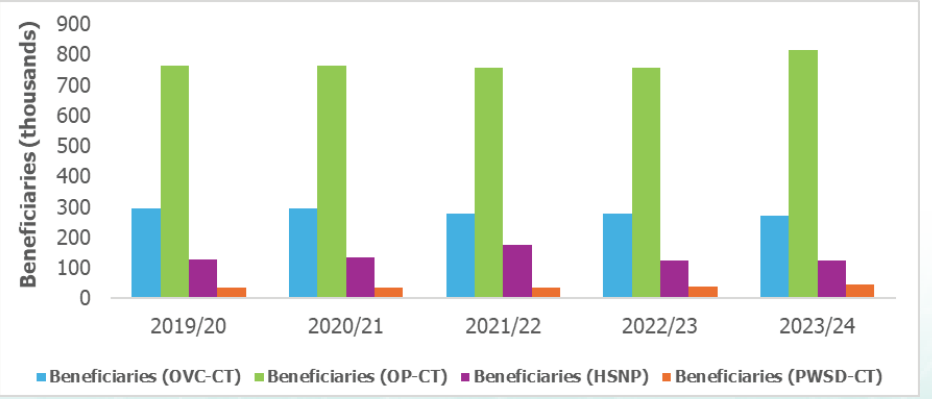
This paper is organized into six sections, including the introduction. The other sections present an overview of cash transfer programmes in Kenya, literature review, methodology, results and discussion, and conclusion and policy recommendations.

2 Social Protection and Policy Framework in Kenya

2.1 Cash Transfer Programmes in Kenya

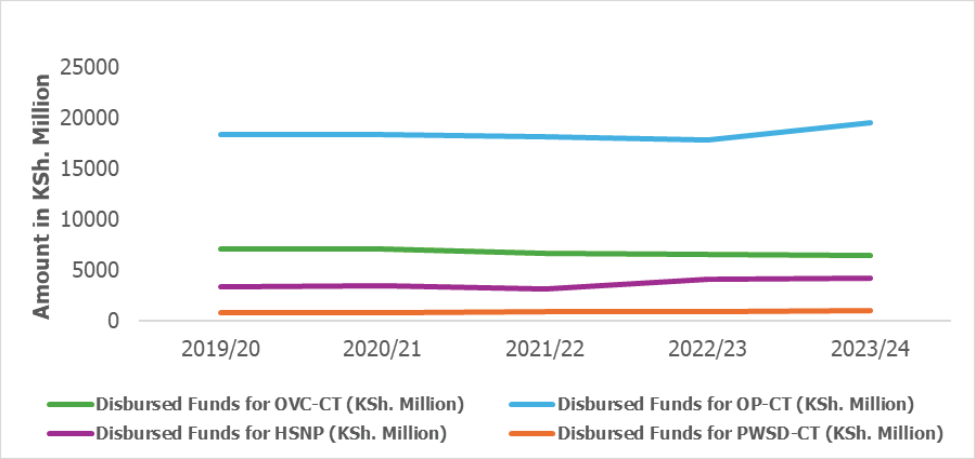
The Government of Kenya initiated cash transfer programmes in 2004 with the introduction of a pilot Cash Transfer to Orphaned and Vulnerable Children (CT-OVC). This was in response to the pressing need to support the adoption and retention of such children within their families and communities, and to boost their human capital development. Cash transfer programmes have since evolved to national-wide programmes covering various categories of beneficiaries across the life cycle and in different situations and contexts. Apart from eligibility criteria for identifying beneficiaries, there are no other conditions for accessing these cash transfers. Other cash transfers apart from CT-OVC include Older Persons Cash Transfer (OPCT) programme, Hunger Safety Net Programme (HSNP) and Persons with Severe Disability (PWsD-CT) programme. All the four cash transfers form the National Safety Net Programme (NSNP), which consolidates the government's social protection delivery framework. The number of beneficiaries receiving older persons, persons with severe disability and hunger safety net cash transfers has been increasing gradually, while the number of caregivers receiving the orphans and vulnerable children fund has been declining since 2019 (KNBS, 2024). A summary of beneficiaries of each programme and funds disbursed between 2019/2020 and 2023/24 financial years are presented in Figure 2.1 and Figure 2.2, respectively.

Figure 2.1: Summary of beneficiaries of the National Safety Net Programme 2019/20-2023/24



Source: Kenya National Bureau of Statistics (2024), Economic Survey

Figure 2.2: Summary of disbursed funds of the National Safety Net Programme and disbursements 2019/20-2023/24



Source: Kenya National Bureau of Statistics (2024), Economic Survey

The households enrolled in the CT-OVC, and PWsD-CT receive Ksh 2,000 per month while the HSNP beneficiaries receive Ksh 2,700 per month. When the CT-OVC was introduced, its transfer size was calculated based on a formula that considers the average incomes of the target group, the ratio of the transfer to the poverty line, and average monthly expenditures on health and education. In 2006, the transfer was about 12 per cent of the poverty line, and between 25 and 30 per cent of the income of households below the poverty line. The HSNP payment was set at 75 per cent of the value of a full WFP food ration in 2006 when it was first calculated. However, the rationale for the size of the OPCT and PWsD-CT payments is less clear. When the government introduced these two programmes, it aligned their transfer values to those of the CT-OVC, without considering the differential needs of the target groups (Government of Kenya, 2017; Gelders and Kidd, 2020).

The value of transfers in Kenya is fixed at a standard level, regardless of household size or composition. On a global scale, this is typical of social protection programmes that are intended for individuals such as OPCT, but not in programmes that target households. There is significant variation in the per capita of transfer programmes, with larger household receiving less cash per member than smaller ones. Evaluations of the HSNP and CT-OVC have found that the programme impacts tend to be pronounced in smaller households. Thus, it is not clear about the minimum value of the transfer and whether transfer value could be indexed to household size since it does not respond well to the differential needs and vulnerabilities of different families (Merttens et al., 2013). Such considerations are particularly significant for households with a high number of children under five years, pregnant and lactating mothers or a household member who is HIV-positive. Estimates of the share of social assistance in total household consumption show that, on average, the transfers accounted for less than 6 per cent of households' per capita consumption needs in 2015/16. Among the poorest 20 per cent of the population, these benefits covered about 12.2 per cent (World Bank, 2018).

Apart from these NSNP, other State and non-State agencies also provide cash transfers to identified vulnerable groups, including in humanitarian conditions, but these interventions tend to be short term and in response to specific concerns, for example, seasonal flooding or severe drought. Kenya has largely been operating UCTs, which represent about 83 per cent of social assistance expenditure (Government of Kenya, 2017). Considering the advantages CCTs can provide for beneficiaries, it is important for the country to consider incorporating CCTs in the current social assistance programmes.

2.2 Policy Environment on Cash Transfers for Food Security and Nutrition

The Constitution of Kenya (2010) guarantees Kenyans of their Economic, Social and Cultural (ESC) rights. Article 43(1)(c) of the Constitution of Kenya provides for the right of everyone to access adequate food of good quality at all times and in dignity through production or purchase. Adequate food, as envisioned in the right, should be achieved not only in quantity but also in quality. Article 43(1)(e) states that "Everyone has a right to social security". Further to this, Article 43(3)(3) states that "the State shall provide appropriate social security to those who are unable to support themselves or their dependants". Other Articles in the Constitution that address the rights and protection of other vulnerable groups include Article 53, 54, 56 and 57 on the rights of children, persons with disability, marginalized groups and Older Persons, respectively. These constitutional provisions are in line with other international instruments and commitments to which Kenya is a signatory, such as the Universal Declaration of Human Rights, the Sustainable Development Goals (SDGs), especially SDG 1 on ending poverty and SDG 2 on zero hunger.

The country's long term development blueprint, the Kenya Vision (2030), makes clear provisions under the Social Pillar for protection of poor and vulnerable members of the Kenyan society. It makes special provisions for the protection of the welfare of the vulnerable groups and puts in place clear flagship projects such as the establishment of the Consolidated Social Protection Fund and the National Safety Net Programme, which entail the four national cash transfer programmes. The Government of Kenya developed the National Social Protection Policy of 2011 (NSPP, 2011) with the aim of reducing socio-economic exclusion, inequality, and vulnerabilities. The policy was reviewed in 2023 to capture emerging dynamics in the social protection landscape and lessons learnt from the implementation of the previous policy. The goal of social protection is to ensure that all Kenyans live in dignity and are given an opportunity to exploit their capabilities for their social and economic development. The Income Security Pillar of the current policy gives provisions for direct transfers to the poor and vulnerable throughout their life cycle; direct feeding programmes for those vulnerable to malnutrition; meals, and nutritional support to schools, the older persons, and pre-school-age children; support training in good nutritional practices, skills transfer and health services; and food distribution during emergencies such as famine and flooding.

Other policies and legislations that promote and protect the rights of the vulnerable groups include the Children Policy of 2010, which aims to provide good nutrition as one of the rights of a child. The Children Act of 2022 requires a child carer to provide nutritional needs of a child. The National Policy on Older Persons and Aging

of 2009 cites provision of food and nutrition measures of old persons, including provision of nutrition interventions in safety nets and programmes to ensure that older persons have access to adequate food and nutrition. The Older Persons and Aging Policy give the most direct support for integration of food and nutrition agenda in social protection. The National Family Promotion and Protection Policy of 2023 also proposes strategies for the promotion of healthy lifestyle by encouraging proper nutrition and community outreach programmes on family health issues such as nutrition.

There were initiatives in the recent past towards more complementary social protection initiatives for better social protection outcomes. This has seen the introduction of the nutrition-sensitive social protection programme – the Nutrition Education through Cash and Health Education (NICHE), initially piloted in Kitui County in 2017/18 and further expanded currently to four (4) more counties of West Pokot, Marsabit, Kilifi and Turkana. The programme targets beneficiaries of the National Safety Net Programme with children under two (2) years or lactating mothers. The programme intends to improve the nutrition of pregnant and lactating mothers and of children and protect them from violence and abuse in pursuit of human capital development.

Medium-Term Plans (MTPs) have clear actions on social protection under the Social Pillar of Vision 2030. The third medium term plan, which incorporated the 'Big Four' agenda prioritized food and nutrition security. Similarly, MTP IV (2023-2027), which implements the Bottom-Up Economic Transformation Agenda (BETA) has ensured the well-being of the most vulnerable groups through expansion of the current cash transfer programme to cover 3.1 million beneficiaries overall. The initiative also aims at enhancement of the programmes on account of the life phase. In that regard, the MTP IV proposes an additional Ksh 500 per target child under two years and pregnant mothers if the top-up does not exceed Ksh 1,000 per household (MTP IV-2023-2027).

There are, however, legislations in the sub-sector that do not respond to any food or nutrition issues such as the Persons with Disability Act of 2003, even though persons with disability or those that may need social assistance mostly fall in the category that faces food deficiency and malnutrition. There is also the need to put in place an oversight mechanism that will ensure coordination of social protection initiatives at the national, county, and sub-county levels. Designing and developing integrated social protection programmes, identifying gaps and priority areas for increasing the impact of social protection programmes are all important.

Literature Review

3.1 Cash to Nutrition Pathways

Cash transfers impact child malnutrition through various determinants, including food, care, and health. This has prompted literature to theorize these effects by elaborating on the pathways of impact. A review of how cash transfers enhance food security for improved nutrition considers five impact pathways: increased amounts of food purchased, enhanced diversity of foods purchased, increased number of meals per day, larger rations of food servings per meal for adults in beneficiary households, and the effect of distance to markets on cash transfer benefits and access to adequate and diverse foods (Tirivayi et al., 2021 and De Groot et al., 2017). Of these five cash transfer-to-nutrition pathways, the first four focus on adequacy and diversity of food, while the last one addresses the impact of market functionality and infrastructure on food availability.

Other pathways relate to health and care. Cash transfers can free carers' time by reducing the need to pursue income-generating activities outside the home. Some cash transfers have been designed to incentivize beneficiaries to participate in training and information sessions, including nutrition education, enabling carers to act on their new knowledge by buying nutritious food and accessing health services. Cash transfers can also increase household expenditure on healthcare and hygiene products, reducing the incidence, duration, and severity of diseases. Improved health leads to higher productivity, which positively impacts other immediate determinants of malnutrition (De Groot et al., 2017).

The research explores whether the receipt of cash transfers and the adequacy of the amounts received help beneficiary households access adequate and diverse foods to meet their nutritional requirements. Further analysis assesses the extent to which cash transfers are associated with child stunting status, attributing these outcomes to the receipt and value of the transfers. Thus, the study addresses the knowledge and evident gap by providing a national analysis of households receiving cash transfers and their link to accessing adequate and diverse foods, thereby supporting positive nutrition outcomes among poor and vulnerable households.

3.2 Empirical Literature

Several studies reveal that cash transfer has influence on household nutrition (Dietrich and Schmerzeck, 2019; Paes-Sousa et al., 2011; Aguero et al., 2006), consumption patterns (Matata et al., 2022; Kusuma et al., 2017), education (Ferre and Sharif, 2014), health (Van Daalen et al., 2022), and food security (Brugh et al., 2018; Tiwari et al., 2016). While other studies register mixed results, there is an agreement among

several researchers that CTs have positive impacts on the nutrition and food security status of beneficiary households.

Studies on the impact of cash transfer on food security in developing countries found that programmes resulted to a range of benefits that include reducing extreme poverty, better nutrition, health, and education outcomes (Mohammadi, 2016). In a cross-country analysis in Sub-Saharan Africa (SSA) involving studies in Zambia, Lesotho, Ghana, and Kenya investigating the impact of cash transfer programmes on food security and nutrition, Tiwari et al. (2016) found large variations in impact of cash transfers on food security among the countries studied. The cash transfer programme in Zambia achieved large impacts on food security and nutrition outcomes and a broad range of other outcomes. The Ghana programme had no impact on food consumption and dietary diversity but did impact a range of non-food expenditures. The cash transfers for orphan and vulnerable children (CT-OVC) in Kenya had significant and positive impacts on food security and nutrition from a baseline survey conducted in mid-2007 and follow-ups 24 months and 48 months after baseline.

Kurdi (2021) conducted a study to investigate the nutritional benefits of cash transfers during humanitarian crises in Yemen. The study revealed that cash transfers significantly increased the purchase and consumption of non-staple food, which positively influenced a child's diet diversity scores. Findings from the evaluation of the Mchinji Social Cash Transfer pilot scheme in Malawi revealed that cash transfers positively affected food intake, adequacy, food expenditure, and variety of diet diversity (Miller et al., 2011). Habimana et al. (2021) estimated the causal effects of Rwanda's unconditional cash transfer programme on poverty, household food expenditure, non-expenditure food and poverty gap. They revealed that UCT positively and significantly impacted the poverty and poverty gap. The study further revealed that UCT had minimal increase in food consumption and no change in non-food consumption. On the other hand, Bastagli et al. (2016) found that cash transfers had a positive impact on food consumption.

A recent study by Matata et al. (2022) in the northern Kenya adopted the Quadratic Almost Ideal Model (QUAIDS) to understand how food expenditure patterns change in the presence of cash transfers. The findings indicated that households diversified their diet to some high-value foods, including proteins. The paper also adopted a difference-in-difference model to determine the effects of cash transfers on household food expenditure. The findings indicate that cash transfers increased the food expenditure of the beneficiaries. Merttens et al. (2013) review of the Kenya Hunger Safety Net Programme (HSNP) found no impact after two years, but there was an improvement after one year and that poorer households were increasing the diversity of their diets. This suggests short term benefits, which are over-written in the long run, and the need for ways to motivate sustained behaviour modification among household heads. MauAuslan and Schofield (2011) assessed the emergency and food security cash transfer programme in Korogocho, Kenya. During the transfer period, they observed an improvement in dietary diversity and an increase in food consumption of the cash transfer beneficiaries by at least one meal per day.

While majority of the studies reveal positive impacts, evidence suggests that some cases of cash transfers do not significantly affect food expenditure overall. A study by Bhalla et al. (2018) investigated the effects of cash transfer and household

vulnerability to food insecurity in Zimbabwe. The findings show no impact on the aggregate household food consumption but reveal a significant impact on food security and diet diversity scores. Similarly, a study by Brugh et al. (2018) on the impacts of Malawi social cash transfer programme on household food and nutrition security indicates no impact of cash transfer on food consumption but report a positive influence on food security and food diversity score. Literature also reveals that cash transfer can have dual effects on the nutrition outcomes. For instance, Kronebusch and Damon (2019) found that conditional cash transfer improved the macro and micronutrients consumption in Mexico while also increasing the consumption of food groups that increase the prevalence of overweight and obesity.

Methodology

4.1 Data Sources

The 2015/16 Kenya Integrated Household Budget Survey (KIHBS) collected by the Kenya National Bureau of Statistics (KNBS) was used in the analysis. The survey targeted a sample of 24,000 households drawn from 2,400 clusters and obtained a response rate of 91.3 per cent. The KIHBS data provides a wide range of indicators such as socio-economic aspects of the Kenyan population, which include education, health, energy, housing, water, and sanitation.

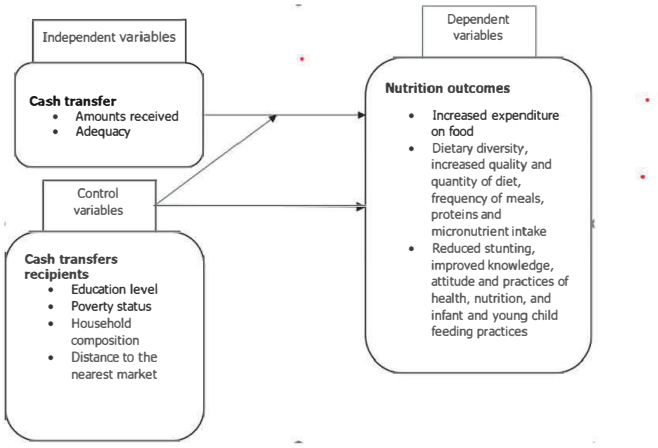
4.2 Estimation Models

This study is based on the conceptual frameworks that hypothesize and model the linkages between cash transfers and child nutrition. The most prominent conceptual frameworks begin by identifying the factors that influence child nutrition and then hypothesize how a cash transfer programme might impact these factors (De Groot et al., 2017). The study adopted this approach as it describes the various channels through which cash transfers can affect child nutrition. This study aims to estimate the effects of cash transfers on food expenditure and dietary diversity among beneficiary households, and on the stunting status of children under five years.

4.2.1 Conceptual framework

Guided by the cash transfers to nutrition impact pathways, the relationship between independent variables, dependent variables and control variables is demonstrated in Figure 4.1. The independent variable of interest in this study is receipt of cash transfers by households and adequacy of these transfers. Cash transfer programmes boost family income, enhancing resources for food security. When families use this cash to purchase nutritious food or invest in food production, both food security and diet diversity improve. This, in turn, can positively affect a child's nutritional intake and status, provided the food is distributed with the child's needs in mind (de Groot et al., 2015; 2017). The control variables are household size, distance to the market, education level of household head, and poverty status.

Figure 4.1: Potential pathways that cash transfer could impact upon cause of malnutrition and food insecurity



Source: Adopted from Bailey and Hedlund (2012)

4.2.2 Effects of cash transfers

The study first estimated the effects of cash transfers receipts by estimating the following set of equations:

$$Y_1 = \beta_0 + \beta_1 \text{ Cash transfers} + \beta_2 \text{ Household size} + \beta_3 \text{ Poor} + \beta_4 \text{ Distance to market} + \beta_5 \text{ Education} + \varepsilon \quad (1)$$

$$Y_2 = \beta_0 + \beta_1 \text{ Cash transfers} + \beta_2 \text{ Household size} + \beta_3 \text{ Poor} + \beta_4 \text{ Distance to market} + \beta_5 \text{ Education} + \varepsilon \quad (2)$$

$$Y_3 = \beta_0 + \beta_1 \text{ Cash transfers} + \beta_2 \text{ Household size} + \beta_3 \text{ Poor} + \beta_4 \text{ Distance to market} + \beta_5 \text{ Education} + \beta_6 \text{ Dietary diversity} + \beta_7 \text{ Food expenditure} + \varepsilon \quad (3)$$

Where Y_1 is household food expenditures, measured by the log of monthly per adult equivalent food expenditure; Y_2 is household dietary diversity as indicated by the household dietary diversity score; Y_3 is child nutritional outcome, measured by child stunting status; and ε is the error term. For regressions (1) and (2), Ordinary Least Squares (OLS) estimation was used, while for the stunting regressions, Probit estimations were used. The average marginal effects were calculated to facilitate interpretation of the results.

Equation 4 represents the marginal effects, which explains the effect of the independent variable on the probability that y=1. The probability is given by a normal cumulative density function (.)

$$(\partial P(y=1)\ )/\partial x = (x\beta)*\beta \quad (4)$$

4.3 Definition and Measurement of Variables

The outcome variables in this study are household food expenditure, household dietary diversity and stunting status of under five children.

Household food expenditure

This is the total monthly expenditure on food by a household member, adjusted for needs (per adult equivalent) and spatial differences. The variable, which is measured in Kenya shillings, is log-transformed to normalize its distribution, and reduce the effect of its large size, making it easier to handle in the analysis (Osborne, 2005).

Household dietary diversity

This outcome variable is a qualitative measure of food consumption that indicates household access to a diverse range of foods. It is measured using a household dietary diversity score (HDDS), which is computed using information on the number of food groups consumed over a given reference period. These food groups include cereals; white roots and tubers; vegetables; fruits; meat, poultry; eggs; fish and other sea foods; pulses, nuts and seeds; milk and milk products; oils and fats; sweets; spices, condiments and beverages. In this study, HDDS is a continuous variable that measures the consumption of foods from 1 to 12 food groups over the past 7 days. Optimal dietary diversity is achieved by consuming four or more of the 12 food groups on average, which implies diversity in both macro and micronutrients (Swindale and Bilinsky, 2006).

Child stunting status

This is an indicator of child nutritional status and is measured by a height-for-age z-score. The z-score is calculated as the difference between individual child's height and the reference population median height divided by the standard deviation of the international reference population of the same age and gender. The variable was computed from the 2015/16 KIHBS data for children under five years old and was constructed into a dummy variable, where a z-score of below minus 2 standard deviations (-2 SD) is stunted and is equals ”1” and above -2 SD is not stunted and is equals ”0”.

Independent variables related to cash transfers

Cash transfers' receipt

Cash transfers are shown to increase food expenditures and improve consumption patterns and nutrition (Matara, 2022; Kurdi, 2021; Habimana et al., 2021). The 2015/16 KIHBS survey asked whether the respondents received cash transfers from any sources, including the government. Government-established cash transfers in Kenya include Older Persons Cash Transfer (OPCT), Hunger Safety Net Programme (HSNP) and Persons with Severe Disability (PWsD-CT). In this study, receiving any of these cash transfers is categorized under cash transfer receipt, and the variable is constructed as a dummy where receipt of any of these cash transfers=”1” and non-receipt=”0”.

Cash transfer adequacy

A household's access to cash transfers of adequate value can have a significant impact on nutrition outcomes (UNICEF, 2023). This study computed the adequacy of cash transfers as the difference between monthly per adult equivalent food expenditure and food poverty line per adult equivalent (in Ksh) for household that receive cash transfer. The equation for cash transfers adequacy is presented as follows:

Adequacy of cash transfers = monthly per adult equivalent food expenditure - food poverty line per adult equivalent

The underlying assumption is that the entire amount of the cash transfer is used for purchasing food. With this assumption, three scenarios are observed: a positive value suggests that the cash transfers are adequate to meet or exceed basic food needs; a zero value indicates that the household's food expenditure is exactly at the food poverty line, suggesting that the cash transfers are just sufficient to meet basic food needs; and a negative value indicates that the household's food expenditure is below the food poverty line, suggesting that the cash transfers are insufficient to meet basic food needs. The food poverty lines for urban-and-rural based households were computed based on KIHBS 2015/16 dataset to measure food consumption patterns and the prices of local foodstuffs. The threshold of food poverty in urban areas is Ksh 2,551 whereas in rural areas is Ksh1,953.

The computed cash transfer adequacy variable is continuous (in Ksh) and is log-transformed to normalize its distribution and mitigate the impact of its large size.

Control variables

Overall poverty status

People living in poverty often lack access to essential necessities such as nutritious food, a hygienic environment, suitable housing, and sufficient medical care, all of which are linked to malnutrition (Peña and Bacallao, 2002). In this study Proxy Means Testing (PMT) mechanism was used to measure the overall poverty status in each household. PMT predicts consumption expenditure in a household based on characteristics such as housing materials, available amenities in a household, characteristics of the household member including age and education, and labour force. The predicted values of household consumption expenditure were obtained through Ordinary Least Squared regression of the log of per adult equivalent household consumption expenditure on the predictors of welfare measures (Appendix 1). Several studies have used PMT for proper targeting of cash transfers (KIPPRA and KNBS, 2023; Kidd and Wylde, 2011). The poverty status variable was constructed by comparing the predicted household consumption with the overall poverty line of 3,252 in rural areas and 5,995 in urban areas based on Foster, Greer and Thorbecke (FGT) method. Based on the PMT, therefore, households that were overall poor were coded as "1" while those who were not were coded as "0".

Household size

A large family has been associated with higher risks of malnutrition due to the strain on the resources available, such as food, water, and sanitation facilities at the household level (Pelto et al., 1991). The study controls for household size, which is measured as the total composition of usual members of household.

Education

Education influences food security and nutrition through mechanisms such as access to information on best agricultural practices and nutrition, improved decision-making, and better employment opportunities and incomes (Kara and Kithu, 2020; Niankara, 2018). Access to education was measured by asking "What is the highest educational level and grade has [Name] completed?" The responses were either pre-primary; primary, post-primary, vocational; secondary; college (middle level); university undergraduate; university postgraduate; madrasa/duksi; or other. The construction of the variables was done to a categorical variable where none=0, primary=1, secondary=2, and tertiary=3.

Distance to the nearest market

Access to markets for buying food and selling farm produce are important for dietary diversity, which in turn improves food security and nutrition in the households (Murage et al., 2019; Koppmair et al., 2017). Households that are far from the market with poor accessibility are likely to have less dietary diversity, lower food expenditures and poor nutrition compared to those who are closer to the market. We control for this variable, which is measured in number of kilometres to the nearest market that a household has access to.

Table 4.1: Variable definitions

Variables	Definition
Dependent Variables	
Log of food expenditure*	The natural logarithm of monthly per adult equivalent food expenditure in Ksh (deflated)
Household dietary diversity*	Continuous variable indicating the number of food groups consumed
Under-five stunting status	Dummy where stunted=1; and not stunted=0
Explanatory Variables	
Cash transfers' receipt	Dummy where household receiving any form of cash transfers=1, and 0 otherwise
Log of adequacy of cash transfers amount	The natural logarithm of the difference between monthly per adult equivalent food expenditure in Ksh (deflated) and food poverty line
Household size	A continuous variable indicating number of household members
Overall poverty	Dummy where poor=1; non-poor=0
Education level of household head	Categorical variable where none= 0, primary=1, secondary= 2, tertiary= 3
Distance to the nearest market	A continuous variable showing number of kilometres to the nearest urban centre or market (round trip)

*These variables were included as independent variables in the stunting model.

4.4 Descriptive Statistics

This section presents the summary statistics of the study sample. The results in Table 4.2 show that the average monthly food expenditure per adult is equivalent to Ksh 4,241.90 (antilog of 8.113). The relatively low food expenditure may be attributed to re-allocating funds towards alternative uses, including dining out or consuming meals outside the home, such as in hotels. Most households consumed from nine food groups in the last seven days, indicating a diverse diet that exceeds the recommended minimum of four food groups per day. The average difference between monthly per adult equivalent food expenditure and food poverty line is Ksh 658 (antilog of 6.731), indicating that the amount of cash transfer could be sufficient to lift households to above the food poverty line. On average, 9.8 per cent of the children were stunted, and the average household size was four (4) members. Overall, 21.9 per cent of the households were poor, indicating vulnerability and a potential need for cash transfers. Most household heads had primary level of education. The average distance from households to the nearest urban shopping centre or market was 5.3 kilometres. However, in Lamu, Wajir, Marsabit, Turkana, and Laikipia counties, households often travel much longer distances, up to 90 kilometres round trip, to reach these markets.

Table 4.2: Sample characteristics

Variable	Observations	Mean	Standard Deviation	Min	Max
Log of food expenditure	21,753	8.113	0.686	1.487	13.219
Household dietary diversity	21,620	9.173	2.013	1	12
Stunting status	21,753	0.098	0.297	0	1
Cash transfer receipt	21,753	0.022	0.146	0	1
Log of adequacy of cash transfers	401	6.731	1.341	2.158	9.715
Household size	21,753	3.977	2.416	1	28
Overall poverty	21,753	0.219	0.414	0	1
Education level	21,753	2.419	0.911	1	4
Distance	21,743	5.282	10.564	0	98

Source: Author's computation from KIHBS 2015/16

4.4.1 Cash transfer receipt, stunting status and education level by overall poverty status

Among the cash transfer beneficiary households, 59.7 per cent were poor. There is a large proportion of poor but non-beneficiary households, pointing to the need to expand the cash transfer programme to cover the needy group. Stunted children make up 7.5 per cent of children living in non-poor households, compared to 17.7 per cent of children living in poor households. This implies that interventions to improve nutrition status should be targeted to the ultra-poor households. Most of

the uneducated households are poor, which may mean that they lack information and resources to improve nutrition related outcomes.

Table 4.3: Distribution of select sample characteristics by poverty status

Cash transfers	Poor (%)	Non-poor (%)
Non-beneficiaries	4483 (21.1)	16796 (78.9)
Beneficiaries	283 (59.7)	191 (40.3)
Stunted		
No	3921 (82.3)	15709 (92.5)
Yes	845 (17.7)	1278 (7.5)
Education		
None	1655 (34.7)	1407 (8.3)
Primary	2419 (50.7)	7428 (43.7)
Secondary	609 (12.8)	4909 (28.9)
Tertiary	83 (1.7)	3243 (19.1)
Total	4766 (100)	16987 (100)

Source: Author's Computation from KIHBS 2015/16

4.4.2 Dietary diversity and household composition by poverty status

The results in Figure 4.2a show that although all households meet the recommended dietary diversity, non-poor households generally have higher dietary diversity compared to poor households. The peak dietary diversity for non-poor households is slightly higher (10 food groups on average) than for poor households (9 food groups on average), highlighting a better overall diet quality among non-poor households and possibly better nutrition status in these households. The sharp decline for non-poor households after reaching the peak, leading to fewer households achieving the highest levels of dietary diversity, and the more gradual decline for poor households after their peak, may warrant further investigation.

From Figure 4.2b, non-poor households are more likely to have smaller household sizes, with the highest concentration at household sizes of two (2). In contrast, poor households tend to have larger household sizes, peaking at five (5) members. As household size increases, the number of both poor and non-poor households declines, but this decline is more rapid for non-poor households. Larger households are more commonly poor, suggesting a correlation between larger household sizes and poverty, which could have implications for nutrition outcomes at the household level.

Figure 4.2a: Distribution of dietary diversity by poverty status

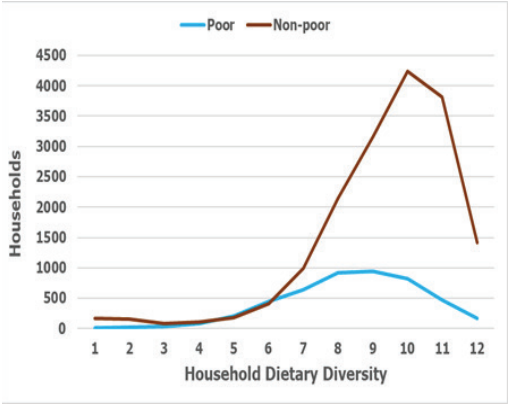
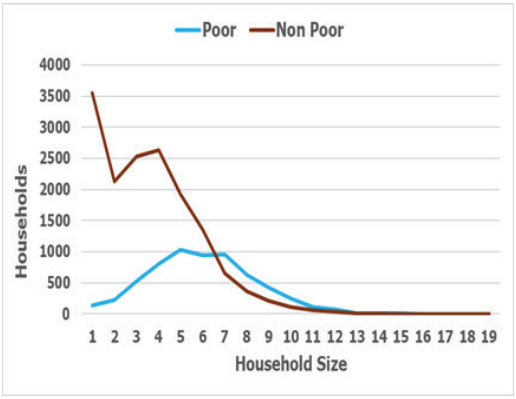


Figure 4.2b: Distribution of household composition by poverty status



5 Results and Discussions on the Effects of Cash Transfers on Nutrition

5.1 Effect of Inflation on the Value of Cash Transfer

The study first examined the value of cash transfers while adjusting for inflation. The results in Table 5.1 show that the value of cash transfers has not kept pace with inflation. For instance, a cash transfer of Ksh 2,000 set in 2011 has a real value of Ksh 874 in 2022 after adjusting for inflation using the annual Consumer Price Index (Government of Kenya, 2017; Daidone, 2019; Gelder and Kidd, 2020). Due to inflation, the real value of cash transfers has decreased over time, resulting in lower purchasing power for recipients. For example, the purchasing power of the CT-OVC decreased by approximately 38 per cent between 2007 and 2016 (CPI_0 is beginning period Consumer Price Index and CPI_t is ending period Consumer Price Index).

Table 5.1: Cash transfers nominal versus real values

Year	Nominal value - OVC/PWsD/OP (Ksh)	Real value - OVC/ PWsD/OP (Ksh) Real value=Nominal value*(1+ CPI_0/CPI_t) (Ksh)	Amounts that will keep real value of Ksh 2,000 Future value=Present value*(1+CPI_t/CPI_0)
2010			
2011	2,000	2,000	2,000
2012	2,000	1,604	2,494
2013	2,000	1,517	2,637
2014	2,000	1,419	2,818
2015	2,000	1,332	3,004
2016	2,000	1,253	3,193
2017	2,000	1,160	3,449
2018	2,000	1,108	3,610

2019	2,000	1,053	3,799
2020	2,000	999	4,005
2021	2,000	941	4,249
2022	2,000	874	4,575

Source: Authors' computation

5.2 Effects of Cash Transfer on Food Expenditure, Dietary Diversity and Stunting

This section presents findings from the multiple regression analysis. The pairwise correlations between study variables were estimated to establish whether there was multicollinearity. The results presented in Appendix 2 show that the values of the correlation coefficients are low, indicating the absence of a strong correlation between the variables included in the regression analysis.

5.2.1 Food expenditure, dietary diversity and stunting by cash transfer receipt

The effects of cash transfers receipt on nutrition outcomes were estimated in a regression together with other control variables such as household size, household head's level of education, poverty status and distance to the nearest market. The results in Table 5.2 show that households that receive cash transfers spent 10.6 per cent less on food as compared to their counterparts who were not in receipt of cash transfers. This could be due to insufficient and irregular cash transfers, reliance on these transfers for non-food items such as education and health, and the difficulty of administering targeted cash transfer programmes, which often delays in reaching the intended beneficiaries (Muindi et al., 2022; Mbugua and Gachunga, 2015).

Beneficiary households consume fewer food groups in a week compared to non-beneficiary households, although both groups generally achieve the optimal dietary diversity of consuming four or more of the 12 food groups on average (Swindale and Bilinsky, 2006). The lower dietary diversity among beneficiary households may be partly due to the low value of the transfers, their irregularity, and the lack of adjustment over time to reflect current economic conditions, which affects purchasing power and limits food variety as demonstrated in the previous section. As a result, the transfers do not significantly change the number of food groups consumed by cash transfer beneficiaries.

Beneficiary households are less likely to have cases of stunting among children under five years. Receiving cash transfers lowers the probability of stunting among households by 2.6 per cent. These findings corroborate other empirical works. In a systematic review and meta-analysis of cash transfers and nutritional outcomes, Manley et al. (2020) concluded that cash transfer programmes targeting households with children under five (5) improved linear growth and reduced stunting, and that the likely pathways were increased dietary diversity and increased consumption of animal proteins.

An increase in household size by one member contributes to a reduction in food expenditure per adult equivalent by 10 per cent, indicating that larger households

spend less on food per person than smaller ones. This finding aligns with Bhalla et al. (2018) in Zimbabwe, where household size was associated with a decreased per capita food consumption but did not significantly affect food security scores. Conversely, an increase in household size boosts dietary diversity by 0.2 units. While Ali et al. (2022) found negative dietary diversity in larger Bangladeshi households, Rashid et al. (2011) noted that more household members might lead to increased own food production, enhancing dietary diversity. Additionally, each additional household member raises the probability of stunting by 2.4 per cent, consistent with Fufa (2022), who identified large household size and low dietary diversity as stunting determinants in under five (5) years Ethiopian children.

Poor households spend 31 per cent less on food per adult equivalent compared to non-poor households, reflecting the correlation between socio-economic status and food consumption patterns, as noted by Sekhampu (2012) in South Africa. Given their limited purchasing power, it is expected that poor households, that often constitute most beneficiaries, will allocate a significant portion of their transfers to food, as observed by Arnold (2011). In addition, poor households consumed fewer food groups compared to non-poor households. This finding corroborates those of Obayelu and Osho (2020) in Nigeria, where low-income urban households exhibited limited dietary diversity. Furthermore, poverty increases the likelihood of stunting in households by 1.6 per cent, highlighting the association between poverty and child malnutrition.

The results reveal that higher education levels of the household head correlate with increased food expenditure per adult equivalent and greater dietary diversity, with heads with tertiary level of education spending 0.48 per cent more and having a 1.4 unit more diverse diet as opposed to their uneducated counterparts. This result is similar to those of Sekhampu (2012), who found that in South Africa, educational attainment of the household head was one of the socio-economic factors that had a strong positive impact on food expenditure. Additionally, higher education levels of household heads are associated with lower stunting probabilities among children under five years, reducing stunting by 1.2 per cent for secondary education and 3.3 per cent for tertiary education. Similar studies by Semba et al. (2018) and Quamme et al. (2022) in Bangladesh and Indonesia, respectively, found that parental education, especially among mothers, reduced stunting by 3.5 per cent.

Distance to the nearest market significantly affects food availability, as the results show that increased distance by 1 kilometre reduces the food expenditure and household dietary diversity score by 0.3 per cent and 1.6 units, respectively. Households further from the market consume fewer diverse foods and spend less on food compared to those nearer to markets. Additionally, the further a household is from the market, the higher the probability of having a stunted child, as these households are 0.04 per cent less likely to purchase food and incur additional transport costs (Usman and Callo-Concha, 2021).

Table 5.2: The effects of cash transfers' receipt

Model	(1)	(2)	(3)
Variables	Log of food expenditure	Household dietary diversity score	Marginal effects of stunting
Cash transfers (Receipt=1)	-0.106***	-0.522***	-0.026***
Household size	-0.099***	0.208***	0.024***
Overall poverty status (Poor=1)	-0.309***	-1.081***	0.016***
Household head education level (Primary=1, Secondary=2, Tertiary=3)	 0.135*** 0.24*** 0.475***	 0.778*** 1.053*** 1.434***	 0.014** -0.012 -0.033***
Distance to the nearest market	-0.003***	-0.016***	0.0004***
Log of monthly per adult equivalent food expenditure	-	-	-0.000
Household dietary diversity score	-	-	0.007
Constant	8.399***	7.839***	
R-squared (OLS)/ Pseudo R-squared (Probit)	0.316	0.144	0.103
Number of observations	21,743	21,610	21,610
Significant at 1 per cent *** significant at 5 per cent ** significant at 10 per cent*			

Source: Author's Computation from KIHBS 2015/16

5.2.2 Food expenditure, dietary diversity and stunting by adequacy of cash transfer amount

Further, adequacy of cash transfers has implications on food expenditure, dietary diversity and stunting. The results in Table 5.3 indicate that among beneficiary households, a 1 per cent increase in cash transfer adequacy— defined as 1 per cent increase above the food poverty line — results in a 27.8 per cent increase in food expenditure and 0.22 units increase in dietary diversity scores. The finding is in line with existing empirical evidence. Davis and Handa (2015) found that

transfers equivalent to at least 20 per cent of baseline consumption had widespread implications, unlike smaller transfers. Miller et al. (2011) similarly found that cash transfer sizes significantly affect food expenditure, consumption, food adequacy, and diet diversity in Malawi. The effect of adequacy of cash transfer amount on stunting status among the children under five years was not significant. This could reflect the importance of other factors, such as diseases, infections, or poor water and sanitation conditions which, despite improved access to food, can still affect a child's stunting status (Bhutta et al., 2013). The effect of dietary diversity of stunting was significant, with the results showing that an increase in HDDS by 1 unit reduces the probability of stunting among the children under five years by 2.5 per cent. This finding is supported by a systematic review of studies conducted in Sub-Saharan Africa, which largely established that food security and dietary diversity are associated with stunting (Gassara and Chen, 2021).

Table 5.3: The effects of adequacy of cash transfers

Model	(4)	(5)	(6)
Variables	Log of food expenditure	Household dietary diversity score	Marginal effects of Stunting
Log of adequacy of cash transfer amount	0.278***	0.22***	0.011
Household size	-0.011**	0.167***	0.013**
Overall poverty status (Poor=1)	0.065***	-0.783***	-0.011
Household head education level (Primary=1, Secondary=2, Tertiary=3)	 0.078*** 0.035 -0.035	 0.765*** 1.353*** 0.68	 -0.039 -0.018
Distance to the nearest market	0.0002	-0.021***	0.001
Log of monthly per adult equivalent food expenditure	-	-	-0.025
Household dietary diversity score	-	-	-0.015**
Constant	6.233***	6.465***	
R-squared/ Pseudo R-squared	0.79	0.234	0.128
Number of observations	401	400	393
Significant at 1 per cent *** significant at 5 per cent ** significant at 10 per cent*			

Source: Author's Computation from KIHBS 2015/16

6 Conclusion and Recommendations

The study sought to examine the effect of cash transfers on food expenditure patterns, dietary diversity, and child nutrition status. The findings show that receipt of cash transfer is negatively associated with food expenditure, household dietary diversity and stunting. The association between cash transfers, food expenditure and household dietary diversity may indicate that households do not utilize the cash transfers on buying food items and may be using the cash for non-food expenditures. Cash transfers reduce the probability of stunting status among the children under five years.

The results also reveal that adequacy of cash transfers increases food expenditure and dietary diversity but does not influence stunting among the under-five children. Other variables, namely household size, poverty status and education level were found to be important in enhancing nutritional outcomes. It was also established that the households that resided further away from markets consumed fewer diverse foods and spent less on food.

Based on these findings, the study proposes the following key policy recommendations:

(i) More interventions should target households classified as poor. The government could establish guidelines and mechanisms to reach more poor households and adjust transfer values in line with changing socio-economic conditions, both in normal and emergency situations. Cash transfers could be adjusted based on the cost of a basket of food items needed to meet minimum nutritional requirements. For instance, the World Food Programme (WFP) determined that the Minimum Healthy Food Basket (MHFB) provides 2,100 kcal per person per day in arid and semi-arid lands. Implementing conditional cash transfers, with proper targeting, can positively affect household dietary diversity.

(ii) The government could consider redesigning the current NSNP programmes to include a cash-plus element. Within the social protection space, the concept of 'cash-plus' is preferred as a mechanism for enhancing the positive impacts of cash programmes in both the short and medium term. Cash-plus programmes augment cash transfers by providing beneficiaries with additional support, either directly or indirectly, by linking them to essential services. These programmes can take various forms, including life skills training, reproductive health education, productive support such as grants for businesses, and links to social services such as nutrition education programmes. Cash-plus programmes have been successfully implemented in other developing countries such as Ghana, Tanzania, and Lesotho (Tirivayi et al., 2023).

(iii) Other policy options the government could explore include indexing cash transfer values using the Consumer Price Index (CPI); regularly adjusting cash transfers based on criteria such as minimum wage increases and GDP growth (KIPPRA, 2023); and considering household size in determining transfer amounts (Baye et al., 2014). Additionally, resources should be deliberately shifted to empower vulnerable groups, such as the poor, and ensure proper targeting to reduce inclusion/exclusion errors. This improved targeting should focus on poor, rural households and involve deeper collaboration with non-State actors.

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Appendix

Appendix 1: Predicted consumption expenditure per adult equivalent

Variable Name	Variable label	Coefficient
Dependent variable	Mean consumption expenditure	
Nutrition	Body Mass Index (children under 5 years)	0.003866
Population characteristic	Children 0-7 years	-0.015411
	Children 15-18 years	-0.032811
Labour	Own account worker	0.067512
Labour	Own account worker farm	0.055992
Education level	None	-0.227999
	Primary	-0.203356
	Secondary	-0.141187
Population characteristic	1-member household	0.618155
	2-member household	0.407711
	3-member household	0.260750
	4-member household	0.173168
	5-member household	0.096769
	6-member household	0.073088
Household	No walls	-0.187563
	Cane/palm/trunks	-0.244489
	Grass/reeds	-0.139658
	Mud	-0.067478
	Corrugated iron sheets	-0.052403
	Dung/mud	0.101543
	Corrugated iron sheets	0.066520
	Asbestos sheet	0.168384
	Concrete	0.143825
	Tiles	0.247000
	Ceramic tiles	0.079062

	Piped water - piped into plot/yard	-0.110024
	Piped water - public tap/ stand pipe	-0.144986
	Tube well/borehole with pump	-0.167216
	Dug well - protected well	-0.158552
	Dug well - unprotected well	-0.153342
	Water from spring - protected spring	-0.158555
	Water from spring - unprotected spring	-0.117838
	Rain water collection	-0.128384
	Cart with tank	-0.101800
	Bicycles with buckets	-0.182529
	surface water	-0.120397
	Fuel wood	-0.059247
	Gas lamp	-0.050938
	Electricity connection	-0.183799
	Generator	-0.165951
	Kerosene	-0.124233
	Charcoal	-0.102226
	Crop residue	-0.260891
	Male-headed HH	0.057072
	Log of sum of members' ages	-0.196369
	Residence	0.098921
	Sum of members' ages	0.000192
	Dressing tables	0.110910
	Sofa sets	0.050245
	Curtains and accessories	0.031767
	Pillows	0.072970
	Mattresses	0.115265
	Towels	0.062923
	Iron box-charcoal	0.062114
	Electric/gas cooker/ meko	0.065772
	Jiko – charcoal	0.043566

	Microwave oven	0.082196
	Electric iron	0.065321
	Electric kettle	0.108231
	Cooking sufurias/pots	-0.203167
	Frying pans	0.066905
	Thermos flask	0.077305
	Wheelbarrow	0.065383
	Torches	0.053798
	Batteries (dry cells)	0.044425
	Solar lamps	0.040710
	Electric bulb /fluorescent tubes	0.046614
	Barbed wire/chain link	0.073035
	Mattock/saw/panga/axe/ slasher	0.042555
	Mobile handset-basic/ smartphone	0.050439
	Telephone installation	0.356367
	Television	0.074614
	Calculators	0.090355
	Computer (laptop)	0.112137
	Flash disks/memory card	0.074727
	Hard disk	0.143638
	Boat/canoe	0.831876
	Car for personal use	0.210104
	Pick-up for personal use	0.209323
	Motorcycle for personal use	0.046744

Appendix 2: Pairwise correlation coefficients

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
(1) Log of food expenditure	1.000								
(2) Household dietary diversity	0.382***	1.000							
(3) Stunted	-0.102***	-0.107***	1.000						
(4) Cash transfers	-0.095***	-0.108***	0.004	1.000					
(5) Household size	-0.442***	0.08***	0.242***	0.065***	1.000				
(6) Poor	-0.405***	-0.252***	0.118***	0.139***	0.429***	1.000			
(7) Adequacy	0.702***	0.269***	-0.025		-0.258***	-0.289***	1.000		
(8) Distance	-0.144***	-0.171***	0.046***						
	0.087***	0.120***	0.151***	0.012	1.000	-0.206***			
(9) Education	0.308***	0.295***	-0.085***	-0.189***	-0.159***	-0.373***	0.089***	-0.206***	1.000
significant at 0.01*** significant at 0.05 ** significant at 0.1*