



Program Impact Pathway Analysis Reveals Implementation Challenges that Limited the Incentive Value of Conditional Cash Transfers Aimed at Improving Maternal and Child Health Care Use in Mali

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ABSTRACT

Background: The program “Santé Nutritionnelle à Assise Communautaire à Kayes” (SNACK) in Mali aimed to improve child linear growth through a set of interventions targeted to mothers and children during pregnancy and up to the child’s second birthday. Distributions of cash to mothers and/or lipid-based nutrient supplement to children 6–23 mo of age were added to SNACK to increase attendance at community health centers (CHCs).

Objectives: The aim of this study, which was embedded in a cluster-randomized impact evaluation of the program, was to assess the incentive value of the cash in relation to CHC attendance.

Methods: We used a mixed-methods approach. We collected quantitative data on cash receipt and CHC attendance in a midline survey of mother–child pairs ($n = 3443$). A program impact pathway analysis guided qualitative data collection and analysis. Twelve CHCs were purposively selected in study groups that received cash. We conducted semistructured continuous observations of cash distributions in 11 CHCs ($n = 22$) and semistructured qualitative interviews with frontline workers (FLWs) ($n = 71$) and mothers ($n = 22$) who were purposively selected from the midline survey.

Results: FLWs’ knowledge of the objective and implementation plan of the cash program component was limited. A challenging physical environment and insufficient cash available for each distribution were identified as causes of irregularities in cash distributions. Most mothers mentioned having to return several times to receive their cash. Child health was identified as the main motivation to attend CHCs and cash was described as an additional benefit.

Conclusion: Implementation constraints related to remoteness and inaccessibility may have undermined the incentive value of the cash transfers in the SNACK program. Additional research is needed to identify interventions that not only incentivize mothers to participate but that can be implemented effectively and with high quality in challenging contexts such as rural areas of Mali.

Curr Dev Nutr 2019;3:nzz084.

Introduction

Social safety net programs can address several underlying determinants of nutrition, including poverty, food insecurity, and low access to adequate care resources. They can also be used as platforms to deliver, and enhance the coverage and effectiveness of, nutrition-specific



Keywords: conditional cash transfer, health service utilization, children, nutrition, process evaluation, program impact pathway, Mali

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Manuscript received March 21, 2019. Initial review completed July 11, 2019. Revision accepted July 15, 2019. Published online July 25, 2019.

The program implementation was funded by the Global Affairs Canada (GAC) through World Food Programme, with support from UNICEF. The research was funded by the European Union (EU) through the International Fund for Agricultural Development, WFP, UNICEF, with an additional support from the CGIAR Research Programs on Agriculture for Nutrition and Health (A4NH), hosted by IFPRI.

Author disclosures: ALP, AZ, MS, SF, YK, ES, ADD, J-LK, KNE, FK, TM, YM-P, and MTR, no conflicts of interest.

None of the authors have a close relative or are part of a professional association with financial interest in the outcome. The funding bodies had no role in the collection, analysis, and interpretation of data, and in the writing of the manuscript.

The data sets used and analyzed in this study are available from the corresponding author on reasonable request.

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Abbreviations used: ANC, antenatal care; ASACO, community association for community health; BCC, behavior change communication; CCT, conditional cash transfer; CFA, West African CFA franc; CHC, community health center; CNA, Cash for Nutrition Awareness; EA, enumeration area; FLW, frontline worker; FMPOS, Faculty of Medicine, Pharmacy and Onto-Stomatology; IRD, French National Research Institute for Sustainable Development; LNS, lipid-based nutrient supplement; NGO, nongovernmental organization; PE, process evaluation; PIP, Program Impact Pathway; SNACK, Santé Nutritionnelle à Assise Communautaire à Kayes; WFP, World Food Programme.

interventions aimed at improving maternal and child nutrition (1, 2). Cash transfer programs have become increasingly popular because of their demonstrated effectiveness at reducing poverty and improving household food security and several other welfare outcomes (3, 4). Cash transfers that include health service utilization conditionalities, referred to as conditional cash transfers (CCTs), have also been shown to improve use of maternal and child health services in Latin America (5–8). For example, studies have documented the impacts of CCT programs on health care utilization, with beneficiaries using the program resources to pay for expenses related to curative or preventive health care visits, transportation to health facilities, or purchase of medical supplies and preventive medicines (9). However, more pronounced effects on health care utilization have been achieved with programs that directly removed user fees for access to health services (10). CCT programs have also been shown to have variable impacts on improving access to preventive health care visits for children, although they did not improve the likelihood that children would achieve full vaccination status (10). The incentive value of cash as well as how the transfer and delivery methods are carried out may affect program utilization and the overall health and welfare outcomes of CCT programs (11).

Few CCT programs have been evaluated to assess implementation processes, which are critically important for program success and scale-up. Implementation research plays an important role in supporting program design and implementation by helping to understand and document what can be achieved in practice, under real-life operational conditions, with even the best-designed programs (12). Process evaluation (PE) is one approach that can be used in implementation research to assess implementation fidelity, which encompasses aspects such as adherence to program design, quality of program/service delivery, and participants' responsiveness (13, 14). PE also provides valuable information on “how” and “why” the program is (or is not) achieving its expected impacts. With a theory-based Program Impact Pathway (PIP) analysis embedded in the PE, it can help identify successes and bottlenecks or constraints to effective implementation that may affect the impact on key outcomes; this allows implementers to make some adjustments along the way or to improve the design and implementation of future programs.

The “Santé Nutritionnelle à Assise Communautaire à Kayes” (SNACK—Community-based nutritional health in Kayes) is a community-based program implemented by the World Food Programme (WFP-Mali) with support from UNICEF in 3 districts of Kayes, Mali. The overall aim of SNACK is to optimize intrauterine and child linear growth through a set of preventive and curative interventions targeted to mothers and children during the first 1000 d (from pregnancy until the child's second birthday).

Incentivizing women to attend community health centers (CHCs) for pre- and postnatal visits during the first 1000 d was the main impetus for adding the “Cash for Nutrition Awareness” (CNA) component to SNACK in 2013. Small amounts of cash and/or a lipid-based nutrient supplement (LNS, Plumpy Doz) were distributed to pregnant women and mothers of young children conditional on their visiting the CHCs for different services. This was expected to increase women's attendance at common CHC health services and increase exposure to SNACK. Therefore, attendance at CHCs was a critical step in the PIP to achieve the outcomes of optimized intrauterine growth and child linear growth.

This article presents findings from the PE and midline impact survey related to the cash component of CNA. The objective of this research was to explore whether and how the cash worked as an incentive for mothers to use preventive health and nutrition services, using a theory-driven approach that included a detailed PIP analysis. Assessing if, how, and why cash worked as an incentive for SNACK-CNA can inform the design of other CCT programs in similar contexts.

Methods

Intervention

The SNACK program consisted of a set of interventions including behavior change communication (BCC), cooking demonstrations, income-generating activities for women, screening and treatment for children suffering from acute malnutrition, blanket feeding during the lean season for mothers and children ≤ 59 mo old, and capacity-strengthening for nutrition actors. The CNA component provided mothers with a cash incentive during visits to CHCs for antenatal care (ANC), delivery, vaccination, and growth monitoring ($\sim \$3.00$ – $\$12.00$ depending on the type of visit, estimated by program implementers to cover the cost for transportation and consultation fees, or the cost for delivery at the CHC) and/or an LNS (Plumpy Doz). Eligibility criteria for women's enrollment into the SNACK-CNA at the CHC were to be pregnant or to have a child < 12 mo of age. Once enrolled, women would receive the cash for their child at each visit to the CHC until the child reached 24 mo of age. For the LNS, women would receive 4 pots of Plumpy Doz at each growth-monitoring visit, starting when their children were aged 6 mo and continuing until 24 mo of age.

Study design

The present study was part of a larger impact evaluation of the SNACK-CNA project that used a cluster-randomized design. The impact evaluation of SNACK-CNA randomly assigned 76 CHCs and their associated catchment areas of 3 districts in Kayes (Bafoulabe, Diema, and Yelimane) into 4 arms. These were: 1) SNACK only, which received standard activities of the program and served as the control group; 2) SNACK + LNS, with standard program activities and LNS distributed monthly to children 6–23 mo of age at monthly growth-monitoring sessions; 3) SNACK + Cash, with standard activities and cash distributed during visits to the CHCs during pregnancy, labor and delivery, child vaccination, and monthly child growth-monitoring sessions (6–23 mo of age); and 4) SNACK + Cash + LNS, with standard activities, cash (as in arm 3), and LNS (as in arm 2). The schedule of distribution of cash and LNS, and their amounts, per study arm are presented in [Table 1](#).

Baseline and endline quantitative surveys for the impact evaluation of the SNACK-CNA project were conducted in November 2013 ($n = 5046$) and November 2016 ($n = 5098$). The midline survey was conducted in all 4 arms in April 2015 (~ 1 y after the start of the program) and the PE was conducted in the 2 arms that received the cash incentive (arms 3 and 4) in August 2015. Arms 3 and 4 were selected for the PE in order to focus the study on the incentive value of the cash of the SNACK-CNA program.

TABLE 1 Schedule of cash and LNS distribution during the first 1000 d, in the 4 study arms¹

	ANC visits	Delivery	Vaccinations	Growth monitoring
Timing	First, second, and third visits	—	Visits at 1.5, 2.5, and 3.5 mo	Monthly visits between 6 and 23 mo; total of 18 possible visits
Study arm				
1) SNACK only (control)	—	—	—	—
2) SNACK + LNS	—	—	—	4 pots LNS/mo
3) SNACK + Cash	2500 CFA	6000 CFA	2500 CFA	1500 CFA/mo
4) SNACK + Cash + LNS	2500 CFA	6000 CFA	2500 CFA	4 pots LNS + 1500 CFA/mo

¹Payments range from 1500 CFA to 6000 CFA, equivalent to ~\$3.00–\$12.00. LNS is Plumpy Doz, in pots of 325 g, providing 20 micronutrients; per 100 g: energy 534 kcal, protein 12.7 g, fat 34.5 g; recommended use: 1 tablespoon, 3 times/d. ANC, antenatal care; CFA, West African CFA franc; LNS, lipid-based nutrient supplement; SNACK, Santé Nutritionnelle à Assise Communautaire.

The PIP

We first designed a PIP to conceptualize the program and its different components. Mapping of the PIP was an iterative process starting with a review of program documents, followed by interviews and discussions with implementation partners [French National Research Institute for Sustainable Development (IRD), WFP, UNICEF, and implementing nongovernmental organizations (NGOs)], as well as health officers of the 3 districts of Kayes during a 2-d workshop held in Bamako 2 mo after the start of the program (May 2014). Through the review of program documents and the interviews and discussions with implementation partners in subgroups, we were able to describe the different program components (inputs, activities, actors, and intended results) as well as the mechanisms (mediators and effect modifiers) by which these components were hypothesized to work and lead to expected impacts (15, 16). With these data, we created a PIP for the entire SNACK-CNA program that included all program components, from inputs, processes, outputs, and outcomes to impacts (Figure 1).

We identified 3 hypothesized pathways of impact of the SNACK-CNA program on maternal and child health and nutrition outcomes: 1) the cash; 2) the LNS; and 3) the BCC (of the SNACK program) pathway. This study focused on the cash pathway, which was intended to incentivize caregivers to participate in SNACK-CNA activities and enhance its overall impacts. The 4 key steps along the cash PIP (Figure 2) included: 1) knowledge and understanding of the program objectives and design by frontline workers (FLWs) (Box 1); 2) cash procurement and management (Box 2); 3) cash distribution (Box 3); and 4) cash utilization (Box 4). We used the PIP to inform PE data collection (identifying key respondents and processes to analyze), and to identify bottlenecks (during data analysis) along these 4 key steps of the cash pathway (Table 2).

Research objectives

The overall objective of this study was to ascertain if and how the cash provided through the CNA component incentivized mothers to follow the recommended schedule of preventive health and nutrition services for themselves and their child. To meet the overall study objective, we addressed the following specific research objectives along the PIP for the cash component:

- 1) To document knowledge and understanding of program design by FLWs: we assessed their knowledge, understanding, and

perceptions of the purpose, objectives, and methods for achieving impact for the CNA cash component (Figure 2, Box 1).

- 2) To describe the implementation of the cash procurement and management: we assessed the implementation of the CNA cash component and identified factors that influenced cash procurement, management, and FLW workload (Figure 2, Box 2).
- 3) To describe the implementation of the cash distribution: we assessed the fidelity of implementation of the cash distribution to protocol and identified factors that influenced cash distribution. We also assessed barriers and facilitators for the uptake of the cash component reported by mothers who participated in the program (Figure 2, Box 3).
- 4) To describe how participating women used the cash: we assessed how mothers used the cash they received when using health care services (Figure 2, Box 4).

Sampling and data collection

The PE sampling scheme used a combination of random and purposive sampling and was an extension of the quantitative midline impact survey, which followed the same principles as the baseline survey. Sample size calculation for the main study estimated the need for 5016 mother–child pairs to be surveyed at baseline. Mother–child pairs were randomly selected using a multistage cluster selection process: at the first stage, in each of the 76 CHC catchment areas, 6 enumeration areas (EAs) were randomly selected with a probability proportional to population size. At the second stage, all households with eligible mother–infant pairs were listed within each EA during a census and a total of 11 households per EA was randomly selected, for a total of ≥66 mother–child pairs included per EA. In case of several eligible children per mother, only 1 child was randomly selected to be surveyed.

Quantitative midline survey.

For the midline quantitative survey, which aimed to assess implementation of the program and uptake by beneficiaries, we estimated that a smaller sample size of 836 mother–child pairs per arm was sufficient (3344 in 4 arms). The same multistage cluster selection process was used: 4 EAs (out of 6 surveyed at baseline) were randomly selected per CHC catchment area; then, within each EA, 4 households were randomly selected from the census of eligible households, and the remaining were included using the itineraries method, until reaching a total of 11 households per EA and 44 mother–child pairs per EA.

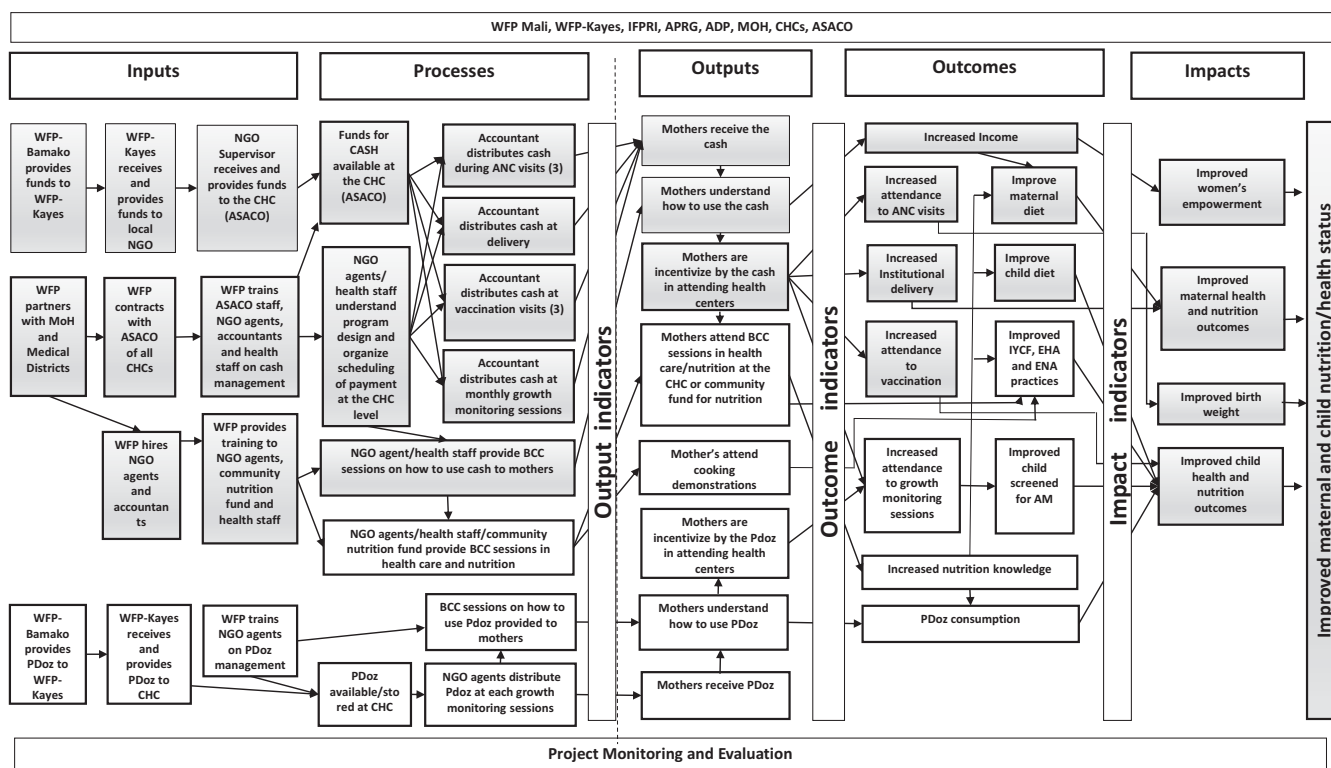


FIGURE 1 PIP for the SNACK-CNA program, Mali. The cash pathway is represented by the shaded box. We identified 3 pathways: the cash transfer pathway, the BCC pathway, and the lipid-based nutrient supplement pathway. We elaborated a second PIP that was specific to the CNA cash pathway, which shows the flow of all activities from program delivery to utilization, outlining the institutions and actors involved, sequencing of program activities, and expected impact of the program (Figure 2). AM, Acute Malnutrition; ANC, antenatal care; ASACO, community association for community health; BCC, behavior change communication; CHC, community health center; CHV, community health volunteer; CNA, Cash for Nutrition Awareness; EHA, Essential Hygiene Actions; ENA, essential nutrition action; IYCF, infant and young child feeding; MoH, Ministry of Health; NGO, nongovernmental organization; PDoz, Plumpy Doz; PIP, Program Impact Pathway; SNACK, Santé Nutritionnelle à Assise Communautaire à Kayes; WFP, World Food Programme.

A total of 3443 mother-child (0–23 mo of age) pairs living in 1933 households randomly selected in the 4 arms of the intervention were surveyed. Quantitative data that covered topics such as household characteristics, program exposure, and maternal and child health and nutrition were collected using structured questionnaires. In addition, questions and modules relevant to the PE were included in the midline survey, on topics such as 1) program awareness, 2) receipt, barriers and facilitators for uptake, and use of cash and/or LNS, and 3) attendance at health services at the CHCs. Quantitative data collection was conducted using Computer Assisted Program Interviews (SurveyCTO) and data management using R version 3.2.1 (R Core Team).

In the 2 study arms selected for the PE (i.e., arm 3: SNACK + Cash and arm 4: SNACK + Cash + LNS), 2 CHCs and their associated catchment areas in each of the 3 districts were purposively selected ($n = 12$), including 1 with the highest burden (representing the most difficult program implementation situation) and 1 with a median value for burden (an average program implementation situation). This was based on 2 indicators: the distance of each CHC from the central CHC and the workload of staff at that center (calculated by the population the CHC covered divided by the reported number of staff at the CHC at baseline). One CHC was replaced owing to a flood

in the area prohibiting access during the time of the survey. PE data collection methods included the focused ethnographic methods of semistructured individual qualitative interviews, semistructured continuous observations, and group free listing (Table 2). Respondent mothers were identified for qualitative interviews based on responses given in the midline survey. Thus, the qualitative and quantitative data were linked, allowing for mixed-methods analysis.

Individual, semistructured, qualitative interviews.

We conducted interviews with all of the FLWs ($n = 71$) involved in program implementation at the selected CHCs. Topics covered included aspects such as the FLW's understanding and conceptualization of the program's purpose, objectives, and methods for achieving impact; their perceived role and workload, operational activities, job motivation, and satisfaction; and any barriers they encountered in carrying out the program as planned. For mothers' interviews, 2 mothers in each CHC catchment area were selected based on responses given in the midline survey ($n = 24$). Three criteria were used for the selection of mothers: 1) having ever attended the CHC for pregnancy and/or growth monitoring of the child; 2) knowledge of the SNACK-CNA program; and 3) having a child between 6 and 23 mo of age at the time of the interview

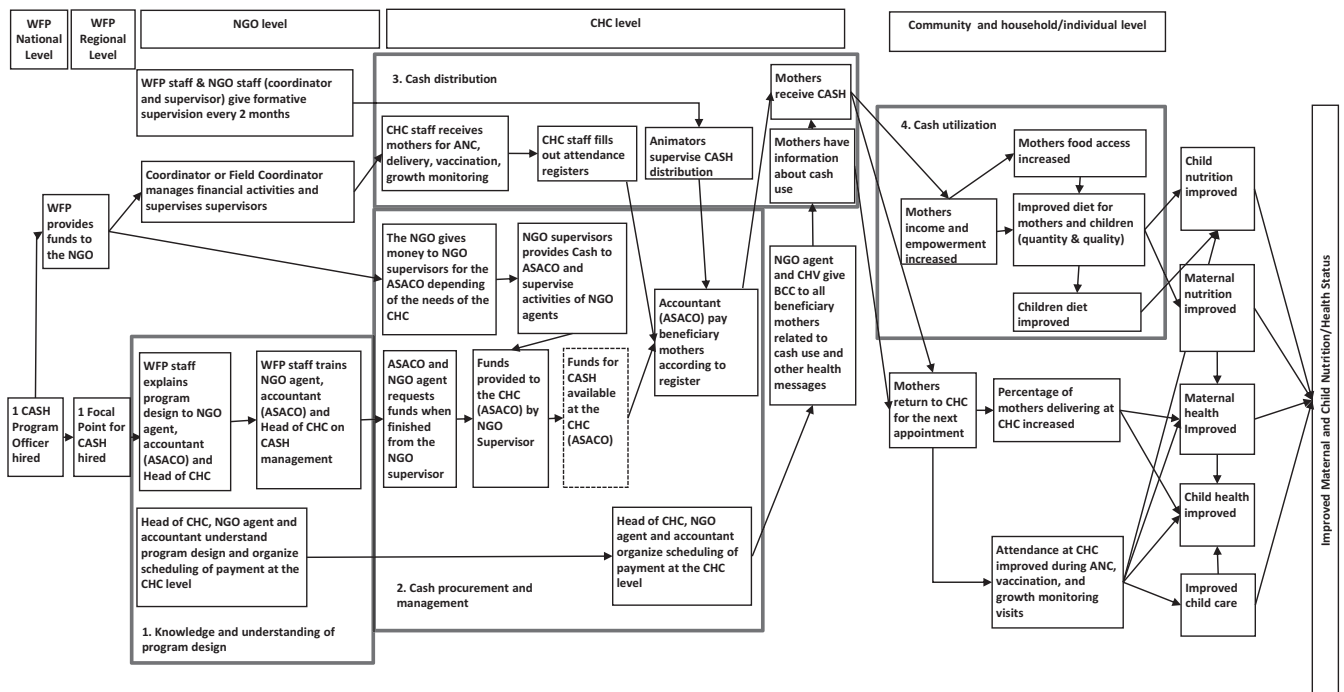


FIGURE 2 Program impact pathway for the cash component of the SNACK-CNA program, Mali. The cash pathway includes knowledge and understanding of program design (Box 1), cash procurement and management (Box 2), cash distribution (Box 3), and cash use (Box 4). NGO agents are paid by local NGOs, accountants by the ASACO, heads of CHCs and HW by the Ministry of Health and/or ASACO, and CHVs are volunteers. ANC, antenatal care; ASACO, community association for community health; BCC, behavior change communication; CHC, community health center; CHV, community health volunteer; HW, health worker; NGO, nongovernmental organization; SNACK, Santé Nutritionnelle à Assise Communautaire à Kayes; WFP, World Food Programme.

(so that they had the potential to have experienced all program services). Mothers meeting these criteria were then stratified by receipt of the cash transfer into: 1) receiving cash at least once since the start of the program, or 2) never having received cash. One mother in each stratum was then randomly selected for the interview. Topics covered included maternal perception about the cash incentive, the costs they had incurred by participating in the program, their satisfaction with the program, uses of cash, and barriers and facilitators to the uptake of the program. All interviews were conducted using a semistructured interview guide digitally recorded by enumerators and simultaneously transcribed and translated from Bambara into French by the same interviewer.

Semistructured continuous observations.

Cash distributions were observed twice in each of the 12 CHCs during the 2-mo duration of data collection. In 1 CHC, however, no cash distribution could be observed because none were conducted within the 2-mo data collection period, despite requesting the CHC's cash distribution schedule and arriving for data collection on the day the distribution was scheduled to be held. In each of the 11 CHCs where observations were conducted, 2 independent observers conducted observations of the cash distribution and all services and activities that occurred therein ($n = 22$) (17). Observations were documented with written narrative summaries by the 2 independent observers, conducted with a "blank slate," and not guided or directed by the observer. A

group debriefing session was held with the independent observers and a facilitator on the same day as the observation, and content was typed in Microsoft Word.

Free listing.

Free listing is a technique used to generate data that describes how discrete domains (with list-able content) are categorized by a group of people (18). The order in which the items fall in the list, and the number of times items appear across multiple lists, can represent the "saliency" of items. More salient words are assumed to appear more frequently across respondents or appear at the beginning of a list. Opportunistic groups of ≤ 10 program participants in each CHC catchment area, gathered outside of the CHCs, were purposively selected to participate in free listing ($n = 24$) to generate a list of the users and uses of the cash transfers. Free-listing data were directly translated into French at the time of data collection and recorded on forms by hand, which were later typed into Microsoft Excel.

Data analysis

Descriptive statistics and comparison between study arms using data from the midline survey were performed using Stata 15.1 (Statacorp). All analyses were weighted according to the population size of each EA and adjusted for the multistage cluster design using the svy command. The linearization method was used to estimate CIs around prevalence estimates.

TABLE 2 Methods to study the steps in the PIP for the cash component of the SNACK-CNA program, Mali¹

Boxes in the PIP for the cash component	Objectives of the PE for the cash component	Research methods	Themes/topics investigated
Knowledge and understanding of the program objectives and design (Figure 2, Box 1)	To document FLWs' knowledge, understanding, and perceptions of the purpose, objectives, and methods for achieving impact for the CNA cash component	Individual semistructured qualitative interviews with FLWs	Program purpose View of program objectives Methods for achieving program impact
Cash procurement and cash management (Figure 2, Box 2)	To describe the implementation of the CNA cash component and identify factors that influenced cash procurement, management, and FLWs' workload	Individual semistructured qualitative interviews with FLWs	Roles Procurement procedures for cash Management for cash payments Monitoring system for cash Workload Job motivation/satisfaction
Cash distribution (Figure 2, Box 3)	To describe the implementation of the CNA cash component and identify factors that influenced cash distribution	Structured observations of program activities at CHCs Individual semistructured qualitative interviews with FLWs	Schedule of payments Opinion of schedule of payments to beneficiaries SNACK-CNA activities Distribution of cash Activities occurring before, after, and during distribution
	To understand mothers' barriers and facilitators for the uptake of the cash component	Individual semistructured qualitative interviews with mothers	Perception about incentive and individual cost of receiving the program Satisfaction with the program Perceived barriers and facilitators to the uptake of the program
Cash utilization (Figure 2, Box 4)	To determine salient practices in the use of cash	Individual semistructured qualitative interviews with FLWs Individual semistructured qualitative interviews with mothers Mothers group free listing Mothers quantitative midterm survey	Users of cash Use of cash

¹CHC, community health center; CNA, Cash for Nutrition Awareness; FLW, frontline worker; LNS, lipid-based nutrient supplement; PE, process evaluation; PIP, program impact pathway; SNACK, Santé Nutritionnelle à Assise Communautaire.

We used thematic analysis to code and analyze the qualitative interview transcript data using an a priori list of codes related to the research questions (19). Coding was an iterative process that was open to incorporating new themes that emerged from the interviews. Observations were analyzed using grounded theory; the researchers coded them without a predefined list and marked themes as they emerged from the data (20). The frequencies of responses from the free listing were coded using a list generated from the responses given, and data were analyzed using Stata 13 (StataCorp LP). Interview and observation data were analyzed using NVivo 11 (QSR International). Three different researchers performed the coding and analysis for the interviews, observations, and free listing, whereas 2 researchers supervised the coding and conducted the analysis.

Ethical approval

The overall study protocol was reviewed and approved by the ethics committee of the Faculty of Medicine, Pharmacy and Onto-Stomatology (FMPOS, Bamako) of the University of Bamako, also known as the University of Mali (N°2013/105/CE/FMPOS), and the Comité Consultatif de Déontologie et d'Ethique of the IRD.

Results

Description of the study sample

Women included in the midline survey all had ≥ 1 child 0–23 mo of age (full sample, $n = 3443$; in the Snack + Cash arm, $n = 871$; in the Snack + Cash + LNS arm, $n = 855$). Close to 24% (23.6%) of children were 0–5 mo old, 30.6% 6–11 mo old, and 45.7% 12–23 mo old at the time of the survey.

The 12 selected CHCs were a mean distance of 79 km (range: 25–185 km) from the main health center. FLWs who were identified as conducting program activities in CHCs included program actors [program supervisors ($n = 3$), local NGO agents ($n = 12$), and program accountants ($n = 12$)]; health staff [vaccinators ($n = 8$), head of the CHC ($n = 10$), midwives ($n = 7$), pharmacy manager ($n = 1$), nutrition focal point ($n = 1$), and nurse assistants ($n = 2$)]; and CHC-affiliated staff [president of the ASACO (community association for community health) ($n = 10$) and community volunteers ($n = 5$)]. Mothers selected for qualitative interviews did not differ from those surveyed during the midline survey in terms of age, education, marital and professional status, or the ages of their children (Table 3). The

TABLE 3 Sample characteristics of mothers in the midline survey and process evaluation of the SNACK-CNA program, Mali

	Midline quantitative survey		Semistructured qualitative interviews	
	<i>n</i>	Mean \pm SD or %	<i>n</i>	Mean \pm SD or %
Households	1933		22	
Mothers (respondents) and children	3443		22	
Maternal age, y		28 \pm 7.1		28 \pm 6.1
Education				
Elementary school completed	371	10.8	1	
No education	3072	89.2	21	
Marital status				
Married, in a polygamous household	1512	43.9	12	
Married, in a monogamous household	1815	52.7	10	
Divorced, separated, or widowed	65	1.9		
Single	51	1.5		
Professional status				
Active	484	14.1	4	
Housewife	2959	86.2	17	
Children's age, mo		12 \pm 6.7		12 \pm 5.3

free-listing respondents ($n = 130$) included pregnant women ($n = 29$), women who had just given birth ($n = 5$), women attending child vaccinations ($n = 21$) or child growth-monitoring sessions ($n = 67$), and people accompanying these women to the CHC ($n = 8$).

The cash pathway

Knowledge and understanding of the program objectives and design by FLWs.

Overall, we found that all FLWs understood the ultimate purpose of the SNACK-CNA program, i.e., to decrease malnutrition in children living in Kayes, and were enthusiastic about the program. FLWs mentioned delays in starting the activities at the beginning of the program and noted that this resulted in some confusion among beneficiaries. When asked about eligibility criteria for women to enter into the program, FLWs were not able to list the program's eligibility criteria as 1) being pregnant or 2) having a child ≤ 12 mo of age, but described a process consisting initially of enrolling only women who had attended ≥ 1 ANC visit, and later a change to also enroll women at delivery. This indicates that criteria for eligibility (planned and described in the study protocol) might have not been clearly communicated to FLWs and NGOs' agents by study designers.

In addition, the timeline for the cash distribution described by FLWs showed some variation regarding when the cash was supposed to be given to women during pregnancy; some reported after each visit, others after 3 visits, and yet others mentioned a requirement of 3-mo spacing between ANC visits, making the 3 payments per pregnancy challenging. Some FLWs also mentioned contradicting schemes regarding how much cash was to be given to women for antenatal or vaccination visits, but all mentioned the correct amount of cash for delivery and for growth-monitoring visits.

We also found that at the time of the survey, program agents (accountants or NGO agents) in some CHCs were still adapting their schedule for cash distributions to the schedule of health center activities to comply with the program design. For example, cash was to be distributed daily during all days the CHC was open and for

every preventive health service delivered. However, some program agents were still distributing cash only on 1 specific day. Some FLWs mentioned having recently been told by program supervisors to allow daily distribution of cash to ensure that payments were made on the same day that health services were provided. Opinions on this varied across FLWs, with some thinking it would be good to avoid back-payments for beneficiaries (which happens when payments are done only on 1 specific day), and others believing that combining payments with daily activities would increase accountant and NGO agent workload. Another issue mentioned by FLWs was that cash would only be paid at CHCs, although the health system in Mali is decentralized, with many activities, such as ANC visits, vaccinations, and growth monitoring, organized and held in communities using an "outreach strategy" for people living in remote areas. Overall, our results regarding FLWs' knowledge and understanding of the program objectives, design, and implementation plan suggest that FLWs could have benefitted from additional training, clarification, and reinforcement to improve their compliance with the program's design and implementation protocol.

Cash procurement and management.

Cash procurement and management was challenging in this CCT program. The ASACOs—which are community health associations that usually participate in funding the CHC and the CHC health staff salaries—were formally asked to oversee cash management at the CHC level. The sequence of obtaining cash at the CHC usually started with the accountant filling out a "call-for-funds" form, signed by the president of the ASACO and the head of the CHC. The form would then be sent to a central location: the NGO office and/or the WFP office in Kayes. Then an NGO supervisor in charge of the distribution for several CHCs would bring the money to the CHC from that central location. Once the money was available, the cash distribution was performed by the accountant, after each of the CHC preventive services was provided to the beneficiaries, until the total amount of money procured

with the “call-for-funds” was distributed, and the process would restart beginning with a new “call-for-funds.”

All FLWs mentioned important and regular shortages of cash to distribute to program beneficiaries. FLWs reported cash shortages in all CHCs over periods ranging from 18 d to 4 mo, and mentioned that, in some CHCs, this had occurred 3–4 times since the start of the program (i.e., in 1.5 y). The challenging environment was frequently cited as a barrier to timely cash receipt by CHCs. The most common barrier was geographical inaccessibility of the CHC, which worsened during the rainy season: “You know that when it rains heavily, the road is blocked, and the money leaves [name of the town] to come here. If we have to give money today or tomorrow [to beneficiaries] and the road is not open, obviously, it will come late” (FLW_2). FLWs often said that cars were not able to drive on flooded roads to deliver the cash to the CHC. Another difficulty with the cash procurement system, highlighted by FLWs, was the supervisor’s heavy workload. As explained by a FLW, “Only 1 supervisor for 17 CHCs in an area like this one, it’s really complicated...” (FLW_3). To compensate, in some CHCs, FLWs and any other person involved in the program, such as the president of the ASACO, would find a way to bring the cash to the CHC, such as using health center- or personally owned motorcycles. In addition, the maximum amount of cash allowed to be requested at each “call-for-funds” was considered too low, especially for CHCs with a heavy workload and a large number of women attending health and nutrition services daily: “One hundred and fifty thousand francs [West African CFA francs] is too low. There are days you can have 5–6 deliveries, plus 100 women attending the health center. Obviously, we finish the money” (FLW_4). These shortages were responsible for back-payments owed to beneficiaries that were impossible to overcome and added to the staff workload.

Cash distribution.

The cash distributions observed as part of this study were all conducted within the health facility, often in the courtyard of the CHC, sometimes under a shed or a tree. In only 1 CHC was the cash distribution carried out in a room converted for this purpose. In all CHCs the NGO agent and the accountant led the cash distribution. The following flow of activities regarding cash payments was observed: mothers sat in the area and waited for their turn to be attended to; mothers presented their beneficiary card and other documents (health card or immunization card) depending on the type of cash payment they were scheduled to receive (ANC, delivery, vaccination, care for children 6–23 mo of age). Documents were used to verify the data in the registers and determine the mother’s eligibility for cash payments. After verification, agents updated registers and forms and mothers affixed their fingerprints to the registers and received the cash directly from the accountant.

In most of the CHCs (7 of 11), the distribution of cash took place alongside other CHC activities (i.e., ANC visits, vaccination, or growth monitoring). Although it was designed to be coupled with the cash distribution, a BCC session with beneficiaries was observed only in 1 of the 11 CHCs. This BCC session communicated payment methods and encouraged use of the cash for maternal and child nutrition. In 4 CHCs, no other CHC activities were observed before, during, or after the cash distribution. Variations between CHCs were observed in the way the distribution was organized: by village or by larger geographic area, with fixed days of distribution at the CHC, by calling women to

come to the CHC when cash was available, or through maintaining daily cash availability at the CHC.

In over half of the observed CHCs (7 of 11), the cash available was insufficient to cover all attendees present on the day of the observations. Consequently, some CHCs set up a system to call women when the money arrived through community volunteers and village leaders, causing many beneficiaries to arrive at the CHC simultaneously. Owing to discrepancies between the amount of cash available for distribution and the number of beneficiaries showing up on a given day, many would return home empty-handed and dissatisfied: “Obviously, there are problems. When 100 or 180 women come and only 20, 30, 40, or 50% receive cash and others don’t, they only express their bad mood” (FLW_6). The shortage of cash available for distribution was confirmed by the CHC that did not hold a cash distribution for the whole duration of our data collection. In addition to the challenge of an insufficient total amount of cash available at each distribution, a salient theme among FLWs was the lack of small monetary notes (change) as an additional challenge for cash distribution: “In that case, one of us has to go to find change ... the lack of change is a real headache, it poses serious problems” (FLW_7).

Mothers described a wide variety of experiences regarding the receipt of cash during pregnancy, delivery, vaccination of children, and growth-monitoring visits with their 6- to 23-mo-old child. Among mothers who did receive cash, there was marked variability in the timeline and number of cash payments received and these fluctuated according to the types of visits, echoing the variability of the schedule described by the FLWs above. For example, none of the women who reported receiving cash during pregnancy did so on the same day as their visit: “Well I cannot say that I liked the way [I received the cash] because we heard that the money is given to a woman every time she makes an ANC visit, but they don’t do it in this way” (Mother_1). Among women who received cash for delivery, half received theirs before leaving the CHC and the other half had to come back, sometimes several times: “I received nothing more than 2500 CFA. Each time I go there, it’s always the same story, ‘The money is finished.’ They gave me nothing and I ended up not going anymore to ask for my money” (Mother_2). The most common barrier to utilizing the program was geographical inaccessibility of the CHC. Mothers mentioned that long distances between their homes and the CHC made participation in the program difficult.

These findings were confirmed by results from the midline survey. Among mothers of children 0–23 mo old (all mothers surveyed), during the last cash distribution at the CHC, 30.6% of mothers waited between 1 and 2 h and 15.2% waited ≥ 3 h to receive their money. Close to half of the mothers (48.5%) had gone to the CHC without receiving any, or receiving only a partial amount, of the cash due, and among them, 54.5% had to return 2–3 times to receive their cash and 8.1% returned 4–6 times. The main reason reported for their repeated visits to the CHC was the lack of cash available for distribution, mentioned by 78.5% of women, whereas 12.6% did not know the reason and 8.8% said they arrived at the CHCs outside of their opening hours.

Cash utilization.

Table 4 presents data on cash users and use for different purposes. Data from free listing highlighted that the most frequently mentioned

TABLE 4 Cash users and cash use in the SNACK-CNA program, Mali

	Quantitative data during midline survey			Group free listing during process evaluation ^a % (n = 678 responses)
	All, % (n = 490)	SNACK + Cash, % (n = 254)	SNACK + Cash + LNS, % (n = 236)	
Cash user		—		Mothers 61.1
		—		Children 34.5
		—		Other members 4.4
Cash use				
Food	79.5	74.3	85.3	Food (meat, bread, potatoes, vegetables, pasta, oil, waffle) 56.6
Clothing	41.6	37.5	46.1	Clothing (shoes, garments) 23.2
Children's health (including cost for transportation, consultation fees, medicine)	27.6	27.3	27.9	Medicine or to pay consultation fees 9.9
Other household member's health	6.1	7.2	5.0	
Household items	0.9	0.3	1.6	Household items (soap, baby powder, child's mattress, towels) 5.6
Savings	0.4	0.4	0.3	Savings 0.4

^aGroup free listing conducted with n = 22 groups, n = 130 respondents. CNA, Cash for Nutrition Awareness; LNS, lipid-based nutrient supplement; SNACK, Santé Nutritionnelle à Assise Communautaire.

users of cash were mothers, followed by children (items purchased for the child by an adult), whereas husbands and other family members were mentioned fewer times. Food was the most salient use of the cash, with 56.6% of mothers reporting having used the cash for food, followed by clothing (23.2%) and purchases of medicine or payment for health consultation fees (9.9%), with no mothers mentioning use for transportation. Among the food items bought (374 responses), mothers listed the following food groups: 1) grains: bread (9%), pasta (2%), rice (2%), flour (2%), and wafers (1%); 2) roots, tubers, and plantain: potatoes (9%) and plantain (1%); 3) animal source foods: meat (17%), milk (5%), fish (3%), and eggs (1%); 4) pulses: beans (2%); 5) vegetables: onions (7%), cucumbers (2%), and other vegetables (2%); 6) fruits: mango (1%) and orange (1%); 7) oil and fats: oil (11%), margarine (1%), and mayonnaise (1%); 8) sweets: sweets (2%) and sugar (2%); and 9) condiments and beverages: cube (12%), tea (3%), and water (1%).

These findings were supported by the midline survey results, which showed that among mothers of children 6–23 mo old who had received the cash, 93.5% were either sole or joint decision-makers (with their husband) regarding the use of the cash. There was no significant difference between arms in the use of cash for different purposes such as food (79.5%), clothing (41.6%), and children's health (27.6%). Interestingly, cash used to buy food was mentioned by 85.3% of the mothers in the arm Snack + Cash + LNS and by 74.3% in the arm Snack + Cash ($P = 0.02$). Another interesting result is that, overall, only 2.7% of mothers mentioned that cash received was used to pay for transportation to the CHC (data not shown).

In the SNACK + Cash + LNS arm, coupling cash and LNS distributions was meant to help prevent women from traveling to

the CHC twice to receive both transfers, but only 2 out of 5 LNS distributions were observed on the same day as the cash distribution. Information from FLW interviews revealed that only 3 out of 6 CHCs were able to distribute LNS and cash on the same days, and in 1 CHC, the FLWs explained that they were only recently told to distribute both simultaneously. The accountant pointed out that simultaneous distribution of LNS and cash was more complex to manage, adding to their workload: “We used to give LNS on Wednesday and cash on Thursday. It was easy for us, but now they said we can't do it this way. To give the LNS and cash together, this makes it difficult” (FLW_5). Some NGO agents used an outreach strategy to distribute LNS to remote villages. Although this increased LNS distribution coverage, this adaptation of the original program design was not in line with the study purpose of encouraging women to come to the CHC to receive services. This also made the cash distribution (organized by the accountant who remained at the CHC) impossible to couple with the LNS distribution.

The quantitative midline survey revealed that among mothers with a child 6–23 mo of age, a higher proportion of women knew about the program in the Snack + Cash + LNS than in the Snack + Cash arm (87.5% and 79.3%, respectively; $P = 0.03$) (Table 5). Women in the Snack + Cash + LNS arm had attended the CHC more frequently than mothers in the Snack + Cash arm (84.7% compared with 72.3%, $P = 0.01$), but fewer mothers in the Snack + Cash + LNS arm than in the Snack + Cash arm had received the cash at least once (45.6% compared with 53.3%; $P = 0.05$). Among those who had attended the CHC, 41.3%, 33.5%, 38.7%, and 14.4% had received (across study arms) the cash during ANC visits, delivery, vaccination, and growth-monitoring visits, respectively. Regarding LNS, 79.9% of mothers of children 6–23 mo old

TABLE 5 Data from the quantitative midline survey on exposure of mothers of children 6–23 mo old to the SNACK-CNA program in the arms SNACK + Cash and SNACK + Cash + LNS, Mali¹

	All		SNACK + Cash		SNACK + Cash + LNS		P value
	n ^a	% ^b (95% CI)	n ^a	% ^b (95% CI)	n ^a	% ^b (95% CI)	
Know of the existence of the CNA program	1234	83.2 (79.3, 86.5)	627	79.3 (73.5, 84.1)	607	87.5 (82.1, 91.4)	0.03
Attended the CHC at least once	1234	78.2 (72.7, 82.8)	627	72.3 (63.6, 79.6)	607	84.7 (78.6, 89.3)	0.01
Received the cash at least once	996	49.4 (45.4, 53.3)	475	53.3 (48.2, 58.4)	521	45.6 (39.8, 51.6)	0.05
During ANC visits	996	41.3 (37.6, 45.0)	475	43.5 (38.2, 48.9)	521	39.2 (34.1, 44.6)	0.28
For delivery	996	33.5 (27.6, 40.0)	475	33.5 (27.6, 40.0)	521	33.5 (28.4, 40.0)	0.99
During vaccination visits	996	38.7 (34.8, 42.7)	475	43.0 (34.6, 46.3)	521	37.1 (31.9, 42.7)	0.44
During growth-monitoring visits	996	14.4 (11.5, 18.0)	475	13.3 (9.6, 18.2)	521	15.5 (11.3, 20.9)	0.49
Received LNS at least once					521	79.9 (74.7, 84.3)	
During vaccination visits					415	24.7 (18.9, 31.8)	—
During growth-monitoring visits					415	66.9 (60.3, 72.9)	—
Without attending any service at the CHC					415	8.3 (5.4, 12.6)	—
Never received cash					415	53.3 (47.2, 59.3)	

¹ANC, antenatal care; CHC, community health center; CNA, Cash for Nutrition Awareness; LNS, lipid-based nutrient supplement; SNACK, Santé Nutritionnelle à Assise Communautaire.

^an = women sampled.

^b% = weighted prevalence.

in the Snack + Cash + LNS arm had received the LNS, with 66.9% of those having received the LNS during growth-monitoring visits (and 33.1% in other circumstances) and 53.3% having never received any cash.

The incentive value of cash

Opinion on cash.

Most FLWs interviewed had a positive opinion about the program: “The project is really beneficial because even for vaccination activities, we don’t need to use the radio anymore to spread the message they must come. Women are here every day for ANC visits. Almost all women benefit from monitoring during pregnancy and deliveries at home really decreased” (FLW_8). Most of the FLWs were also satisfied with the amount of cash given to mothers, because they felt it motivated women to come to the CHC. FLWs frequently mentioned improvements in women’s lives such as the ability to purchase necessary items and improvements in autonomy and decision-making power as a result of receiving the cash: “It is really helpful ... thanks to the money ... they manage some personal things, without the help of their husband” (FLW_9). FLWs agreed the money was useful for women, helping them to take care of their children and put money toward the cost of transportation to the CHC: “For those who live far, it is very helpful ... [a woman] takes a motorcycle, she says to the driver, ‘Here you have 1000 CFA, buy a liter [of gasoline], put it in the motorcycle, and take me to the health center’” (FLW_10). Despite the challenges in receiving the cash, most mothers said they were satisfied with the amount received: “Ah! This amount was a real benefit for me; I jumped for joy because of this amount. I spent 5500 CFA for my delivery costs and they gave me 6000 CFA” (Mother_3). These results were confirmed by the midline survey, with 94% of women agreeing that the amount of cash distributed was fair.

Reasons for visiting and not visiting the CHC during the first 1000 d.

When mothers were asked during interviews to explain their reasons for visiting the CHC, most of the mothers who had received cash at

least once said the cash did not influence their decision to go to the CHC. The most salient reasons to attend CHCs included the diagnosis and treatment of diseases, the prevention of complications during pregnancy, the protection of children from childhood diseases, and the achievement of good health for children. These responses underscore that health was the primary motivation to visit the CHCs. When asked about the benefits they received from the CHCs, mothers described both the material (cash, mosquito net, LNS, etc.) and the health and wellbeing benefits: “I went for a long time to the health center and this for 8 pregnancies. All these children were born in the health center and all were properly vaccinated in the same health center, so it’s not because of the money that we are going to the health center” (Mother_4). On the other hand, approximately half of the mothers belonging to the Snack + Cash + LNS arm interviewed during the PE stated that the LNS was influential in their decision to attend growth-monitoring visits: “It was to weigh her, so Fatoumata could have the LNS, because last time when health workers came to our village for the distribution of LNS, Fatoumata was not the right age, so they gave me an appointment to bring her today” (Mother_5). In fact, all mothers had a favorable opinion regarding the LNS, putting forward that the LNS helped to facilitate good growth for the child: “I think it is good because it allows the child to eat well ... The importance of LNS is that it allows good growth of the child” (Mother_6). LNS seemed to have some weight in incentivizing women to attend CHCs during children growth-monitoring visits.

During interviews of women from both groups, most mothers identified the issue of transportation as a reason for not visiting the CHC. Mothers mentioned having long distances to walk between the CHCs and villages, the poor state of roads, the lack of a mode of transportation, and when available, transportation costs incurred for the long distances from the villages to the CHCs. Among FLWs, 1 head of a CHC stated that the cash was good as an incentive to increase attendance at the CHCs, but was not enough to cover medical expenses. Interestingly, a few FLWs suggested that the program should pay directly the fees for ANC visits, for delivery, and for women’s

transportation to attend vaccination and growth-monitoring visits, rather than providing cash to beneficiaries.

Discussion

Overall, this study showed that the cash component of the SNACK-CNA program was appreciated by both mothers and FLWs, and that cash was primarily used for food and medication. The research, however, highlighted several implementation challenges that were influenced by geographic inaccessibility, long distances to reach health centers, and poor road conditions which worsened during the rainy season. These constraints affected both the ability of FLWs to deliver the cash according to protocol, and the participation of beneficiaries in the program and their likelihood of receiving the cash when attending the CHCs. Our data revealed that CHCs adopted a variety of approaches to implement the cash component, which deviated from the original protocol and led to some operational inefficiencies and discontent among beneficiaries. This is highly likely to have influenced the incentive value of the cash, which was generally perceived as limited by beneficiaries.

The main purpose of the cash component of SNACK-CNA was to increase maternal and child attendance at the CHC for health and nutrition services by providing a cash incentive conditional upon attendance. In order to succeed in increasing attendance, the program would have had to ensure that cash was available for distribution, that the amounts available for distribution were sufficient to meet the expected attendance, and that cash was distributed at the same time as services were provided to avoid beneficiaries having to return to the CHC on different occasions in order to receive the cash they were owed. Our results, however, show that funds available at distributions were often insufficient for the number of beneficiaries present and therefore mothers had to return several times to the CHCs to receive their cash. For mothers who had long distances to travel and high transportation costs, the success of the conditional monetary incentive program relied on its dependability, which varied between locations. The sample of mothers who were interviewed in the PE reported that their main motivation to attend services at the CHC was to protect their child's and their own health by receiving medical care and preventive services. Cash was perceived as a *benefit* of attending the CHC but not as an *incentive* to attend. This may indicate that: 1) the cash may not have been the best incentive to boost attendance at CHCs in this context, 2) the cash value may have been too low to incentivize mothers to attend CHCs given transportation and other constraints, or 3) implementation issues and operational constraints leading to irregular receipt of the cash (or excessive effort on the part of the beneficiary to receive it) prevented the cash from functioning as a meaningful incentive for targeted beneficiaries.

Regarding the type of—and delivery system for the—incentive, our findings suggest that the LNS delivered in addition to the cash provided a greater incentive than cash alone, as evidenced by the fact that among mothers of children 6–23 mo of age (eligible for both cash and LNS), 72.3% in the Snack + Cash arm had attended the CHC at least once compared with 84.7% of mothers in the Snack + Cash + LNS arm ($P = 0.01$). Our results showed that the LNS was also perceived by mothers as a benefit and an incentive for caregivers to attend

growth-monitoring visits. Mothers clearly viewed LNS as important for improving their children's health and preventing malnutrition, which was the first reason mentioned by beneficiaries to attend CHCs. Some FLWs also suggested that removing fees for health services, as done in some countries in Sub-Saharan Africa, might be a more effective way to stimulate mothers to deliver at health facilities (21, 22). In Kenya, vouchers and co-paid vouchers were also found to boost facility delivery rates (23). Finally, a promising delivery approach for any type of cash transfer program is the use of mobile phone transfer systems (m-transfers), but it requires that beneficiaries have easy access to m-transfer cash delivery points, which was not the case in our study area (24).

Previous studies in Mexico found that the amount of the transfer is important to incentivize program participation (25). When first designed and implemented in Latin American countries, the optimal amount of the cash transfer for a given population was calculated based on poverty levels, given that the programs were originally designed as social transfers to reduce poverty and food insecurity (26). More recently, the cash amount has been calculated based on the financial costs (indirect or direct) of accessing and using health care services (5). In the SNACK-CNA program, the size of the transfer was calculated to cover an average transportation cost to the CHC of ~\$4.00 (round trip) and small costs for acquiring basic supplies like a pregnancy logbook or prenatal supplements such as iron. However, this amount of cash was considered small as compared with other social safety net programs implemented in Africa (27). In addition, given that women often had to go back and forth, sometimes several times, to the CHC to receive their cash owing to implementation challenges, the cost for transportation was higher than the potential gain. Overall, the total amount of cash a woman would receive in both study arms delivering cash was equivalent to \$96 for a complete follow-up (i.e., 3 antenatal visits, delivery, 3 vaccination visits, and 18 growth-monitoring visits), corresponding to close to 2 mo of consumption expenditure per adult in rural Mali (~\$46/mo) (28). However, to obtain the total amount, a woman would need to go to the CHC 25 times from pregnancy until her child reaches 24 mo of age. A study conducted in Zambia and Uganda corroborates our findings showing that transportation was a main challenge for women to deliver at the health facility, owing to 3 factors: affordability, accessibility, and adequacy of transport options, which was worst among the poorest women (29).

The PE and midterm survey analysis also revealed that the criteria used by FLWs to enroll women in the program deviated from the original plan described in the study protocol. From the program's start, FLWs enrolled women for receiving cash only during ANC visits or at delivery, instead of enrolling all pregnant women or women with a child <12 mo of age as per protocol. In fact, eligibility criteria were changed by program managers between the time of protocol design and program roll-out in order to reduce costs. The rationale behind this change was that enrolled women would be included from pregnancy up to the child's second birthday—and be covered by the program for the whole first 1000 d period. The perceived risk, however, was that if mothers missed enrollment (during pregnancy or at delivery), their child would not be eligible to receive benefits during the first 2 y of his/her life. This is indeed what we found in the cross-sectional midline survey, which showed that 1 y after the start of the program, the proportion of women who had received cash during growth-monitoring visits in both arms

was still low, whereas LNS distributions were fully implemented during growth-monitoring sessions in the Snack + Cash + LNS arm. We also observed a difference between study arms in the proportion of mothers who were aware of the program. This could be due to the outreach strategy used by some FLWs to distribute LNS at the community level, which could have lowered attendance at CHCs to receive cash, or to the increased workload for FLWs in the arm Snack + Cash + LNS, which could have prevented FLWs from distributing the cash regularly.

The use of mixed methods along the PIP in our study allowed for a deeper and richer analysis and understanding of the program's operations, implementation, and utilization in this context (30, 31) and helped identify potential areas that could be strengthened. Overall, results from the PE highlighted the challenges of program implementation in a rural, resource-poor environment such as the Kayes region. We shared and discussed our results with program implementers and stakeholders at a workshop organized in Kayes, in April 2016. Some of the recommendations to strengthen implementation included to provide clear, written instructions for program eligibility criteria, schedule, and amount of cash to all CHCs; to revise the current cash supply chain to deliver cash on time and in appropriate amounts to beneficiaries; and to increase the number of NGO supervisors and agents to obtain the cash and correct change for distribution. Availability of a larger amount of cash for each distribution was also found to be necessary to meet the demands of the program. Working sessions in subgroups of stakeholders were also organized to stimulate discussion regarding corrective actions that could strengthen the program's implementation and impact. Program implementers decided to provide additional training to all FLWs to strengthen knowledge and understanding of the program design, provide motorcycles to facilitate transport for program inputs, stop all back-payments, and include vaccination and growth monitoring as entry points to the program.

We used the program theory framework from Leroy et al. (32) to design the SNACK program's PIP and hypothesized the following pathways for cash transfers to improve maternal and child nutritional status, including positive effects on 1) women's income and control over resources; 2) children's dietary intake; 3) women's knowledge and awareness; 4) utilization of health services and child health; and 5) women's time, which could be affected either positively or negatively. According to the findings from free listing about the use of cash by beneficiaries, more than half of the responses indicated that the cash was used to buy food, potentially leading to an increase in household or children's dietary diversity as shown in other studies in Africa (33, 34), and thus it could have affected nutrition outcomes through improved diets. BCC sessions were also intended to encourage women to use the cash for maternal and child nutrition. However, we observed a BCC session conducted simultaneously with the cash distribution in only 1 CHC, whereas BCC sessions were held during LNS distributions in all CHCs. In the latter, the messages delivered focused mainly on the use of LNS, but also provided some advice on hygiene and child nutrition. Women's time in the SNACK-CNA project, on the other hand, could have been negatively affected by program utilization. Unavailability of cash on the day of service, and in some cases the separation between the cash and the LNS components of the intervention (in the group that received both), led to mothers returning to the CHCs several times

to receive their cash. This, coupled with long distances for mothers to travel in order to reach the CHCs and waiting time to receive the cash and/or LNS, may have represented a high time cost for women to participate. This, in turn, could have had a negative overall effect on the time mothers could allocate to child care or to generating income.

Our study has some limitations. First, we cannot exclude a social desirability bias from the FLWs interviewed. FLWs praised the program and they could have overestimated the usefulness of the cash for beneficiaries because of the presence of the survey team. However, enumerators presented themselves as independent from program implementers and built rapport with FLWs in order to make them feel comfortable sharing their real opinions. Second, some women might have felt ashamed to admit that they were incentivized by the cash to attend the CHCs, because this response would have highlighted their poverty status. However, the enumerators were trained extensively to provide a nonjudgmental and comfortable atmosphere during interviews and also built rapport with the women in the same way they did with FLWs.

In conclusion, our study showed that implementation constraints related to remoteness and inaccessibility may undermine the incentive value of a cash transfer aimed at increasing health service utilization by mothers and young children. The cash was perceived as a benefit of the program, but not an incentive, especially given irregularities in payment which resulted in a significant time burden for beneficiaries to receive their cash, and the relatively small amount of the transfer. In remote rural areas such as those served by the SNACK-CNA program in Mali, other approaches, including direct payment to CHCs for services rendered or payment of the total amount after all visits are completed at the CHC, should be considered. Our study also highlighted the importance of developing a theory-based PIP and carrying out careful implementation research using mixed methods to assess implementation fidelity and effectiveness and to better understand constraints to implementation and to utilization by targeted beneficiaries. The results of such study are invaluable for program strengthening, replication, or scale-up, especially in resource-poor settings such as rural Mali (35). Further studies should continue to explore alternative incentives to stimulate use of health services. LNS or other micronutrient supplements that can provide direct nutritional benefits to both mothers during pregnancy and young children should be considered either alone or in combination with cash, delivered under different types of conditionalities, to ensure optimal utilization of health services by targeted populations during the first 1000 d (36–38).

Acknowledgments

Our acknowledgements go to the Ministry of Health, the Direction de la Nutrition, WFP-Mali, WFP-Kayes, UNICEF, the Centre de Recherche, d'Etudes et de Documentation pour la Survie de l'Enfant (CREDOS) for their formative research, the Institut National de Recherche en Santé Publique (INRSP), program actors, field coordinators, enumerators, and household members, mothers, and children who participated in the study. The authors' responsibilities were as follows—AZ, ALP, MS, YM-P, and MTR: conceived and designed the study; YK, ADD, ES, and SF: conducted the data collection; ADD, J-LK, ES, SF, AZ, and ALP: analyzed the data; TM and NEK: were responsible for the program implementation; ALP and AZ: drafted the manuscript; and all authors: critically revised and approved the final manuscript.

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