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Impact of Cash Transfers in Health and Nutrition Interventions During the First 1,000 Days of a Child in Mali

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Abstract

Introduction: The first 1,000 days, from conception to the child's second birthday, represent a critical period for growth, cognitive development, and survival. In a context where child malnutrition remains a major issue in sub-Saharan Africa, and particularly in Mali, this study evaluates the impact of cash transfers on the first 1,000 days of the child.

Methods: The study was conducted among 264 women and 151 children aged 6 to 23 months in Mali (Kayes), selected randomly across four health districts at the household level linked to 87 health centers. The study analyzes the combined impact of healthcare and nutrition services, conditional cash transfers, and distribution of the Plumpy'Doz® nutritional supplement on maternal and child health.

Results: The results show a significant improvement in health practices.

Attendance at community health centers was significantly higher in the Cash groups ($p < 0.001$) compared with the Plumpy'Doz® group and women's decision-making autonomy reached 53.4% in the combined group

($p = 0.0001$).

Vaccination coverage was higher in the Plumpy'Doz® groups ($p = 0.001$), while nutritional screening rates were significantly higher in the Plumpy'Doz® group ($p < 0.0001$).

Nutritionally, the study revealed a reduction of over 7% in stunting and a decrease of 7.7% in global acute malnutrition. Analysis of dietary diversity indicated a significant improvement in the Cash and Combination groups, suggesting a direct effect of cash transfers on access to more varied diets.

Conclusion: The combination of financial support and nutritional supplementation produces a synergistic effect that strengthens both healthcare utilization, women's empowerment, and children's nutritional status. Integrating cash transfers into health and nutrition interventions during the first 1,000 days of life represents a promising intervention for addressing chronic malnutrition and holds potential for replication in other regions of Mali and similar African settings.

Keywords: Cash Transfer, 1,000 Days, Maternal and Child Health, Mali

Introduction

The first 1,000 days, spanning from conception to the child's second birthday, represent a critical biological and developmental window during which the foundations of physical, cognitive, and immune development are established (Black *et al.*, 2013) [2]. Globally, malnutrition remains one of the main threats to child survival and development. In 2022, over 148 million children suffered from stunting and 45 million presented with acute malnutrition (UNICEF, 2023) [6]. These forms of malnutrition irreversibly compromise growth potential, intellectual development, and future productivity.

In sub-Saharan Africa, stunting prevalence remains particularly high, affecting approximately 32% of children under five, with significant disparities across countries and rural areas (FAO, IFAD, UNICEF, WFP & WHO, 2023) [5]. Determinants are numerous and interrelated, including food insecurity, poverty, inadequate healthcare services, low female empowerment, and inappropriate feeding practices during pregnancy and early childhood.

In West Africa, chronic malnutrition is also a major public health issue. According to ECOWAS (2022), nearly one in three children suffers from stunting, and recurrent food insecurity and climate shocks exacerbate household nutritional vulnerability. Social protection systems are often insufficient to compensate for gaps in healthcare, food, and primary health services.

In Mali, the nutritional situation remains concerning. Recent demographic data indicate that 38% of children under five suffer from stunting and 12% from global acute malnutrition, among the highest rates in the region (Mali Demographic and Health Survey, 2018).

Multiple factors contribute to these results, particularly structural poverty, low dietary diversity, limited access to healthcare services, and inappropriate infant and young child feeding practices.

To address persistent malnutrition challenges in Mali, an integrated and innovative approach, combining cash transfers and health and nutrition interventions during the first 1,000 days, has been implemented within nutrition programs. This strategy aims to promote health- and nutrition-friendly practices during this critical period by simultaneously targeting household economic capacity, dietary behaviors, access to healthcare services, and nutrition prevention actions.

The approach is structured around three complementary components. The first involves conditional cash transfers for pregnant and lactating women to reinforce their use of health services and encourage adoption of appropriate nutritional practices. The second component focuses on distributing nutritional supplements, notably Plumpy'Doz®, to children aged 6 to 23 months to provide adequate energy and essential micronutrients for malnutrition prevention and optimal growth support. The third component involves promoting health and nutrition care in accordance with national and international standards, particularly through integrated management protocols for acute malnutrition (Integrated Management of Acute Malnutrition & Integrated Management of Childhood Illnesses), ensuring a coordinated and effective response to various forms of malnutrition.

In this context, the present study aims to analyze the impact of cash transfers combined with health and nutrition care during the first 1,000 days of the child in Mali. It specifically seeks to assess the effects of this approach on maternal and child health practices and on the nutritional status of children aged 0–24 months. The underlying hypothesis is that this integrated strategy would contribute to improved health and nutrition practices and, consequently, better nutritional status for children in the Malian context.

Methods and Materials

This study combines a descriptive and comparative cross-sectional survey with a retrospective cohort approach that allowed evaluation of health and nutrition indicators over the 2014–2017 period. The cross-sectional survey was conducted between May and July 2016 in four health districts of Mali (Bafoulabé, Oussoubidiagna, Diéma, and Yélimané).

The study population included women aged 15–49 years and their households who had participated in cohort follow-up since 2014 and provided informed consent. A sample of 264 women was selected from an initial population of 500

individuals. Random selection ensured relative representativeness. The cohort enabled tracking the evolution of health and nutrition indicators over 2014–2017. Inclusion criteria included residence in targeted districts and availability for field visits, with informed consent obtained. Exclusion criteria included households that had moved, participants refusing or absent during data collection, and pregnant women not followed within the cohort.

Participants were divided into three intervention groups: (i) Plumpy'Doz® supplementation alone, (ii) Cash transfer alone, and (iii) Combination Cash + Plumpy'Doz®. Data were collected at home, community health centers (Cscom), and community sites to facilitate individual interviews and nutrition consultations.

Collected data included socio-demographic characteristics of participants and households, nutritional practices and dietary habits, as well as maternal and child health data. Data were entered and analyzed using SPSS and ENA software, combining descriptive statistics to characterize the population and households, comparative analyses across intervention groups, and longitudinal cohort analysis to track the evolution of nutritional and health indicators from 2014–2017.

Statistical tests included Chi-square for qualitative variables, T-tests and ANOVA for quantitative variables, and logistic and linear regression analyses to identify factors associated with observed outcomes.

Results

1. Healthcare Service Utilization

Results show a clear and statistically significant improvement in attendance at health centers, particularly in groups receiving financial support. The Cash group had significantly higher regular attendance than the Plumpy group ($p < 0.001$), reflecting a much higher probability of regular visits. The combined intervention achieved maximal effect, with 100% health center attendance. Extremely high statistical significance ($p < 0.000000001$) confirms the robustness of these differences. These results demonstrate that cash transfers, alone or with Plumpy'Doz® are particularly effective in encouraging health service utilization, exceeding the regional average of 62%.

2. Assisted Deliveries

The rate of assisted deliveries increased sharply from 34% before the intervention to 79.6% after implementation. Comparative analysis across groups shows statistically significant differences ($p < 0.001$), with 56% in the Cash group, 51% in the Plumpy group, and the highest rate of 80% in the combined intervention group. This performance reflects better adoption of recommended health practices, particularly the use of qualified personnel during childbirth.

3. Women's Empowerment

3.1 Decision-Making Autonomy

In the Cash-only group, 31.8% of women reported making decisions alone, used as the reference. In the Plumpy group, 23.9% of women made decisions alone, OR = 0.67 (95% CI: 0.35–1.28, $p = 0.22$), slightly lower than Cash but not statistically significant. The combined group (Cash + Plumpy) had 53.4% of women making decisions alone, OR = 2.51 (95% CI: 1.40–4.50, $p = 0.002$), indicating a significant increase in decision-making autonomy compared with Cash. These results suggest a synergistic effect of

combining cash transfers with nutritional supplementation on women's empowerment. Cash alone was insufficient to significantly increase individual decision-making, highlighting the importance of the combined intervention.

3.2 Observed Economic Effects

According to household reports, 96% of spouses observed reductions in health-related expenses, debts, and purchases of basic necessities such as soap or food. This improvement in socio-economic conditions enhances the impact of the approach by contributing to overall household well-being.

4. Complete Vaccination Coverage

83.0% of children in the Cash group were fully vaccinated. In the Plumpy group, 97.7% were fully vaccinated, OR = 10.2 (95% CI: 1.28–81.5, $p = 0.028$), indicating children were ten times more likely to be vaccinated than in the Cash group. In the Combination group, 89.8% were vaccinated, OR = 1.97 (95% CI: 0.73–5.32, $p = 0.18$), almost double the probability compared with Cash but not statistically significant. These results highlight the key role of Plumpy'Doz® in adherence to preventive health services, likely due to close follow-up associated with its distribution.

5. Nutritional Screening

Nutritional screening analysis shows significant differences across groups. For children, screening rates were 59.1% (Cash), 90.9% (Plumpy), and 84.1% (Combination) ($p < 0.0001$). Among women, screening was 31.8% (Cash), 59.1% (Plumpy), and 45.6% (Combination) ($p = 0.0005$), emphasizing the strong effect of interventions, particularly those including Plumpy'Doz®. Regular health and nutrition activities at centers during Plumpy'Doz® distributions encouraged adherence, while Cash alone did not significantly increase participation.

6. Dietary Diversity of Children

Dietary diversity improved significantly in the Cash and Combination groups compared with the Plumpy-only group ($p < 0.0001$), indicating that cash transfers directly enhance access to varied diets, likely increasing household purchasing power and the ability to diversify children's meals.

7. Nutritional Impact on Children

Anthropometric evaluation of 151 children aged 6–23 months revealed significant nutritional improvements after three years of implementing the approach. Stunting decreased by over 7%, while global acute malnutrition decreased by 7.7%. These improvements are attributable to increased follow-up visits, early nutritional screening, and improved diet, all reinforced by cash transfers and Plumpy'Doz® distribution. These statistical results confirm that interventions combining financial support and nutritional supplementation produce a synergistic effect on child nutritional status. Cash access facilitates diversified food purchases and improves overall household well-being, while Plumpy'Doz® ensures regular follow-up and acute malnutrition prevention. The approach thus significantly reduces stunting and malnutrition while reinforcing optimal feeding practices during the first 1,000 days.

8. Identified Limitations

8.1 Insufficient Awareness on Home Delivery Risks

Despite interventions, up to 43% of women in the Plumpy group delivered at home. While intergroup analysis shows a significant overall effect ($p < 0.001$), awareness activities remain insufficient to ensure optimal use of skilled birth attendants.

8.2 Low Male Involvement

Male participation remains limited in decisions regarding care, prenatal or postnatal visits, or awareness activities. This low involvement is a structural barrier that limits overall program effectiveness and reduces potential impact on maternal and child health practices.

Discussion

Data analysis shows that the integrated health and nutrition approach with cash transfers and Plumpy'Doz® distribution significantly improved health and nutrition conditions during the first 1,000 days, a critical period for breaking the intergenerational cycle of malnutrition. Statistical results confirm that community health center attendance is significantly higher in the Cash and Combination groups than in the Plumpy-only group ($p < 0.001$; OR = 22.37 for Cash vs Plumpy), and women's decision-making autonomy is also strengthened in the combined group ($p = 0.0001$) (Issa Lende, 2017) [1].

Conditional cash transfer appears as a major lever for women's empowerment, facilitating not only access to health services but also dietary diversification and improved household nutrition practices. Plumpy'Doz® contributes significantly to acute malnutrition prevention and vaccination coverage improvement ($p = 0.001$), largely due to regular follow-up and frequent contact with health personnel.

The combined Cash + Plumpy'Doz® approach is the most effective, enhancing women's decision-making capacity and significantly reducing stunting and global malnutrition in children. These results confirm the relevance of multisectoral interventions combining economic support, nutrition education, and strengthened health services, consistent with recommendations in the child nutrition literature (Black *et al.*, 2013) [2].

However, sustainable success depends also on community and structural factors. Limited male involvement in health decisions and high rates of home deliveries (up to 43% in the Plumpy group) are obstacles to maximizing impact. Community mobilization, awareness of home delivery risks, and stable funding remain essential to optimize maternal and child health benefits.

Conclusion

Interventions combining financial support and nutritional supplementation are the most effective in strengthening women's empowerment, improving vaccination coverage, promoting nutritional screening, and enhancing children's dietary diversity. Cash transfers alone contribute to some improvements, notably dietary diversity and decision-making autonomy, but are insufficient to maximize effects on health practices and nutrition service utilization.

The first 1,000 days remain critical for the child's physical

and cognitive development. This study shows that the integrated approach, combining health care, nutrition, and cash transfers, constitutes a relevant and effective intervention. It significantly improves health practices, strengthens women's decision-making autonomy ($p = 0.0001$), and reduces stunting and acute malnutrition in children aged 0–23 months (stunting reduction 7%, global acute malnutrition reduction 7.7%).

Moreover, health center attendance is significantly higher in Cash and Combination groups compared with Plumpy-only ($p < 0.001$), and vaccination coverage improves significantly in Plumpy'Doz® groups ($p = 0.001$). These results illustrate the synergistic effect of the combined approach, consolidating both household well-being and child health.

When deployed in other regions of Mali or similar African contexts, this strategy could serve as a replicable model for combating chronic malnutrition and an effective lever for promoting maternal and child health.

Research Contributions

1. Strengthening Local Health Systems: The integrated health and nutrition approach with Cash and Plumpy improves community health center attendance, vaccination coverage, and nutritional screening, confirming that combined economic and nutritional interventions can enhance local health system effectiveness.
2. Guiding Nutrition and Social Policies: The study provides strong quantitative evidence on the effectiveness of combined interventions (Cash + Plumpy'Doz®) in reducing stunting and acute malnutrition, guiding policymakers and government agencies in implementing conditional cash transfer programs and optimizing regional or national nutrition and food security policies.
3. Strengthening University and Research Programs: The methods and results provide educational and scientific contributions for universities and research centers, offering a practical example of cohort follow-up, applied statistical analysis in nutrition and public health, and multisectoral intervention design. Data can be used for training students in public health, nutrition, social sciences, and development, as well as inspiring applied research.
4. Empowerment and Social Impact: The study highlights the role of health and nutrition interventions with cash and Plumpy in strengthening women's autonomy, dietary diversification, and household participation in health activities, representing an important lever for long-term economic and social empowerment and community development.
5. Replicable Strategic Model: Results indicate the approach can be adapted and reproduced in similar African contexts, as it combines economic and nutritional interventions to maximize impact during the first 1,000 days and support holistic child and family development.

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Conflict of Interest: The authors declare no conflicts of interest; analyses and conclusions were conducted independently, without influence from funders or operational partners.

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