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ASSESSMENT OF EFFECTIVENESS OF CONDITIONAL CASH TRANSFER IN IMPROVING NUTRITIONAL STATUS OF CHILDREN DURING THE FIRST 1000 DAYS OF LIFE

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ABSTRACT

Background: The first 1,000 days of life, from conception to a child's second birthday, are a critical period for growth, development, and long-term health. Adequate nutrition during this period is essential for preventing malnutrition and promoting optimal physical and cognitive development. Conditional Cash Transfer (CCT) programs provide financial incentives linked to health and nutrition services to improve maternal and child health outcomes. This study aimed to assess the effectiveness of a CCT program in improving the nutritional status of children during the first 1,000 days of life.

Materials & Methods: : A descriptive cross-sectional study was conducted from 16 May 2025 to 16 November 2025 at the Health and Nutrition Stunting Prevention Conditional Cash Transfer facilitated center, Rural Health Centre Chak No. 3, District Shaheed Benazirabad, Sindh, Pakistan. A total of 408 children aged two years who completed all scheduled follow-up visits from the third to the eighth quarter were selected through purposive sampling. Data were collected using a structured questionnaire and anthropometric assessment form. Nutritional status was assessed using Mid-Upper Arm Circumference (MUAC), weight, and height measurements. Data were analyzed using SPSS version 29, and paired sample t-tests were applied to compare measurements at admission and the eighth-quarter assessment.

Results: Significant improvements were observed in all anthropometric indicators. Mean MUAC increased from 12.54 ± 0.99 cm to 13.75 ± 0.91 cm, mean height increased from 67.95 ± 45.66 cm to 77.46 ± 5.27 cm, and mean weight increased from 7.65 ± 8.06 kg to 9.77 ± 7.44 kg ($p < 0.001$ for all comparisons). Overall, 397 (97.3%) children demonstrated improvement in nutritional status. Greater improvements were observed among children receiving higher cash transfers along with specialized nutritious foods and Ready-to-Use Therapeutic Food (RUTF).

Conclusion: The CCT program was highly effective in improving the nutritional status of children during the first 1,000 days of life. Integrated cash transfer and nutrition support interventions can play a significant role in reducing child undernutrition and promoting healthy growth among vulnerable populations.

KEYWORDS: Conditional Cash Transfer, First 1,000 Days of Life, Child Nutrition, Anthropometry, Malnutrition.

INTRODUCTION

The first 1,000 days of life spanning from conception to a child's second birthday are vital for growth and development, making adequate nutrition essential for fetal and infant health.[1]This timeframe is often referred to as the "1000-day window of opportunity," as appropriate nutrition and care for the unborn child and infants can have lasting effects on the health and economic prospects of familie,[2] Maternal malnutrition directly affects newborn development, highlighting the need to address nutritional needs during pregnancy. Interventions like counseling, behavior change, and nutritional support improve health outcomes,[3] The nutrition and care provided to the expectant mother during the first 1000 days affect the essential for infant's growth.[4] Adequate nutrition during pregnancy is vital for maternal and newborn health, especially in Pakistan.[3,5] In the first two years of life, nutrition continues to play a decisive role in shaping a child's future potential[6], Insufficient or inappropriate nutrition during the first 1000 days can cause irreversible damage to both physical and cognitive development.[7] These effects are largely irreversible in South Asia,[8] including Pakistan, the burden of child under nutrition remains alarmingly high.[9]

The Pakistan Demographic and Health Survey reports that approximately 38% of children under five are stunted, 17% are wasted, and 23% are underweight.[3,10] Several interlinked barriers hinder the achievement of optimal nutrition in the first 1000 days.[11] Poor maternal health prior to and during pregnancy further complicates the nutritional picture contributing to poor fetal growth and adverse birth outcomes.[12] Addressing nutrition in the first

1000 days requires an integrated approach combining nutrition-specific and nutrition-sensitive interventions.[13] Early evaluations suggest improvement child growth outcomes.[14] Conditional Cash Transfer (CCT) programs in healthcare provide financial incentives to encourage health-seeking behaviors and improve outcomes by addressing economic and motivational barriers. These programs target low-income households, requiring compliance with conditions such as growth monitoring, immunization, antenatal care visits, and facility-based deliveries.[15] Low-income and middle-income countries experiencing nutrition transition face an increasing double burden of malnutrition.[16] Cash transfers alone have had minimal effects on long-term child well-being outcomes, such as nutrition and health, despite strong evidence supporting their ability to improve more immediate factors, like food access. Consequently, cash-plus programs were created with the goal of achieving better outcomes in these more distant, "third-order" measures. Conditional Cash Transfer (CCT) programs prioritize vulnerable groups by ensuring regular postnatal clinic visits for mothers and children. They enhance child health outcomes, support immunization, and reduce under nutrition-related issues like stunting and wasting.[17] CCT program increase utilization of maternal and child health services and reduce barriers to accessing preventive care.[18,19]

MATERIAL & METHODS

Study Design and Setting

A descriptive cross-sectional study was conducted at the Health and Nutrition Stunting Prevention Conditional Cash Transfer (CCT) facilitated center located at the Rural Health Centre (RHC), Chak No. 3, District Shaheed Benazirabad, Sindh, Pakistan. The study was carried out over a six-month period from 16 May 2025 to 16 November 2025.

Study Population and Sample Size

The study population comprised children enrolled in the Conditional Cash Transfer (CCT) program during the first 1,000 days of life. The sample size was calculated using RaoSoft software with a 95% confidence level, 5% margin of error, and an expected prevalence of 40%. The minimum required sample size was 369 participants. After adding 10% to compensate for possible non-response, the final sample size was increased to 408 children.

Sampling Technique

A non-probability purposive sampling technique was employed to recruit eligible participants from the CCT facilitated center.

Inclusion and Exclusion Criteria

Children aged two years who attended all scheduled follow-up visits from the third to the eighth quarter (six consecutive visits) and whose parents or guardians provided written informed consent were included in the study. Children older than two years and those who missed two consecutive quarterly follow-up visits were excluded.

Data Collection

Data were collected using a structured questionnaire and anthropometric assessment form. Information regarding socio-demographic characteristics, cash transfer amounts received, and nutritional support provided through the CCT program was obtained from caregivers and program records.

Anthropometric measurements included weight, height, and Mid-Upper Arm Circumference (MUAC). Baseline measurements recorded at admission were compared with measurements obtained during the eighth quarter follow-up visit to assess changes in nutritional status.

Study Variables

The primary outcome variable was improvement in nutritional status, assessed through anthropometric indicators including MUAC, weight, and height. Independent variables included the amount of quarterly cash transfer received and the type of nutritional support provided through the CCT program.

Statistical Analysis

Data were entered and analyzed using Statistical Package for Social Sciences (SPSS) version 29. Descriptive statistics were calculated and presented as frequencies, percentages, means, and standard deviations. Paired sample t-tests were applied to compare anthropometric measurements at admission and at the eighth quarter follow-up. A p-value of less than 0.05 was considered statistically significant.

RESULTS

A Total of 408 children aged two years were included in the study. Of these, 213 (52.2%) were female and 195 (47.8%) were male (Table 1).

Table:1 Demographic characteristics of the study children by Age and Gender (n= 408)

Variable	(n)	%
Child Age		
2 Years	408	(100%)
Gender		
Male	195	(47.8%)
Female	213	(52.2%)

Significant improvements were observed in all anthropometric indicators between admission and the eighth quarter of follow-up (Table 2). The mean Mid-Upper Arm Circumference (MUAC) increased from 12.54 ± 0.99 cm at admission to 13.75 ± 0.91 cm at the eighth quarter, with a mean difference of 1.21 cm ($t = -25.37$, $p < 0.001$). Similarly, the mean height increased from 67.95 ± 45.66 cm to 77.46 ± 5.27 cm, demonstrating a mean increase of 9.51 cm ($t = -4.21$, $p < 0.001$). The mean weight also increased from 7.65 ± 8.06 kg at admission to 9.77 ± 7.44 kg at the eighth quarter, with a mean difference of 2.12 kg ($t = -3.91$, $p < 0.001$).

Table:2 Comparison of Anthropometric Measurements of children at Admission and the 8th Quarter Assessment (n = 408)

Variable	Range at Admission 3rdQuarter	Range at 8th Quarter	(n) %	Admission Mean (± SD)	8th Quarter Mean (± SD)	Mean Difference	t-value/	p-value
MUAC (cm)	**8-15.5cm**	**10-18cm**	**408 (100%)**	**12.54±0.99**	**13.75±0.91**	**-1.21**	**-25.37**	**<0.001**
Height (cm)	**50-80cm**	**50-90cm**	**408 (100%)**	**67.95±45.66**	**77.46±5.27**	**-9.51**	**-4.21**	**<0.001**
Weight (kg)	**4-15kg**	**4-17kg**	**408 (100%)**	**7.65±8.06**	**9.77±7.44**	**-2.12**	**-3.91**	**<0.001**

Regarding nutritional outcomes and cash transfer support, 397 (97.3%) children showed improvement in nutritional status, while only 11 (2.7%) did not improve (Table 3). Among children receiving PKR 4,000–4,500 per quarter along with specialized nutritious food and Ready-to-Use Therapeutic Food (RUTF), 205 (50.25%) demonstrated nutritional improvement, whereas 7 (1.71%) did not improve. Similarly, among those receiving more than PKR 5,000 per quarter with the same nutritional support package, 191 (46.81%) showed improvement and only 4 (0.98%) did not improve. One child receiving PKR 2,500–3,500 together with specialized nutritious food demonstrated nutritional improvement.

Table:3 Association Between Quarterly Cash Transfer, Supplementary Food Support, and Improvement in Children's Nutritional Status (n = 408)

Cash Transfer Received Quarterly (PKR)	Supplementary Foods Provided Through the CCT Program	Improved Nutritional Status n (%)	Not Improved Nutritional Status n (%)
2500 - 3500	**Specialized nutritious food**	**1 (0.25%)**	**0 (0.0)**
4000 - 4500	**Specialized nutritious food & RUTF**	**205 (50.25%)**	**7 (1.71%)**
>5000	**Specialized nutritious food & RUTF**	**191 (46.81%)**	**4 (0.98)**
Total 408 (100%)	**408 (100%)**	**397 (97.30%)**	**11 (2.70%))**

DISCUSSION

The findings of this study demonstrate a substantial positive effect of the Conditional Cash Transfer (CCT) program on the nutritional status of children during the first 1,000 days of life. Nearly all participants (97.3%) experienced measurable nutritional improvement, indicating that the combined provision of financial support and nutritional supplementation can effectively address child under nutrition in vulnerable populations. Significant improvements observed in MUAC, weight, and height measurements suggest enhanced growth and nutritional recovery among beneficiary children. These findings are consistent with previous evidence showing that CCT programs increase household food security, improve access to healthcare services, and promote adherence to growth monitoring and nutritional interventions. By reducing economic barriers and encouraging regular health facility attendance, CCT programs contribute to better child health outcomes.[6-9]

The study further indicates that children receiving larger cash transfers alongside specialized nutritious foods and RUTF achieved greater nutritional gains. This observation supports the concept that integrated "cash-plus" interventions are more effective than financial assistance alone. Such approaches not only improve access to food but also facilitate behavioral changes related to child feeding practices and healthcare utilization.

The high proportion of improved nutritional outcomes observed in this study may also reflect the effectiveness of regular follow-up visits, growth monitoring, caregiver counseling, and nutritional support provided through the facilitated centers. Collectively, these interventions create an enabling environment for optimal child growth and development during this critical window of opportunity.[15, 20]

CONCLUSION

The Conditional Cash Transfer (CCT) program was highly effective in improving the nutritional status of children during the first 1,000 days of life. Significant improvements were observed in anthropometric indicators, including MUAC, weight, and height, with 97.3% of participating children demonstrating measurable nutritional improvement. The findings highlight the potential of integrated cash transfer and nutrition support interventions to reduce child undernutrition and promote healthy growth among vulnerable populations in Sindh Pakistan.

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