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EFFECTIVENESS OF COMMUNITY BASED INTERVENTION IN REDUCING CHILDHOOD MALNUTRITION

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ARTICLE INFO	ABSTRACT
	Early childhood malnutrition remains a severe global health concern,
Keywords:	disproportionately impacting low- and middle-income nations. This
Malnutrition, Childhood, Cbis,	research assesses the impact of community-based interventions (CBIs)
Community Empowerment	to alleviate malnutrition in children under five years old. With a mixed-
Corresponding Author:	methods research design in rural and peri-urban areas, the study
Dr. Ushna Afzal, Hair Transplant	integrates quantitative anthropometric measurements and qualitative
Surgeon, Senior Medical Officer,	interviews. Findings indicate that children who are exposed to CBIs have
Aesthetic Physician	much lower stunting, wasting, and underweight levels, and attain greater
Email: <u>ushnaafzal37@gmail.com</u>	dietary diversity and exclusive breastfeeding compliance than non-
	exposed children. Community empowerment, culturally acceptable
	education, and high trust relations with community health workers are
	highlighted as the major enablers of success by the study. Sustained
	barriers such as food insecurity and funding uncertainty call for
	integrated, adaptive, and sustainable models. This study reaffirms the
	position of CBIs as change agents in child nutrition and demands multi-
	sectoral coordination and long-term coping strategies to optimize their
	impact.

Introduction

Malnutrition is still a major cause for death and disease among the young in many parts of the world, especially in low-and middle-income countries. Despite improvements in food systems, over 45 million children under the age of five are suffering from wasting, and 149 million face stunting (UNICEF, 2023). The WHO in 2022 pointed out that poor nutrition in the earlier years not only leads to impaired physical development but also to irreversible cognitive impairment. To manage the crisis, most public health agencies had relied on facility-based forms of intervention. While such interventions are generally effective in urban settings, they often fail in rural and underserved areas for reasons of inaccessibility, monetary costs, and lack of infrastructure (Cichon et al., 2025). To offset the shortcomings of facility care, CBIs have emerged as cost-effective and decentralized models for preventing and treating malnutrition.

CBIs consist of trained local health workers, peer support groups, and community-led feeding programs physiologically bridged to the local environment (López-Ejeda et al., 2025). For instance, in Gao, Mali, decentralized treatment for malnutrition resulted in increased uptake of treatment and decreased costs (Cichon et al., 2025). Such interventions have been especially successful in fragile and conflict-affected zones where one finds the traditional healthcare infrastructure lacking (Li et al., 2024). The development of community nutrition programs includes CMAM, growth monitoring, food security counseling, and behavior change communication. Conversely, culturally sensitive interventions that link with local resources achieve better outcomes (Kyanjo et al., 2025).

Quantitative research repeatedly shows the effectiveness of CBIs in lowering stunting, wasting, and underweight rates. In Nepal and India, the implementation of participatory learning and action (PLA) among women's groups lowered stunting by more than 15% over three years (Patel et al., 2021). Qualitatively, CBIs have empowered mothers, enhanced community resilience, and enhanced care-seeking behaviors (Mwangi et al., 2019). In Ethiopia, consistent community healthworker involvement was associated with greater exclusivebreastfeeding coverage (Tadesse et al., 2020). Meta-analyses confirm that community-led monitoring and local ownership are strong predictors of success (Ahmed et al., 2023). However, success varies by context. In urban slums of Nairobi, interventions faced barriers due to overcrowding and mobility (Mutiso et al., 2022). In areas of conflict such as South Sudan, community

nutrition centers were promising but were hindered by inconsistency because of supply chain interruptions (Aketch et al., 2023). Even with promising evidence, there are challenges. Scalability is frequently circumscribed by sustainability, staff burnout, poor follow-up, and cultural

resistance. Furthermore, even though numerous studies show short-term gains, longitudinal evidence regarding the effectiveness of CBI is limited (Saha et al., 2021). Therefore, the global health sector needs to prioritize evidence-based, adaptive, and culturally responsive community programs. This study contributes to the build-up of this evidence base by examining new models of intervention, implementation effects, and crosssectional case studies of 2018–2025.

Empirical evidence on multiple continents has shown that CBIs can enhance nutritional status a mong children. Singh and Ahmed (2023) in India noted a 17% decrease in wasting

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among the under-fives through village nutrition hubs. In Kenya, Mwangi et al. (2019) noted improved minimum dietary diversity scores among children 6–23 months of age through regular community nutrition sessions.

These quantifiable effects prove that CBIs are effective interventions against undernutrition, parti cularly in high-burden rural areas. Meta-analyses also support this. Ahmed and Bhuiyan (2023) prepared a regional synthesis of 18 CBI trials in South and Southeast Asia and concluded that community-based delivery mechanisms are more responsive and costeffective than centralized systems. The same is supported by Van Der Berg and Botha (2021), who attributed food security-oriented CBIs to stunting decline in Southern Africa. Yet, results vary. In city Nairobi, Mutiso and Wanjohi (2022) discovered that intense mobility of the population and congestion restricted reach of CBI, emphasizing context sensitive design. Hamid and Baloch (2022) made a related observation, with the authors arguing that integrating behavioral science into messages enhances retention and engagement in culturally conservative environments such as Balochistan. While CBIs are accompanied by anthropometric changes, they also induce social change. Giving mothers knowledge and decision-makers is a recurrent theme of empowering caregivers, especially women. The author's Kyanjo et al. (2025) and Gomez and Navarro 2019 state that peer supportive and joint learning groups increased maternal self-confidence while improving proper food practices and nutritional awareness. In Ethiopia, Abebe and Mekonnen (2019) claim that agriculture extension and community nutrition combined developed the behavior of sustained household food production and resilience among families, whereas community kitchens in Egypt doubled as nutrition education places, tying community relations and intergenerational learning. These qualitative changes underscore that proper CBIs are not really technical interventions to be transformed but rather vehicles for mobilizing communities toward self-sufficiency and long-term wellness. Gaps never kuro ojali successful prove that would have facilitated the movement toward scaling up CBIs. Most programs rely heavily on external funding and lack continuity once donors withdraw (Saha & Nair, 2021). Dlamini and Ntuli (2023) reported that peer volunteers are not retained in Lesotho mostly because of lack of incentives to motivate them and burnout-associated with volunteerism. The other weak links are monitoring and evaluation. Rahman and Akter (2020) stated that in many rural Bangladesh programs, outcome data were recorded inconsistently, making the tracking of performance complicated. Health tools in conjunction with digital

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dashboards—like those piloted by Das and Kalita (2021)—provide a solution for the way forward, especially in postpandemic context where remote tracking is a must. In fragile and conflict-affected regions-for instance, Somalia and South Sudan-Ali and Yusuf (2022) and Aketch and Duer (2023) pointed out that the delivery of services continues to suffer due to political instability and disruption of supply chains, despite strong community support. This synthesis highlights that while the area of CBIs has somehow changed the landscape for child nutrition intervention in many areas, the actual impact is very uneven and largely depends on the local context, governance capacity, and sustainability mechanisms. Very few studies are longterm in nature, with fewer still considering integration into education, mental health, and agriculture. The study in question will attempt to redefine effectiveness beyond anthropometry to include sustainability, empowerment, and equity considerations.

Objectives

This research seeks to assess the effectiveness of community-based interventions (CBIs) in the prevention of childhood malnutrition. The specific aims are:

1.To determine the contribution of CBIs towards reducing stunting, wasting, and being underweight among children.

2.To compare various models of CBI and determine those with the most measureable and sustainable effects.

3.To analyze the contribution of community participation and caregiver empowerment in improving the effectiveness of interventions.

4. To examine how economic, environmental, and cultural factors impact the success of CBIs.

5.To determine the application of technology, monitoring systems, and sustainability measures in long-term program success.

6.To recognize challenges and propose best practice for enhancing future community-based nutrition interventions.

Methodology

Study Design

This research adopted a mixed-methods approach, which combines quantitative cross-sectional studies with qualitative semi-structured interviews. This design was important for the objects' valuation of nutrition outcomes and also detailed investigations of the community dynamics and

behavioral changes. The methodology was essentially informed by Haskins et al. (2025), who held a comparable approach in the estimation of nutrition interventions at the community level.

Study Setting and Participants

The study was implemented in two rural and two peri-urban communities selected on the basis of being high in undernutrition and the presence of ongoing CBIs. The study participants included: Caregivers of children between the ages of 6-59 months

Community health workers (CHWs)

Nutrition coordinators in the locality

Eligibility criteria were therefore mirrored from those described by Haskins et al. (2025) and targeted persons who were directly engaged in or who have experienced community-based nutritional interventions.

Sampling Strategy

For the qualitative study, inclusion-exclusion sampling was done to account for representation across gender, community roles, and levels of intervention exposure. The quantitative study sampled using systematic random sampling of households that were incorporated into community-based intervention programs. Sample calculations were with the assistance of G*Power software, taking into account parameters from other studies like Erzse et al. (2024), which evaluated the community action for maternal-child nutrition support using the cross-sectional study.

Data Collection Methods

Quantitative Data

Quantitative information consisted of:

Standardized anthropometric measurements (height-for-age, weight-for-height)

Pre-validated structured household surveys

Assessments of dietary diversity scores and feeding practices.

Qualitative Data:

Semi-structured in-depth interviews using a protocol from Haskins et al. (2025) modified for this research Audio recordings transcribed word-for-word for thematic analysis

Data Analysis

Quantitative data were examined using SPSS v26.0. Descriptive statistics and inferential tests (ttests, chi-square tests, logistic regression) were used to investigate associations between exposure to intervention and nutritional status. Qualitative data were analyzed by thematic content analysis using NVivo, following Braun and Clarke's (2006) six-step process, as used in Haskins et al. (2025).

Results

Sample Characteristics

Characteristic	Value		
Mean caregiver age (years)	28.7 ± 5.3		
Gender of caregiver	91% Female, 9% Male		
Monthly household income below poverty	63%		
line			
Child mean age (months)	28.5 ± 16.2		
Child gender distribution	51.4% Male, 48.6% Female		
Number of qualitative participants	28 (18 caregivers, 6 CHWs, 4 nutrition		
	coordinators)		

Participant eligibility criteria aligned with Haskins et al. (2025)

Quantitative Findings

Nutritional Status

Anthropometric assessments shows that:

Outcome	Overall	CBI-Exposed	Non-Exposed	р-
	(%)	(%)	(%)	value
Stunting (HAZ < -2 SD)	32.5%	25.1%	41.3%	< 0.001
Wasting (WHZ < -2 SD)	18.2%	12.7%	24.8%	0.002
Underweight (WAZ < -2 SD)	26.7%	19.4%	34.6%	< 0.001
MUAC below 12.5 cm	20.3%	14.6%	27.1%	0.003
Minimum dietary diversity	61%	71%	48%	< 0.001
achieved				
Exclusive breastfeeding at 6	58.5%	66.2%	49.1%	0.011
months				

(CBI = Community-Based Intervention; HAZ = Height-for-Age Z-score; WHZ = Weight-for-Height Z-score; WAZ = Weight-for-Age Z-score)



Children treated with community-based interventions (CBIs) showed much improved results:

Outcome	Group/Comparison	Statistic	Value	P-value
Mean height-	Exposed vs Non-	t(410)	5.84	< 0.001
for-age Z-	exposed			
scores				
Risk of	Intervention vs	OR (95% CI)	0.54 (0.36–	0.002
wasting	Control		0.80)	

Dietary Diversity and Feeding Practices



Additional Dietary and Breastfeeding Results

Outcome	Group/Compar	rison Va	lue	P-value
Minimum	Overall	61	%	-
dietary				
diversity (≥5				
food groups)				
Minimum	CBI-exposed	vs 22	.17	< 0.001
dietary	Non-exposed			
diversity by				
exposure				
Exclusive	Sustained C	CHW 58	.5%	0.011
breastfeeding	activities			
at 6 months				

Qualitative Findings

Thematic analysis of the 28 interviews led to the identification of the following major themes:

1. Community empowerment and knowledge gain

The caregivers reported that their understanding of IYCF practices had improved considerably through peer learning and community sessions. One caregiver elucidated, "*Before the sessions, we thought water was enough for infants. Now we understand the importance of breastfeeding exclusively for six months.*"

2. Behavioral transition in feeding practices

They are able to describe some definite behavioral changes, including:

The earlier introduction of nutrient-dense complementary foods,

More regular timing of meals,

Greater inclusion of fruits and vegetables.

Another lesson brought home by community health workers (CHWs) was the demonstration of good feeding practices during their home visits.

3. Barriers to the sustained nutritional gain

The caregivers said that persistent challenges still included:

Restricted access to a diversity of food due to seasonal variability,

Economic variables that limit food purchasing.

A CHW noted, "Sometimes we educate, but families cannot buy eggs or fruits every week."

4. Socioeconomic Contextual Role

Maternal work was associated with opportunities and risks:

Working mothers were more likely to be able to provide varied foods,

But some had time limitations for best child feeding.

5. Trust and Involvement with CHWs

Strong caregiver-CHW trust relationships were consistently highlighted as essential for intervention adoption and sustainability.

Data Integration

Quantitative and qualitative results showed excellent concordance:

Households reporting frequent CHW visits also reported increased dietary diversity in children and breastfeeding compliance.

Societies with functional peer support groups had more robust maternal empowerment stories.

Data Management and Quality Assurance

Quantitative data entry was complemented with double-data entry mechanisms.

Coding supported by NVivo scored an intercoder reliability kappa of 0.89.

There were no significant data quality issues identified during internal audits.

DISCUSSION

Using a mixed-methods approach, this paper assessed the effectiveness of community-based interventions in improving the nutrition outcomes of children in rural and peri-urban areas. The evidence is now building to firmly conclude that CBIs have a significant impact on the reduction of stunting, wasting, and underweight in children aged below five years. Although a 32.5% prevalence of stunting is still alarming, it is a substantial reduction compared to situations where children are not exposed to CBIs, which is in agreement with previous findings in South Asia and Sub-Saharan Africa (Patel et al., 2021; Singh & Ahmed, 2023). Wasting prevalence, also expectedly (18.2%), also concurs with previously reported reductions in participatory community models within the Kenyan and Ethiopian settings (Mwangi et al., 2019; Abebe & Mekonnen, 2019). Quantitative improvement in dietary diversity scores closely mirrors findings from Nepal and India, where community-led education had excellent, significant, and minimum dietary diversity improvement (Manandhar et al., 2018; Sethi et al., 2022). The achievement of 71% in dietary diversity score by households exposed to CBIs supports the effectiveness of nutritionspecific message targeting according to the type of interventions described by Kyanjo et al. (2025) and Van Der Berg and Botha (2021). Exclusive breastfeeding rates among participants were significantly higher in communities with active CHWs, resonating with such reports from community health programs in Malawi and Uganda (Tadesse et al., 2020; Hörnell et al., 2025). This highlights the important role played by the frontline in supporting early child nutrition as presented by López-Ejeda et al. (2025) and Gómez and Navarro (2019). Qualitative findings from this study pertaining to maternal empowerment, trust in CHWs, and improved feeding practices were sounded by Mahmoud and El-Masry (2021) and John-Schuster et al. (2024). Caregivers considered peer learning to be valuable and culturally relevant for counseling, which corresponded with participatory approaches in fragile settings (Li et al., 2024; Aketch et al., 2023). However, continuous barriers like economic constraints and food seasonality were reflected in the challenges identified by Saha and Nair (2021) in South Asia and Ali and Yusuf (2022) in conflict-affected Somalia. Indeed, as reiterated by Martins et al. (2022) and Mutiso and Wanjohi (2022), seasonal food insecurity remains one major threat to sustainability.

The mixed-methods integration provided robust validation, where quantitative dietary diversity gains corresponded with qualitative accounts of improved feeding behaviors. This aligns with findings from Das and Kalita (2021) on the role of behavior change communication and mHealth tools in enhancing program uptake post-COVID. The community empowerment outcomes noted here are consistent with the socio-ecological transformations observed in rural health interventions (Ahmed & Bhuiyan, 2023; Singh et al., 2023). Specifically, the reported decision-making shifts among women support theories linking nutrition improvements to gender empowerment (Hamid & Baloch, 2022; Khatun et al., 2021). While this study's outcomes affirm the potential of CBIs, challenges regarding sustainability, volunteer retention, and funding vulnerabilities persist. Dlamini and Ntuli (2023) similarly reported volunteer burnout as a limiting factor in CBI expansion in Lesotho. Moreover, the gaps in data monitoring noted here parallel findings from Rahman and Akter (2020) in Bangladesh, suggesting that digital innovations like mHealth (Das & Kalita, 2021) should be more widely adopted. The context-specific nature of intervention success remains crucial. In densely populated or conflict settings, program outcomes were less consistent, consistent with reports from Cichon et al. (2025) and Aketch and Duer (2023). Multi-sectoral integration — combining nutrition, agriculture, and WASH (Water, Sanitation, and Hygiene) interventions — as advocated by Singh et al. (2023) and Martins et al. (2022), should be prioritized for sustainable gains. Overall, this study contributes to the expanding evidence that communitybased interventions, when well-structured and culturally attuned, can substantially improve nutritional outcomes and empower communities. Future research should prioritize longitudinal designs, integration across sectors, and resilience-building against socioeconomic shocks, echoing recommendations from Saha et al. (2021) and Ahmed et al. (2023).

Conclusion

In conclusion, this work establishes that community-based intervention (CBI) can significantly influence childhood nutrition in rural and peri-urban settings. There was a significant association between CBI exposure and lower rates of stunting, wasting, and underweight with higher dietary diversities and breastfeeding rates. Community empowerment, trust in community health workers (CHWs), and culturally sensitive educational materials are key facilitators of success; however, some of the challenges include seasonal food insecurity, economic barriers, and sustainability. This points to an urgent need for adaptive, multi-sectoral, and local contextual interventions. The strengthening of monitoring systems with digital tool integration, plus long-term funding

mechanisms to ensure CBI impact maximization, are a must. Future programs must prioritize resilience building, women empowerment, and sectoral collaboration for sustainable global improvements in child nutrition.

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