The Effect of Positive Deviance Hearth Approach on Wasting Among Children Aged 6-24 Months in Chinkozya Community, Kazungula District, Southern Province Zambia

Research Article

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Abstract

Background: Malnutrition is one of the major causes of childhood morbidity and mortality in Zambia. Positive deviant hearth (PH/hearth) has been recommended as one way of overcoming the high morbidity and mortality rates among under-five children. The current study aimed at assessing the effect the positive deviance hearth approach (PD/Hearth) had on underweight among children in Chinkozya community of Kazungula district in Southern Province Zambia.

Method: An intervention study was 44 children aged 6 – 24 months were admitted to the hearth for a period of 3 months. The intervention was conducted through experimental learning. Mothers/caregivers and community volunteers met at a local point where knowledge on practices from mothers with well-nourished children were shared with mothers with acute malnourished children. Questionnaires were administered to the head of the households of the 44 children who were admitted into the hearts and socio-demographic information was obtained. We conducted anthropometric measurements at baseline (day 1)and at the end of the three months intervention. Data analysis was conducted using STATA version 16 and WHO Anthro software version 3.2.2.

Results: The baseline prevalence of stunting was 40.9%, underweight 25% and wasting 4.5%. At the end of the intervention underweight among children was 6.8%. PD/heath reduced underweight by 18.2% (from 25% - 6.8) in Chinkozya community. Based on the paired t-test, the mean WAZ difference reduced by 0.27 (95%CI:-0.67, 0.13) between baseline and endline. However, this effect was not significant. (P-value = 0.1806).

Conclusion: PD/hearth reduced the prevalence of underweight in Chinkozya community, Kazungula district.

Keywords: Positive deviance; Hearth; Acute malnutrition; Children; Zambia

Introduction

Underweight is one of the major causes of morbidity and mortality among children below the age of five [1]. In 2010, over 104 million children in the world were underweight. Most of these children live in sub-Saharan Africa. Globally underweight accounts for 1 million death [2] and the prevalence of underweight in sub-Saharan Africa is 38%.1 Under-nutrition

Apart from causing morbidity and mortality in children, malnutrition which manifests itself as underweight, stunting, and wasting can also affect physical growth and motor development, lower intellectual quotient (IQ), lack of social skills which may have an impact in adulthood [3]

In Zambia, the most recent data shows that among children less than five years of age, 35% are stunted, 12% are underweight

and 4% are wasted [4]. Literature shows that community-based interventions to combat malnutrition have shown a reduction in severe malnourished children in Zambia from 51% in 2009 to 35% in 2013[5]. The Zambian government and its partners have used among many other interventions the PD/hearth approach to reduce the levels of underweight in the country.

Positive Deviance (PD) is a strength-based or asset-based approach based on the belief that in every community there are certain individuals ("Positive Deviants") who's special, or uncommon practices and behaviours enable them to find better ways to prevent malnutrition than their neighbours who share the same resources and face the same risk [6-8]. The positive deviance intervention is designed to contribute to the reduction of the high levels of malnutrition by rehabilitating the malnourished children, affordably and sustainably in a culturally acceptable manner, enabling families to sustain the rehabilitation of these children at home on their own and prevent malnutrition among the community's other children, current and future [9]

The Positive Deviance approach has been in literature since 1967 with the aim of fighting malnutrition, although field research has been recent [10]. Most African and Asian countries have adopted the PD/hearth approach to help reduce malnutrition [9] In Malawi, study that used the PD/hearth approach to examined the impacts of training on nutrition, hygiene and food safety designed by the Nutrition Working Group, Child Survival Collaborations and Resources Group (CORE) showed a progressive effects in ameliorating children's under nutrition and improve dietary and hygiene practice among mothers [11].A Kenyan study also found an improvement in weight gain among children who were followed up for six months after graduating from the hearth in Migori County [12]. The study further found that feeding frequency was the main contribution to weight gain compared to other care practices [12]

Underweight is caused by so many factors. The main cause of underweight is inadequate dietary intake [13].Other factors include diseases that may be cause by food insecurity in the household, poor maternal and child care practices, poor sanitation, and living environment and no access to basic health services [13]. These factors can be attained easily if the community is involved in the implementation of the intervention. The current study used positive deviance hearth approach because of its developmental approach to the community already exists within the community. This approach differs from traditional "community need based" approaches in that it does not focus primarily on Identification of needs and the external inputs necessary to meet these needs [10]. PD/heath seeks to Identify and optimize existing and available resources and solutions within the community to solve community nutrition underweight among children. The primary objective of this study was to assess the effect of the PD/hearth approach[7]. In the reduction of underweight among under-five children aged 6-24 months.

Materials and Methods

Study area

We conducted an intervention study using the PD/hearth approach at Chinkozya rural community health post of Kazungula district in Southern Province, Zambia. Chinkozya community is located 35km from the Simango Health Centre under which it operates. The Simango Rural Health Centre is located in Kazangula District, approximately 60km from Livingstone the tourist capital of Zambia. Based on the nutrition assessment conducted for the whole catchment areas prior to the study, Chinkozya has one of the highest rates of under-five children disease presentation of all the villages in the catchment area, due to its high population.

Study population

The study population included children aged 6-24 months who were enrolled into the PD hearth in Chinkozya community.

Measurements

Socio demographic information

Socio-demographic information was collected from the mother of infants at baseline (day 1). The data collected included the age and sex of the head of house, marital status, level of education, occupation.

PD/hearth intervention

We implemented PD/heath approach using community volunteers. We used practices of mothers with well-nourished children to transfer them to mothers with underweight (acute malnourished) children. The practices included feeding practices with the emphasis on introducing solid foods at 6 months and feeding children with complementary foods three times a day. Water and sanitation in which mothers were told to draw water from a protected water source such as a borehole, treating water either by boiling or using chlorine and washing of hands before and after handling food and after using the toilet or following changing the child's nappy. Hygiene regarding bathing the child and cleaning cooking utensils after use, cleaning, caring, and health seeking behaviour were emphasized.

These were done through experimental learning which included cooking demonstration of some foods and feeding of children with the same foods. The PD/hear approach was also localised by participants who called it "chiko" meaning a cooking place or fireplace. Care givers and community volunteers met at a local point where knowledge on practices from mothers with well-nourished children was shared with mothers with acute malnourished children.

Anthropometric measurements

Weight of children in the intervention was taken on day 1, 12, 30 and 3 months after the start of the hearth to assess their nutritional status. The purpose of taking weight 12 days after enrollment was to monitor children who were not gaining weight so that they can be referred to the rural health centre for further medical attention. Height of infant was taken at baseline only. However, for the purpose of this study only weight and height taken on day one (baseline) and weight taken at three months endpoint will be reported.

Length/Height Board of the United Nations Children's Funds (UNICEF) were used by community volunteers who underwent training on how to conduct height and weight measurements. The reading from the height boards were recorded to the nearest centimetre. Portable (Seca Model 881) scales were used for measuring weight of children dressed in light clothing. The scales were checked

for accuracy and calibrated using standard known weights before use. Weights were recorded to the nearest 0.1 kg. Children who could not stand on the scale were weighed with the respondent, then the respondent was weighed alone, and the difference was used for obtaining weight of the child. The children were dressed in light clothing and the scales were calibrated to zero each day of measurement to avoid measurement errors. The reading of the child's weight was recorded to the nearest 0.1kg.

Statistical analysis

We used world health organisation (WHO) reference medians to calculate anthropometric indices. Weight-for-height s-score (WHZ). Height -for -age (HAZ) and weight-for-age (WAZ) below negative two (<-2) defined wasting, stunting and underweight, respectively. WHO anthro software was used to do the nutrition status analysis while STATA version 16 was used to compute percentages, means and standard deviations of baseline characteristics and to determine the mean difference between the baseline and endpoint WAZ using paired t-test.

Ethical approval

Permission to conduct a study in Chinkozya community was granted by the Kanzungula district office and the village head person. Informed consent was given by the mothers/caregiver to have their children included in the study.

Results

The socio-demographic characteristics of participating children are presented in Table 1. The number of children enrolled in the study was 44. Of the 44, 28 (63.6%) were females while 16 (36.4%) were males, and their age ranged from 6-24 months. The mean WAZ was -0.89 ± 1.27, ranging from -2.71 to 1.87. The number of mothers who enrolled their children into the hearth was 37 (84.1), while 7 (15.9) were caregivers.

†Mothers refer to biological mother while caregiver is a family member who looks after a child when the biological mother is not available.

Maternal care practices of children enrolled in the hearth are shown in Table 2. There was an improvement in all the care practices that were assessed in the study(Table 3). Meal frequency improved from 51.2% to 82.3%. Participation of mothers in the hearth also improves from 76.4% to 98.1.

Figure 1 shows the mean difference between baseline and endline WAZ in Chinkozya community. The median WAZ at baseline is slightly before the -1SD while at baseline it's above -1SD. This indicates an improvement in WAZ between baseline and end line.

The mean WAZ difference between baseline and endline is shown in Table 4. The mean at baseline was -0.89 and the mean at endline was-0.63. The mean difference between the two time points was -0.27 (95%CI:-0.67 , 0.13). However, this mean was not statistically different P-value = 0.1806.

Discussion

The main aim of the study was to assess the effect of the PD/hearth

Table 1: The socio-demographics characteristic of participating children.

Characteristic	Mean ± SD or n (%)	Range
Sex of the child		
Female	28 (63.6)	-
Male	16 (36.4)	-
Age of the child		
6-12	17 (38.6)	-
13-18	15 (34.1)	-
19-24	12 (27.3)	-
Anthropometry		-
Birth weight (kg)	3.10 ± 0.37	2.5 – 4.0
Length-for-Age (LAZ)	1.73 ± 1.10	-2.95 – 4.38
Weight-for-Age (WAZ)	-0.89 ± 1.27	-2.71 – 1.87
Weight-for-Length (WLZ)	0.27 ± 1.5	-2.95 – 4.38
Age of the mother/caregiver†	28.6 ± 6.7	18 – 41.7
Caregivers	7 (15.9	-
Mothers	37 (84.1)	-
Employment status of HH		
Subsistence farmer	36 (81.8)	-
Business man/woman	5 (11.4)	-
Government employee	1 (2.3)	-
None	2 (4.5)	-
Education level HH		
No formal education	9 (20.5)	-
Primary level	33 (75.0)	-
Secondary level	2 (4.5)	-

†Mothers refer to biological mother while caregiver is a family member who looks after a child when the biological mother is not available.

**Table 2**: Maternal care practices of children enrolled in the hearth in Chinkozya community.

Care Practices	Baseline	Endline
Meal Frequency (3 meals a day)	51.2	82.3
Hand wash	49.0	93.7
Participation of men in hearth	10	45.1
Attending under-five clinic	66.5	88.9
Clean child	78	95.4
Seeking health care for the child	70.6	79.5

Table 3: Shows the prevalence of underweightamong children in Chinkozyacommunity, Kazungula district according to age.Of the 44 children in the sampled survey,6.8% (n = 3) were below -2 standard deviation (SD) that is moderate malnutrition, and none were below -3 standard deviation (SD) severe malnutrition.The three who were wasted included one infant and the other two were three years and above.

Indicator	n	Mean score	Prevalence in % (95% CI)
Baseline Indicators			
Weight-for-age (WHL)	44	0.27 ± 1.55	4.5 (0%, 11.8%)
Height-for-age (HAZ)	44	-1.73 ± 1.1	40.9 (25.2%, 56.6%)
Weight-for-age (WAZ)	44	-0.89 ± 1.27	25 (11.1%, 38.9%)
Endline Indicator			
Weight-for-age (WAZ)	44	-0.63 ± 0.69	6.8 (0%, 15.4%)

Table 4: The mean WAZ difference between baseline and endline in Chinkozya community

Baseline	Baseline	Endline	Mean difference (95%CI)	P-Value
Weight-for-age (WAZ)	0.27 ± 1.55	-0.63 ± 0.69	-0.27 (-0.66 , 0.13)	0.1806

Figure 1: Boxplot for the median WAZ at baseline and endpoint.
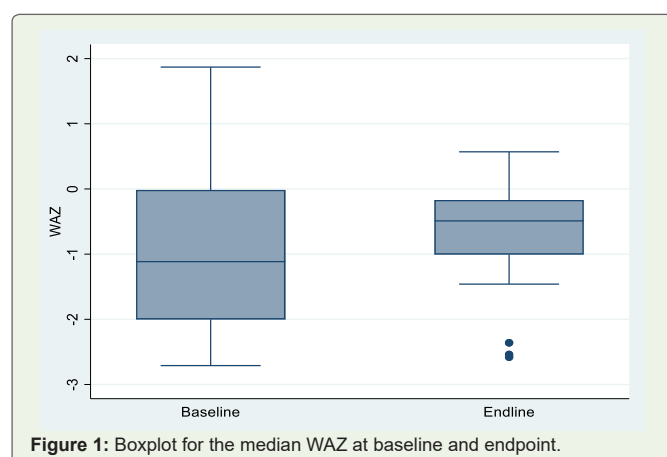
approach in the reduction of underweight among under-five children aged 6-36 months. In Chinkozya community. Result from the study indicates that PD/Hearth reduced the levels of underweight by 18.2% (from 25% - 6.8%) in the three months intervention period. The 6.8% had a reduction from moderate underweight to mild underweight. Our findings are similar to the a PD/hearth impact evaluation conducted in Kenya that found a reduction in underweight from 18.9% to 3.8% of those who were moderate underweight and from 43.4% to 34.0% of those who were mild under nutrition [12].The reduction in the current study is evidenced by the successful graduations that took place in Chinkozya community. Children gained weight of 400g and above. Thus, changing their nutrition status from severe, moderate or mild to normal.

However, when paired t-test was used to determine the difference in mean WAZ between the baseline and endline, we recorded a mean difference of -0.27 (95%CI:-0.67, 0.13), yet this mean was not statistically different (P-value = 0.1806). Our finding differ with what was found in similar studies that were conducted in Ecuador and Kenya [12,14].A community-based Positive Deviance/Hearth infant and young child nutrition intervention that was conducted in Ecuador found that PD/hearth improved diet and reduced underweight among participating children, odds ratio. 0.36; 95% (95%CI, 0.13-0.96)[14].In Kenya a study that determine the level to which PD/hearth enables families to sustain rehabilitation at home on their own and to identify the practices which influence PD/hearth outcomes found a mean difference of 0.36, (95% CI: 0.57 to 0.14) [12]. The findings in the current study could be because our intervention was only conducted for three months compared to the Ecuador and Kenya studies that were conducted for six months. Secondly, our study compared means between the baseline and endpoint and not with the control group unlike the Ecuador and Kenyan studies that had control groups to compare their results with.

The current study also showed an improvement in the care practices among the mother and caregivers. Mothers increase their care practice of meal frequency from 51.2% to 82.3%. Those who were giving children meals twice a day increased the frequency to three times a day. Increased meal frequency showed an improvement in weight gain than other care practices in Kenya[12].This is an indication that the increased meal frequency in our study might

have contributed to the weight gain experienced by children in our study. Other care practices among mothers such as breastfeeding more than 7 times a day, clean and clad child, mothers interest to learn new things has shown positive correlates of child growth [15] The improvement of cleaning the child by the mother/caregivers in our study from 78.0% to 95.4% is similar to what was found in India where care practices of a clean and clad children contributed to the improved the nutrition status of children [15].Furthermore, our study shows that the PD/Hearth approach encouraged male involvement in child care. There was an increase of male participation from 10% at baseline to 49.1% at endline. Male involvement in PD/hearth has been encouraged because it can help the mothers/caregiver to practice good care behaviours [15].

Conclusions

The PD/heath approach reduced underweight among children in Chinkozya community. If well implemented by the community through involvement of men, it can help reduce levels of underweight in rural communities

Limitation and strength of the study

We did not have a control group to which we could compare our findings with. However, the study has contributed to the existing knowledge that the PD/Hearth approach has helped reduce underweight level among infants aged 6- 36 months. The strength of the study was that it involved men who also contributed foods to rehabilitate the children. Their involvement was a motivation to mothers to participate in PD/hearth meetings since men are the decision makers in most homes in Chinkozya community.

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