

Community Based Nutrition Education for Promoting Nutritional Status of Children under Three Years of Age in Rural Areas of Mahottari District of Nepal

Yadav DK¹, Gupta N², Shrestha N³, Kumar A⁴, Bose DK⁵

Abstract

Introduction: Maternal and child mortality have declined significantly in Nepal to the extent that Nepal is on track to meet the Millennium Development Goals for maternal and child mortality. Similar improvements have not been seen in general nutrition status of them. Objective of this study was to evaluate a nutrition-education intervention designed to improve nutritional status (reduce stunting, wasting and underweight) of children. **Materials and Methods:** It was an intervention with separate sample pretest posttest design. Two groups of Village Development Committee (VDC) from Mahottari district were recruited as interventional and control areas. The intervention was a 12-months nutrition education program and comprised of twelve times with 2-3 hour nutrition lectures and discussion classess conducted by the Female Community Health Volunteers (FCHVs). **Results:** The Present study found that number of underweight children increased by 7.6% in control group while it decreased by 17.7% in intervention group from baseline to endline in both groups. So, intervention programme was able to decrease the number of underweight children significantly. Study shows that wasting status of children increased by 11.4% in control group from baseline to endline period. While in intervention group wasting status of children decreased by more than 5% from baseline to endline period. **Conclusion:** Nutrition education intervention was effective to reduce wasting and underweight but did not reduce the stunting status of children. Stunting reflects failure to receive adequate nutrition over a long period of time and is affected by recurrent and chronic illness. Findings suggested that nutrition programme of longer duration should be implemented to control the stunting status of children.

Key words: Nutrition education, Stunting, Wasting, Underweight

¹Dipendra Kumar Yadav, MPH, Lecturer, School of Health and Allied Sciences, Pokhara University, Kaski, Nepal and PhD Scholar, Faculty of Health Sciences, Sam Higginbottom Institute of Agriculture, Technology and Sciences, Allahabad, India, ²Dr. Neena Gupta, Senior Assistant Professor, FHS, SHIATS, Allahabad, India, ³Prof. Naveen Shrestha, Valley College of Technical Sciences, Kathmandu, ⁴Prof. Dr. Annamma Kumar, Former Dean, College of Home Science, SHIATS, Allahabad, India, ⁵Dr. Dipak Kumar Bose, Associate Professor, Allahabad School of Agriculture, SHIATS, Allahabad, India.

Address for correspondence:

Dipendra Kumar Yadav
Lecturer
School of Health and Allied Sciences
Pokhara University, Kaski, Nepal
Tel: +977-9856033787
E-mail: dipendrayadavph@gmail.com

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Introduction

Malnutrition in all its forms directly or indirectly is responsible for approximately half of all deaths worldwide. This applies to perinatal and infectious diseases as well as chronic diseases. Malnutrition accounts for 11% of the global burden of disease, leading to long-term poor health and disability and poor educational and developmental outcomes¹.

Malnutrition among children is a public health problem in Nepal. Nepal Demography and Health Survey (NDHS-2011) reported that 29% children are underweight, 41% stunted and 11% wasted². Childhood illnesses such as diarrhea and acute respiratory infections (ARIs) also are common³.

Improvement of exclusive breastfeeding practices, adequate and timely complementary feeding, along with continued breastfeeding for up to two years or beyond, could save annually the lives of 1.5 million children under five years of age⁴.

Promotion of breastfeeding and behaviour change communication for improved complementary feeding are both stated priorities of the Ministry of Health and Population, Nepal but it appears that the quality of efforts to date have been insufficient and poorly designed and implemented. Particular problems in Nepal are delay initiation of breastfeeding, a decline in exclusive breastfeeding rates and early and late complementary feeding with a low quality complementary feeding diet. Global experience indicates that it is possible to improve breastfeeding rates although less evidence exists for improvements in complementary feeding practices⁵.

Maternal and child mortality have declined significantly in Nepal to the extent that Nepal is on track to meet the Millennium Development Goals for maternal and child mortality. Similar improvements have not been seen in general nutrition status of them⁵.

Literate mothers had less number of stunted, wasted and underweight children in comparison to illiterate mothers (NDHS 2011). On the basis of NDHS findings, the idea that educating the primary child-care takers (mothers) that improving women's awareness of appropriate feeding practices can improve the nutritional status of children².

The idea that educating the primary child-care takers (mothers) can improve the nutritional status of young children⁶ is partly based on the belief that improving women's awareness of appropriate feeding practices would correlate with improvement in their feeding behaviors.

The objective of this study was to evaluate a nutrition-education intervention designed to improve nutritional status (reduce stunting, wasting and underweight) of children.

Materials and Methods

Study of an intervention with separate sample pre-test-post-test design and study duration lasted from 1st February 2012 to 12th November 2013. Two groups of VDCs from Mahottari district were recruited as interventional and control areas. Study population was under three year's children and their mother and study was carried out in rural areas of Mahottari district.

Desired numbers of participants were selected by using formula given below.

$$\text{Where, } n = D [(Z_1 + Z_2)^2 * (P_1 (1 - P_1) + P_2 (1 - P_2)) / (P_2 - P_1)^2]$$

Suppose an increase of 5 percentage points in the proportion of initiation of breastfeeding within 1 hour after delivery is to be measured. Assume further that at the time of the first survey; about 45 percent of mothers were initiation of breastfeeding within 1 hour after delivery to be following proper practices. In this case, $P_1 = .45$ and $P_2 = .50$. Using standard parameters of 95 percent level of significance (Z_1) and 80 percent power (Z_2), values of $Z_1 = 1.645$ and $Z_2 = 0.840$ are chosen.

In intervention area 121 households were selected for baseline and endline study. Control area ratio 1:1.5 was taken in comparison to intervention group and thus 182 households were selected for baseline and endline study in control group. A total 615 and 708 under 3 years old children were selected as baseline and endline respectively.

Multistage sampling technique was used in the study. Mahottari district was selected purposively for the study because of Human Development Index this district has ranked 59 out of 75 districts. District (76 VDCs) was divided into three strata according to geographical location (North, Middle and South Part). Names of all VDCs were recorded alphabetically in separate stratum. Four VDCs from each stratum were selected randomly. Again two VDCs were selected for interventional group and two VDCs from each stratum were selected for control group randomly. Total 6 VDCs were selected for intervention group and similar numbers of VDCs were selected for control group. Each VDC consists of nine wards. Two wards were selected randomly from each VDC. Systemic random sampling technique was followed to get required number of households in both areas. Intervention areas, 10 households were taken from each selected wards and control areas, 15 households were taken from each selected wards as systemic random sampling. After that all children less than three years of age were selected for study from all selected households.

Two groups of VDCs from Mahottari district was recruited as interventional and control areas. In intervention areas, Female Community Health Volunteer was trained to promote feeding behaviours and nutritional status of children. Through this programme FCHV conducted monthly meeting with mothers group at ward level with the objective of

promotion of feeding behaviours and nutritional status of children. Each member of Mother's group has been given the task to educate mothers of children regarding nutrition education and counselling for betterment of children's nutritional status. FCHV conducted 12 meeting with mothers throughout 12 months: one interactive nutrition discussion class 2-3 hours per month. In control areas, First 12 months was taken as follow up stage and was not given nutrition education but district health system has overall responsibility to give comprehensive health services for betterment of community people. In control areas only one episode of nutritional education was given to the beneficiaries after endline data collection.

Ethical Approval was taken from Sam Higginbottom Institute of Agriculture, Technology and Sciences, India and Nepal Health Research Council, Nepal. Verbal consent was taken from each participant mother and permission was given from District Health Office, Mahottari to carry out the study.

Data were collected once at the beginning of the study (base line) and the other at end of the study (end line) in both areas i.e. intervention and control. Interview schedule focused on socio-demographic conditions, nutrition and feeding behaviors and child seeking practices were collected from mothers. Anthropometric measurements were carried out to assess the degree of malnutrition in children of under three years of age from all the study groups from intervention and control areas. Height for weight, weight for age, height for age and MUAC were calculated for children. Height was measured using a standard height measuring scale (board) for children under three years. For children length was also measured. Weight of children was measured using a lightweight electronic SECA digital scale (UNICEF Electronic Scale). MUAC of children was measured with UNICEF MUAC tape.

Data were coded and entered in EpiData 3.1 version software. Anthropometric analysis such as Z-score value was calculated in EpiInfo 3.3.2 version. Epi-Info software was produced tables of frequencies for Z-score classes of 0.5 Z-score intervals and graphs of frequency distributions. Finally all the data from Epidata and EpiInfo were exported to IBM SPSS Statistics 20 software and then analyzed it. Appropriate statistical test was applied wherever required. The result was interpreted in the light of the objectives. Statistical calculations were calculated wherever required.

Results

The total number of children selected for the study was 1323 of age less than three years. This study was a pre-post with controlled design. Out of 1323, 615 and 708 children under three years of age were selected as baseline and endline respectively. Out of 759, 353 and 406 children were selected for control and intervention group respectively as a baseline of the study. Similarly out of 564, 262 and 302 children were selected for control and intervention as an endline study. Two groups of VDCs from Mahottari district were recruited as interventional and control areas. Data were collected twice once at the beginning of the study (baseline) and the other at the end of study (end line) in both areas i.e. intervention and control.

In this study, Mean age of mother was 25.22 ± 4.30 and 25.21 ± 3.95 years of control and intervention groups respectively. Mean age and weight of children was 17.43 ± 10.03 months and 9.30 ± 3.01 kg of control group while in intervention group mean age and weight was 16.82 ± 9.1 months and 8.71 ± 2.35 kg. 58.4% and 59% of the mothers were illiterate and 10.5% and 10.7% mothers passed the secondary level of control and intervention group respectively.

Study shows Stunting increased by 1.3% in control group while marginally (0.1%) increased in intervention group from baseline to endline period. Number of underweight children increased by 7.6% in control group while it decreased by 17.7% in intervention group from baseline to endline. Wasting increased by 11.4% in control group. Also, it was found that statistically significant increase in the burden of wasting from baseline to endline. While in intervention group wasting decreased by more than 5% from baseline to endline.

Initiation of breast feeding within 1hr of birth decreased in control group while in intervention group, increased by 8.44%. Results shows that mother experienced that colostrums feeding of children decreased by 1.3% in control group while in intervention group, colostrums feeding of children showed satisfactory rate of increased (6.7%) by intervention programme that was statistically significant $p=0.00$.

Vitamin A supplementation received by children was increased by only 1.93 % in control group while it was increased by 7.27% in intervention group from baseline to endline. That increasing trend was found to be statistically significant ($p=0.03$).

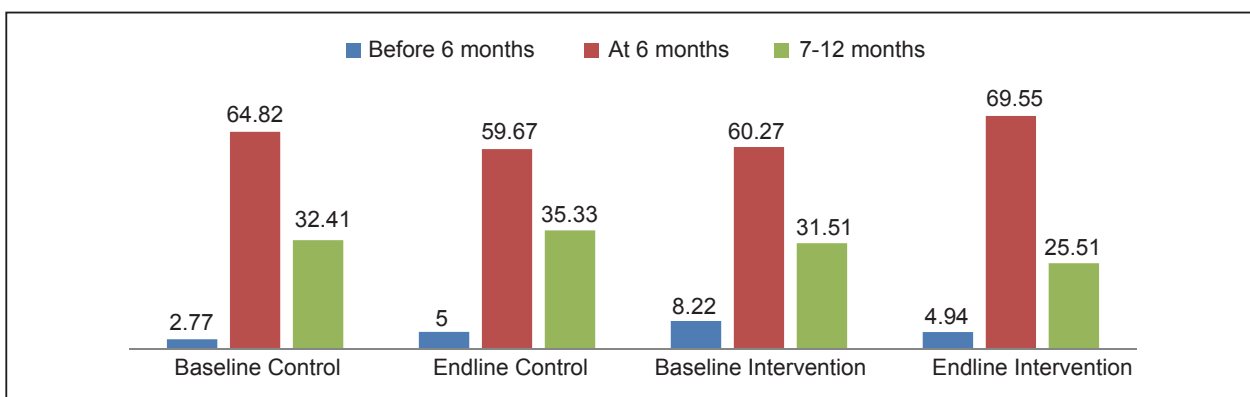


Fig 1: Percentage of children started complementary feeding in months

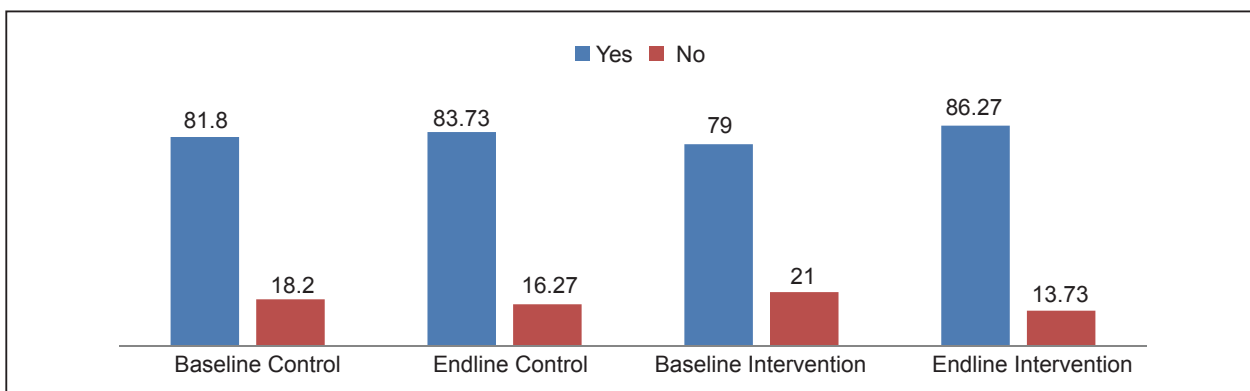


Fig 2. Percentage of children received Vitamin A capsule

Table 1: Baseline details of 615 mothers and children recruited for study. Values are number (percentages) unless stated otherwise.

Variable	Control Baseline (n=353)	Intervention Baseline (n= 262)
Mother		
Mean (SD) age (years)	25.22 (4.30)	25.21 (3.95)
Family Income Monthly		
< 5000 Rupees	40 (11.3)	18 (6.9)
5000 - 10000 Rupees	260 (73.7)	219 (83.6)
> 10000 Rupees	53 (15.0)	25 (9.5)
Mean (SD) Nepalese currency	7323 (3739)	7563 (3153.97)
Educational status of mother		
Illiterate	206 (58.4)	157 (59.9)
Non- formal	71 (20.1)	47 (17.9)
Primary	39 (11.0)	30 (11.5)
Secondary	24 (6.8)	21 (8.0)
Intermediate	11 (3.1)	2 (0.8)
Bachelor & above	2 (0.6)	5 (1.9)
Children		
Mean (SD) age (months)	17.43 (10.03)	16.82 (9.11)
Mean (SD) weight (kg)	9.30 (3.01)	8.71 (2.35)
Mean (SD) length/height (cm)	73.59 (10.53)	73.50 (10.30)
Sex		
Female	156 (44.2)	128 (48.9)
Male	197 (55.8)	134 (51.1)

Table 2: Nutritional status of children.

Indicators	Control (n= 759)			Intervention (n= 564)		
	Normal	Stunting	Test Statistics	Normal	Stunting	Test Statistics
Height for Age						
Baseline	196 (55.5)	157 (44.5)	$\chi^2 = 0.13$	159 (60.7)	103 (39.3)	$\chi^2 = 0.00$
Endline	220 (54.2)	186 (45.8)	$P = 0.71$	183 (60.6)	119 (39.4)	$P = 0.98$
*Change in %	-1.3	1.3		-0.1	0.1	
Weight for Age	Normal	Underweight		Normal	Underweight	
Baseline	211 (59.8)	142 (40.2)	$\chi^2 = 4.37$	127 (48.5)	135 (51.5)	$\chi^2 = 18.14$
Endline	212 (52.2)	194 (47.8)	$P = 0.03$	200 (66.2)	102 (33.8)	$P = 0.00$
*Change in %	-7.6	7.6		17.7	-17.7	
Weight for Height	Normal	Wasting		Normal	Wasting	
Baseline	253 (71.7)	100 (28.3)	$\chi^2 = 10.73$	171 (65.3)	91 (34.7)	$\chi^2 = 2.02$
Endline	245 (60.3)	161 (39.7)	$P = 0.00$	214 (70.9)	88 (29.1)	$P = 0.15$
*Change in %	-11.4	11.4		5.6	-5.6	

Note: 1.The figure in the parenthesis is percentage of frequency.

*Changes nutritional status of children from baseline to endline period.

Table 3: Practices regarding child feeding among mothers

Indicators	Control			Intervention		
	Within 1 hour	After 1 hour	Test Statistics	Within 1 hour	After 1 hour	Test Statistics
Breastfeeding initiation						
Baseline	198 (75.57)	64 (24.43)	$\chi^2 = 0.88$	134 (66.67)	67 (33.33)	$\chi^2 = 3.74$
Endline	214 (72.05)	83 (27.95)	$p = 0.34$	175 (75.11)	58 (24.89)	$p = 0.05$
*Change in %	-3.52	3.52		8.44	-8.44	
Colostrums feeding	Yes	No		Yes	No	
Baseline	236 (88.05)	32 (11.95)	$\chi^2 = 0.21$	188 (89.09)	23 (10.91)	$\chi^2 = 7.37$
Endline	262 (86.75)	40 (13.25)	$p = 0.63$	228 (95.79)	10 (4.21)	$p = 0.00$
*Change in %	-1.3	1.3		6.7	-6.7	
Exclusive breast-feeding up to 6 months	Yes	No		Yes	No	
Baseline	222 (82.83)	46 (17.17)	$\chi^2 = 0.85$	158 (74.88)	53 (25.12)	$\chi^2 = 2.52$
Endline	241 (79.81)	61 (20.19)	$p = 0.35$	193 (81.09)	45 (18.91)	$p = 0.11$
*Change in %	-3.02	3.02		6.21	-6.21	

Note: The figure in the parenthesis is percentage of frequency and frequency were analyzed only of those mothers who had child less than 24 months of age.

*Changes in percentage of feeding status of children from baseline to endline period.

Discussion

The nutritional status of children under age three is an important measure of children's health. The anthropometric data on age, height and weight as well as independent variables were collected in this study to permit the measurement and evaluation of the nutrition-education intervention research.

In children, the three most commonly used anthropometric indices are weight-for-height, height-for-age, and weight-for-age. Deficit in height-for-age is called stunting and indicates chronic malnutrition.

Deficit in weight-for-height is called wasting and indicates acute malnutrition. Deficit in weight-for-age is often referred to as underweight and reflects low weight-for-height, low height-for-age, or both⁷.

In baseline control group, Prevalence of wasting, stunting and underweight was 28.3%, 44.5% and 40.2% while in baseline intervention group 34.7%, 39.3% and 51.5% of children less than three years were wasting, stunting and underweight respectively. According to NDHS 2011 report, Prevalence of wasting, stunting and underweight was 11%, 41% and 29% respectively children below five years, which is lesser as compared

to this study². This difference could be due to a smaller sample size of our study.

Study reveals that the Stunted children increased by 1.3% in control group while marginally increased (0.1%) in intervention group during study period from baseline to endline. So that intervention was not able to reduce stunting status of children. This can be attributed to the fact that stunting represents chronic malnutrition and that the intervention program was given for shorter duration. Stunting reflects failure to receive adequate nutrition over a long period of time and is affected by recurrent and chronic illness. Height-for-age, therefore, represents the long-term effects of malnutrition in a population and is not sensitive to recent, short-term changes in dietary intake.

Study found that number of underweight children was increased by 7.6% in control group while it was decreased by 17.7% in intervention group during study period from baseline to endline. So, intervention programme was able to decrease the no. of underweight children significantly. Study shows that wasting was increased by 11.4% in control group while in intervention group wasting was decreased by more than 5% from baseline to endline. These findings is comparable with study done by Malekafzali et al and Kilaru et al which showed different findings and this difference could be due to a distinct intervention design, study areas and study population^{8,9}.

88.05% and 88.09% of children received colostrums in baseline control and baseline intervention group respectively. 75.57% and 66.67% children were put to breast within one hour of birth in baseline control group and baseline intervention group respectively. Children 82.83% and 74.88% were fed exclusively with breast milk in baseline control group and baseline intervention group respectively. Subedi, Paudel et al. study in Nepal and finds that three out of four children were fed colostrums by their mother. About 82% of the mothers had practiced exclusive breastfeeding and 90% of them had initiated complementary feeding at the age of six month of their child. This difference could be due to a distinct study areas and study population¹⁰.

Present study found that initiation of breast feeding within 1hr of birth decreased in control group while in intervention group increased by 8.14% from baseline to endline. It was found to be statistically significant in intervention group. It was found that colostrums feeding to their children by mothers decreased by around 1.3% in control group; while in intervention group, colostrums feeding to children satisfactorily increased through nutrition intervention

programme from baseline to endline respectively and that was statistically significant.

Early initiation of breastfeeding is important for both the mother and the child. Early suckling stimulates the release of prolactin, which helps in the production of milk, and oxytocin, which is responsible for the ejection of milk. It also stimulates contraction of the uterus after childbirth and reduces postpartum blood loss. The first liquid to come from the breast, known as colostrum, is produced in the first few days after delivery. Colostrum is highly nutritious and contains antibodies that provide natural immunity to the infant. It is recommended that children be fed colostrum immediately after birth (within one hour) then it helps for wellbeing to children.

Conclusion

From the findings of the study it shows that prevalence of malnutrition (underweight, stunting, and wasting) is still creates major health problems among children less than three years, particularly in Central Terai region. Nutritional education intervention was effective to reduce wasting and underweight but did not reduce the stunting status of children. On the basis of findings, longer duration of nutrition programme should be implemented to control the stunting status of children.

This study supports the view that nutrition education has potential for improving feeding behaviors and nutritional status of children. This intervention was concerned in only one district and will need to be replicated with a larger sample size to evaluate its effectiveness.

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