Understanding nutrition capacities of Front Line Workers' (FLWs) in implementation of integrated nutrition programs in Nepal

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Innovation Lab for Nutrition

Abstract Number: 5

Background

The Government of Nepal's Multi-Sector Nutrition Plan (MSNP) was a key policy initiative to address the issue of undernutrition in a systematic manner, adopting a multi-sector approach. MSNP Phase I was implemented from 2012-2017 with a goal to significantly reduce chronic undernutrition in women and children. The first phase of MSNP focused on achieving key outcomes (by undertaking and scaling up nutrition specific and sensitive interventions through vertical and horizontal multi-sectoral linkages across health, agriculture, education, water and sanitation, and local development sectors. Strengthening capacity of central and local government on nutrition was one of the key outcomes of MSNP. Under this outcome, assessment of nutrition knowledge and training by FLWs implementing MSNP at the level was identified as the foremost task of first phase of MSNP. As Nepal now prepares for implementation of second phase of MSNP (2017-2022), evidence generated from the first phase on assessment of capacity of front line workers remains critical for successful implementation of the forthcoming phase of integrated nutrition actions.

Objectives and Methods

Objectives

The objective of this study is to understand the extent to which FLWs from integrated agriculture, health and nutrition programs have retained nutrition knowledge through trainings they received at the sub-national level, and how the FLWs imparted that information to the first 1000 days mothers.

Methods

The study extracted data from 234 FLWs through a cross-sectional survey conducted in 13 districts of Nepal in 2015. Respondents were grouped into one of the five groups: Government Health Workers (GovHealth), Female Community Health Volunteers (FCHVs), Government Agriculture/livestock Workers (GovAg), NGO agriculture workers (NGOAg) and, ward level representatives and community leaders, categorized as Other FLWs (Other). Participants were asked about questions related to experiences as FLWs, whether they had ever received training on nutrition, agriculture or health, with open ended nutrition and agriculture knowledge questions on identifying child malnutrition, maternal malnutrition and complementary feeding. Continuous outcome variables were compared using multivariable linear regression models with an exchangeable covariance structure to account for clustering within each district. Analysis was performed in Stata SE 14.0.

Results

GovHealth and GovAg were more likely to be males than other types of FLWs. Almost all FCHVs and GovHealth reported receiving training on nutrition topics like growth monitoring and vitamin and mineral supplementation. Only about one-third of FCHVs reported children's shortness/small for age and presence of edema as features of child malnutrition, while about one-fourth of FCHVs and GovHealth identified maternal shortness/small for age as features of maternal malnutrition. About one-fifth of GovHealth and FCHVs correctly reported Bitot's spot as a feature of child malnutrition. Less than half (43.5%) of GovAg and 25% of Other FLWs reported ever participating in a nutrition training. About three-fifth (60%) of NGOAg participated in a nutrition training. Almost all FLWs in the FCHV, GovHealth, GovAg, and NGOAg groups were able to correctly identify solid, liquid and semi-solid foods introduced to a child of 6 months. In multivariable models for nutrition knowledge, FLW was strongly correlated with nutrition and agriculture knowledge indicators. GovHealth were able to identify 0.96 [95%CI (0.31, 1.60), p=0.004] more features of child malnutrition than FCHVs, and they were also 1.19 [95%CI (1.04, 1.36), p=0.01] times more likely to identify 6 months as the appropriate age to introduce all liquids, solids and semi-solid foods. FLWs from GovAg, NGOAg and Other FLWs groups all identified significantly fewer features of both child and maternal malnutrition compared to FCHVs. The other FLWs group were significantly less likely to identify 6 months as the appropriate age to introduce liquids, solids and semi-solid foods, compared to FCHVs. No significant difference was seen in nutrition knowledge, whether or not the FLW worked in a Suaahara district. FLWs participating in a nutrition training in the last 12 months were able to identify significantly more features of child malnutrition and maternal malnutrition.

Acknowledgements

Funding sources: Support for this research was provided by the Feed the Future Innovation Lab for Nutrition, which is funded by the United States Agency for International Development under grant ID AID-263-LA-14-00004. The opinions expressed herein are solely those of the authors.

Results

Table 2: Sociodemographic, training, supervision and cross-sectoral collaboration characteristics of Front Line Workers (FLWs) in the study sample[1]

	FCHV[2] (n=58)	Gov't Health[2] (n=39)	Gov't ag./ livestock[2] (n=23)	NGO agriculture[2] (n=29)	Community org.[2] (n=95)
Sociodemographic Characteristics					
Female	58 (100.0)	14 (35.9)	1 (9.1)	24 (82.8)	29 (30.5)
Age (Mean ± SD)	42.4 ± 10.9	37.7 ± 10.2	44.4 ± 8.6	30.6 ± 9.1	40.1 ± 10.8
Number of years of education[3]					
0-5	32 (55.2)	0 (0.0)	0 (0.0)	9 (31.0)	20 (21.1)
6-9	19 (32.8)	2 (5.1)	0 (0.0)	7 (24.1)	23 (24.2)
≥10	7 (12.1)	37 (94.9)	23 (100.0)	13 (44.8)	52 (54.7)
Caste					
Brahmin/Chhetri	20 (34.5)	12 (30.8)	11 (47.8)	0 (0.0)	27 (28.4)
Janjati	34 (58.6)	23 (59.0)	10 (43.5)	26 (89.7)	46 (48.4)
Dalit	4 (6.9)	3 (7.7)	1 (4.4)	3 (10.3)	19 (20.0)
Other	0 (0.0)	1 (2.6)	1 (4.4)	0 (0.0)	3 (3.2)
Ecological zone					
terai (plains)	30 (51.7)	21 (53.9)	12 (52.2)	1 (3.5)	50 (52.6)
hills or mountains	28 (48.3)	18 (46.2)	11 (47.8)	28 (96.6)	45 (47.4)
Training					
Has received training on a nutrition topic[4]					
Ever	58 (100.0)	37 (94.9)	10 (43.5)	20 (69.0)	24 (25.3)
In the last 12 months	41 (70.7)	24 (61.5)	6 (26.1)	19 (65.5)	14 (14.7)
Has received training on a WASH topic[5]					
Ever	58 (100.0)	31 (79.5)	15 (65.2)	22 (75.9)	67 (70.5)
In the last 12 months	35 (60.3)	18 (46.2)	10 (43.5)	21 (72.4)	36 (37.9)
Has received training on agriculture[6]					
Ever	28 (48.3)	10 (25.6)	16 (69.6)	27 (93.3)	29 (30.5)
In the last 12 months	18 (31.0)	2 (5.1)	5 (21.7)	19 (65.5)	6 (6.3)
Received training on counselling or group facilitation					
Ever	52 (89.7)	21 (53.9)	16 (69.6)	23 (79.3)	40 (42.1)
In the last 12 months	24 (41.4)	11 (28.2)	6 (26.1)	22 (75.9)	12 (12.6)
Experience as a FLW					
Years worked as a FLW	15.7 ± 7.0	12.7 ± 9.1	18.5 ± 10.4	2.0 ± 0.7	4.9 ± 5.4
Days worked per week as FLW	2.3 ± 1.1	6.1 ± 0.3	6.1 ± 0.4	2.9 ± 2.2	2.7 ± 2.2
Hours worked on FLW working days	2.8 ± 1.2	6.4 ± 0.9	6.5 ± 1.4	3.8 ± 2.5	3.3 ± 2.6
Facilitates a mothers group	57 (98.3)	22 (56.4)	0 (0.0)	4 (13.8)	2 (2.1)
# mothers' groups held per year	11.1 ± 1.9	6.2 ± 4.0	-	8 ± 4.9	4.5 ± 2.1
Does home-visits or individual counselling	58 (100.0)	37 (94.9)	22 (95.7)	21 (72.4)	78 (82.1)
Home visits per week	7.0 ± 4.7	3.0 ± 3.6	8.4 ± 7.1	5.2 ± 7.5	4.4 ± 5.7
Visitors to their home seeking advice per week	3.9 ± 2.4	6.8 ± 6.8	5.8 ± 4.6	2.0 ± 2.9	3.1 ± 3.9

1. Values are n (%) or mean ± standard deviation; 2. FCHV = Female community health volunteer; Gov't health worker includes government employed health assistants, auxiliary health workers and auxiliary nurse midwives; Gov't agriculture or livestock includes government employed livestock or agriculture extension workers or junior technical assistants; Gov't WASH are village water, sanitation & hygiene committee members; while community organization FLW includes all civil society or non-governmental organization staff working in health, nutrition and/or agriculture in the village development committees of interest; 3. In Nepal, primary school is 5 years and secondary school is 10 years; thus categories could be interpreted as: primary education or less; some secondary education; completed secondary education or more; 4. Nutrition topics include training on: breastfeeding, children's diet including complementary feeding, nutritional care of sick children, growth monitoring, vitamin and mineral supplementation or anemia; 5. WASH topics include treating drinking water, toilet use, , handwashing, or food safety; 6. Agricultural topics include: homestead gardening and/or chicken rearing, diseases and vaccinations

Table 3: Nutrition and agriculture knowledge among the different types of Front Line Workers (FLWs)[1]

	FCHV (n=58)	Gov't health (n=39)	Gov't ag/ livestock (n=23)	NGO ag. (n=29)	Community org. (n=95)	P
Identifies the following as a feature of child malnutrition						
Child is short/small for age	23 (39.7)	26 (66.7)	8 (34.8)	12 (13.0)	23 (25.0)	
Child is thin for height	45 (77.6)	36 (92.3)	10 (43.5)	19 (65.5)	61 (64.2)	
Child loses appetite	23 (39.7)	21 (53.9)	6 (26.1)	13 (44.8)	27 (28.4)	
Child gets ill often	37 (63.8)	23 (59.0)	14 (60.9)	18 (62.1)	45 (47.4)	
Child has little/no energy	29 (50.0)	15 (38.5)	9 (39.1)	18 (16.7)	37 (34.3)	
Child doesn't develop like other children	14 (24.1)	14 (35.9)	8 (34.8)	5 (9.1)	14 (25.5)	
Child has thin arms	31 (53.5)	27 (69.2)	7 (30.4)	13 (12.2)	29 (27.1)	
Child has pale palms	5 (8.6)	7 (18.0)	1 (4.4)	1 (6.7)	1 (1.1)	
Child has oedema	18 (31.0)	17 (43.6)	3 (13.0)	4 (8.2)	7 (14.3)	
Child has bitot spots	12 (20.7)	8 (20.5)	3 (13.0)	2 (7.1)	3 (10.7)	
Number of above features identified	4.1 ± 1.6	5.0 ± 1.8	3.0 ± 1.7	3.6 ± 1.6	2.6 ± 1.4	<0.001
Identifies the following as a feature of maternal malnutrition						
Mother is short/small for age	13 (22.4)	10 (25.6)	4 (17.4)	4 (13.8)	16 (16.8)	
Mother is thin for height	38 (65.5)	33 (84.6)	8 (34.8)	16 (55.2)	46 (48.2)	
Mother loses appetite	28 (48.3)	21 (53.9)	9 (39.1)	13 (44.8)	34 (35.8)	
Mother gets ill often	36 (62.1)	22 (56.4)	16 (69.6)	17 (58.6)	48 (50.5)	
Mother has little/no energy	38 (65.5)	25 (64.1)	12 (52.2)	20 (69.0)	43 (45.3)	
Mother has thin arms	24 (41.4)	18 (46.2)	2 (8.7)	9 (31.0)	17 (17.9)	
Number of above features identified	3.1 ± 1.1	3.3 ± 0.9	2.2 ± 1.1	2.7 ± 1.0	2.1 ± 1.2	<0.001
Identifies 6 mos. as appropriate age to introduce the following:						
Water or other clear liquids	58 (100)	39 (100)	19 (82.6)	28 (96.6)	82 (86.3)	
Milk or milk products	58 (100)	39 (100)	20 (87.0)	29 (100)	83 (87.4)	
Semi-solid foods (ie porridge)	55 (94.8)	38 (97.4)	19 (82.6)	29 (100)	86 (90.5)	
Solid foods	47 (81.0)	38 (97.4)	20 (87.0)	23 (79.3)	75 (79.0)	
Eggs	49 (84.5)	38 (97.4)	17 (73.9)	26 (89.7)	61 (64.2)	
Animal meat/fish	45 (77.6)	38 (97.4)	15 (65.2)	20 (69.0)	53 (55.8)	
All of the above	44 (75.9)	36 (92.3)	14 (60.9)	18 (62.1)	51 (53.7)	<0.001
Identifies the following as a way to improve garden water use						
Plant in basins	8 (13.8)	4 (10.3)	10 (43.5)	4 (13.8)	10 (10.5)	
Use mulch	32 (55.2)	26 (66.7)	19 (82.6)	27 (93.1)	63 (66.3)	
Improve organic matter	15 (25.9)	17 (43.6)	15 (65.2)	15 (51.7)	17 (17.9)	
Make the beds the correct shape	25 (43.1)	14 (35.9)	19 (82.6)	13 (44.8)	38 (40.0)	
Number of above strategies identified	1.4 ± 0.9	1.6 ± 1.0	2.7 ± 1.3	2.0 ± 0.9	1.3 ± 0.9	<0.001
Identifies the following as a way to improve soil fertility						
Adding of compost/manure/organic matter	53 (91.4)	37 (94.9)	22 (95.7)	29 (100)	90 (94.7)	
Adding urine	17 (29.3)	11 (28.2)	13 (56.5)	15 (51.7)	20 (21.1)	
Crop rotation	0 (0.0)	4 (10.3)	9 (39.1)	2 (6.9)	0 (0.0)	
Plant soil-enriching crops like legumes	0 (0.0)	1 (2.6)	9 (39.1)	2 (6.9)	4 (4.2)	
Prevent erosion	2 (3.5)	5 (12.8)	3 (13.0)	4 (13.8)	3 (3.2)	
Plough against the contour	27 (46.6)	8 (20.5)	15 (65.2)	18 (62.1)	39 (41.1)	
Plant wind breaks	1 (1.7)	1 (2.6)	6 (26.1)	1 (3.5)	3 (3.2)	
Manage water run-off	12 (20.7)	0 (25.6)	9 (39.1)	13 (44.8)	18 (19.0)	
Mulch	11 (19.0)	4 (10.3)	7 (30.4)	7 (24.1)	15 (15.8)	
Number of above strategies identified	2.1 ± 0.9	2.1 ± 1.3	4.0 ± 2.1	3.1 ± 1.1	2.0 ± 1.1	<0.001
Identifies the following as important for poultry management						
Keeping the chickens inside a coop	31 (53.5)	29 (74.4)	20 (87.0)	27 (93.1)	67 (70.5)	
Providing quality feed and clean water	20 (34.5)	23 (53.9)	18 (78.3)	22 (75.9)	53 (55.8)	
Brush off the chicken coop and dispose manure	25 (43.1)	15 (38.5)	13 (56.5)	20 (69.0)	34 (35.8)	
	2 (3.5)	5 (12.8)	12 (52.2)	7 (24.1)	9 (9.5)	
	1.3 ± 1.0	1.8 ± 1.2	2.7 ± 1.3	2.6 ± 0.9	1.7 ± 1.2	<0.001

		Number of features of child malnutrition the FLW is able to identify			Number of features of maternal malnutrition the FLW is able to identify			Identifies 6 months as appropriate age to introduce all liquid & solids to children		
	N	Mean ± SD	Adjusted difference (95%CI)[1]	P	n (%)	Adjusted difference (95%CI)[1]	P	n (%)	Multivariate PR (95%CI)[2]	P
Type of FLW[3]										
FCHV	58	4.1 ± 1.6	reference	-	3.1 ± 1.1	reference	-	44 (75.9)	reference	-
Government health worker	39	5.0 ± 1.8	0.96 (0.31, 1.60)	0.004	3.3 ± 0.9	0.28 (-0.08, 0.63)	0.65	36 (92.3)	1.19 (1.04, 1.36)	0.01
Government ag. or livestock worker	23	3.0 ± 1.7	-1.03 (-1.69, -0.38)	0.002	2.2 ± 1.1	-0.82 (-1.22, -0.41)	0.005	14 (60.9)	0.78 (0.52, 1.15)	0.20
NGO agriculture worker	29	3.6 ± 1.6	-0.88 (-1.41, -0.35)	0.001	2.7 ± 1.0	-0.81 (-1.21, -0.42)	<0.001	18 (62.1)	0.81 (0.60, 1.09)	0.16
Other FLW	95	2.6 ± 1.4	-1.43 (-1.98, -0.89)	<0.001	2.1 ± 1.2	-0.90 (-1.16, -0.64)	<0.001	51 (53.7)	0.69 (0.51, 0.92)	0.01
Agroecological Zone[3]										
Terai (plains)	114	3.1 ± 1.9	-0.62 (-1.29, 0.05)	0.07	2.2 ± 1.2	-0.64 (-1.14, -0.14)	0.01	76 (66.7)	1.02 (0.80, 1.30)	0.85
Hills or Mountains	130	3.8 ± 1.6	reference	-	3.0 ± 1.0	reference	-	87 (66.9)	reference	-
District is part of the Suahaara program[3]										
Yes	103	3.8 ± 1.7	0.32 (-1.29, 0.05)	0.28	2.9 ± 1.2	0.34 (-0.21, 0.89)	0.22	70 (68.0)	1.08 (0.82, 1.44)	0.58
No	141	3.3 ± 1.8	reference	-	2.4 ± 1.2	reference	-	93 (66.0)	reference	-
Has received training on a nutrition topic:[4]										
In the last year	104	4.2 ± 1.6	0.71 (0.19, 1.23)	0.01	3.1 ± 1.0	0.46 (0.10, 0.81)	0.01	83 (79.8)	1.56 (1.28, 1.90)	<0.001
More than a year ago	45	3.9 ± 1.8	0.71 (0.12, 1.30)	0.02	2.6 ± 1.0	0.17 (-0.24, 0.59)	0.41	35 (77.8)	1.52 (1.07, 2.15)	0.02
Never	95	2.5 ± 1.6	reference	-	2.1 ± 1.2	reference	-	45 (47.4)	reference	-
Received supervision ≥2 times per month[5]										
Yes	112	3.6 ± 1.7	0.22 (-0.12, 0.56)	0.20	2.7 ± 1.1	0.08 (-0.19, 0.35)	0.55	84 (75.0)	1.21 (0.96, 1.51)	0.10
No	92	3.4 ± 1.8	reference		2.6 ± 1.2	reference		57 (59.9)	reference	

1. Adjusted difference and corresponding 95% confidence intervals and p-values were obtained from multivariable linear regression models accounting for correlated erros within districts using an exchangeable correlation structure; 2. Multivariable prevalence ratios, 95% confidence intervals and p-values were obtained from generalized estimating equations with a log link and Poisson distribution accounting for correlated errors within districts using an exchangeable correlation structure; 3. Independent variables in the multivariable model include: type of frontline worker (FCHV, government health worker, government agriculture or livestock worker, NGO agriculture worker or other FLW), agroecological zone (terai vs. mountain or hill) and whether the district is a Suahaara intervention district (yes vs. no); 4. Independent variables in the multivariable model include: type of frontline worker (FCHV, government health worker, government agriculture or livestock worker, NGO agriculture worker or other FLW), and whether the FLW received a nutrition training in the last 12 months, over 12 months ago or never; 5. Independent variables in the multivariable model include: type of frontline worker (FCHV, government health worker, government agriculture or livestock worker, NGO agriculture worker or other FLW), whether the FLW received a nutrition training in the last 12 months, over 12 months ago or never, and the frequency of supervision (≤1 times per month vs. ≥2 times per month)[4]

Overall, majority of FLWs received training in nutrition, agriculture and health through MSNP trainings, as well as trainings from programs like Suaahara, KISAN, etc. The analysis demonstrate that capacity and knowledge on nutrition actions is strong within the health sectors (GovHealth, FCHVs). Nonetheless, the analysis also demonstrate an inadequate nutrition knowledge among health sector FLWs in correctly identifying malnutrition. There was, however, variability across non-health sectors (GovAg, NGOAg, Other FLWs) trained in nutrition topics and their knowledge on nutrition. As Nepal rolls out its second phase of MSNP, further investment on increasing nutrition capacities of FLWs' is highly recommended at all levels and sectors. Further analysis will focus on how the knowledge on nutrition and personal practices match among FLWs.