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Food consumption pattern and nutritional care and support for HIV and AIDS infected and non-infected children living in Kailali district of Nepal

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Abstract:
Background And Objectives: *HIV/AIDS pandemic has been on the rise in Nepal since the first case was reported in the country in 1988. HIV/AIDS being growing problem is fueled by ignorance about nutrient requirement and brutal discrimination against people. Kailali district is one of the highly HIV and AIDS endemic districts of Nepal.*
Method: *Analytical cross sectional study design was used to conduct a study among 75 HIV/AIDS infected and 75 non-infected children in Kailali district. Data was collected with the help of semi structured questionnaire that included a food-frequency checklist, anthropometric measurement and 24-hour dietary recall form.*
Result: *Poor nutritional status was observed among both infected and non-infected children. A total of 47, 53 and 83% of the infected children were stunted, wasted and underweight as compared to 53, 47 and 17% for the non-infected group. Average numbers of meals consumed per day were 3.23 and 3.17 for infected and non-infected children respectively. Among HIV infected children, there was a weak positive relationship between BMI of children and monthly income of respondent which was not statistically significant (p=0.077). A moderate positive relationship between BMI of non-infected children and monthly income of respondent with statistically significant difference (p=0.000). There was no significant difference between the major components of nutritional care and support and HIV status. No statistically significant difference was observed in calorie intake, wasted, underweight, and stunted and HIV status. However, there was a significant difference (p=0.000) between HIV status of children and symptoms of nutritional implications.*
Conclusion: *Majority of children (6-15 years) among non-infected group were underweight. In contrast, majority of infected children (1-5 years) were wasted. The mean age, weight and height of non-infected children were higher. The consumption of balanced diets was irregular. Major symptoms of nutritional implications were anorexia, nausea and vomiting, mouth/throat soar and diarrhea.*
Keywords: *HIV and AIDS children, HIV and Nutritional status among children, Nutritional care and support, Nepal*

I. INTRODUCTION

The HIV epidemic remains a serious public health concern globally with a large number of preventable new HIV infections occurring each year and millions of people dying prematurely of AIDS.[1]Highest prevalence i.e. 7,215 was seen among Clients of SWs/STD. 1,037 children were reported of being infected. People with age group 30-39 were found to have high prevalence (6,312). While, 3,544 children (0-14) were reported of being HIV infected. [2] Kailali district is one of the highly HIV and AIDS endemic districts of Far Western Development Region in Nepal.

HIV and AIDS have significant impacts on nutrition at the levels of the individual, household and community. In households affected by HIV or AIDS, overall food consumption generally decreases. For the individual, malnutrition will increase both susceptibility to HIV infection and vulnerability to various post-infection impacts HIV or AIDS and malnutrition often operate in tandem. Poor nutrition increases the risk and progression of disease, and, in turn, disease exacerbates malnutrition [3]

Previously not any studies in Nepal have conducted research in relation to HIV and nutritional status among children. Hence the purpose of this study is to investigate into this matter in the context of Nepal by comparing the nutritional status and HIV among children in endemic district.

II. METHODS

The study design was Analytical Cross-sectional in nature and was prepared with the aid of both quantitative data. Snowball sampling method was used to select households with HIV and AIDS infected children. Respondents of non-infected children were selected purposively from all the VDCs and municipality

within the same district. A study was conducted among children of age 1-15 years with the help of their care takers.

Weighing scales, measuring board, height charts or measuring tape were used as a tool to retrieve children's height and weight to calculate BMI. Bowls and cups were used to measure the quantity of foods consumed by children in order to calculate energy intake. Data was collected through the interview schedule and semi structured questionnaire from the care givers. A consolidated questionnaire that included a food-frequency checklist and personal 24-hour dietary recall was used to gather information from caregivers. In order to validate the study 10% of the sample (i.e. 15) was assigned for the pre-testing of the questionnaire.

A written and informed consent was obtained from each care givers and the study was approved by the institution's ethical committee.

The study population was subdivided into 2 groups of 75 children each. Group I (Normal children whose care takers could give informed consent), Group II (HIV and AIDS infected children whose care takers could give informed consent)

Data were defined and entered in datasheet created in Epidata and analyzed in bar, graph, charts, and tables using Statistical Package for Social Sciences (SPSS) Version 16.0. Calculation of z scores for nutritional classification of children (<5 years) was done in WHO anthro software.

III. RESULTS

1.1 Food Consumption: Caregivers of both HIV/AIDS infected and non-infected child were asked about the foods that their children consumed. In both the study group majority of the caregivers were found giving rice (97 percent) and lentils (87 percent) to their children as a daily food items. Fruits like Banana and Guava were only found to be consumed by 5 percent and 7 percent children. Both the study group consumed bottle gourd in more proportion (Infected=55 percent and Non-infected=19 percent). Animal products like milk, curd, meat and eggs were given less to HIV infected children as compared to non-infected children.

Table 1: Food consumed by children 24 hours prior to the interview*

Foods	**Infected**		**Non-infected**		**Total (n=150)**	
Cereal products	n	%	n	%	n	%
Rice	70	48	75	52	145	97
Bread	8	61	5	39	13	9
Roti	47	48	50	52	97	65
Fruits						
Banana	2	25	6	75	8	5
Guava	3	30	7	70	10	7
Vegetables						
Potato	15	52	14	48	29	19
Bitter gourd	5	83	4	17	9	6
Bottle gourd	24	55	19	45	43	29
Green leafy vegetable	6	67	13	33	19	13
Animal Products						
Milk	14	47	16	53	30	20
Curd	1	20	4	80	5	3
Red Meat	9	43	12	57	21	14
Eggs	2	28	5	82	7	5
Legumes/Pulses						
Gram	1	25	3	75	4	3
Soybeans	3	50	3	50	6	4
Lentils	65	50	66	50	131	87
Others						
Tea	27	57	15	43	47	31
Noodle	1	33	2	66	3	2
Rice Pudding	1	50	1	50	2	1
Khichadi	1	33	2	66	3	2

*MCQs

1.2 Food frequencies: The frequencies of food given to both HIV and AIDS infected and non-infected children by their caregivers. Meat/Poultry/Fish were found to be given sometimes usually to children in both groups (Infected=54.7 percent and Non-infected=65.3 percent). These products were not given to infected children on daily basis but 1.3 percent of non-infected children were provided with Meat/Poultry/Fish on daily basis. Similarly, fruits were also given sometimes only to the children in both the groups (Infected=72 percent and 74.7 percent). However, infected children were found consuming less fruits compared to non-infected children. Daily vegetables, dairy products and cereals consumption was recorded more in non-infected child i.e. 54.7, 26.7 and 37.3 percent respectively. HIV infected children were given juice (5.3 percent) daily than those of non-infected children.

Table 2: Frequencies of food given to children

S.N	Food Items Given to Child	Often (almost every day) n (%)	Weekly n (%)	2-3 times a week n (%)	Monthly n (%)	Sometimes n (%)	Never n (%)
HIV and AIDS infected Children (n=75)							
1.	Meat/Poultry/Fish	0	5(6.7)	0	20(26.7)	41(54.7)	9(12)
2.	Fruits	2(2.7)	5(6.7)	3(4)	6(8)	54(72)	5(6.7)
3.	Vegetables	36(48)	1(1.3)	21(28)	1(1.3)	16(21.3)	0
4.	Dairy products	19(25.3)	0	1(1.3)	5(6.7)	42(56)	8(10)
5.	Juice	4(5.3)	0	0	1(1.3)	5(6.7)	65(86.7)
6.	Legumes/Pulses	38(50.7)	5(6.7)	17(22.7)	2(2.7)	11(14.7)	2(2.7)
7.	Cereals	0	20(26.7)	5(6.7)	4(5.3)	4(5.3)	42(56)
Non-infected Children (n=75)							
1.	Meat/Poultry/Fish	1(1.3)	5(6.7)	0(0)	11(14.7)	49(65.3)	9(12)
2.	Fruits	0	6(8)	1(1.3)	8(10.7)	56(74.7)	4(5.3)
3.	Vegetables	41(54.7)	3(4)	23(30.7)	1(1.3)	7(9.3)	0
4.	Dairy products	20(26.7)	1(1.3)	5(6.7)	5(6.7)	33(44)	11(14.7)
5.	Juice	2(2.7)	1(1.3)	0	1(1.3)	9(12)	62(82.7)
6.	Legumes/Pulses	36(48)	8(10.7)	18(24)	2(2.7)	11(14.7)	0
7.	Cereals	28(37.3)	12(16)	19(25.3)	5(6.7)	11(14.7)	0

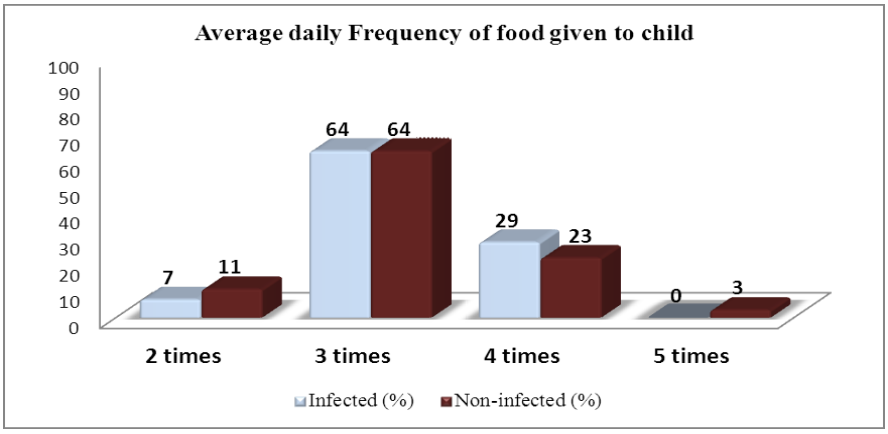

Fig 1: Bar diagram showing frequencies of foods given to infected and non-infected children

1.3 Energy Intake: Data in this table gives total mean energy recommended and consumed by HIV and AIDS infected and non-infected children 24 hours prior to interview. Usually, 10-15 percent extra energy is recommended for HIV and AIDS infected children. The study between two groups shows that infected children (4-12 years) lack recommended energy. Similarly, low calorie intake is seen in non-infected children with 4-6 years (1743 Kcal), 10-12 years (2417 Kcal) and 13-15 years (2791 Kcal). Higher proportions of infected children are deprived from recommended energy than those of non-infected.

Table 3: Mean energy intake by HIV and AIDS infected and non-infected children 24 hours prior to interview

	Energy (Kcal)			
Age Group	**Infected**		**Non-infected**	
Children	Recommended**	Consumed(mean)	Recommended*	Consumed(mean)
1-3	1496	1871	1360	1498
4-6	2013	1552	1830	1743
7-9	2409	2374	2190	2356
Male				
10-12	2860	2555	2600	2417
13-15	3190	3081	2900	2791
Female				
10-12	2585	2555	2350	2417
13-15	2739	3081	2490	2791

**10% more than normal, *Src: {Department of Food Technology and Quality Control, 2004}[4]

1.4 Time spent with children: In both the study groups, majority of caregivers spent 1-5 hours each day with their children. Caregivers of infected children (44 percent) were found giving sufficient time to their children (5-10 hours). Caregivers of non-infected children spent more time (whole day) with their children than those of non-infected children i.e. 5% and 4% respectively.

Table 4: Average time spent by caregivers with their children each day

Time spent	Infected		Non-infected		Total	
	n	%	n	%	n	%
Whole Day	3	4	4	5	7	4.7
5-10 hours	33	44	28	37	61	40.7
1-5 hours	39	52	43	57	82	54.7
Total	**75**	**50**	**75**	**50**	**150**	**100**

1.5 Institutional support: Only 20 percent HIV and AIDS infected children have got institutional support. 24 percent of infected children got support from Government, while 12 percent got from NGOs. No one in non-infected group got institutional support.

Table 5: Institutional support received by children

	Yes						No		Total
Group	NGO		INGO		Government		n (%)		n
	n	(%)	n	(%)	n	(%)	n	(%)	
Infected	9	12	3	4	18	24	45	60	75
Non-infected	0	0	0	0	0	0	75	100	75
Total	**9**	**6**	**3**	**2**	**18**	**12**	**120**	**80**	**150**

1.6 Symptoms with nutritional implication: Except for nausea and vomiting (15 percent), all other symptoms with nutrition implication were more among the HIV/AIDS infected than for the non-infected children. Prevalence of anorexia, mouth/throat soar and diarrhea were found more in infected children i.e. 24, 12 and 13 percent respectively.

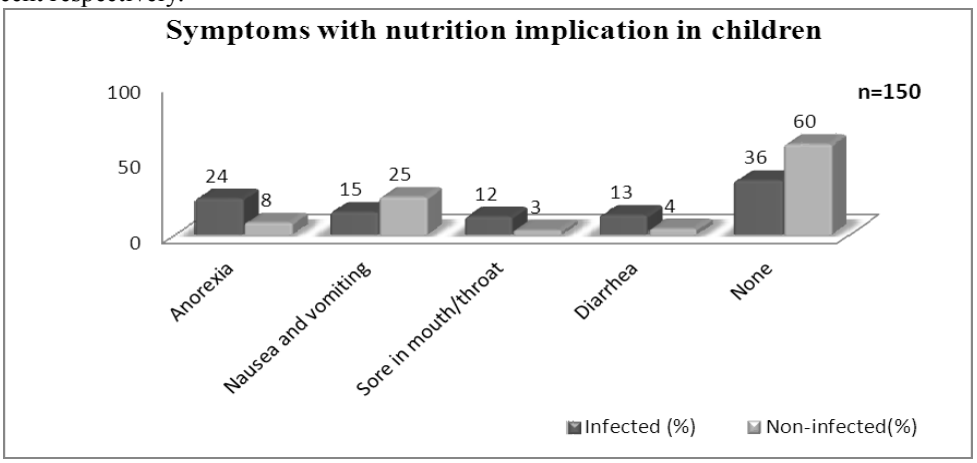

Fig 2: Bar diagram showing symptoms with nutritional implication in infected and non-infected children

1.7 Nutritional status of children in relation to income of caregivers: For Infected group, the results show that there is a weak positive relationship between BMI of children and monthly income of respondent (Pearson Correlation=0.225). The results is not statistically significant (p=0.077). It shows that there is 9% variability of BMI with monthly income of caregivers. For Non-infected group, the results show that there is a moderate positive relationship between BMI of children and monthly income of respondent (Pearson Correlation=0.549). There is a significant association between the two category (p=0.077). It shows that there is 25% variability of BMI with monthly income of caregivers.

Table 6: Relationship between HIV and nutritional status of children with monthly income of caregivers

Correlations				
Group			BMI of Children	Monthly income of caregivers
Infected	BMI of Children	Pearson Correlation	1	.255
		Sig. (2-tailed)		.077
		N	56	49
	Monthly income of caregivers	Pearson Correlation	.255	1
		Sig. (2-tailed)	.077	
		N	49	49
Non-infected	BMI of Children	Pearson Correlation	1	.549**
		Sig. (2-tailed)		.000
		N	52	48
	Monthly income of caregivers	Pearson Correlation	.549**	1
		Sig. (2-tailed)	.000	
		N	48	48

**. Correlation is significant at the 0.01 level (2-tailed).

1.8 Nutritional status of children in relation to frequency of food given: In both the study groups, there is an inverse relationship (Infected =-0.01 and Non-infected=-0.047) between monthly income of caregivers and frequency of food given to child. The probability value for both groups is above conventional threshold of $p < .05$ (Infected=0.93 and non-infected=0.697); hence the two categories are statistically not significant with inverse relationship.

Table 7: Relationship between HIV and nutritional status of children with frequency of food given

Group			Monthly income of respondent	Frequency of food given to child each day
Infected	Monthly income of respondent	Pearson Correlation	1	-.010
		Sig. (2-tailed)		.938
		N	62	62
	Frequency of food given to child each day	Pearson Correlation	-.010	1
		Sig. (2-tailed)	.938	
		N	62	75
Non-infected	Monthly income of respondent	Pearson Correlation	1	-.047
		Sig. (2-tailed)		.697
		N	70	70
	Frequency of food given to child each day	Pearson Correlation	-.047	1
		Sig. (2-tailed)	.697	
		N	70	75

1.9 Association measurement between training and nutritional status: Statistically non-significant differences were observed among wasted (Infected: X^2=0.000, P=1.0 and non-infected: X^2=0.000, P=1.0) underweight (Infected: X^2=0.423, P=0.515 and non-infected: X^2=0.325, P=0.535) and stunted (Infected: X^2=0.000, P=1.0 and non-infected: X^2=0.000, P=1.0) children with respect to nutritional training/counseling received by their caregivers.

Table 8: Association between training received by caregiver and nutritional status of children (<5 years)

Group	**Nutritional training/ counseling received by caregiver**	**Wasting**		**Underweight**		**Stunting**	
		Normal	Wasted	Normal	Underweight	Normal	Stunted
Infected	Yes	4(11.1)	2(33.3)	2(8)	4(23.5)	1(16.7)	5(13.9)

	No	10(27.8)	3(50)	8(32)	5(29.4)	1(16.7)	12(33.3)
Non-Infected	Yes	3(8.3)	0	1(4)	2(11.8)	1(16.7)	2(5.6)
	No	19(52.8)	1(16.7)	14(56)	6(35.3)	3(50)	17(47.2)
Total		**36**	**6**	**25**	**17**	**6**	**36**

1.10 Association between HIV status and morbidity pattern: With the highest prevalence of anorexia (24 percent) among infected and nausea and vomiting (25 percent) among non-infected children, statistically significant difference P=0.000, X^2=20.857) was observed between HIV status and morbidity pattern of children.

Table 9: Association between HIV status and morbidity pattern of infected and non-infected children

Group	**Anorexia**		**Nausea and vomiting**		**Mouth/ throat soar**		**Diarrhea**		**None**	
	n	%	n	%	n	%	n	%	n	%
Infected	18	24	11	15	9	12	10	13	27	36
Non-infected	6	8	19	25	2	3	3	4	45	60
Total	**24**	**16**	**30**	**20**	**11**	**7**	**13**	**9**	**72**	**48**

1.11 HIV status and total calorie intake: It shows that there is no statistically significant difference between the distributions of HIV status and total calorie intake by children (z = -0.124, p = 0.901).

Table 10: Comparison between HIV status and total calorie intake.

Group	**N**	**Median(Md)**	**Percentile (25-75)**
Infected	75	1939	1597-2724
Non-infected	75	1986	1600-2629
Total	**150**		

Mann-Whitney U=2779.5

1.12 HIV status and nutritional care and support:

Living together with child: Among caregivers of infected children, 92 percent and among non-infected children 98.7 percent reported of living together with their child. Statistically not significant differences were observed between caregivers living together with infected and non-infected children.

Time given to child: Caregivers of infected child who reported giving insufficient time (<10 hours) were found to be 52 percent and 57.3 percent caregivers of non-infected child reported giving insufficient time to their children. Statistically not significant differences were observed between time given by caregivers to HIV infected and non-infected children.

Time allowed for child to sleep: All the caregivers were asked about the time given for their child for sleeping. Most of the caregivers (89.3 percent) of infected children as well as caregivers (92 percent) of non-infected children reported allowing >8 hours to their children for sleep. Statistically not significant differences were observed between time provided for sleep by caregivers to HIV infected and non-infected children.

Pure water given to child: Majority of caregivers reported of not providing pure water to their children in both infected (89.3 percent) and non-infected (93.3 percent) group. No statistical significant differences were observed.

Institutional support: Statistically significant differences were observed between infected and non-infected children in getting institutional support (p=0.000). For receiving institutional support, infected children were about 24 times more likely to get support than non-infected children (OR=24.33, 95% CI: 5.546-106.764).

Table 11: Association between HIV status and nutritional care and support

Group	**Living together with child**				**X^2**	**P-value**	**OR (95% CI)**
	Yes		No				
	n	%	n	%			
Infected (n=75)	69	92	6	8	2.398	0.122*	0.155
Non-Infected (n=75)	74	98.7	1	1.3			(0.018-1.324)

Group	**Time given to child**						
	>10 hours		<10 hours		X^2	P-value	OR (95% CI)
	n	%	n	%			
Infected (n=75)	36	48	49	52	0.430	0.512	1.240
Non-Infected (n=75)	32	42.7	43	57.3			(0.652-2.362)

Group	Time allowed for child to sleep				X^2	P-value	OR (95% CI)
	<8 hours		>8 hours				
	n	%	n	%			
Infected (n=75)	8	10.7	67	89.3	0.315	0.575	1.373
Non-Infected (n=75)	6	8	69	92			(0.452-4.169)
Group	**Pure water given to child**				X^2	P-value	OR (95% CI)
	Yes		No				
	n	%	n	%			
Infected (n=75)	8	10.7	67	89.3	0.758	0.384	1.672
Non-Infected (n=75)	5	6.7	70	93.3			(0.521-5.367)
Group	**Institutional support**				X^2	P-value	OR (95% CI)
	Yes		No				
	n	%	n	%			
Infected (n=75)	30	40	45	60	31.14		**24.33**
Non-Infected (n=75)	2	2.7	73	97.3	4	**0.000**	**(5.546-106.764)**

*Yates's Correction

IV. Discussion

The study includes about 40% (Male=55% and Female=45%) of total HIV and AIDS infected children as per the record of DAAC of Kailali district, where total registered cases were 188 (Oct, 2011). This study documents poor nutritional status among HIV positive children aged 12-59 months compared to their HIV negative counterparts. According to the NDHS survey, 41% of children below 5 years of age are stunted, 29% of the children are underweight and 11 % of the children are wasted. [5] A similar scenario has been found in this study with 14% wasted, 40% underweight and 86% stunted.

This study documents high consumption of rice, lentils and roti which accounts 97, 87 and 65 percent respectively. 77% of children consumed white bread only while 85% consumed standard milk and 7% consumed milk less than once a month or never.[6] The variation on food consumption occurs depending on place of residence. However, Average number of meals given to children per day was found to be 3.23 with majority of taking 3 times in average as found in this study. Majority of children had food only for three times a day.[7][8]

Calorie consumed by infected children (4-12 years) lack recommended energy and low calorie intake is seen in non-infected children with 4-6 years (1743 Kcal), 10-12 years (2417 Kcal) and 13-15 years (2791 Kcal). Higher proportion of HIV positive children are deprived from recommended energy than those of non-infected children.[4] Similarly, Majority of children (55%) didn't consume recommended calorie in the study by Chege P. et al. People living with HIV and AIDS require (10-15%) more energy than normal children.[9] High calorie requirement and improper dietary intake could be the reason for not getting minimum calorie required in both study groups. However, No statistically significant difference between the distributions of HIV status and total calorie intake by children were observed.

The main illnesses among children reported by their respondents since last two weeks were anorexia, nausea and vomiting, mouth/throat soar and diarrhea. There was no significant difference between the amount of kilocalories taken per day (p=0.901). However, there was a significance difference in the number of sick (p=0.03) and morbidity pattern (p=0.000) among children for two groups which was similar to other study (Chege P. et al, 2010). However, there was no significant difference in number of wasted, underweight and stunted. The significant difference in morbidity patterns may be due to opportunistic infections which increases nutrient needs.

There was a positive but moderate positive correlation (r=0.549) among non-infected group which was significant (P=0.00) between the BMI of children (6-15 years) and monthly income of caregivers, at 0.05 level of significance. This suggests that increment of income is important for improvement of nutritional well-being among non-infected children. Increment in monthly income helps in buying nutritious food for children and hence increases the nutritional status. However, among the HIV infected group, There was a weak positive correlation (r=0.255) among which was not significant (P=0.077) between the BMI of children (6-15 years) and monthly income of caregivers. This documents that the increase in monthly income increases BMI of children only due to chance.

There were no significant differences observed for HIV status and various components of nutritional care and support like- living together with children (p=0.122), time given to children (p=0.512), time allowed for children to sleep (p=0.315), pure water given to children (p=0.758). However, statistically significant difference (p=0.000) was found for institutional support between infected and non-infected children. This shows that infected children were about 24 times more likely to get support than non-infected children (OR=24.33,

95% CI: 5.546-106.764). This may be due to support from various Government and non-Government organizations for HIV infected children. Government hospitals were found providing support in higher proportion.

IV. CONCLUSION

The findings of the study conclude that malnutrition remains as a great problem for both HIV infected and non-infected children in Kailali district. Majority of the children were of 6-15 years with poor nutritional status among non-infected group. In contrast, majority of children less than 5 years of age have poor nutritional status among infected group. The health status of children has also been determined by income of caregivers. Majority of the children did not consume recommended kilocalories in both groups. Children infected with HIV need more nutrition and care than non-infected children, which show lacking in this study.

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