

Full Length Research Paper

Assessment of Dietary Consumption of Vitamin A by Preschool Children in Southern Ethiopia- A Cross Sectional Study

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ABSTRACT

Vitamin A deficiency is public health problem in Ethiopia. Studies showed that mainly preschool children's are more affected by this problem. There are many causes that lead vitamin A deficiency but inadequate dietary intake is primary causes in developing countries. The objective of the study was to assess dietary consumption of vitamin A by preschool children aged group 2-5 years in Sodo Zuria district, South Ethiopia. A cross-sectional survey was conducted using two stage cluster sampling technique was used to select representative samples of 576 preschool children's from three rural kebeles of the study area. A modified 7 day HKI food frequency questioner and 24 hr FANTA food diversity score were used to assessing dietary intake of Vit-A. The result of this study specifies that, 99.5% of preschool children had consumed Vit-A rich foods from animal source ≤ 4 times and 98 % of preschool children were consuming animal & plant (weighted by source) source of Vit-A rich foods ≤ 6 times per week. The mean frequency of consumption of animal source of Vit-A was 1.42 times and the mean consumption of total animal plus plant source (weighted by source) of Vit-A was 3.01 times for the last one week. The finding showed that frequency of consumption of Vit-A rich foods was below the threshold value of HKI and PAHO/WHO recommendation. According to FAO criteria dietary consumption of Vit-A by majority of preschool children was inadequate and they were at risk of VAD problem. So mother/care givers of the child should encourage their preschool children to eat Vit-A rich foods each day at least one food item that are animal foods, yellow, orange fruits and green vegetables.

Key words: Vitamin A deficiency, Food frequency, Food diversity, Dietary consumption

INTRODUCTION

Vitamin A deficiency is a public health problem in Ethiopia. National Nutrition Program, (2008) states that in the country, VAD affects 61 % of children 6 to 59 months of age which is considerably high and it is number one cause of preventable blindness. Likewise, country level profiles indicate that 298,000 child deaths in Ethiopia over six year period (2000-2005) can be attributed to VAD (Ethiopian Profiles Team & AED/ Linkages, 2005). The main cause of VAD in developing countries is inadequate dietary intake of Vit-A. The consumption of Vit-A rich foods is affected by many factors like inadequate production of Vit-A rich foods, unavailability of Vit-A rich foods in markets, large family size, high maternal parity levels, land size, that are presumed to contribute to inadequate consumption of Vit-A rich foods in developing countries (Demissie *et al.*, 2009). Unfortunately, studies relating to country and region or area specific about the consumption of Vit-A rich foods and causes of VAD for preschool children in Ethiopia are scarce, and hence, substantive information regarding factors contributing to VAD is lacking in Ethiopia including the study area. The objective of the study was to assess dietary consumption of vitamin A by

preschool children aged group 2-5 years in Sodo Zuria Woreda, South Ethiopia.

MATERIALS AND METHODS

The A community based cross-sectional survey was undertaken to assess the consumption of Vit-A rich foods by preschool children in Sodo Zuria district, Wolyita Zone, SNNPR, it is 380 km south from the capital Addis Ababa and 160 km from the regional capital Hawassa. The study period was from February-March, 2011. Source population of the study was all preschool children aged 2-5 years, who were living in Sodo Zuria district. The study participants were all randomly selected preschool children aged 2-5 years who were living in selected three kebele. Source of information were mothers/care givers of 2-5 years old child who knows the child food habit.

The sample size was determined by the formula $N = Z^2_{(1-\alpha/2)} pq/d^2$ (by using standard normal value at 95 % confidence level (1.96), population proportion of consumption of vitamin rich food of 50% , Margin of error of 5% and design effect account to be 1.5), the total sample size was 576 preschool children. Two stage clusters sampling was used. The first stage involves

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selection of three kebele. Out of thirty one rural kebeles of the district, three kebeles were selected by probability proportional to the sample size (PPS) sampling technique. By using random number table generating one number between 1 to sampling interval to select the first kebele after getting sampling interval. Sampling interval is calculated from dividing the total cumulative number of preschool children (2-5 years) in the Woreda into numbers of the kebeles taken for studies (three), then adding the sampling interval to the number that was obtained during randomization to identify the other two kebeles. The second stage was selection of households in selected kebeles;- The house holders in the selected kebeles with 2-5 years of age children were identified by immunization card from the nearby health post/center as well as house to house registration for those who are not registered on immunization card. The sample size (576) was equally assigned for the selected three kebeles. The sampling frame was prepared by registering all eligible children age 2-5 years old in each three kebeles. After that, simple random sampling was used to select the required number of children (2-5 years) in selected kebeles.

All preschool children (2-5 years old) and permanent resident (living for at least the past 6 month) in Sodo Zuria district were included, but those who were not permanent resident and not willing to participate were excluded. After getting consent from Hawassa University ethical review committee and verbal consent from each respondent, data's like household's socio demographic and economic characteristics and food practice of 2-5 years of age child were collected by using structured questionnaire. Whereas dietary consumption of Vit-A rich foods by 2-5 year old child was assessed by using a modified Helene Keller International qualitative food frequency questionnaire and Food diversity and Nutrition Technical Assistance Project (FANTA) (HKI, 1992; FANTA, 2006).

Pre-tested and a modified questionnaire was used to collect the data according to the objective of the study. SPSS windows version 16 was used to analyze the data. Descriptive summaries using frequencies, proportions and figure were used to present the study results.

RESULTS

In this study 576 households were included with response rate of 100 %. Out of the total study subject preschool children 282 (49 %) were male the rest 294 (51 %) were female in sex with the mean age of 43.4 ± 1.09 months. Average family size of the study participant household was 5.96 people. Majority 549 (95.30 %) of the study participated households were headed by fathers and main occupation of head of the households was farmer (Table-I).

Frequency of consumption of Vit-A rich foods by preschool children in the last one week

According to the study above half (57.6 %) of study subjects had consumed DGLV like kale, cabbage less or equal to one times in the last one week prior of the survey. None of the study subjects were consuming both carrot and pumpkin every day in past one week. Likely this finding states that slightly above half (54.3 %) of preschool children's were consuming avocado less or equal to one time per week and only 2 % of preschool children were consuming avocado every day for the last one week. The mean frequency of consumption each of avocado and mango in the last one week prior to the survey was below two times. Slightly above one fifth (21.9 %) of preschool children were consuming papaya at least one time per week (Table-II).

In the study area, the study subjects' consumption frequency of chilies and sweet potato leaves was so less, i.e. 85 % and 99 % of preschool children had never consumed both these foods in the last one week. Nearly two third (68.6 %) of study subjects had consumed white fleshed sweet potato (WFSP) at least once per week, but 1.4 % and 6.8 % of study subjects had consumed yellow fleshed sweet potato (YFSP) and orange fleshed sweet potato (OFSP) at least once per week respectively. Slightly lower than half (48.4 %) of preschool children had consumed WFSP greater than or equal to four times per week, while 1.9 % of preschool children had consumed OFSP greater than or equal to four times per week (Table-II).

Table I: Socio-demographic and economic characteristics of the study participated households in Sodo Zuria Woreda from February-March, 2011(N=576).

Variables	Number	Percent
Ethnicity		
Wolyta	563	97.7
Amhira	7	1.2
Gurage	6	1.1
Religion		
Protestant	350	60.8
Orthodox	180	31.3
Catholic	23	4.0
Muslim	21	3.6
Other	2	0.3

Head of the household		
Father	549	95.3
Mother	25	4.4
Other	2	0.3
Occupation of the head of the household		
Farmer	533	92.5
Petty trader	28	4.9
Civil servant	11	1.9
None	2	0.3
Other	2	0.3
Respondent		
Mother	496	86.2
Other	80	13.8
Educational level of the respondent		
None	270	46.9
Read/write	104	64.9
Elementary (grade 1-6)	167	29
Junior high school (grade 7-8)	24	4.2
High school (grade 9-12)	11	1.9
Marital status of the respondent		
Married	477	82.8
Single	86	14.9
Divorced	7	1.2
Widowed	6	1
Mean± SD		
Mean family size	5.96 ± 1.88	
Average age of children in month	43.4 ± 1.09 months	

Table II: Frequency of consumption of plant source of Vit-A rich foods by preschool children in the last one week in Sodo Zuria Woreda from February-March, 2011 (N=576).

Food item	% of preschool children consumes		Mean* frequency per week
	≤ 4 times per week	> 4 times per week	
Chilly	99.00	1.00	0.33
Dark green vegetable	98.30	1.70	1.31
Avocado	90.60	9.40	2.00
Carrot	99.70	0.30	0.50
Mango	92.20	7.80	1.74
Pumpkin	99.70	0.30	0.28
Papaya	100.00	–	0.40
WFSP	70.30	29.70	3.02
OFSP	100.00	–	0.16
YFSP	100.00	–	0.03
Sweet potato leaves	100.00	–	0.010

(*) represents the mean is not weighted by source

The consumption frequency of foods from animal sources by study subjects was very low in the last one week. Thus, 34.9 % of preschool children had consumed milk at least one times per week. For eggs 1.4 % of preschool children were consuming at least one day, but the rest 98.6 % of study subjects were not consuming egg. Almost all (99.1 %) and (99.8 %) of study subjects had not consumed chicken and fresh / dried fish for the

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last one week respectively. In the same way about 16.7 % of preschool children had consumed meat at least one time per week (Table-III).

Regarding to the frequency of consumption of fats and oils in the present study, 98.3 % of preschool children were consuming oil fried food below four times per week. Around 99 % of preschool children consumed Vit-A fortified oils below four times per

week. The mean frequency of consumption of oil fried food and Vit-A fortified oils was below one time for the last seven days.

Likewise 9 % of preschool children were consuming Vit-A fortified cereals at least one time per week (Table-III).

Table III: Frequency of consumption of animal source of Vit-A rich foods by preschool children in the last one week in Sodo Zuria Woreda from February-March, 2011(N=576).

Food item	% of preschool children consumes		Mean frequency Per week
	≤ 4 times per week	> 4 times per week	
Egg with yolk	100.00	—	0.203
Milk	96.50	3.50	0.75
Fresh/ dried fish	100.00	—	0.0035
Chicken	100.00	—	0.013
Meat	100.00	—	0.23
Better	100.00	—	0.36
Liver	100.00	—	0.31
Oils and fortified foods			
Oil fried food	100.00	—	0.609
Vit-A fortified oil	100.00	—	0.33
Vit-A fortified cereal	100.00	—	0.19
Biscuit/ bread	99.30	0.70	0.98
Total mean consumption of			
Plant source of Vit-A (weighted by source)			1.61
Animal source of Vit-A			1.42
Animal +Plant source of Vit-A (weighted by source)			3.03
Percent below threshold			
Total animal source of Vit-A			99.5 %
Total Animal+ Plant source of Vit-A(weighted by source)			98 %

Dietary diversity score of preschool children in the past 24 hrs

This study showed that out of listed 12 food groups the mean dietary diversity of the previous 24 hrs were 4.15625 ± 1.86 and 4.0677 ± 1.35 food groups at the household and individual level (preschool children) respectively. Likewise 15 % of preschool children had consumed ≥ 6 food groups, 39.10 % of preschool children consumed 4-5 food groups and 45.90 % of preschool children consumed less than or equal to three food groups for the last 24 hrs.

DISCUSSION

Average family size of the study participant households were 5.96 ± 1.88 people which is slightly higher than the national data (5.2 persons per rural households) stated in the 2005 Ethiopian Demographic Health Survey report (CSA, 2005). The mean land size was 0.65 hectare in the study area. Demissie *et al.* (2009), reported that the consumption of Vit-A rich foods is affected by factors like, a large family size and land size that are presumed to contribute to inadequate consumption of Vit-A in developing countries.

It is already identified that Vit-A is found in plants and animal sources. Foods from animal origin contain high bio-available Vit-A. Of plant sources vegetables and fruits are the main sources of Vit-A. The consumption of these vegetables and fruits are vital in designing sustainable interventions to prevent Vit-A deficiency. But the practice regarding to the consumption of vegetables and fruits indicated that extremely sub-optimal in developing countries (Demissie *et al.*, 2009). According to the present study, dietary intake of Vit-A rich foods by preschool children was so less. Majority (99. 8%) of preschool children were not consuming animal foods every day and 96.3 % were not consuming any Vit-A rich foods every. Around all (99.5 %) of preschool children were consuming animal foods less or equal to four times per week and 98 % of preschool children were consuming total animal plus plant source (weighted by source) of Vit-A rich foods less than or equal to six times per week.

Their mean consumption of animal, total animal plus plant source (weighted by source) of Vit-A rich foods was 1.42 and 3.03 days respectively (Table-3). In line with study conducted in Uganda reported that 75 % of young children were not consuming animal foods regularly and in Kenya 70.8 % of children had consumed animal foods less than four times per week (Cornelia *et al.*, 2010; Kipkorir *et al.*, 2006). However, the current child feeding guidance of (PAHO/ WHO 2003; WHO 2005) recommends that infants and young children over 6 months of age should be feed those Vit-A rich foods every day in order to prevent VAD problem. HKI method also determines whether VAD is a public health problem i.e. by using two threshold criteria. First one is mean frequency of consumption of animal sources of Vit-A is less or equal to four days per week and second one is mean frequency of total consumption of animal and plant sources of Vit-A (weighted by source) is less than or equal to six days per week. VAD is likely to be a public health problem if at least 70 % of surveyed communities do not meet the threshold Vit-A (Rosen *et al.*, 1993). WHO (1996), also suggests that if less than 75 % of preschool age children consume Vit-A rich foods at least three times a week the community/ population should be considered as at risk community/ population. As a result base on this suggestion, the study area preschool children were 'at risk of Vit-A deficiency problem', since their dietary intake of Vit-A was below the threshold level of the HKI and PAHO/WHO recommendations. The dietary diversity result also showed that majority of study subject preschool children food diversity score were low and medium. Given that dietary diversity scores have been positively correlated with increased mean micronutrient density adequacy of foods in young children (Ruel *et al.*, 2002; Dewey *et al.*, 2004; FANTA 2006). Out of all the study subject preschool children, by FAO food diversity score criteria ,45.9 % had low (consumed ≤ 3 food groups) , 39.1 % had medium (consumed 4 and 5 food groups) and 15 % had high dietary diversity score (consumed ≥ 6 food groups) for the last 24 hours (FAO, 2006). In this case dietary diversity score of preschool children was less, therefore, preschool children found in this study area are 'at risk of VAD problem'.

CONCLUSION AND RECOMMENDATION

Dietary consumption of Vit-A by preschool children was inadequate and they were at risk of VAD problem in Sodo Zuria district. So, it is better mother/care givers of the child should encourage their preschool children to eat Vit-A rich foods each day at least one food item that are animal foods, yellow (primarily yellow fruits) or (green vegetables) or orange in colors like OFSP. Encourage mothers/ care givers of the child to grow vegetables and fruits in their home garden to diversify their preschool children's food intake in the study area.

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