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Research

Food insecurity and socioeconomic status as predictors of animal source food consumption among adolescent girls in Hosanna, Ethiopia

Belay Bancha, Legese Petros

Corresponding author: Belay Bancha, Hosanna Health Science College, Hosanna, Ethiopia. banchabelay@gmail.com

Food insecurity and socioeconomic status as predictors of animal source food consumption among adolescent girls in Hosanna, Ethiopia

Belay Bancha[1,&], Legese Petros[1]

[1]Hosanna Health Science College, Hosanna, Ethiopia

[&]Corresponding author

Belay Bancha, Hosanna Health Science College, Hosanna, Ethiopia

Abstract

Introduction: in Ethiopia, adolescents account for 20-26% of the general population. This period is a window of opportunity to break the intergenerational cycle of malnutrition. However, there is a scarcity of data on the status of animal source food consumption in these segments of the population. Methods: a community-based cross-sectional study design was employed using a cluster sampling technique to collect data from 451 households where adolescent girls are family member. Data were entered into Epi-Data version 3.1 and then exported to SPSS version 23 for analysis. Logistic regression analysis was

performed. *Adjusted odds ratios (AORs), along with corresponding 95% confidence intervals (CIs), were used, and the level of statistical significance was declared at a p-value of <0.05.* **Results:** *a total of 434 households with adolescent girls were involved. We found that 41.7% of households were food insecure, 71.9% (C.I. 67.5-75.8) of adolescent girls consumed at least one category of animal source food. Controlling for others, household food insecurity (AOR=0.24, 95% C.I. 0.15-0.38), household wealth index (AOR=0.31, 95% C.I.=0.16-0.59, AOR=0.30, 95% C.I.=0.16-0.58) and lack of exposure to information (AOR=0.34, 95% C.I.=0.20-0.57) were significant predictors of animal source food consumption.* **Conclusion:** *a significant portion of households were food insecure, which adversely affects the consumption of animal source food and may trigger vicious cycles of malnutrition. Given that adolescence is the second period in human life during which rapid growth and development occurs, improving the dietary quality of adolescent girls is to be an agenda.*

Introduction

Globally, there are 1.8 billion adolescents, comprising 10-19 years old, representing approximately 20% of the world´s population. Of these, 90% live in low- and middle-income countries. In Ethiopia, adolescents account for 20-26% of the country's total population [1-3]. This is a period of most rapid growth second to childhood [4], characterized by rapid transition to adulthood marked by physical and biological growth and development. For instance, 50%, 20% and 50% of potential weight, height, and skeletal mass respectively are gained in this period; hence, optimal nutrition is critical during this period [5-8]. Additionally, it is a period of critical window of opportunity to intervene in an intergenerational cycle of malnutrition [3]. Collectively, meeting the nutrition needs of adolescent girls could be an important step in breaking the vicious cycle of malnutrition, chronic diseases and poverty at population level [9,10]. However, adolescents from developing countries are susceptible to nutritional deficiencies due to early childhood nutritional insults [11] and adverse environmental conditions, including food insecurity, which could impact their developmental potentials [5].

Along with food variety and dietary diversity, consumption of animal source foods (ASFs) is an indicator commonly used to assess the quality of dietary intake at an individual or household level. In recognition of this, food guides usually recommend several daily servings from ASFs, which tend to be richer sources of many readily bioavailable micronutrients (MNs), even in small amounts. This has an implication that with consumption of ASFs, the overall nutritional quality in diet is improved to meet the requirements for energy and other essential MNs, especially for those who are at risk of nutrition deficiencies [12-14]. Despite considerable efforts to decrease its prevalence, nutritional status of adolescents has witnessed minimal improvement over the past five decades [8,15]. Although diet-related health problems affect both sexes and all age groups, they are a major public health problem among adolescent girls [16]. Considering the burden of suboptimal dietary intake, the promotion of a micronutrient-dense diet has become a global concern [6]. In recognition of its health consequences, the 65th World Health Assembly in 2012 endorsed a 50% reduction in the burden of MNs deficiency in women of reproductive age by 2025, beginning in 2011. Ethiopia has also been striving to curb the high burden of MN deficiencies by implementing national nutritional programs and strategies. However, all the efforts and studies were concentrated around pregnant women and children aged 6-59 months, neglecting adolescent girls. Therefore, this study is aimed to determine the role of household's food security status in predicting animal source food consumption among adolescent girls and also to assess the association of socioeconomic status and animal source food consumption among adolescent girls.

Methods

Study setting, design and sampling: a community-based cross-sectional study design was employed in Hosanna Town, Hadiya Ethiopia, from May 21-June 20, 2019. The sample size was computed with the assumptions of a single population proportion formula to detect at least 26.8% ASF consumption [17], a 95% significance level, a 5% margin of error, a 10% non response rate and a design effect of 1.5. With this, the final sample size was (301*1.5)=451.

$$n = \frac{(z\alpha/2)^2 \times p(1-p)}{d^2} = \frac{(\frac{z\alpha}{2})^2 \times 0.268(1-0.268)}{(0.05)^2}$$

$$= \frac{(1.96)^2 \times 0.196}{0.0025} = 301$$

Where n= sample size zα/2= 95% CI p=population proportion d=margin of error. A cluster sampling method was used; after obtaining the required numbers of clusters using the probability proportional to population size (PPS) method, in identified clusters all Health and Human Services (HHs) where adolescent girls live in were selected for data collection. Pregnant adolescent girls were excluded from the study.

Data collection tools and procedures: data collection tool was designed by principal investigators. A pretested and an interviewer administered structured questionnaire was used. Data were collected on socioeconomic and demographic conditions, access to media information and HHs food security status. Households wealth index variables were adapted from 2016 Ethiopian Demographic and Health Survey (EDHS, 2016) [18]. We used WHO/FAO dietary diversity score guidelines [19] to assess ASF consumption. Households food security status was determined using the HH food insecurity access scale (HFIAS) developed by Food and Nutrition Technical Assistance (FANTA) [20]. We used 24-H dietary recall in the preceding day to assess ASF consumption among adolescent girls. Consumption

ASF was constructed by counting the intake of animal source products (flesh foods, egg, and dairy products) in the preceding day.

Data quality management: a structured questionnaire was prepared in English, translated to Amharic and back translated to English to check for consistency. Pretest was performed on a 5% of sample size; internal consistency was assessed by Cronbach´s alpha, after which modification was considered. Data collection was carried out by trained professional nurses under supervision.

Data analysis: using double entry verification, data were entered into Epi-Data version 3.1 and then exported to Statistical Package for Social Science (SPSS) version 23 for analysis. Before analysis, missing values and normality for continuous variables were checked; new categories were created. The wealth index status of HH was computed by principal component analysis (PCA) based on the possession of HH assets and housing quality variables, which were adapted from EDHS 2016 [18]. Descriptive statistics were performed. The status of ASF consumption was dichotomized as consumer (if any of the predefined food items in the list was consumed) and non-consumer to run the logistic regression model. Initially, bivariate analysis was performed to select candidate variables for multivariable logistic regression. Variables with a p-value of <0.25 in bivariate analysis were considered potentials for multivariate analysis. Finally, multivariable logistic regression was fitted to identify predictors of ASF consumption among the study population. Adjusted odds ratios (AORs) along with corresponding 95% confidence intervals (CIs) were used to report the results. The level of statistical significance was declared at a p-value of <0.05.

Results

Sociodemographic characteristics: a total of 434 HHs were included in the analysis, yielding a response rate of 96.2%. Of the total adolescent girls, 130 (30%), 151 (34.8%) and 133 (35.3%) were

in their early, middle and late adolescence age, respectively. We found that of the total participants, 61.1% were protestant by religion and 78.8% were Hadiya by Ethnicity. The occupational and educational status of parents, family size and wealth index status were assessed (Table 1).

Household food security and animal source food consumption: of the total HHs under the study, 181(41.7%) were food insecure, which was further categorized into different degrees of food insecurity: mildly food insecure 48 (11.1%), moderately food insecure 59 (13.6%) and severely food insecure 74 (17%). In the context of food insecurity at HH level, shifting to less expensive and poor quality food (73.5%), reducing non-food expenditures (53%), reducing the amount of consumed meal (41%) and cutting the number of meals (40%) were among the major coping strategies used by the household. Of the total participants in the study, 71.9% (C.I. 67.5-75.8) of adolescent girls consumed at least one category of ASFs 24-Hours preceding the survey date.

Predictors of ASF consumption: in bivariate analysis, nine potential covariates were identified for the multivariable logistic regression model; family size, living with either or both parents, educational status of mother, educational status of father, maternal occupation, paternal occupation, HH food security status, HH wealth index and adolescents´ exposure to information were identified at a p-value <0.25. After adjusting for the others, HH food security status, HH wealth and adolescent exposure to information showed statistically significant associations with ASF consumption in the population under the study. Estimates obtained through a multivariable logistic regression model showed that the odds of consuming ASF is reduced by 76% among adolescent girls living in food-insecure HHs (AOR=0.24, 95% C.I.=0.15-0.38). Additionally, ASF consumption is lowered by 70% among adolescent girls from low and middle wealth status family when compared to their high class family counterparts (AOR=0.31, 95% C.I.=0.16-0.59, AOR=0.30, 95% C.I.=0.16-0.58). Moreover, the

likelihood of consuming ASF among adolescent girls lacking exposure to information is reduced by 66% in comparison to access to their counterparts (AOR=0.34, 95% C.I.=0.20-0.57) (Table 2).

Discussion

The Sustainable Development Goals (SDGs) call for efforts to eliminate malnutrition in all forms by 2030 and ensure the access of all people to nutritious and abundant food [21,22]. Despite global initiatives and sufficient food production, this study reported that more than four in ten (41.7%) households are food insecure. This is in line with the reported 37.2-44.4% HH food insecurity in the country [23,24]; however, the status of food insecurity is much higher than the reported 14% [3] and lower than the 75% as reported by Birhane *et al*. [25]. These inconsistencies could be explained by socioeconomic differences of the study setup. In the context of food insecurity, we found that HHs resort to various coping strategies to escape difficulties. This is supported by findings from qualitative and quantitative studies [22,25-27]. After controlling for the confounding effects of others, HHs food security status, HHs wealth status and adolescent's exposure to information predicted ASF intake among adolescent girls. This study identified that adolescent girls living in food-insecure HHs are less likely to consume an ASF diet than their food-secure counterparts. This is consistent with other studies reported that the likelihood of having a quality diet is higher among adolescents from food-secured HHs; food insecurity predisposes people to relay on a less quality diet [28,29] as a coping strategy.

The current study identified that HH wealth status determines the consumption of ASF among adolescent girls. This may be explained by the reality that the purchasing ability of the family is wealth status dependent. This is supported by a study reported that socioeconomic status (SES) of HHs determines the purchasing power of the family for a variety of foods, including ASF [13]. In this

study, it is witnessed that adolescent girls lacking exposure to information are less likely to consume ASF. This may be best explained by a study [30] reported that information has more favorable associations with recommended levels of lifestyle behaviors. There is also evidence that adherence to a healthy dietary recommendation is increased with greater exposure to the information delivered by different mass media [31]. As a result, individuals with access to health-promoting information are supposed to have better nutritional knowledge that could be translated to practice. After controlling for confounding effects, parental education [17] was not significantly associated with the consumption of ASF among adolescents. This may signal that nutritional knowledge is lacking in the curricula of formal education.

Conclusion

More than four in ten HHs are food insecure; practicing ranges of coping strategies. Food security status of HH, SES and information showed statistically significant association with consumption of ASF-a proxy indicator of dietary quality. Limited consumption of ASFs could adversely affect the micronutrient reserves of to-be-a-mother girls and by which it may precipitate the vicious cycles of intergenerational malnutrition. As adolescence is the second period in human life during which rapid growth and development occurs, improving the dietary status of these sensitive segments of the population is an agenda of all concerned bodies. Practical multistakeholder nutrition-sensitive and nutrition-specific programs need to be implemented for effective achievements of global and local agenda of food and nutrition security. Despite significant contributions to filling the gap, we disclose the following limitations: qualitative dietary information may not correlate with nutrient adequacy. Because of the nature of the design, we cannot declare causal effects. As we have used at least one group of ASFs in the list, we recognize that

there could be a risk of overestimation of ASF consumption.

What is known about this topic

- *Association of SES and nutrient dense diet;*
- *The possible link of food security with nutrition security.*

What this study adds

- *Lack of access to media information reduces the likelihood of quality dietary intake;*
- *The better parental education may not guarantee intake of nutrient dense food.*

Competing interests

The authors declare no competing interests.

Authors' contributions

BB involved in the conceptualization, design, conduct, analysis, interpretation and drafting of the manuscript; LP involved in the design, analysis, interpretation and revision of the manuscript. All authors read and approved the final manuscript.

Acknowledgments

Tables

Table 1: adolescent girls socio-demographic characteristics in Hosanna Town, Ethiopia, 2019 (n=434)

Table 2: predictors of animal source food consumption among adolescent girls in Hosanna Town, Ethiopia, 2019 (n=434)

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Table 1: adolescent girls socio-demographic characteristics in Hosanna Town, Ethiopia, 2019 (n=434)			
Variables		**Frequency**	**Percent**
Adolescent girls age category	Early adolescent	130	30
	Middle adolescent	151	34.8
	Late adolescent	153	35.2
Religion	Protestant	265	61.1
	Orthodox	99	22.8
	Muslim	37	8.5
	Others	33	7.6
Ethnicity	Hadiya	342	78.8
	Kembata	53	12.2
	Siltie	28	6.5
	Other	11	2.5
Educational status of adolescent's mother (n=424)	No formal education	75	17.7
	Primary (1-8 grade)	207	48.8
	Grade 9-12 grade	74	17.5
	Graduate	68	16
Educational status of adolescent's father (n=422)	No formal education	36	8.5
	Primary (1-8 grade)	104	24.7
	Grade 9-12 grade	132	31.3
	Graduate	150	35.5
Occupation of mother (n=424) *	Employee	120	28.3
	Merchant	104	24.5
	Housewife	183	43.2
	Others	17	4.0
Occupation of father (n=422)*	Employee	201	47.6
	Merchant	88	20.9
	Farmer	49	11.6
	Others	84	19.9
House hold family size	≤5	185	42.6
	>5	249	57.4
HH wealth index category	Low	135	31.1
	Middle	153	35.3
	High	146	33.6
* In case when adolescent girls are married and/or parental death, educational/occupational status of parents were not required to be reported			

Table 2: animal source food consumption among adolescent girls in Hosanna Town, Ethiopia, 2019 (n=434)

Variables		Animal source food consumption		COR (95% CI)	P-value	AOR (95% CI)	P-value
		Yes	No				
Food security status	Food secure(ref)	215	38	1		1	
	Food insecure	97	84	0.20 (0.13-0.32)	<0.001	0.24 (0.15-0.38)	<0.001
HHs wealth index	Low	84	51	0.20 (0.11-0.38)	<0.001	0.31 (0.16-0.56)	<0.001
	Middle	98	55	0.22 (0.12-0.41)	<0.001	0.30 (0.16-0.58)	<0.001
	High (ref)	130	16	1		1	
Media information	Not at all	172	95	0.35 (0.22-0.57)	<0.001	0.34 (0.20-0.57)	<0.001
	At least once a week (ref)	140	27	1		1	