Assessment of Factors Associated with Dietary Diversity Practice among Women of Reproductive Age in Asaita Districts, Afar region, Ethiopia

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Abstract

Background: During the reproductive period of a woman's life, both the mother and the new-born require sufficient and nutritious diet. Dietary diversity is a stand-in measure of adequate nutritional intake for women of reproductive age (WRA). The objective of this study was to evaluate dietary diversity practices and explore the factors associated with the same among WRA in the Asaita districts of Ethiopia's Afar region.

Methods: A community-based cross-sectional survey of 422 randomly chosen WRA was carried out in the Asaita districts from February to March 2020. Data was gathered using 24-hour dietary recall techniques. Ordinal logistic regression model was used to identify and assess the factors influencing dietary diversity.

Results: The result of the study showed that the mean dietary diversity score of the sample WRA was 4.17 with a standard deviation of 1.11. About 13.0%, 78.5%, and 8.5% of women included in the survey practiced low, medium, and high dietary diversification, respectively. The fitted proportional odds model revealed that marital status, family size, education level and ownership of each of cell phone, bank account, refrigerator, television and cart were significantly associated with dietary diversity practices of WRA.

Conclusions: Based on the findings of the study we conclude that education level and having a bank account (savings), cell phone and refrigerator had positive association with dietary diversity of WRA, while male as well as female family size had the opposite effect. Thus, due attention should be given to family planning and nutritional education focusing on illiterate women of reproductive age.

Key words: *women of reproductive age, dietary diversity, ordinal logistic regression, proportional odds model*

1. Background

Dietary diversity refers to the number of distinct food items or food groups consumed during a specific period of time. It is a crucial component of diet quality - eating a range of foods from different food groups is linked to an appropriate intake of nutrients that are necessary for optimum health (Ruel, 2003; Waswa et al., 2015; Arimond et al., 2010). Additionally, it refers to a wider variety of foods across and within dietary groups that can guarantee optimal nutrient intake and support both physical and mental growth and overall health (Daniels, 2009). Due to inadequate nutritional intakes, unequal food distribution within the household, inappropriate food storage & preparation and dietary taboos, women in the reproductive age and their children are particularly prone to malnutrition (Girma and Genebo, 2002). According to the World Health Organization (WHO, 2008), dietary diversity can assure an improvement in the quality of complementary foods, which has been highlighted as one of the most affordable methods for enhancing health and lowering morbidity and mortality among young children. The health of mothers and their unborn children is improved by maternal dietary diversity, which serves as a proxy measure of maternal nutrient sufficiency. In low-income and middle-income countries, multiple micronutrient deficiencies are still a serious public health concern, particularly for reproductive women. An increase in dietary diversity is also linked to household food security (Hatløy et al., 2000).

Due to the accessibility of agricultural products, social level and community cultural practices, food sources varied around the world. According to a report from the Food and Agricultural Organization (FAO) in 2013, about three-quarters of the diversity found in agricultural crops have been lost over the past century, and this erosion is still going on. Only 15 plant and eight animal species account for around 90% of the protein and energy in our food, which has serious effects on both nutrition and food security (Food and Agricultural Organization, 2013). In Ethiopia, cereals (barley, sorghum, wheat and rice) made up the majority of household diets, accounting for an estimated 90% of weekly consumption. Additionally, 60% of country's households had poor dietary diversity and 40% had a medium dietary diversity scores. The prevalence of the dietary variety scores varied across Ethiopia's regions (Goshu et al., 2013; Mekuria et al., 2017).

According to a report by the World Health Organization (WHO, 2015), while the intake of high diversified foods is associated with lower rates of malnutrition, deficits of macro and micronutrients can impose a significant health burden through lost productivity, increased susceptibility to illnesses and poor growth and development. Due to their greater micronutrient needs, women between the ages of 15 and 49 who are planning a pregnancy are more vulnerable (Torheim et al., 2010). Low-quality, repetitive diets were the norm in resource-constrained, low-income countries like Ethiopia. Large percentage of women were found to consume monotonous food types, having very low intakes of foods high in vital micronutrients like vitamin A and iron (Zerfu et al., 2016).

The most prominent potential negative consequence of lack of dietary diversity is malnutrition, which has a number of contributing factors. Several previous researches suggested some socio-demographic and clinical factors that are associated with dietary diversity among pregnant women (Desta et al., 2019; Kiboi et al., 2017), children under five years of age (Gebremichael et al., 2017; Victor et al., 2014; Damtie et al., 2020), and households (Mekuria et al., 2017; Misker et al., 2016; Ochieng et al., 2017). For example, a cross-sectional study conducted in Kenya found that family size, gender of the household head, educational attainment and age were strongly related with the dietary diversity of women who were pregnant in areas with high agricultural potential (Gitagia et al., 2019).

In examining the impact of covariates on women's nutritional diversity practices, several researchers utilized binary logistic regression and multiple regression which restrict the chronological order (or ordinal nature) of dietary variety (low, medium, and high). To fill this gap, this study used a community-based cross-sectional study design to examine the relationship between independent factors and dietary diversity in the Asaita Districts of the Afar region by utilizing ordinal logistic regression model.

2. Materials and Methods

2.1 Description of the study area

The study was carried out in the Asaita Woreda of zone 1 (Awsi Rasu) in the northeastern Ethiopian region of Afar. The zone is situated 655 kilometers to the north-east of Addis Ababa, the capital city of Ethiopia, and 65 kilometers from the region's largest town, Samara. The zone is broken down into 13 kebeles, 11 of which are rural and the rest urban. The primary mode of livelihood in the Woreda is the production of livestock using an agro-pastoral method.

2.2 Study population, sample size and sampling procedure

The population of the study was all women of reproductive age (15 to 45 years) in Asaita Woreda of Afar Regional state. The sample was selected following the laws of the statistical theory of sampling that helps to make valid inferences about the population based on data obtained from the sample which ascertain the degree of accuracy of the results. The single population proportion formula was used to compute the sample size. Assuming a 95% confidence level ($Z_{\alpha/2} = 1.96$) and 5% margin of error, the minimum sample size required is computed as:

$$n = \frac{Z_{\alpha/2} p(1-p)}{d^2} = \frac{(1.96)^2 (0.514)(1-0.514)}{(0.05)^2} = 384$$

where $p = 51.4\%$ is the prevalence of the attribute taken from a previous research done in Addis Ababa (Worku et al., 2015). To account for contingencies (such as non-response), a 10% allowance was made and the total sample size considered was n = 422. The sample was proportionally allocated among two kebeles and systematic random sampling was employed to select study participants. The necessary information was then gathered using personal interview.

2.3 Data collection and measurements

Following the approach recommended by the Food and Agriculture Organization (FAO) of the United Nations, primary data was gathered based on a qualitative 24-hour recall of every food and beverage consumed by respondents (if measured at the individual level) or by any other household member (if measured at the household level) (Kennedy et al., 2010). According to several dietary variety studies, one day memory time is less vulnerable to recall inaccuracy than a week or month recall interval (Kennedy et al., 2007). The dependent variable considered in the study was women's dietary diversity score which was calculated from a 24-hour recall of food and beverage consumed categorized into eight food groups. A score of one (1) was given to each food groups consumed so that women's dietary diversity score ranges from zero to eight. Then, based on the recommendation of FAO (Kennedy et al., 2010), women were classified into three groups: ≤ 3 food groups as low dietary diversity, 4-5 food groups as medium dietary diversity and ≥ 6 food groups as high dietary diversity. Thus, the response variable of the study was the dietary diversity score of WRA classified into low, medium and high:

$$Y = \begin{cases} 1 & \text{, if low dietary diversity} \\ 2 & \text{, if medium dietary diversity} \\ 3 & \text{, if high dietary diversity} \end{cases}$$

Based on the reviewed literature and the aims of the current study, various socio-demographic characteristics of study participants such as gender of the household head, age, marital status, family size (disaggregated by male and female family members), religion, educational status, occupation, number of rooms in the house and availability of electric power were considered as independent variables. Moreover, ownership of bank account, radio, television, mobile, refrigerator and cart among women were considered as further explanatory variables.

2.4 Operational definitions

- Dietary diversity can be defined as the number of different food groups consumed by an individual over a 24-hour period.
- Food groups are a collection of foods that contain a similar mix of nutrients.
- Inadequate dietary diversity refers to dietary diversity less than the standard recommended levels**.**
- Minimum dietary diversity is the consumption of four or more food groups from defined food groups for higher dietary quality and to meet basic nutritional needs (WHO, 2015).
- Healthier consumption pattern is consumption pattern with higher factor loading for food items strongly recommended by WHO to be consumed by women, particularly all the five major food groups (vegetables, fruit, meat, milk (dairy) and egg).

2.5 Statistical data analysis

In this study, frequencies, percentages and means were used to describe the variables under consideration. The association between categorical explanatory variables and levels of dietary diversity (low, medium and high) was explored using the Chi-square test. Moreover, ordinal logistic regression model was utilized to identify and analyze the potential determinants of women's dietary diversity.

2.5.1 Logistic regression model

Regression is a statistical procedure which attempts to predict the values of a given variable, termed the dependent, outcome or response variable, based on the values of one or more independent variables (predictors or covariates). If the response variable is continuous, we can use the usual linear regression model. When the response variable is discrete, taking on a limited number of possible values, on the other hand, one of the appropriate regression models is logistic regression. Logistic regression models are classified according to the type of categories of the response variable as binary logistic regression model, multinomial logistic regression model and ordinal logistic regression models (Hosmer et al., 2013). Binary logistic regression model is used to model a dichotomous response variable, whereas the multinomial logistic regression is a simple extension of the binary logistic regression model where the response variable has more than two unordered categories. Ordinal logistic regression models are utilized to model the relationship between an ordinal response variable (that is, a response variable with more than two categories that have some natural ordering) and independent variables.

2.5.2 Ordinal logistic regression model

Ordinal logistic regression is an extension of binary logistic regression for analyzing an ordinal response variable having more than two categories by considering the ordering of the response categories. There are different types of ordinal logistic regression models. These include: the adjacent-category, the continuation-ratio, the proportional odds, the unconstrained partial-proportional odds and the constrained partial-proportional odds models (Hosmer et al., 2013).

2.5.3 Proportional odds model

The proportional odds model (POM) is used for modeling a response variable that has more than two ordered levels with a set of explanatory variables by considering the cumulative probabilities instead of the probability of an individual event. A random sample is drawn from the joint distribution of $(Y, \mathbf{X})$, where Y is an ordinal response and $\mathbf{X'} = (X_1, X_2, \ldots, X_k)$ is a vector of independent variables. Consider a response variable having J ordered categories. Define $P_j(\mathbf{X}) = P(Y = j \mid \mathbf{X})$, $j = 1, 2, \ldots, J$. The j^{th} cumulative probability is the probability that Y falls in category j or below given a set of predictors (Hosmer et al., 2013):

$$\pi_j(\mathbf{X}) = P(Y \le j \mid \mathbf{X}) = P_1(\mathbf{X}) + P_2(\mathbf{X}) + \ldots + P_j(\mathbf{X}) \quad , j = 1, 2, \ldots, (J-1) \quad \ldots\ldots\ldots\ldots\ (1)$$

The odds of the first j cumulative probabilities are given by:

$$\text{odds}(\pi_j(\mathbf{X})) = \frac{P(Y \le j \mid \mathbf{X})}{1 - P(Y \le j \mid \mathbf{X})} = \left[\frac{\pi_j(\mathbf{X})}{1 - \pi_j(\mathbf{X})}\right] \quad , j = 1, 2, \ldots, (J-1) \quad \ldots\ldots\ldots\ldots\ (2)$$

The POM models the log-odds (logits) of the first j cumulative probabilities as:

$$\ln\left[\text{odds}(\pi_j(\mathbf{X}))\right] = \ln\left[\frac{\pi_j(\mathbf{X})}{1 - \pi_j(\mathbf{X})}\right] \quad , j = 1, 2, \ldots, (J-1) \ldots\ldots\ldots\ldots\ (3)$$

The relationship between the cumulative probabilities and the set of predictors is not linear in ordinal logistic regression model. Rather, the cumulative probabilities are related to the predictors through the logistic distribution function**:**

$$\pi_j(\mathbf{X}) = P(Y \le j \mid \mathbf{X}) = \frac{\exp\{\alpha_j - (\beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k)\}}{1 + \exp\{\alpha_j - (\beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k)\}} \quad , j = 1, 2, \ldots, (J-1) \ldots\ (4)$$

The corresponding cumulative logit model is given by:

$$\text{logit}(Y \le j \mid \mathbf{X}) = \alpha_j - \beta_1 X_1 - \beta_2 X_2 - \ldots - \beta_k X_k \quad , j = 1, 2, \ldots, (J-1) \quad \ldots\ldots\ldots\ (5)$$

Equation (5) is called the proportional odds model. Each of the cumulative logits has its own intercept (α_j) which does not depend on the values of the independent variables. However, the model assumes that the coefficients $\beta_1, \beta_2, \ldots, \beta_k$ are identical for each logit (that is, the effect of explanatory variables is the same across the cumulative logits). The estimated values of these parameters show the direction and strength of relationship between the explanatory variables and the log-odds of the dependent variable. The results are interpreted as the effect of the estimated category of the independent variables relative to the reference category on the log-odds of being in higher levels of the categories of the dependent variable.

2.5.4 Assessment of model adequacy

Proportional odds models are commonly used to model ordinal responses, but the proportional odds assumption may not hold in practice, leading to biased inference. Tests such as score, Wald and likelihood ratio can be used to assess the proportional odds assumption.

To assess the goodness of fit of an estimated model to the data, the Pearson and deviance tests which compare the observed and expected values can be used. The likelihood ratio (LR) test which tests the joint null hypothesis that the slope coefficients except the constant are all zero can be used to assess the overall significance of the model parameters.

3. Results and Discussion

3.1 Results

This study used information on dietary diversity of a total of 422 sampled women of reproductive age (WRA) in Asaita districts of Afar regional state. Table 1 presents summary statistics of demographic and socio-economic characteristics of WRA as well as the results of test of association between levels of dietary diversity (categorized as low, medium and high) and predictors. We can see that 87.4% and 12.6% of the household heads were male and female, respectively. The distribution of education level revealed that overwhelming majority of women (85.5%) had no education, while 21 (5.0%), 17 (4.0%) and 23 (5.5%) had primary, secondary and higher education, respectively. Regarding marital status, close to nine-tenth of women (87.4%) were married, while the remaining were single or divorced. Over half of all women respondents possessed radio, mobile phone and bank account. In contrast, the majority of women had no refrigerator, television and cart in their house.

The Chi-square test results show that, except religious affiliation, all categorical predictors considered in this study have a significant relationship with the levels of dietary diversity of women. This implies that the presence (or absence) of these factors had significant effect on the status of dietary diversity practice of women in the reproductive age in the study area.

Table 1: Summary of demographic & socio-economic characteristics of WRA in Afar region, Asaita districts

Variable	Category	Count (%)	Chi-square (p-value)
Gender of household head	Male	369 (87.4)	20.206 (0.000)*
	Female	53 (12.6)	
Marital status	Single	23 (5.5)	13.744 (0.000)*
	Married	369 (87.4)	
	Divorced	30 (7.1)	
Educational level	No education	361(85.5)	71.987 (0.000)*
	Primary education	21 (5.0)	
	Secondary education	17 (4.0)	
	Higher education	23 (5.5)	
Current occupation	Daily laborer	32 (7.6)	41.724 (0.000)*
	Government employee	18 (4.3)	
	House wife	369 (87.4)	
	Merchant	15 (3.6)	
Religion	Orthodox	17 (4.0)	6.101 (0.051)
	Muslim	405 (96.0)	
Electricity	Yes	370 (87.7)	17.128 (0.000)*
	No	52 (12.3)	
Radio	Yes	220 (52.1)	7.644 (0.022)*
	No	202 (47.9)	
Mobile phone	Yes	257 (60.9)	40.755 (0.000)*
	No	165 (39.1)	
Bank account	Yes	244 (57.8)	50.087 (0.000)*
	No	178 (42.2)	
Refrigerator	Yes	109 (25.8)	85.975 (0.000)*
	No	313 (74.2)	
Television	Yes	137 (32.5)	49.603 (0.000)*
	No	285 (67.5)	
Cart	Yes	29 (6.9)	12.999 (0.002)*
	No	393 (93.1)	

Summary statistics for continuous variables are presented Table 2. The mean dietary diversity score was 4.17 with a standard deviation of 1.112. Thus, on average, the sample women practiced medium dietary diversity (4-5 food groups). The mean age of the women under study was about 37 years. Regarding family size, the average number of male and female family members was 2.28 and 2.04, respectively.

Table 2: Descriptive statistics for continuous variables of WRA in Afar region, Asaita districts

Variable	Minimum	Maximum	Mean	SD
Age	15	49	36.53	7.667
Family size (male)	0	5	2.28	1.138
Family size (female)	1	5	2.04	0.914
Number of rooms	1	2	1.20	0.400
Dietary diversity score	1	8	4.17	1.112

From the total sample of 422 WRA, 55 (13.03%), 331 (78.44%) and 36 (8.53%) fell under low dietary diversity category (≤3 food groups), medium dietary diversity category (4-5 food groups) and high dietary diversity category (≥6 food groups), respectively. The most commonly eaten food groups by WRA within the 24-hour period prior to the date of data collection were grains (100%), followed by 'other' vegetables (90.52%), beans or peas (77.96%) and milk or milk products (49.05%). In contrast, vegetables or roots and other types of meat or poultry were minimally consumed, while meat made from animal organs, fish or sea food and nuts or seeds were food groups which were not consumed at all (Figure 1).

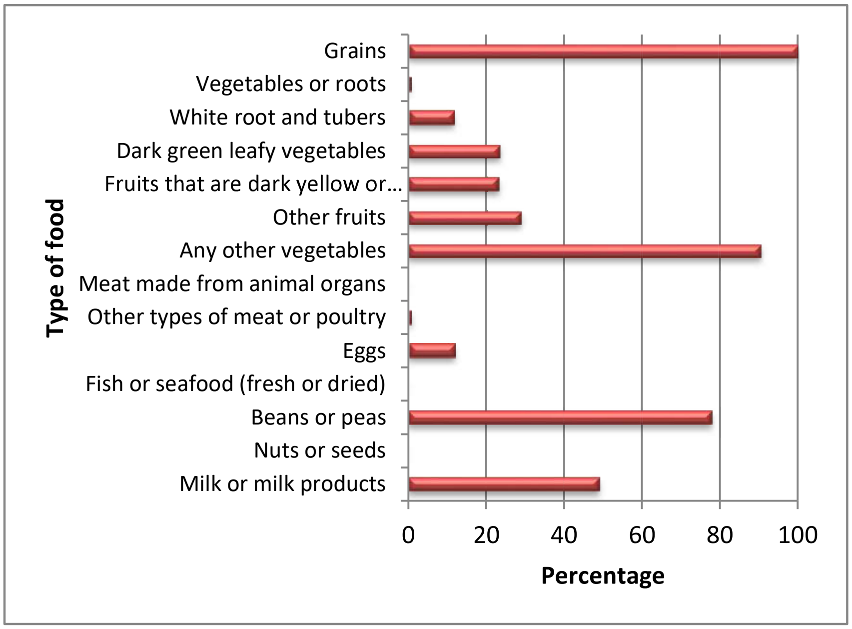

Figure 1: Percentage distribution of types of foods consumed by WRA

Results of the fitted multivariable ordinal logistic regression model

Before interpreting the results from the fitted model, one needs to verify whether the model is a good fit to the data or not. The results of the fitted ordinal regression model indicted that the Chi-square test statistic for the deviance test was not significant (Chi-Square = 299.617, p-value = 1.00). Thus, the null hypothesis that the model fits the data well cannot be rejected. We then assessed the overall significance of the model using the LR test. It tests the joint null hypothesis that the slope coefficients except the constant are all zero. The LR test statistic was found to be significant (Chi-Square = 17.007, p-value < 0.001). Thus, we reject the null hypothesis and conclude that the independent variables are together statistically significant.

The other test that needs to be conducted is whether the proportional odds assumption is satisfied or not. In our case, the Chi-square test statistic was found to be insignificant (Chi-Square = 4.015, p-value = 0.251). Thus, we do not reject the null hypothesis that the effect of each of the predictor variables is identical across the two cumulative logits.

The results of the fitted proportional odds model are shown in Table 3. The significant explanatory variables suggested by the model were male family size, female family size, marital status, education level and ownership of each of bank account, cell phone, refrigerator, television and cart (p-value < 0.05). Note that the nature of this study was a cross-sectional design, and hence, the results may not necessarily imply a cause-effect relationship between the explanatory variables and dietary diversity among WRA.

Male family size was significant at the 5% level. Since its coefficient is negative, as male family size increases, the likelihood of WRA being in higher categories of dietary diversity decreases, holding the remaining covariates constant. Similarly, the higher the female family size, the lower the likelihood of registering higher dietary diversity score. When we come to marital status, unmarried (single) WRA were about three times more likely to be in higher categories of dietary diversity compared to divorced WRA, keeping the other variables constant.

The other significant explanatory variable was education level of WRA. WRA with no education, primary schooling and secondary schooling were less likely to be in the higher outcome categories than those with higher education. Specifically, the odds of being in the higher categories of dietary diversity were 93.5%, 97.4% and 97.6% lower for WRA with no education, primary education and secondary education compared to those with higher education, respectively, keeping the other variables constant. The results also revealed that WRA who owned cell phone, bank account and refrigerator were more likely to be in the higher dietary diversity categories than those who didn't. Unexpectedly, the opposite was true for those WRA who owned television and cart.

Table 3: Results of the fitted POM of dietary diversity of WRA in Afar region, Asaita districts

Variables	$\hat{\beta}$	se($\hat{\beta}$)	Wald	p-value	exp($\hat{\beta}$)	95% CI for exp($\hat{\beta}$)	
						Lower	Upper
Family size (Male)	-0.552	0.216	6.548	0.011*	0.576	0.377	0.879
Family size (Female)	-0.408	0.202	4.065	0.044*	0.665	0.448	0.988
Marital status (Ref. = Divorced)							
Single	1.048	0.268	15.231	0.000*	2.850	1.680	4.830
Married	-0.059	0.289	0.041	0.839	0.940	0.540	1.660
Education (Ref. = Higher education)							
No education	-2.736	1.365	4.018	0.045*	0.065	0.004	0.941
Primary education	-3.632	1.255	8.382	0.004*	0.026	0.002	0.309
Secondary education	-3.717	1.256	8.763	0.003*	0.024	0.002	0.285
Cell phone (Ref. = No)	2.996	0.573	27.370	0.000*	20.005	6.507	61.503
Bank account (Ref. = No)	4.255	0.745	32.604	0.000*	70.457	16.359	303.445
Refrigerator (Ref. = No)	2.464	0.853	8.343	0.004*	11.752	2.208	62.545
Television (Ref. = No)	-3.386	0.867	15.238	0.000*	0.034	0.006	0.185
Cart (Ref. = No)	-7.171	1.076	44.425	0.000*	0.002	0.001	0.006

Ref. = Reference category, * Significant at the 5% level

3.2 Discussion

In the current study, 13.03%, 78.44% and 8.53% of women of reproductive age fell under low, medium and high dietary diversity categories, respectively. The prevalence of high dietary diversity was lower than those reported in Kenya (61%) (Kiboi et al., 2017), South Africa (25%) (Chakona and Shackleton, 2017) and Southern Ethiopia (16.2%) (Boke and Geremew, 2018). This discrepancy might be due to differences in the study period (season), geographical location and/or socio-cultural factors, among others.

The descriptive statistics showed that grains and beans/peas were the most commonly consumed food groups by WRA within the 24-hour period prior to the date of data collection, while vegetables/roots, meat/poultry products, fish/sea foods and nuts/seeds were minimally consumed or not at all. This finding is almost consistent with the finding of other studies conducted in Kenya (Kiboi et al., 2017) and Southern Ethiopia (Boke and Geremew, 2018). Furthermore, many studies in developing countries have documented that the main dietary sources are cereal based (e.g., Saaka et al., 2017).

Among the explanatory variables considered in the study, male family size, female family size, marital status, education level and ownership of each of bank account, cell phone, refrigerator, television and cart were found to be significantly associated with the levels of dietary diversity of WRA in the ordinary logistic regression model analysis.

Our results revealed that WRA with no education, primary schooling and secondary schooling were less likely to be in the higher dietary diversity categories than those with higher education. This might be attributed to the fact that educated women tend to have greater awareness and understanding of nutritional health benefits. Various studies reported that educated women allocate a substantial proportion of their household food budget to nutritious foods (Mbwana et al., 2016; Morseth et al., 2017).

Another finding of this study was that an increase in family size (male as well as female) negatively influenced the dietary diversity of WRA. According to a study by Gitagia et al. (2019), this could partly be explained by the fact that as family size increases, the intra-household food distribution is affected and food may become more limited, which in turn would limit access to different food groups.

Having a bank account/savings was also significantly associated with dietary diversity. The results of the fitted POM indicated that WRA who had a bank account were more likely to be in the higher dietary diversity categories than those who didn't. This is consistent with the results of a study conducted in Limpopo Province, South Africa, where households with low dietary diversity were also the most impoverished, and only few of them had money in a savings account (Drimie et al., 2013), and scores for dietary diversity have been shown to be linked to socioeconomic characteristics (Keatinge et al., 2011).

The results also revealed that WRA who owned cell phone and refrigerator were more likely to be in the higher dietary diversity categories as compared to their counterparts who did not have these utilities. These results might be related to personal income since dietary diversity increases with household assets (Desta et al., 2019; Kiboi et al., 2017).

One unexpected result was that WRA who owned television were less likely to be in the higher dietary diversity categories than those who didn't. Naturally, we expect those who have access to information through media to have better knowledge about nutrition & health, and hence, more inclination to a diversified diet.

4. Conclusion

The objective of this study was to assess the dietary diversity practices and identify the factors associated with the same among Ethiopian women of reproductive age (WRA) in the Asaita districts of the Afar region, Ethiopia. To meet these objectives, ordinal logistic regression model was employed.

The mean dietary diversity score of the sample WRA was found to be 4.17. Moreover, low, medium, and high dietary diversity practises were practised by 13.03%, 78.44%, and 8.53% of WRA who participated in this study, respectively. The results of the study showed that male family size, female family size, marital status, education level and having each of cell phone, bank account, refrigerator, television and cart were statistically significantly associated with dietary diversity practices of WRA in Asaita districts of Afar Regional state. The study recommends that due attention should be given to family planning and nutritional education focusing on illiterate women of reproductive age.

Limitations of the study

In this study there are some limitations. Food availability in the household may have seasonal variation which can affect dietary diversity. Moreover, the assessment of dietary intake was based on a 24-hour recall method which may not accurately reflect WRA's past feeding experience and may be subject to recall bias.

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