

Dietary Diversity Feeding Practice and Determinants among Children Aged 6-23 Months in Kamba Woreda, Southern Ethiopia Implication for Public Health Intervention

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Abstract

Dietary diversity has been recognized early by nutritionists as a key element of high quality diets. It is associated with overall quality and nutrient adequacy of the diet in low-income countries including Ethiopia.

Objective: To assess dietary diversity feeding practice and associated factors among 6-23 months young child in Kamba Woreda 2014.

Methods: Community-based cross-sectional study was conducted on mothers who had young child from 6 to 23 months. Exploratory data analysis method was done to check missing values, potential outliers and normality distribution for continuous variables. Multivariate logistic regression analysis was conducted by SPSS version 20 to identify significant predictors based on p-value less than 0.05 with 95% confidence level.

Results: Of the interviewed mothers who had a child aged 6-23 months 131 (23.3%) fed their child four or more varieties of foods from seven food groups within 24 hours preceding the survey. The dominant food groups they fed their child were grain and legumes but they had low practice of animal source and vitamin source feeding. Place of delivery, those who gave birth at Health facility Adjusted odd ratio 4.45 (2.08-9.54), Growth monitoring in health facility 2.28 (1.33-3.89), those who has access to cow milk 2.01 (1.19-3.37), and those who work in home as housewives 2.50 (1.23-4.93) were significant identified factors for minimum dietary diversity feeding practice.

Conclusion and Recommendation: Global infant and young child feeding practice guide line is being implemented in Ethiopia for more than a decade; however, dietary diversity feeding practice of mothers is poor in study site. Focusing on appropriate mixed feeding practice platforms should be developed and messages disseminated to the target audience via different media to enhance dietary diversity feeding practice. Integrating agricultural sectors with health sectors is important to support the family to grow vegetables, fruits and rare animals to improve dietary diversity.

Keywords: Dietary diversity; Feeding practice; Southern Ethiopia

Abbreviation

AOR: Adjusted Odd Ratio; DD: Dietary Diversity; EDHS: Ethiopia Demographic and Health Survey; IYCF: Infant and Young Child Feeding; SNNPR: Southern Nations Nationalities and People's Region; WHO: World Health Organization

Introduction

Dietary diversity (DD) has long been recognized by nutritionists as a key element of high quality diets. Increasing the variety of foods across and within food groups is recommended in most dietary guidelines internationally [1,2].

Insufficient quantities and inadequate quality of complementary foods, poor child feeding practices, and high rates of infections have a detrimental effect on health and growth in children less than 2 years of age. Even with optimum breastfeeding, children will become stunted if

they do not receive sufficient dietary diversity and meal frequency after 6 months of age [3,4].

The transition period from exclusive breastfeeding to two years is a critical window for optimal growth and development of the child. During this period, appropriate, safe, adequately nourished and frequent feeding is essential [5].

For vulnerable infants and young children, the problem is particularly critical because they need energy and nutrient dense foods to grow and develop both physically, mentally and to live a healthy life [6]. An estimated 6% of under-five deaths can be prevented by ensuring optimal complementary feeding among which dietary diversity and meal frequency are the most important ones, significantly contributing to the realization of Millennium Development Goal 4 [7,8].

Meeting minimum standards of dietary quality is a challenge in many developing country settings including Ethiopia, especially in areas where household food security is poor, and it has often not been given enough emphasis. Children may not be fed frequently enough during the day, or the quality of the food may be inadequate [9-12].

In developing countries where the main concern is dietary deficit, nutrient adequacy alone is often used to refer to dietary quality. However, quantifying intake of nutrients is often expensive, time consuming and associated with methodological challenges. Dietary diversity is frequently assessed by the use of simple tools such as diversity scores, i.e., the number of food groups consumed over a reference period. These scores are promising measurement tools in industrialized as well as developing countries, and several studies indicate that they are good proxies of overall dietary quality [13-15].

Recently there has been lack of evidence regarding dietary diversity status and determinant factors in Kamba community therefore this study was conducted to that directs policy makers to draw appropriate intervention measures to improve and flourish the health of future generation.

Methods and Materials

Study setting and source population

This community based cross sectional study was conducted on 579 mothers who had young child from 6 to 23 months in Southern parts of Ethiopia in Kamba Woreda in 2014. Kamba Woreda is one of the administrative Woreda in Gamo Gofa Zone, South Ethiopia 100 kms away from Zonal town Arba Minch and 505 Kms from Addis Ababa. From the total population around 44,000 are women in reproductive age group. The local communities are largely depending on subsistence agriculture economy. The health institution distribution in the Woreda is 39 health posts and 9 health centers providing health services including maternal and child health care [16-18].

Inclusion and exclusion criteria

Mothers/care givers who have young children from 6 to 23 months who live in the selected Keble for at list 6 months were included in the study and those who had mental illnesses interfering the interview were not considered in study.

Sample size determination

The sample size was determined by using single population proportion formula by the following assumption for prevalence of minimum dietary diversity feeding practice 17.8% in among mothers having children 6-23 months-of-age in Northern Ethiopia [19], desired precision (d) =4% and 95% confidence level.

$$N = \frac{Z^2 \cdot P \cdot (1-P) \cdot 352}{d^2}$$

The final sample size was calculated by taking 1.5 design effect and 10% none response rate which is 579.

Sampling methods and procedures

From all small Keble (smallest administrative unit) in the Woreda, eight Kebles were selected by using lottery method. Then the number of study participants was allocated for each Keble based on proportional to population size allocation method by using

community based demographic and health related information registration prepared by health extension workers as the sampling frame. Preliminary survey was conducted first to identify the target households which have young child from 6 to 23 months. Finally infant-mother pairs were selected from each Keble by using simple random sampling methods after giving code for each house hold which have young child from 6 to 23 month and house to house interview was under taken [20].

Data collection procedure

Data was collected from mothers/care givers who have one child in age 6 to 23 months from each household by direct interviewing. Pre tested and structured questioner was used to collect data on socio demographic characteristics and maternal characteristics. First dietary diversity score tools was adapted from WHO infant young child feeding gridline which contains seven food items (groups) for young child dietary diversity from 6 to 23 months [17]. Data on dietary diversity was collected by allowing mothers freely to recall the type of food items feed their child within 24 hours. Then the data collector's records the child dietary diversity with the help of seven food items [17,18].

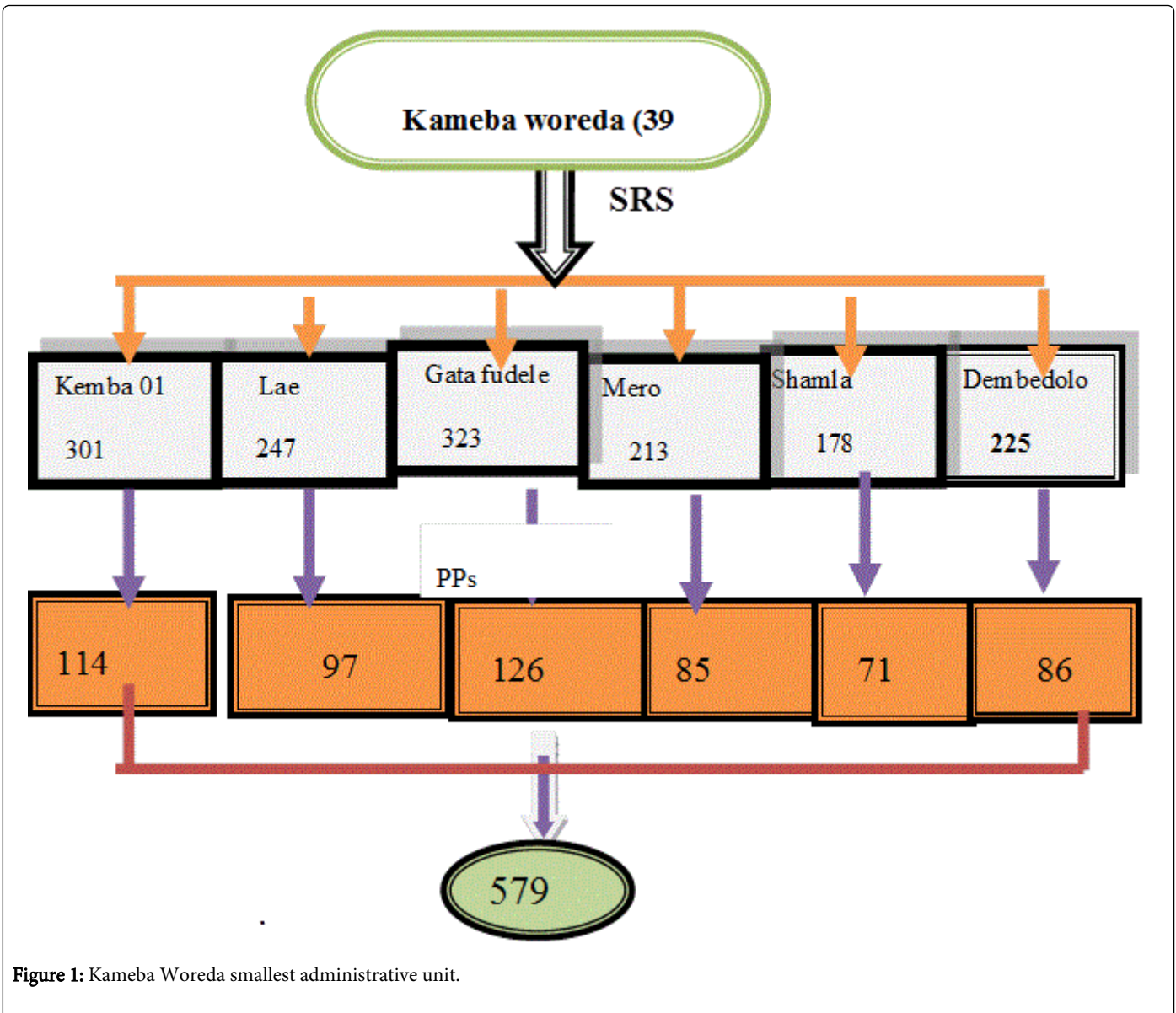
Data quality control

First the questioner was prepared in English and translated to Amharic and pre tested on 5% of mothers before actual data collection outside the selected kebeles; correction and modification was done based on the gap identified during interview. Sixteen Grade 12 completed female students were recruited as data collectors and supervised by 4 clinical nurses. Two day training was given on the aim of the research, content of the questionnaire, and how to conduct interview for data collectors and supervisor to increase their performance in field activities. The Collected data was checked every day by supervisors and principal investigator for its completeness and consistency.

Data analysis and management

Data was coded and entered in to EPI Info version 3.5.1 and exported to SPSS Version 20 for analysis. Missing values checked by conducting simple frequency analysis. Exploratory data analysis was done to check missing values, potential outliers and the normality distribution for those continuous variables. The presence of multi-collinearity also was checked and effort was made to incorporate different models to cross check. Frequencies and cross tabulation were calculated to describe the study population in relation to relevant variables. Binary logistic regression analysis was conducted to assess the crude association between dependent and independent variables. Finally Independent variables which show association in binary logistic regression analysis and those which have P-value less than 0.25 entered in to multivariate logistic regression model, to identify significant factors associated with outcome variables.

Finally significant factors were identified based on AOR include with 95% confidence level which did not include none value and P-value less than 0.05 [21-24].



Data was kept in the form of file in secure place where no one access except the investigator, confidentiality was insured by not recording names or any personal identifiers.

Growth monitoring practices-it is routine activity performed by health professional at health facility and Community level to screen nutritional status in fewer than five children [17].

Operational definition and definition of terms

Minimum dietary diversity: Proportion of children 6-23 months of age who receive foods from four or more food groups during the previous day considered as adequate and three and below is considered as inadequate (low). The seven food groups used for tabulation of this indicator were: grains, legumes and nuts; dairy products (milk, yogurt, cheese); flesh foods (meat, chicken and liver/organ meats); eggs; vitamin A rich fruits and vegetables; and other fruits and vegetables consumption of any amount and quality of foods from each food group was sufficient to 'count' [16-18].

Complementary feeding: is the period (between 6-2 years) during which foods or liquids are provided along with continued breastfeeding [16-18].

Ethical consideration

The proposal was submitted to the Research ethics committee (REC) of Addis continental institute of Public Health. Ethical clearance was obtained from Addis continental institute of Public Health. Permission letter was obtained from Kameba Woreda Health office. Verbal informed consent from each study participant was obtained after clear explanation about the purpose of the study. All the study participants were reassured that they would be anonymous. Names or any personal identifiers were not recorded. Respondents were clearly told about the study and the variety of information needed from them. They were given the chance to ask anything about the study and made free to refuse or stop the interview at any moment they want if that was their choice [25].

Result

Socio-demographic characteristics of mothers and young child

Among mother interviewees having young child-266 were male (47.3%), and 296 were female (52.7%). The mean age of young child was 13.75 months \pm 5.95 (SD). One third of respondents had no formal education and half of them were government workers and student in there occupational status (Table 1).

Variables	Frequency No	Frequency percent (%)
Age		
6-8 months	97	17.3
9-12 months	165	29.4
13-17 months	256	45.6
18-24 months	44	7.8
Sex of the child		
Male	266	47.3
Female	296	52.7
Residence of mother		
Rural	221	39.3
Urban	341	60.7
Age of the mother		
15-19	97	17.3
20-24	165	29.4
25-29	256	45.6
\geq 30	44	7.8
Religion statues		
Orthodox	196	34.9
Protestant	347	61.7
Muslim	19	3.4
Education		
No education	173	30.8
Primaru education	202	35.9
Secondary and above	187	33.3
Occupational Statues		
Private (merchant, farmer)	245	43.6
Hourse wife	29	5.2

Govt. worker and Student	288	51.2
Ethnicity		
Gamo	461	82
Gofa	23	4.1
Wollayta	62	11
Amahara	14	2.5
Others	2	0.4
Monthly income		
\leq 500 birr/month	457	81.3
\geq birr/month	105	18.7
Grow vegetable		
Yes	305	54.30%
No education	257	45.30%
Having cow that give milk		
Yes	215	38.30%
No	347	61.70%

Table 1: Socio-demographic Characteristics of mothers, who had infant aged from 6 to 23 months, who live in Kamba Woreda, 2014

Prevalence of dietary diversity and type of diversified food items in Kamba Woreda, South Ethiopia

Among mothers who took part in the study, i.e. 131 (23.3%) fed their child \geq 4 food items and the rest 431 (76.7%) fed \leq 3 food items within 24 hours preceding the survey based on WHO young child feeding guide line indictors on dietary diversity. The dominant food items were grain and legumes. Low feeding practice was observed on animal source food like eggs and meat which is 17.3% and 2% respectively (Figure 1). Among mothers who fed their child minimum dietary diversity (\geq food groups) 33.59% were in age group 9-12 months (Figure 2) [26].

As study revealed that mother had relatively good practice dietary diversity feeding practice in age group of 6 to 8 months and decrease in age group above 9 months (Figure 3).

Factors associated with dietary diversity feeding practices

After conducting multivariate analysis of delivery venue, those who gave birth at health facility Adjusted odd ratio (AOR) 4.45 (2.08-9.54), Growth monitoring practice in health facility AOR 2.28 (1.33-3.89), those who had access to cow milk AOR 2.01 (1.19-3.37) and those who work in home as housewives AOR 2.50 (1.23-4.93) were significant identified factors for minimum dietary diversity feeding practice (Table 2) [27].

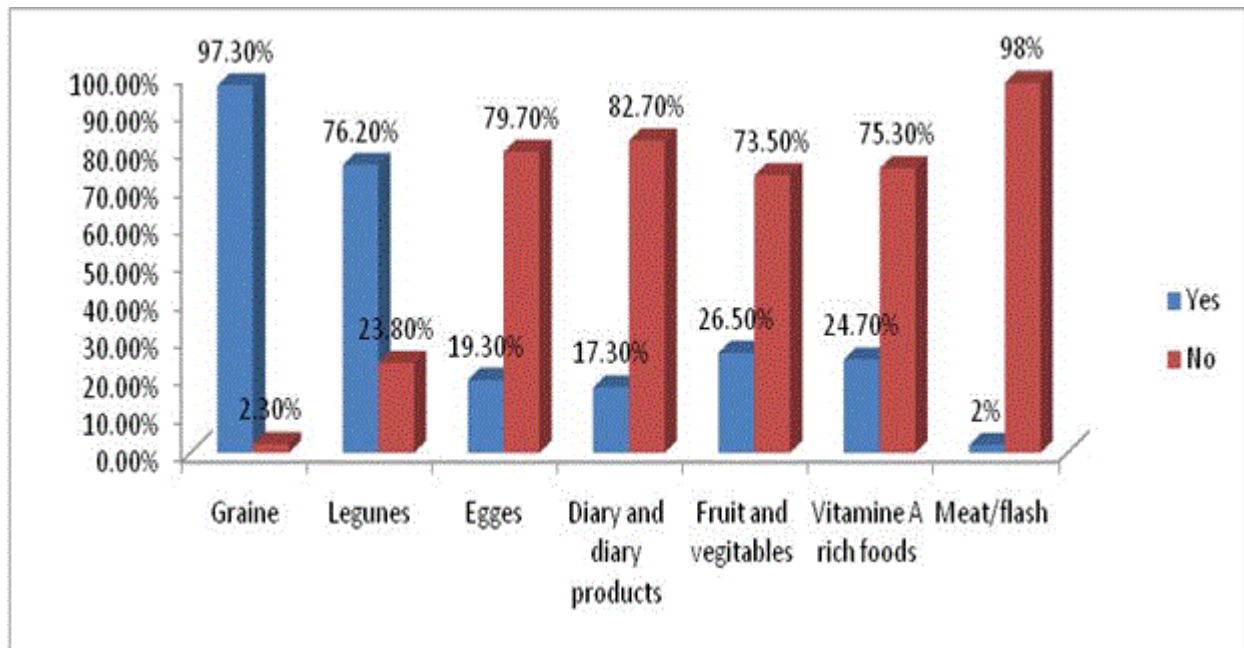


Figure 2: Dietary diversity feeding practices of mothers for their young child in Kamba Woreda Southern Ethiopia in 2014.

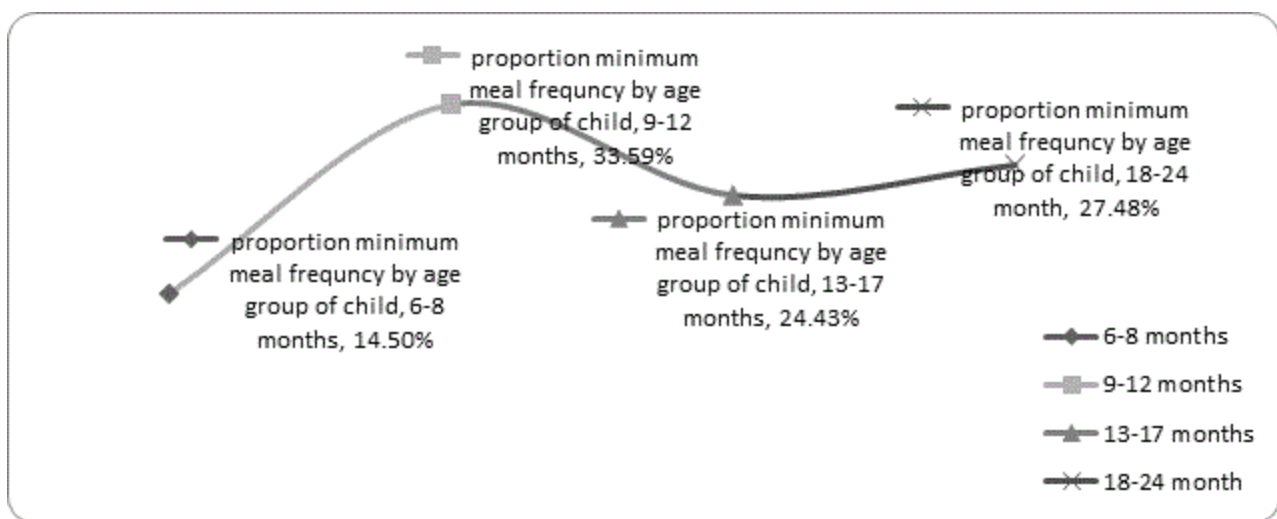


Figure 3: Dietary diversity feeding pattern of mothers by age group for their young child in Kamba Woreda Southern Ethiopia in 2014

Explanatory variable	Dietary diversity score feeding of 7 food items >4 (1) < 3 (0)		Crude OR (95% CI)	Adjusted OR (95% CI)	P-value
Sex of child					
Male	67	199	1.22 (0.83-1.81)	0.88 (0.57-1.37)	0.56
Female	64	232	1	1	
Residence					
Rural	171	50	0.94 (0.63-1.40)	0.69 (0.36-1.33)	0.27

Urban	260	81	1	1	
Age of mothers					
≤ 19	29	68	0.44 (0.177-1.11)	0.60 (0.19-1.86)	0.39
20-24	40	125	0.59 (0.25-1.43)	0.78 (0.27-2.28)	0.74
25-30	55	201	0.69 (0.29-1.64)	0.68 (0.25-1.83)	0.54
≥ 31	7	37	1	1	
Education level					
No formal education	38	134	1	1	
Primary education	41	168	1.42 (9.88-2.30)	0.89 (0.48-1.63)	0.97
Secondary and above	52	129	1.65 (1.03-2.64)	1.36 (0.74-2.50)	0.67
Occupational status					
Private (merchant, farmer)	63	189	1	1	
Housewife	51	194	0.94 (.50-1.75)	1.15 (0.63-2.13)	0.97
Gov. worker & student	17	48	1.27 (0.83-1.93)	1.58 (0.56-4.43)	0.39
Media Exposure					
Yes	77	223	0.75 (0.50-1.12)	0.75 (0.44-1.29)	0.3
No	54	208	1	1	
Place of delivery					
Hospital	25	44	3.84 (2.01-7.34)	**4.45 (2.08-9.54)	0
Health center	81	218		1.80 (0.96-3.42)	0.069
Home	25	169	1	1	
ANC follow up					
≥ 4times	81	272	0.37 (0.12-1.14)	0.37 (0.12-1.14)	0.082
1-2 times	46	97	0.15 (0.09-0.47)	0.15 (0.05-0.47)	0.001
No ANC	4	62	1	1	
PNC follow up					
≥ 3	13	36	0.84 (0.43-1.64)	1.29 (0.56-2.96)	0.56
2-Jan	24	84	1.06 (0.64-1.76)	1.39 (0.75-2.59)	0.3
No	94	311	1		
Growth mentoring					
Yes	89	339	1.74 (1.3-2.68)	**2.28 (1.33-3.89)	0.007
No	42	92	1	1	
Birth interval					
With 3 and above	52	172	2.85 (1.302-6.24)	1.31 (0.659-2.65)	0.44
Within 2 years	8	63	1	1	
Gravid					
Multi	80	277	1.15 (0.78-1.73)	0.50 (0.20-1.24)	0.14

Prime	51	154	1	1	
Presence of cow milk					
Yes	40	175	1.56 (1.02-2.36)	**2.01 (1.19-3.37)	0.008
No	91	256	1	1	
Grows vegetable in farm					
Land and their compound			1.18 (0.80-1.74)		0.78
Yes	67	238	1	0.93 (0.57-1.53)	
No	64	193		1	
Work condition					
Field work	82	299	1	1	0.008
Work at home as house wife	49	132	1.35 (0.89-2.04)	**2.50 (1.23-4.93)	

Table 2: Association between dietary diversity feeding practice and each explanatory variable (Crude and adjusted OR) among 6 to 23 months young child in Kamba Woreda, Southern Ethiopia in 2014. **Significant factors.

Discussion

This community based cross-sectional study identified the prevalence of dietary diversity feeding practice was 131 (23.3%) fed their child four or more varieties of foods and the rest 431 (76.7%) feed ≤ 3 food items from the seven food groups in 24 hour preceding the survey based on the WHO recommendation and indicators [26,28], the finding is higher than national prevalence which is 10.8% and relatively higher from recent study conducted in North Ethiopia Mekelle city which is 17.8% [29], and relatively lower than from finding from Nepalese (30.4%) [30].

The possible explanation for this variations in the prevalence of dietary diversity feeding practice have been observed and direct comparisons is difficult because of differences in methodology (the current study was conducted by primary data source and the previous were utilize secondary data source [10,25], study setting, study population dynamics, timing of the study, and related socioeconomic factors [29,31]. Even though Ethiopian Government implemented through health extension programs by adapting WHO infant and young child feeding practice guideline [27]; however the achievement is not satisfactory in dietary diversity feeding practice which is a core feeding practice for the wellbeing of a child [23,29]. The dominant dietary food items were grain (96.3%) and legumes (76.2%) this is consistent with study conducted in north Ethiopia, but low feeding practice is observed in diary and dairy products, meat, Vitamin A rich fruits and vegetables. The possible explanations might be misunderstanding of mothers young children could not be able to digest food like meat and egg; and majority of the mothers has low economic status which make unable to purchase and fed these relatively costly food sources items from the local market [32].

Among socio-demographic factors, mothers who worked as housewives at home have 2.5 more likely to fed diversified food as compared to those who work far from their house in field area. The possible explanation for this finding, mothers who worked off-residence had no sufficient time to prepare mixed and diversified food for their child [33].

Mothers who had access to cow milk fed diversified foods two times as compared to their counterpart. The possible explanation for this

association mothers who have access to cow milk fed frequently their child and increase dietary diversity feeding practice specifically diary and dairy products.

Mothers who gave birth in health institution were 4.45 (2.08-9.54) and those who had Growth monitoring practice were 2.28 (1.33-3.89) more likely to fed diversified food as compared to their counterpart and correlate with study conducted in North Ethiopia, Sri Lanka and Tanzania. In general service utilization like growth monitoring, Post natal, Antenatal and institutional delivery enhance diversified feeding practice of mothers for their child because health professional give health education on importance of dietary diversity feeding practice during this service utilization [29,30,33].

Conclusion

Global infant and young child feeding practice guideline is being implemented in Ethiopia for more than a decade, but dietary diversity feeding practice of mothers was poor in current study setting. The dominant food groups were grain and legumes and low practice of animal source food like (eggs and meat) and vitamins reach sources food items (fruits and vegetables) feeding practice was observed.

Strengths and Limitations

This study was conducted as community based empirical research and believed to be representative for similar setting. It was undertaken by employing free recall ways of interviewing methods on dietary diversity to avoid or minimize recall bias. In contrary, the study did not consider the quantity of food variety consumed by a child consumed. Social desirable bias might be introduced even effort exerted to minimize by ensuring privacy matters. The nature of this study design was cross-sectional and it is difficult to establish cause-effect relationship.

Recommendation

For health professional

- Mothers should be properly educated on the appropriate combination of local staples for complementary food for children of six months and above through practical food demonstration classes during post-natal period in health facility and at house hold level.
- Health professional should give focus to advice and counsel mothers on dietary diversity feeding practice.

For government public health sectors

- Appropriate behavioral change communicating (BCC) and attitude change communication (ACC) tools should be developing and disseminated to target audience through different media to educate the significance of dietary diversity feeding practice for young child in this critical window period.
- Government media should make advertising on dietary diversity feeding importance for a child growth and development.

For agricultural sectors

- The agricultural sectors should be support the family to grow home garden and rare animals to improve dietary diversity feeding practice.

For researchers

- Further study should be conducted to measure dietary adequacy by measuring (weighting) food consumed by a young child per 24 hours and anthropometry measurement to see dietary feeding on nutritional status.

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Conflict of Interest

The authors declare that they have no conflict of interest.

Authors' contribution

EA: Initiated the research, wrote the research proposal, conducted the research, did data entry and analysis and wrote the manuscript. DM: Involved in the write up of methodology of proposal and research work.

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