

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Minimum Acceptable Diet and Associated Factors among Infants and Young Children aged 6-23 months in Amhara Region, Central Ethiopia: A Community-Based Cross-Sectional Study
AUTHORS	Molla, Abebaw; Egata, Gudina; Getacher, Lemma; Kebede, Bezie; Sayih, Alemayehu; Arega, Mikyas; Bante, Agegnehu

VERSION 1 – REVIEW

REVIEWER	Hashmi, Ahmar Chiang Mai University, Department of Family Medicine
REVIEW RETURNED	11-Nov-2020

GENERAL COMMENTS	<p>Title: Minimum acceptable diet and associated factors among infants and young children aged 6-23 months in Debre Birhan Town, Ethiopia: community-based cross-sectional study</p> <p>Thank you for the opportunity to review this article. The article uses a cross-sectional design to determine factors related to minimum acceptable diet among children between 6 and 23 months of age in an Ethiopian community.</p> <p>I am unsure if this paper is a good fit for BMJ Open. I do not think this is novel research although it may be helpful to specific communities in East Africa or Ethiopia. The methodology is sound, but the authors don't demonstrate the novelty of their research in the introduction, have a limited discussion, and could be more precise and to the point (through a stronger introduction and methods section) to determine precisely what variables to include, why, and present these in the Results section. Not only would it be important to show how factors relate to MAD, but there is no description of why this is important—namely that low rates of MAD are assumed to relate to undernutrition. The manuscript would be much stronger if the authors had argued for this as well as presented growth data on the infants in this study, but I am unsure if this data is available.</p> <p>I think the authors may take some time to make major revisions and perhaps try to place this in a more nutrition-specific or geographic-specific journal.</p> <p>Some specific comments are as follows:</p> <p>Introduction Since the manuscript is focused on 6-23 months, the first paragraph should be shortened to not more than two sentences on why undernutrition (specifically) is the big issue in this population. Then go straight to the first sentence of the second paragraph.</p>
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The second paragraph would be more interesting if the authors made the link between MAD and poor nutrition outcomes, instead of only reporting low rates of MAD (which has been well documented).

Lines 80-83: We can assume that MAD is even lower than estimates for dietary diversity, just by the definition of MAD versus dietary diversity alone. Therefore, I would suspect that the studies you mention would still be informative to identify potential factors in Ethiopia that one may find in the current study population, prior to conducting the authors' analysis. This would help develop a more direct univariable and multivariable analysis as well—instead of including ALL the variables, the authors can tailor their analysis to fewer variables while controlling for potential confounders and omitting colinear variables. These variables (included and excluded from your models) can then be further explained in the Methods.

Methods:

For study participants and sampling, it is unclear the need for breaking up into clusters. From the analysis it doesn't seem that you compare the different clusters, and it is unclear if the clusters are used to make an inference on the population as a whole. This would require ensuring your sample size is appropriate within each cluster, but again, the analysis suggests that these clusters are analyzed as a whole.

Furthermore, it is difficult to estimate the appropriate sample size given that the prevalence of MAD in this study is much higher than the prevalence used to estimate the sample size.

Results:

Tables: I strongly recommend to look for other similar papers with similar tables and try to format accordingly. Please keep an eye on trying to format to save space. For example, instead of two columns for frequency and % you can put both values in one column (n, %).

By looking at other literature, you can also determine what variables need to go in your demographic table in Table 1. And think a bit more carefully about what variables to include. Does marital status determine outcomes in MAD from the literature? Maternal occupation? Also, I do not think that "employed" is particularly descriptive for maternal occupation (this could be ANY number of occupations). Perhaps the more important variable is in a bigger category that can be represented more easily—does the mother work or not?

Table 1: Husband educational status: able to read and write should overlap with higher levels of education (primary, secondary, college). Recommend to limit to no formal education versus formal education as you have described for maternal education. It is good to be consistent in this way as well.

The variables you have chosen also depend on your literature review, including what specific factors within Ethiopia are assumed to be related to MAD (this goes back to an earlier statement that I made). If the authors have a working model of how the variables may affect your outcome of interest, and think about collinearity or confounding, the authors will be clearer on what variables to

	<p>include in these tables. It will make it easier to report and easier for the reader to understand.</p> <p>The authors may consider including a demographic table—preferably demographic variables that gave results in the multivariable analysis—and then another table that summarizes both the bivariable and multivariable analysis. Then highlight the important factors within the text of the results. Remember, not all the variables in the analysis are the most important even if they are significant (given the cross-sectional design); the authors must decide what they think is most important to convey from their study.</p> <p>Lines 175-182 should be included in the Methods.</p> <p>Lines 183-198 are only restating what is in Table 3. Maybe the authors should revise so as to highlight the key findings from this table more succinctly, “x, y, and z had increased odds of MAD”, etc.</p> <p>Discussion: Think about the “big picture” for the first paragraph of this section. What was the key finding? Why was it important? What was the original research question and how confident are the authors that their data answers the research question?</p> <p>Overall, most of the discussion is a restatement of the results, and the authors should take some time to focus on what they want the readers to take away as key messages from their study.</p> <p>Lines 226-229 shows where understanding the variables and how they correlate with one another (to be explained in the methods, clearly) would help to determine: is education more important than household food insecurity or household income? How and in what way? Are these variables in your analysis collinear? Are those women who received IYCF advice more likely to be educated as the authors state? How can we tell?</p>
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REVIEWER	Susy K. Sebayang Universitas Airlangga, Indonesia
REVIEW RETURNED	18-Dec-2020

GENERAL COMMENTS	<p>The manuscript has clear aims and important information needed to improve child nutrition in low middle income countries. The manuscript will benefit from a major English editing. The manuscript also needs major revisions to improve the quality. Below are my comments and suggestions for improvement.</p> <p>Introduction</p> <ol style="list-style-type: none"> 1. Paragraph 1. It would be useful to focus this paragraph to set the importance of infant and young child nutrition instead of setting the background for maternal and under-five nutritional status. 2. Line 67-68 needs a reference. 3. Please explain why measuring MAD is important compared to only assessing minimum meal frequency and dietary diversity. 4. The manuscript also needs stronger justification for why the study is important. Stating that there is lack of information on the prevalence and associated factors in certain part of Ethiopia is not a strong enough justification. The authors need to explain what is unique with the study that differentiate it from other studies
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including the EDHS data that can also be used to assess the determinants of MAD. The authors also need to show the importance of the manuscript for international readers.

Methods

1. Please explain the reason behind the study location selection
2. Who was interviewed in the household? Was it the mother or care-taker?
3. Operational definition of indicators need to be explained more clearly. For example, the questions in HFIA questionnaires need to be explained in general before explaining how to define food secure and insecure households.
4. Please add information on the response rate
5. Please add information on whether consent was obtained in writing or verbally?

Statistical analysis

1. Line 148 Why was predictors for anemia needed?
2. Please explain all the variables assessed for determinant analysis? Please don't use the term dependent and independent variables as they are not clear to the readers. Were all the variables in Table 2 used in bivariate analysis? If so, some of the categories of the variables were too low in number. For example: other maternal ethnicity, widowed, number of under five=3. I suggest the authors to reclassify these categories for a better analysis.
3. How were confounders determined. Did the authors also test for interactions between variables in the model?
4. What was done to adjust for cluster sampling in the analyses?

Results

1. What is HEWs?
2. How was history of child illness measured? Was it from records or recall for a certain period?
3. Table 1 and 2. Were these variables tested in bivariate model?
4. Table 3. What do the numbers in Meet MAD columns represent?
5. Table 3. The terms such as yes for household food security and child history of illness are not clear. Perhaps it is better to write it 'child having history of illness in the past' Or "Food secured household".
6. Why were head of household and wealth index kept in the final model? Are these confounders? Please clarify in the method section the stages of the analysis.

Discussion

1. There are other results such as breastfeeding practice or bottle feeding and complementary feeding that were included in the results but not discussed in the discussion sections.
2. A more in-depth discussion is needed especially for the possible implication for policy and research and possible mechanism. For example, why was the paternal education level especially for those having primary education was strongly associated with good MAD. Also, why having home garden was important. What are the implications for policy.
3. It also seemed that it was dietary diversity that limits MAD more. What are the suggestions for programs or policy makers regarding this. This may be linked with the the results on home garden.

VERSION 1 – AUTHOR RESPONSE

Reviewer Comments

Reviewer 1

First of all, would like to thank Dr. Ahmar Hashmi, Chiang Mai University for your constructive comments that have paramount value to increase scientific standards and quality of our manuscript. Reviewer: Since the manuscript is focused on 6-23 months, the first paragraph should be shortened to not more than two sentences on why undernutrition (specifically) is the big issue in this population. Then go straight to the first sentence of the second paragraph.

Author Response: the comments addressed as requested and indicated below. The details are found in the highlight version of the revised manuscript.

✓ Proper nutrition from conception to 24 months of age critical window period that determines the survival, health, and nutritional status of a child. Optimum complementary feeding at the age of six months together with breastfeeding until two years of age warrants optimal growth, development, and maintain healthy life throughout the life cycle. By contrast, inappropriate infant and young child feeding lead to stunted growth and poor cognitive development.

Reviewer: The second paragraph would be more interesting if the authors made the link between MAD and poor nutrition outcomes, instead of only reporting low rates of MAD (which has been well documented).

Author Response: In many resource-limited countries, like Ethiopia high rate of growth failure occurs within 24 months of age and thereafter decreases, and this mainly because of resource limitation and inappropriate child feeding practice. The minimum acceptable dietary standard in children 6-23 months of age has numerous benefits; enhance linear growth, better cognitive development, and high school achievement, reduced risk of non-communicable disease, increase body immune system and productivity during adult life. Meeting minimum acceptable diet also essential to reduce macro and micronutrient deficiency and lead to improving linear growth status. On the other hand, the unmet minimum acceptable dietary standard has devastating, long-term, and irreversible health outcomes such as stunted growth, and a stunted child becomes a small adult with different adverse health effects in the life course.

Reviewer: For study participants and sampling, it is unclear the need for breaking up into clusters. From the analysis, it doesn't seem that you compare the different clusters, and it is unclear if the clusters are used to make an inference on the population as a whole. This would require ensuring your sample size is appropriate within each cluster, but again, the analysis suggests that these clusters are analyzed as a whole. Furthermore, it is difficult to estimate the appropriate sample size given that the prevalence of MAD in this study is much higher than the prevalence used to estimate the sample size.

Author response:

⇒ As it is indicated in the method section, the final calculated sample size was 459, but a total of 577 infants and young children aged 6-23 months were found in randomly selected clusters and all infants and young children in the selected cluster were included in the study.

⇒ Regarding the sample size, the sample size of the study was calculated during the proposal development stage by considering the existed evidence which is a proportion of MAD 7% that gives the maximum sample size for the present study, but at the proposal stage, we don't know the prevalence of our study result, it may be similar or far away from the previous studies including prevalence used to estimate the sample size. This is one feature of scientific finding. However, the possible variation between the prevalence of the present study and the prevalence used to estimate the sample size is due to

⇒ The prevalence used to calculate sample size is not a single study, it is the national prevalence of the 2016 EDHS report that has variations in time, population, and settings

with the present study. The prevalence used to determine sample size was included different settings; urban, semi-urban, rural, and pastoral communities with the majority of the sample study sample was rural population, and 96% of a mother of children aged 6-23 months had no formal education. In contrast, our study was conducted in an urban setting and nearly 80 % of the mother of children have formal education. To summarize, the difference in the study population, period, and study setting may be mentioned as reasons for the far difference between the prevalence of the current study as compared with prevalence used to estimate sample size for the present study.

⇒ The reason why we used cluster sampling, sometimes it is too expensive to carry out Simple Random Sampling (SRS) if the population is large or scattered, absence of a complete list of the study population, travel costs can become expensive, and interviewers have to survey people from one end to the other end. Cluster sampling is also the most widely used homogenous population that can greatly reduce cost. The source population living in the town are homogeneous concerning variables distribution that affects the outcome variable; access to health care, information, nutrition education, drinking water, and cultural influence (attitude, socialization, and perception) that factors affect nutrition and child feeding practice. This means that variation between clusters tends to be more similar because of the aforementioned reasons.

⇒ In this regard authors agreed with the assumption of population homogeneity or little or no variation, we used the cluster sampling method and we divided the source population into nine clusters by considering kebeles (the smallest administrative unit) in Ethiopia as clusters and three clusters were selected randomly to select the study participant for this study.

⇒ Also, by considering variation within and among clusters, we use a design effect of 1.5 to increase our sample, decrease the loss of efficiency and decrease variation.

⇒ Regarding inference, to make the result generalizable to the whole population, authors were used the random sampling method to select clusters, data were collected from all elements or units in the selected clusters and more than 30% of the clusters were included in the study. Hence, the result of the study concludes to the whole population in the town.

⇒ Concerning data analysis even though we used the cluster sampling method, our objective is to see the relationship of individual explanatory variables with the meeting of MAD but not to understand how grouping variables or cross-level relationships between higher level and lower level variables that influence meeting MAD and we calculated the interclass correlation coefficient (ICC) during analysis and the value of ICC is 0.03 or 3% which is less than 5%, so running other levels of analysis such as multilevel, cluster level or hierarchical level would not be necessary and performing single level or individual-level data analysis would be adequate to such study, based on this reasons authors have used a single level or individual-level data analysis for the present study. Reviewer: We can assume that MAD is even lower than estimates for dietary diversity, just by the definition of MAD versus dietary diversity alone. Therefore, I would suspect that the studies you mention would still be informative to identify potential factors in Ethiopia that one may find in the current study population, before conducting the authors' analysis. This would help develop a more direct univariable and multivariable analysis as well—instead of including ALL the variables, the authors can tailor their analysis to fewer variables while controlling for potential confounders and omitting collinear variables. These variables (included and excluded from your models) can then be further explained in the Methods.

Author response: comment was addressed as requested and indicated in the revised version

Reviewer: Tables: I strongly recommend to look for other similar papers with similar tables and try to format accordingly. Please keep an eye on trying to format to save space. For example, instead of two columns for frequency and % you can put both values in one column (n, %). By looking at other literature, you can also determine what variables need to go in your demographic table in Table 1. And think a bit more carefully about what variables to include. Does marital status determine outcomes in MAD from the literature? Maternal occupation? Also, I do not think that "employed" is particularly descriptive for maternal occupation (this could be ANY number of occupations). Perhaps

the more important variable is in a bigger category that can be represented more easily—does the mother work or not?

Author response:

Regarding the question does marital status determine outcome MAD from the literature? In our scope of literature review, we did not find marital status as predictors of MAD. In the present study marital status is not used to determine the outcome but we used descriptive statistics in sociodemographic characteristics.

⇒ On the other hand, maternal occupation can determine the outcome variable MAD because maternal occupation is associated with income which in turn influences the ability to access food or purchasing power.

⇒ Also classifying maternal occupation status as working and not working is one means to see the association of working status with MAD, but mother's working type or nature of work/ occupation has influence child caring practice as well as economic capacity.

⇒ Mothers engaged in employment (government or private) and farmers don't have adequate time for child care practice compared with merchant and housewife and child-caring practice take over by caregiver or relatives.

⇒ Besides income or economic status also varies by type of work mother engaged. This income difference has a significant influence on household purchasing power to a diversified diet.

These difference again affect consumption of optimal nutrition that lead to unmet minimum acceptable diet. Because of this reason, we used maternal occupation based on work type.

Reviewer: Table 1: Husband educational status: able to read and write should overlap with higher levels of education (primary, secondary, college). Recommend to limit to no formal education versus formal education as you have described for maternal education. It is good to be consistent in this way as well.

Author Response: The comment addressed as requested and indicated in the revised version.

Reviewer: Lines 175-182 should be included in the Methods

Author response: addressed as requested and indicated in the revised version.

Reviewer: Lines 183-198 are only restating what is in Table 3. Maybe the authors should revise to highlight the key findings from this table more succinctly, "x, y, and z had increased odds of MAD"

Author response: addressed as requested

The variables; mother's education, father's education, increase the age of a child, presence of home garden, child-free of illness two weeks before the survey, child growth monitoring utilization, the mother with four or above ANC visits during pregnancy, and mother received IYCF counseling were significantly associated with meeting minimum acceptable diet (Table 3).

Reviewer: Lines 226-229 shows where understanding the variables and how they correlate with one another: is education more important than household food insecurity or household income? How and in what way? Are these variables in your analysis collinear? Are those women who received IYCF advice more likely to be educated as to the author state? How can we tell?

Author response: This is maybe due to educated parents may easily capture infant and young child feeding counseling and advice messages provided by health care workers and other media outlets compared with an uneducated parent. Also, education improves household revenue, ensures household food security, and vital to leave out from poverty because educated parents are more productive, resourceful, and join to greater paid jobs. Therefore, higher educated parents have adequate resource to provide more diversified and high-quality diet to their children than parents have no education. This implies that education is more significant than household food security or household income.

Multicollinearity between explanatory variables was checked using standard error and variables with standard error ≥ 2 were considered collinear and removed from the analysis. Regarding the question, the standard error value of variables (household income and food security) was less than 2 and considered there no multicollinearity between household income and food security.

Regarding the question; are those women who received IYCF advice more likely to be educated as to the author's state? We did not say that women who received IYCF advice more likely to be

educated. But what we want to say is that women who received infant and young child feeding advice from health extension workers were provided a minimum acceptable diet to their children or children whose mothers received IYCF advice from health extension workers had more odds of meeting MAD.

Reviewer 2

First of all, we would like to express our gratitude to Dr. Susy Sebayang, Summit Institute of Development for your practical and fruitful comments that could increase the scientific values and quality of our manuscript. Hereafter, the author's response is described in the following sections and the details of the response were found in the highlight version of the manuscript.

Reviewer: Paragraph 1 would be useful to focus this paragraph to set the importance of infant and young child nutrition instead of setting the background for maternal and under-five nutritional status

Author response: In many resource-limited countries, like Ethiopia high rate of growth failure occurs within 24 months of age and thereafter decreases, and this mainly because of resource limitation and inappropriate child feeding practice. The minimum acceptable dietary standard in children 6-23 months of age has numerous benefits; warrant linear growth, improve cognitive development and school achievement, reduced risk of non-communicable disease, increase body immunity system and productivity during adult life. The nourishing minimum acceptable diet also important to reduce macro and micronutrient deficiency and linked with improved linear growth status. On the other hand unmet minimum acceptable dietary standard has devastating, long-term, and irreversible health outcomes such as stunted growth, and a stunted child becomes a small adult with different adverse health effect in the life course.

Reviewer: Line 67-68 needs a reference.

Author response: the comment addressed as requested

Reviewer: Please explain why measuring MAD is important compared to only assessing minimum meal frequency and dietary diversity

Author response: Minimum dietary diversity used to measure quality diet of infant and young child diet; micronutrients adequacy of a child but not measure breastfeeding status, while minimum meal frequency measure quantity or energy consumption child from food groups. In contrast, minimum acceptable diet measures multiple dimensions of child feeding; both micronutrient and energy adequacy. Besides, MAD was also used to measure breastfeeding status and optimal complementary feeding pattern. To summarize minimum dietary diversity and minimum meal frequency measures only quality and quantity of child diet respectively, while minimum acceptable diet measure multiple dimension of child's diet; both quality and quantity of child diet. MAD also reflect appropriate complementary feeding practice. Therefore, assessing MAD more important to capture both energy intake and micronutrient adequacy as compare to assessing MDD or MFF because MDD and MMF measure only one dimension of diet; quality and quantity respectively.

Reviewer: The manuscript also needs stronger justification for why the study is important. Stating that there is a lack of information on the prevalence and associated factors in a certain part of Ethiopia is not a strong enough justification. The authors need to explain what is unique with the study that differentiates it from other studies including the EDHS data that can also be used to assess the determinants of MAD

Author response:

- ✓ The EDHS report showed the national pooled prevalence of minimum acceptable diet with sample population are greatly varied by factors that affect infant and young child feeding practice: the sample population in EDHS greatly varies by dietary habits, culture, geographical setting, socioeconomic status, residence, educational status, availability of basic services, access to basic health services and access to safe drinking water.
- ✓ More than two-thirds of a sample population of EDHS was rural residents and fourth-fifth mother had no formal education. Also, factors associated with minimum acceptable diet were not identified by the EDHS report. Due to these variations distribution of minimum acceptable diet and its associated factors vary by location and settings and it is difficult to generalize the EDHS result to various geographical and cultural settings.

✓ In contrast, our study was conducted in an urban setting that has similar characteristics with the cultural influence of child feeding, dietary habits, health service, education, water, and sanitation. Nearly, eighty percent of mothers in our study sample population have formal education. Also, our study identifies factors influencing meeting minimum acceptable diet in the study area. So the current study help to detect representative estimate of minimum acceptable diet and associated factors among infant young child in the study setting and this in turn help to design socio-cultural interventions best fit to the location.

✓ On the other hand, our study also differs from the study done in northwest Ethiopia. A study done in northwest Ethiopia was conducted among orthodox religion followers lactating mothers during the fasting season. During the fasting season, Orthodox religious followers are restricted from the consumption of animal and animal products including egg, and Orthodox religious follower mother also may not prepare a separate dish of animal and animal products for her child. This significant consumption of minimum acceptable diet standard and it is difficult to infer the result for the non-fasting season and non-orthodox followers. But the present study was conducted among any religious followers and non-fasting period. Therefore, the study conducted by filling the aforementioned gaps, and the result of the study is generalizable to all religious followers in the study area.

Reviewer: Please explain the reason behind the study location selection

Author response: because the study area is located in the Amhara region where the prevalence of stunting among children age 6-23 months is the highest in the country, while the infant mortality rate is second highest next to the Afar region. This most often due to poor nutrition during the first critical periods especially, after the introduction of complementary feeding practice. As result determining the prevalence of MAD and identifying, factors associated with infant and young child feeding practice in the study area are important to design cultural and situation-specific intervention strategies to combat stunting and other malnutrition-related health problems in the region including the study area.

Reviewer: who was interviewed in the household? Was it the mother or caretaker?

Author response: The mother was interviewed and used as a primary source of data for the study, but if the mother was absent caregiver was interviewed to collect the data for the study.

Reviewer: Operational definition of indicators needs to be explained more clearly. For example, the questions in HFIAS questionnaires need to be explained in general before explaining how to define food secure and insecure households.

Author response:

Data regarding household wealth was collected using information from ownerships available assets; ownership of livestock, agricultural land, electronics, radio, television, refrigerator, car, bicycle, cart, gold, sofa, source of water, availability of electric city, type of toilet and household characteristics; type of wall, floor, and ceiling.

Household food security was measured by using Household Food Insecurity Access Scale (HFIAS) a validated tool developed by Food and Nutrition Technical Assistance (FANTA). The HFIAS is based on respondent recall in the past 30 days and asks two closely related questions; nine occurrence questions that examine the experience of food insecurity in the past 4 weeks with two response choices as 1=yes or 0=no. each occurrence questions followed by a frequency of occurrence question that questions the respondent how often the specific condition occurs in the past 4 weeks with the form of Likert scale response as 1= rarely (1 to 2 times in the past 30 days), 2= sometimes (3 to 10 times in the past 30 days) and 3=often (> 10 times in past 30 days). When summing up the frequency of occurrence questions, the HFIAS score of household range 0-27, and the severity of household food insecurity increase with an increase in the HFIAS score.

Measurements

Food secure household: Household experience none of food insecurity conditions experience or just experience worry, but rarely in the past four weeks.

Food insecure household: household experience one of the three levels of food insecurity conditions; mildly, moderately, and severely food insecurity or access conditions in the past four weeks categorized as food insecure.

Minimum dietary diversity: consumption of four or more food groups from the WHO recommended seven food groups within 24 hrs day or night before the survey.

Minimum meal frequency: the minimum number of times the child consumes solid, semi-solid, or soft foods (including two milk feeds for non-breastfed children) within 24 hrs day or night before the survey. The minimum number of times is two times for breastfed children aged 6-8 months, three times for children aged 6-23 months, and four times for non-breastfeed children 6-23 months of age.

Minimum acceptable diet: consumption of the minimum dietary diversity and minimum meal frequency within 24 hrs day or night before the survey.

Early initiation of breastfeeding: putting a child to the breast within one hour after birth.

Timely introduction of complementary feeding: providing a child with solid, semi-solid, or soft foods in addition to breast milk at the age of 6 months.

Household Wealth index: A proxy measure of living standards derived from information on ownership available assets and household characteristics and household classified into tertiles.

Reviewer: Please add information on the response rate

Author response: A household considered eligible if the infant and young child aged 6-23 months with mother /caregiver living for at least six months in the selected kebeles was included in the study. The child was excluded from the study if the mother/caregiver was absent in the household or the mother/caregiver was unable to respond due to the child's illness or her illness and if the eligible household was closed after three revisits.

Reviewer: Please add information on whether consent was obtained in writing or verbally

Author response: The study was conducted following the declaration of Helsinki ethical principles for medical research involving human subjects and each study participant gave informed written consent.

Reviewer: Line 148 Why was predictors for anemia needed

Author response: it was an editorial problem and corrected to a minimum acceptable diet as indicated in the revised manuscript version.

Reviewer: Please explain all the variables assessed for determinant analysis?

Author response: Logistic regression was used to identify variables significantly associated with a minimum acceptable diet. The explanatory variables were selected based on similar studies done on minimum acceptable diet and the variables were classified as maternal, paternal, child, and household-related variables.

Maternal related variables

Age of mother categorized as: 19-24, 25-29 and ≥ 30 years of age; the maternal level of education: no formal education, primary education, secondary education, and college and above; occupational status: housewife, employed, merchant and farmer; mother involvement in deciding on what child to be feed: involved and not involved; mother has a history of illness within two weeks prior the survey: yes or no; the number of antenatal care visits during pregnancy: less than three antenatal care visits and four antenatal care visits; frequency of maternal fruit and vegetable consumption per week: consume less than three times per week and consume four times or more per week; mother get an infant and young child feeding counseling from health extension workers: yes or no; mother use child growth monitoring service: yes or no mother history of illness two weeks before the survey: yes or no, and place of delivery: home or health facility.

Father related variables

Father education: have no formal education; primary, secondary, and college or above; father occupation: employed, merchant, and farmer.

Child-related variables

Child sex: male vs female; child age categorized; age 6-11 months, age 12-17 months, and age 18-23 months; child initiated to complementary feeding: yes or no; child currently bottle feed: yes or no and child has a history of illness with two weeks prior the survey: yes or no. the child currently bottle feed:

yes or no; time child introduce to complementary food; less than six months, at six months and above six months.

Household related variables

Household wealth index: classified into poor, medium, and rich; head of household or head of a family is a primary person who is responsible or have authority for decision making in the household: father, mother, or both; household food security; food secure or food insecure; the presence of home garden: yes or no, family size: categorized ≤ 3 , 4-5 and ≥ 6 family members.

Reviewer: Please don't use the term dependent and independent variables as they are not clear to the readers.

Author response: the comment corrected as indicated in the revised version

Reviewer: Were all the variables in Table 2 used in bivariate analysis? If so, some of the categories of the variables were too low in number. For example, another maternal ethnicity, widowed, number of under-five=3. I suggest the authors to reclassify these categories for a better analysis.

Author response:

⇒ All variables reported in the table were not used in bivariate analysis and the variables selected for bi-variable analysis were based on similar studies done on minimum acceptable diet as indicated in the revised version.

Reviewer: How were confounders determined? Did the authors also test for interactions between variables in the model?

Author response:

⇒ Confounders were determined in two stages.

⇒ The first stage is during, the design stage by considering age and residence.

⇒ Second, during the analysis stage, using multivariate analysis. A multivariate logistic regression model was used to determine potential confounders since the multivariate logistic regression model can handle covariates and control many confounders simultaneously that can give adjusted odds ratio result which is adjusted for various explanatory variables and confounders.

⇒ Regarding the interaction effect test. Yes, we did interaction effects. An interaction effect test was done by two-factor product term and interaction was considered significant at $P < 0.05$, but all interaction was insignificant.

Reviewer: What was done to adjust for cluster sampling in the analyses?

Author response:

⇒ To choose the appropriate analysis model for the study, first, we fit the null model to examine the variation between communities (simply community variation) and to decide whether the use of cluster-level/multilevel analysis is important or not. Accordingly, the measures of community variation (random-effects) were estimated with intra-class correlation coefficient (ICC) and the value was not significant (ICC=0.03 or 3%, which is less than 5%). Therefore, ordinary logistic regression is adequate instead of a cluster-level/multilevel logistic regression model. Hence we didn't need to consider the cluster-level analysis and cluster adjustment.

Reviewer: What is HEWs

Author response: HEWs are standing for health extension workers and indicated in the revised version.

Reviewer: How was history of child illness measured? Was it from records or recall for a certain period?

Author response: children having a history of illness were measured within two weeks prior to the study and it was based on the mother or caregiver's verbal report.

Reviewer: Table 1 and 2. Were these variables tested in bivariate model

Author response: all the variables of Tables 1 and 2 were not tested in the bivariate model, but only selected variables were tested for bi-variable analysis. The selection was based on previous studies as indicated above in response to question 12.

Reviewer: Table 3. What do the numbers in Meet MAD columns represent?

Author response: actual number of children who meet minimum acceptable diet and who did not meet minimum acceptable diet while the value in the bracket was percentage frequency and indicated in the revised version.

Reviewer: Table 3. The terms such as yes for household food security and child history of illness are not clear. Perhaps it is better to write it 'child having a history of illness in the past' Or "Food secured household".

Author response: Addressed as commented and indicated in the revised version

Reviewer: 6. Why were head of household and wealth index kept in the final model? Are these confounders?.

⇒ □ Because these variables were fulfilled the criteria ($p\text{-value} < 0.2$) during bi-variables analysis were considered into a multivariate model, even if they are not significant in the multivariate model. Also, the odds difference before and after adjustment for possible confounders is less than 10% so we have no sufficient evidence to say these variables are confounders.

Reviewer: There are other results such as breastfeeding practice or bottle feeding and complementary feeding that were included in the results but not discussed in the discussion sections.

Author response: our discussion was based on the study findings. Hence, we discussed variables of the study that show significant association in multivariable analysis after controlling all potential confounders.

Reviewer: A more in-depth discussion is needed especially for the possible implication for policy and research and possible mechanism

Author response: addressed based on the comments and indicated in the revised version.

Reviewer: why the paternal education level was especially for those having primary education was strongly associated with good MAD.

Author response:

This is maybe due to educated parents may have a better understanding of IYCF nutrition counseling and advice messages provided by health professionals and other media channels compared with unschooled parents. Higher education status is also associated with engagement in higher-paid work that can increase in wealth quintile and household resources which enable parents to provide children high-quality diet. Hence, Policymakers should encourage a higher level of educational attainment and IYCF education appropriate to illiterate parents should be designed to reduce the low rate of MAD.

Reviewer: It also seemed that it was dietary diversity that limits MAD more. What are the suggestions for programs or policy makers regarding this? This may be linked with the results on home garden.

Author response: This because in resource-limited settings, home garden or backyard farming practices important to improve household food security and increase household resources by reducing the expense of buying foods and retailing home garden products that are positively associated with dietary diversity. The home garden practice also may be associated with increasing food availability and accessibility especially, in a household with no access to agricultural land. This denotes to policymakers should encourage and support urban agricultural practice in the food production system of a country.

Reviewer: It also seemed that it was dietary diversity that limits MAD more. What are the suggestions for programs or policy makers regarding this?

Author response: MAD is not achieved by age-appropriate meal frequency but the meal must be diversified or at least four food groups from seven food items. However, enormous factors affect dietary diversity especially, food availability and accessibility or economic access to food are the main factors influencing to meet dietary diversity. Therefore,

✓ Policymakers should be designed strategies that increase household income or resource that improve the household purchasing power of high-quality diet

✓ The government should increase food availability in the country by strengthening the agricultural production system.

✓ In resource-limited countries, backyard farming practice has a positive impact on dietary diversity, hence, policymakers should encourage home garden practice particularly, urban agriculture is vital to increase dietary diversity of households that have no agricultural land.

VERSION 2 – REVIEW

REVIEWER	Sebayang, Susy Summit Institute of Development
REVIEW RETURNED	20-Mar-2021

GENERAL COMMENTS	<p>The authors have responded to the comments but several issues remain to be addressed.</p> <p>The authors identified in the rebuttal some important points that make the study different from other studies. However, these points are not reflected in the introduction section of the manuscript. Similarly, the authors mentioned in their response that selecting the study location is important to design cultural and situation specific intervention. This information, too, is not reflected as a justification for study location selection in either the introduction or the method sections. In the rebuttal the authors mention that they tested for interaction. This information should also be included in the method and in the results section the authors should state that no interaction was found significant. Similarly, the authors mentioned in their rebuttal that they determined confounders by looking at the percentage change in the coefficient. Please explain this in the method section.</p> <p>Please clarify in the method section what test was done to detect multicollinearity.</p> <p>The authors mentioned their reason for not adjusting for cluster sampling. Please add this information in the method.</p> <p>Please add the response rate. There were 577 infant and young child eligible, but there are only 531 data analysed. What was the response rate and what are other reasons why there were missing data</p> <p>Table 1 was not referred to in the results text.</p> <p>Please correct the prevalence of MAD in the results.</p> <p>Please the direction and magnitude of the association of the significant factors of MAD. Please also do the same for the abstract.</p> <p>Discussion: Comparison is needed to understand some of the text written in the discussion. For example, the authors wrote: “Mothers who had secondary education and above were more likely to provide MAD to their children and children whose fathers attained primary education level had more odds to meet MAD. –What are these factors compared to?</p> <p>Discussion section needs more depth. Strength and limitation of the study needs to be addressed in this section. In addition, implication for policy or further research should also be addressed here. I would suggest writing general findings, comparison with other studies, possible mechanism, strength and limitation as well as discussion on policy implications all in different paragraphs. Policy implication needs more indepth discussion. Adding examples of similar successful programs from different countries (with reference) would improve this section.</p> <p>The written English has improved but the manuscript still needs editing.</p>
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VERSION 2 – AUTHOR RESPONSE

Reviewer: 2

Dr. Susy Sebayang,

We are grateful for your positive comments given to improve the scientific standards and quality of the manuscript.

Reviewer: The authors have responded to the comments but several issues remain to be addressed. The authors identified in the rebuttal some important points that make the study different from other studies. However, these points are not reflected in the introduction section of the manuscript.

Author response: comment accepted and included in the introduction section

Reviewer: Similarly, the authors mentioned in their response that selecting the study location is important to design cultural and situation specific intervention. This information, too, is not reflected as a justification for study location selection in either the introduction or the method sections.

Author response: the comment accepted and included in the introduction section as showed in the revised version

Reviewer: In the rebuttal the authors mention that they tested for interaction. This information should also be included in the method and in the results section the authors should state that no interaction was found significant.

Author response: comment addressed and included as requested

Reviewer: Similarly, the authors mentioned in their rebuttal that they determined confounders by looking at the percentage change in the coefficient. Please explain this in the method section.

Author response: reviewer comment acknowledged and addressed in the revised version.

Reviewer: Please clarify in the method section what test was done to detect multicollinearity.

Author response: comment accepted and addressed as follow, Multicollinearity between explanatory variables was checked using standard error and variables with standard error ≥ 2 were considered collinear and removed from the analysis and it is indicated in the revised version.

Reviewer: The authors mentioned their reason for not adjusting for cluster sampling. Please add this information in the method.

Author response: the comment addressed as requested and indicated in the revised version

Reviewer: Please add the response rate. There were 577 infant and young child eligible, but there are only 531 data analyzed. What was the response rate and what are other reasons why there were missing data

Author response: addressed as requested,

As we describe in method section, final calculated sample size of the study was 459, but a total of 577 infants and young children aged 6-23 months live in randomly selected clusters. Due to the nature of one stage cluster sampling method, all infants and young children 6-23 months of age live in the selected cluster were included in the study. However, Among 577 infants and young children aged 6-23 months live in the selected clusters, 531 mother-children pair took part in the study making a response rate of 92.0%. Seven infants and young children were excluded according to exclusion criteria and thirty nine study participants were refused to participate in the study. it is indicated in the revised manuscript.

Reviewer: Table 1 was not referred to in the results text.

Author response: table 1 is cited in the result texts as commented and indicated in the revised version.

Reviewer: Please correct the prevalence of MAD in the results.

Author response: the comment corrected as prevalence of MAD was 31.6 % [95% CI: (27.7, 35.2)] and showed in the revised version.

Reviewer: Please the direction and magnitude of the association of the significant factors of MAD. Please also do the same for the abstract.

Author response: reviewer comment accepted and addressed as requested. The details showed in the revised version

Discussion:

Comparison is needed to understand some of the text written in the discussion. For example, the authors wrote: "Mothers who had secondary education and above were more likely to provide MAD to their children and children whose fathers attained primary education level had more odds to meet MAD. –What are these factors compared to?"

Author response: Children whose mother attained secondary and college-level education had greater odds of MAD compared with children whose mother had no formal education.

Reviewer: Discussion section needs more depth. Strength and limitation of the study needs to be addressed in this section.

Author response: discussion section written according to reviewer comment. However, as per journal guideline, strength and limitation study included under article summary section immediate next to abstract.

Reviewer: In addition, implication for policy or further research should also be addressed here. I would suggest writing general findings, comparison with other studies, possible mechanism, strength and limitation as well as discussion on policy implications all in different paragraphs. Policy implication needs more indepth discussion. Adding examples of similar successful programs from different countries (with reference) would improve this section.

Author response: reviewer comment accepted and addressed as requested, but limitation of the study included next to abstract under article summery as per journal guideline.