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Original Article

Minimum Acceptable Diet Intake and Associated Factors Among Children Aged 6–23 months in Guinea: a Multilevel Analysis of Secondary Data

Apport alimentaire minimum acceptable et facteurs associés chez les enfants âgés de 6 à 23 mois en Guinée : une analyse multiniveau des données secondaires

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ABSTRACT

Background. Optimal complementary feeding practices contribute to improving the nutritional status of children under two years of age and contribute to their good growth. This study aimed to analyze the associated factors of the minimum acceptable diet (MAD) intake among children aged 6 to 23 months in Guinea. **Methods.** We extracted data from 6,557 children aged 6-23 months from the Global Analysis of Vulnerability, Food Security and Nutrition survey in Guinea. We analyzed the data using Stata V.15.0 software. A multilevel logistic regression model was fitted to identify factors associated with MAD. **Results**. Only 28.2% of the children aged 6-23 months received MAD. Children aged 12-17 months (Adjusted Odds Ratio (AOR): 1.95, 95% Confidence Interval (CI): 1.60, 2.38) and 18-23 months (AOR: 2.89, 95% CI: 2.39, 3.50) were more likely to receive MAD. In addition, possession of radio (AOR: 1.23, 95% CI: 1.08, 1.40), health decision-making by the wife of the head of household (AOR: 1.33, 95% CI: 1.13, 1.57), and a higher level of household head's education (AOR: 1.27, 95% CI: 1.03, 1.57), average wealth index households (AOR: 1.63, 95% CI: 1.30, 2.04), wealthy households (AOR: 1.93, 95% CI: 1.54, 2.42) and wealthier households (AOR: 2.40, 95% CI: 1.86, 3.09) were significantly associated with MAD. **Conclusion.** To improve the MAD, the emphasis must therefore be placed on women's access to the media, support for household income-generating activities, and the promotion of behavior change.

RÉSUMÉ

Contexte. Des pratiques optimales d'alimentation complémentaire contribuent à améliorer l'état nutritionnel des enfants de moins de deux ans et contribuent à leur bonne croissance. Cette étude visait à analyser les facteurs associés à l'apport alimentaire minimum acceptable (MAD) chez les enfants âgés de 6 à 23 mois en Guinée. **Méthodes**. Nous avons extrait les données de 6 557 enfants âgés de 6 à 23 mois de l'enquête Global Analysis of Vulnerability, Food Security and Nutrition en Guinée. Nous avons analysé les données à l'aide du logiciel Stata V.15.0. Un modèle de régression logistique multiniveau a été adapté pour identifier les facteurs associés au MAD. **Résultats**. Au total, 28,2% des enfants âgés de 6 à 23 mois ont reçu du MAD. Les enfants âgés de 12 à 17 mois (rapport de cotes ajusté (AOR) : 1,95, intervalle de confiance (IC) à 95 % : 1,60, 2,38) et de 18 à 23 mois (AOR : 2,89, IC à 95 % : 2,39, 3,50) étaient plus susceptibles de recevez MAD. De plus, la possession d'une radio (AOR : 1,23, IC 95 % : 1,08, 1,40), la prise de décision en matière de santé par l'épouse du chef de ménage (AOR : 1,33, IC 95 % : 1,13, 1,57) et un niveau plus élevé du niveau d'éducation du chef de ménage (AOR : 1,27, IC 95 % : 1,03, 1,57), des ménages à indice de richesse moyen (AOR : 1,63, IC 95 % : 1,30, 2,04), des ménages aisés (AOR : 1,93, IC 95 % : 1,54, 2,42).) et les ménages plus riches (AOR : 2,40, IC 95 % : 1,86, 3,09) étaient significativement associés au MAD. **Conclusion**. Pour améliorer le MAD, l'accent doit donc être mis sur l'accès des femmes aux médias, l'appui aux activités génératrices de revenus des ménages et la promotion du changement de comportement.

HIGHLIGHTS OF THE STUDY

What is known about the subject

In Africa, there is an association between the mother's level of education, age, occupation, birth order of the child, quintile of household wealth, household size, and living environment, food diversity and frequency of meals.

The question addressed in this study

Factors associated with the minimum acceptable dietary (MAD) intake in children in Guinea.

What this study brings new

- Only 28.2% of the children aged 6-23 months received MAD. Children aged 12-17 months and 18-23 months were more likely to receive MAD.
- Possession of radio, health decision-making by the wife of the head of household, and a higher level of household head's education, average wealth index households, wealthy households and wealthier households were significantly associated with MAD

Implications for practice, policy or future research

Emphasis must be placed on women's access to the media, support for household income-generating activities, and the promotion of behavior change.

INTRODUCTION

Malnutrition continues to be a major public health problem in many low- or middle-income countries [1]. It is responsible for more than a third of all child deaths worldwide, although it is usually not the direct cause [2]. In these guidelines, the World Health Organization (WHO) recommends, in addition to exclusive breastfeeding for the first six months of the child, introducing other foods in infants from the sixth month [3]. Starting at six months, breast milk no longer covers the child's nutritional needs, hence the interest in a complementary and diversified diet to meet his dietary needs [4]. Based on scientific evidence, infants and young children need a diversified diet for the first two years of their life to achieve optimal growth, better health, and harmonious development [5]. The minimum acceptable diet (MAD) intake is a critical element in reducing infant mortality. According to estimates by the United Nations Children's Fund (UNICEF), in 2015, 5.9 million children under 5 died from malnutrition. The leading causes are related to a lack of dietary diversity [6]. Overall, 35% of deaths among children under five are related to undernutrition [7]. In Africa, less than a third of children aged 6 to 23 months meet the minimum criteria for dietary diversity and frequency of meals [8]. In sub-Saharan Africa, inappropriate food practices are associated with harmful and multidimensional consequences for children's health and cognitive development. This practice accounts for more than two-thirds of under-five mortality [9]. According to a study conducted in Ethiopia in 2017, 57% of deaths of children under the age of five (5) resulted from inappropriate complementary food practices. They also contributed to 40% of stunting among children, 9% of acute malnutrition among children, and 25% of underweight [10]. The MAD remains a significant challenge for developing countries, particularly in sub-Saharan Africa [11] [12].

In Burkina, according to the 2020 SMART survey, at the national level, the proportion of children aged 6 to 23 months who received a minimum acceptable diet was 21.9% [13]. According to a 2020 study in Senegal, only 7% of children aged 6-23 months breastfed received a minimum acceptable diet [14]. Guinea, like these countries, is facing a worrying nutritional situation. According to SMART 2012, at the national level, only 4% of children aged 6-23 months had a minimum acceptable diet [15]. Previous studies in several countries, such as South Asia, Ethiopia, and Tanzania, have shown a significant association between the mother's level of education, age, occupation, birth order of the child, quintile of household wealth, household size, and living environment, food diversity and frequency of meals [16] [17] [18].

Few studies in sub-Saharan Africa have examined the factors associated with the minimum acceptable dietary intake in children aged 6 to 23 months. Most of these studies focused on health formations or districts but also on individual determinants, thus obscuring environmental factors that could better explain the minimum dietary intake in children aged 6 to 23 months. As far as we know, no research has been done in Guinea. Therefore, we believe it is important to conduct this research to analyze the factors associated with the minimum acceptable dietary intake in children aged 6 to 23 months to bridge this scientific gap.

METHODS

Study design and population

This study is based on a secondary analysis of data from the Global Analysis of Vulnerability, Food Security and Nutrition (AGVSAN) survey conducted in 2018. The AGVSAN was a cross-sectional household survey. The survey collected data on children's diet and nutritional status. A stratified, randomly weighted, two-stage sampling, nationally representative and at the residence and environment level, was conducted. All children aged 6-23 months selected in the eight administrative regions of Guinea (Conakry, Boké, Faranah, Kankan, Kindia, Labé, Mamou, and N'zérékoré) were eligible for the survey.

Dependent variable

This study used the 2008 WHO indicators to assess infant and young child feeding to measure MAD [19]. The outcome variable is the MAD for children aged 6-23 months, a composite indicator of children with a minimum frequency of meals and a minimum dietary diversity.

If a child was fed by at least four of the seven food groups during the day or night preceding the survey, the child is considered to have minimal dietary diversity. The seven food groups used for the tabulation of this indicator are: cereals, roots, and tubers; legumes and nuts; dairy products (milk, yogurt, cheese); meat-based foods (meat, fish, poultry); eggs; vitamin A-rich fruits and vegetables; other fruits and vegetables. The minimum frequency of meals is the provision of two or more meals of solid, semi-solid, or soft food for breastfed children aged 6-8 months, three or more times

for breastfed children aged 9-23 months, and four times for children aged 6-23 months who are not breastfed [19].

Independent variables

The variables at the individual level (level 1) were the individual characteristics of the children and their mother: the age of the child, the age of the father and that of the mother, the level of education of the head of household, the marital status, the region of habitation, household size, quintile of wealth, gender of the child, home environment, radio and television ownership, food and care decision-making, home gardening. Our second level (level 2) is represented by the prefectures, all of which form the region. The contextual variable in our study is residence.

Data analysis

All analyses were performed with Stata 15.0 software. The description of all the selected variables was the first step in our analysis. Next, the socio-demographic characteristics of the subjects studied were described. Numbers and percentages were calculated for each qualitative variable. The univariate analysis consisted of estimating the association between the dependent variable and each of the independent variables by performing a simple logistic regression. This analysis yielded the crude odds ratio with their confidence interval (95% CI). A p-value of less than 0.05 was considered statistically significant. However, for the inclusion of variables in the model during the multilevel analysis, the threshold of 20% was retained. Therefore, a multilevel binary logistic regression model was fitted. Three models were fitted for multilevel analysis. The first was the null model (Mode 0) containing no exposure variables, which was used to check the variability of MAD across the prefecture. The second model (M1) is a model containing individual explanatory variables. The third model (M2), or complete model, contains, in addition to the variables of the individual level, the contextual level variable, and the place of residence. Successive models were compared using the likelihood ratio test. The adjusted odds ratios (AOR) were estimated with their p-value and 95% confidence interval. This estimate was made using the maximum likelihood method. The variance inflation factor (VIF) verified the multicollinearity between the explanatory variables. We have a hierarchical structure of our data classified as Level 1 (individual characteristics of children and their parents) and level 2 (prefectures).

Model Equation:

We used the simplified formula Merlo et al. [20] developed to present our model's equations for applying the MAD. In the empty model, the probability that a mother will practice MAD depends only on the prefecture/residence environment, which is explained by a random interception at the prefecture/residence environment/level, illustrated in the following formula:

$$\log\left(\frac{p_{ij}}{1-p_{ij}}\right) = \gamma_{00} + u_{0j}$$

The indices i and j correspond to person i of the prefecture j.

γ_{00}= average of the overall probability expressed on the logistic scale.

u_{0j}= random error associated with each prefecture j on a logistic scale, normally assumed to be distributed, of mean 0 and variance. Residual variance at the community or inter-prefecture level is expressed on the logistic scale. In this empty model, the probability of a mother performing MAD in prefecture j depends on γ_{00} And u_{0j}. In our 2-level model, the probability of a mother practicing MAD depends on the prefecture/home environment. An example of the equation of the model with a predictive variable is written:

$$\log\left(\frac{p_{ij}}{1-p_{ij}}\right) = \gamma_{00} + \gamma_{10}X_{ij} + u_{0j} + u_{1j}X_{ij} + e_{ij}$$

γ_{10} is the average regression slope at the prefecture level.

u_{1j} represents the deviation of each prefecture from the mean relation. It is a random variable with zero mean.

e_{ij} represents a random error associated with each mother i in prefecture j and is assumed to be normally distributed, averaging zero.

The intra-class correlation coefficient (ICC) was used to estimate the variation of MAD between the different prefectures, and it is calculated as follows: ICC $=\frac{VA}{VA+3,29}$ * 100%, where VA = variance at the prefecture level [20].

Ethical approval and consent to participate:

Not applicable

Consent to publication:

Not applicable

RESULTS

Socio-demographic characteristics

This presents the socio-demographic characteristics of children aged 6 to 23 months and their parents. Children aged 18-23 months were the most represented with 45.3%, followed by children aged 12-17 months with 38%. More than half (53.3%) of the children were male. Almost all (94.7%) of the children had a married mother, and two-thirds (66.7%) of the children had a non-literate head of household. Decision-making on the feeding of children fell to the head of the household in 88.4% (Table 1).

Tableau I: Distribution of the sample according to socio-demographic characteristics of children aged 6-23 months and their parents in Guinea

Characteristics	Number	Percentage
Child age (months) (n=6557)		
06-nov	1095	16.70
déc-17	2489	37.96
18-23	2973	45.34
Child's gender (n=6557)		
Male	3496	53.32
Female	3061	46.68
Mother's age (years) (n=6550)		
15-24	267	4.08
25-34	759	11.59
35-49	5524	84.34

Tableau II (suite): Distribution of the sample according to socio-demographic characteristics of children aged 6-23 months and their parents in Guinea

Characteristics	Number (n)	Percentage (%)
Father's age (years) (n=6557)		
15-20	34	0.52
25-34	112	1.71
35-49	6.411	97.77
Marital status (n=6499)		
Married	6152	94.66
Single/ Divorced	64	0.98
Widow	283	4.35
Region (n=6499)		
Conakry	221	3.40
Boke	858	13.20
Faranah	966	14.86
Kankan	1077	16.57
Kindia	888	13.66
Labe	921	14.17
Mamou	542	8.34
N'zerekore	1026	15.79
Level of education of the head of household (n=6499)		
Not literate	4335	66.70
Primary or secondary	1590	24.47
Superior	574	8.83
Place of residence	(n=6499)	
Urban	5067	77.97
Rural	1432	22.03
Household wealth quintile (n=6499)		
Very poor	1332	20.50
Poor	1214	18.68
Average	1307	20.11
Rich	1291	19.86
Very rich	1355	20.85
Possession of radio (n = 6499)		
Yes	3514	54.07
No	2985	45.93
Possession of television (n=6499)		
Yes	4811	74.03
No	1688	25.97
Number of children under 5 (n= 6557)		
0–5	6041	92.13
6 and more	516	7.87
Feeding decision making (n=6422)		
Head of household	5677	88.40
Wife of head of household	539	8.39
Adult(s) only	206	3.21
Healthcare decision making (n= 6411)		
Head of household	5051	78.79
Wife of head of household	1166	18.19
Adult(s) only	194	3.03
Home Gardening (n=6499)		
Yes	1787	27.50
No	4712	72.50

Prevalence of minimum acceptable diet intake among children 6-23 months

The overall prevalence of MAD was 28.2% (95% CI: 27.1-29.3). Only 17% of children aged 6-11 months had MAD compared to 26.1% for children aged 12-17 months and 34.1% for children aged 18-23 months (figure 1)

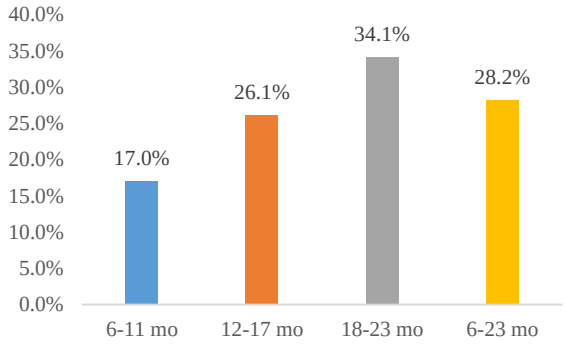

Figure 1: Prevalence of the minimum acceptable diet by

Factors associated with MAD among children aged 6-23 months

The variables age of the child, level of education of the head of household, place of residence, wealth quintile, radio possession, television, and health decision-making were statistically associated with MAD among children aged 6 to 23 months (Table 2).

Table II: Associated factors to MAD in univariate analysis among children aged 6-23 months in Guinea

Characteristics	Minimum Acceptable Diet		
	Odds Ratio	(95% CI)	P-value
Child age (months)			
6 – 11	**Ref.**		
12 – 17	**1.85**	[1.53, 2.24]	0.000
18 – 23	**2.76**	[2.29, 3.32]	0.000
Child's gender			
Male	**Ref.**		
Female	**1.00**	[0.89, 1.12]	0.999
Mother's age (years)			
15 – 24	**Ref.**		
25 – 34	**1.00**	[0.72, 1.40]	0.950
35 – 49	**0.91**	[0.67, 1.22]	0.530
Father's age (years)			
15 – 24	**Ref.**		
25 – 34	**0.67**	[0.26, 1.68]	0.400
35 – 49	**0.84**	[0.37, 1.87]	0.670
Level of education of the head of household			
Not literate	**Ref.**		
Primary or secondary	**1.10**	[0.95, 1.27]	0.165
Superior	**1.49**	[1.22, 1.83]	0.000
Marital status			
Married	**Ref.**		
Single/ Divorced	1.20	[0.67, 2.16]	0.540
Widow	1.22	[0.92, 1.61]	0.150
Place of residence			
Rural	Ref.		
Urban	1.62	[1.38, 1.91]	0.000
Household wealth quintile			
Very poor	Ref.		
Poor	1.12	[0.90, 1.39]	0.270
Average	1.76	[1.44, 2.16]	0.000
Rich	2.21	[1.81, 2.69]	0.000
Very rich	2.84	[2.30, 3.49]	0.000

Table II (suite) : Associated factors to MAD in univariate analysis among children aged 6-23 months in Guinea

Characteristics	Minimum Acceptable Diet		
	Odds Ratio	(95% CI)	P-value
Possession of radio			
Yes	Ref.		
No	0.71	[0.63, 0.81]	0.000
Possession of television			
Yes	Ref.		
No	0.58	[0.49, 0.67]	0.000
Region			
Conakry	Ref.		
Boke	1.17	[0.41, 3.33]	0.760
Faranah	0.56	[0.18, 1.70]	0.319
Kankan	1.28	[0.45, 3.64]	0.634
Kindia	1.16	[0.40, 3.30]	0.771
Labe	0.56	[0.19, 1.61]	0.285
Mamou	0.42	[0.12, 1.41]	0.167
N'zerekore	0.42	[0.15, 1.17]	0.090
Number of children under 5			
0 - 5	Ref.		
6 and more	0.92	[0.74, 1.15]	0.510
Feeding decision making			
Head of household	Ref.		
Wife of head of household	1.01	[0.81, 1.26]	0.876
Adult(s) only	0.83	[0.59, 1.16]	0.293
Healthcare decision making			
Head of household	Ref.		
Wife of head of household	1.30	[1.11, 1.53]	0.001
Adult(s) only	0.94	[0.66, 1.34]	0.750
Home Gardening			
Yes	Ref.		
No	1.03	[0.90, 1.18]	0.610

The null model (Model 0) found a 31.8% variation in MAD prevalence between prefectures. However, this difference was reduced to 25.6% when individual and contextual level factors were adjusted in the final model (Model 3). The explanatory variables significantly associated with MAD were possession of a radio, health decision-making, level of household head's education, children's age group, and household wealth index. In the final model, health decision-making by the wife of the head of household (AOR: 1.33, 95% CI: 1.13, 1.57) was more likely to have MAD compared to decision-making by the head of household. The higher level of household head's education (AOR: 1.27, 95% CI: 1.03, 1.57) was associated with MAD compared to the non-literate. Children aged 12-17 months (AOR: 1.95, 95% CI: 1.60, 2.38) and 18-23 months (AOR: 2.89, 95% CI: 2.39, 3.50) were respectively 1.95 times and 2.89 times more likely to have MAD compared to children aged 6-11 months. Possession of radio by mothers was 1.23 times (AOR: 1.23, 95% CI: 1.08, 1.40) more likely to have MAD compared to mothers who did not own a radio. Average wealth index households (AOR: 1.63, 95% CI: 1.30, 2.04), wealthy households (AOR: 1.93, 95% CI: 1.54, 2.42), and wealthier households (AOR: 2.40, 95% CI: 1.86, 3.09) were more likely to have MAD compared to very poor households (Table 3).

Table III: Multilevel analysis of factors associated with MAD among children aged 6-23 months in Guinea

Characteristics	Null model	Final model 6,411
	AOR	95% CI
Possession of radio		
No	Ref.	
Yes	1.23	[1.08, 1.40] **
Possession of television		
No	Ref.	
Yes	1.15	[0.96, 1.38]
Healthcare decision making		
Head of household	Ref.	
Wife of head of household	1.33	[1.13, 1.57]**
Adult(s) only	0.85	[0.59, 1.22]
Level of education of the head of household		
Head of household	Ref.	
Wife of head of household	1.00	[0.86, 1.16]
Adult(s) only	1.27	[1.03, 1.57]*
Marital status		
Married	Ref.	
Single/ Divorced	1.36	[0.74, 2.48]
Widow	1.21	[0.91, 1.63]
Child age (months)		
6 – 11	Ref.	
12 – 17	1.95	[1.60, 2.38]***
18 – 23	2.89	[2.39, 3.50]***
Household wealth quintile		
Very poor	Ref.	
Poor	1.05	[0.84, 1.32]
Average	1.63	[1.30, 2.04]***
Rich	1.93	[1.54, 2.42]***
Very rich	2.40	[1.86, 3.09]***
Fixed effects		
Intercept	0.23	0.09
Random place of residence		
Intercept Variance (ES)	0.49	0.24
ICC (%)	31.8 %	25.6 %
Log-likelihood	-3505.3013	-3320.9759
p-value	< 0.0000	< 0.0000
AIC	7016.603	6675.952

****p <0.01; **p <0.001; ***p <0.000***
ES (Erreur Standard); ICC (Interclass correlation coefficient); AIC (Akaike Information Criteria)

DISCUSSION

Infant and young child feeding practices directly influence the nutritional status of children under two years of age and their development [19]. Therefore, our study aimed to examine factors associated with MAD using multilevel logistic regression analysis. In this study, the prevalence of MAD was 28.2%. Our results show that the prevalence of MAD remains low in Guinea.

The prevalence found in our study is lower than that reported by other studies. This prevalence was 48.4% in Bangladesh, 83.2% in Vietnam in 2013 [21], 46% in Ghana in 2015 [22], 37% in Zambia in 2012 [23] and 71% in Sri Lanka in 2012 [24]. On the other hand, it is higher than that reported in Ethiopia in 2018, with 23.3%

[25], 15% in India in 2012 [23] and 26.5% in Nepal in 2013 [26]. The results of our study could be explained by the weak socioeconomic context of households in Guinea since more than half are poor [15] and cannot provide their children with the minimum acceptable diet.

A three-level logistic regression revealed that the possession of radio, health decision-making, education level, children's age group, and household wealth index were associated with MAD. This study showed that children aged 12-17 months and 18-23 months were more likely to receive MAD than children aged 6-11 months. Our results are similar to those of other studies conducted in Africa and the Asian region [22] [27] [28] [29] [30] [31] [32]. Poor complementary feeding knowledge, beliefs, and traditional practices influenced optimal feeding practices [32] [33]. This would result in the late introduction of complementary feeding, which is essentially composed of cereals and milk. The mothers think that the youngest's intestine cannot digest certain types of food like bananas, eggs, meat, etc. [33].

In this study, children whose mothers had radios were significantly associated with MAD. Similar results have been found in other studies [29] [30] [31] [32]. This work highlighted that children whose mothers watched television every day and were exposed to the media were more likely to have MAD than children born to mothers with limited media access. The media has the potential to promote the use of maternal health services such as antenatal care, delivery in health facilities, postnatal care, and family planning. This could be attributed to the fact that the media is considered a reliable source of population health information [34] [35] [36].

The fact that the decision of the child's health care is taken by the wife of the head of the household was significantly associated with MAD. A study in northwestern Ethiopia also found similar results [5]. When mothers are involved in household decision-making, they can easily access household resources and help ensure that children can be well-nourished and healthy.

In our study, children living in households with an average wealth index, rich and very rich, were more likely to have MAD than those from very poor households. These results are similar to other studies showing a positive relationship between dietary diversity, meal frequency, and socioeconomic factors [5] [30] [31]. High-income households find it easier to obtain foods from different food groups regardless of price and to eat in a diversified way compared to low-income households [31] [33].

The household head's higher education level was associated with a MAD. This finding is consistent with work elsewhere, which reported that a high proportion of children meeting dietary diversity guidelines was related to mothers' level of education [5] [30] [31] [32]. This could be explained by the high level of understanding of mothers or fathers, which allows them to access reliable information and easily understand educational messages on health and child nutrition. These educated mothers are also more likely to be engaged in paid work, allowing them to improve the food intake of their children but also monitor their health status [30] [32] [33]. On the other hand, uneducated mothers may not easily understand the consequences of an undiversified diet and the nutritional needs of infants and young children.

Our study has certain limitations. First, the study used responses from mothers or caregivers to examine events that occurred the day before, which may lead to recall bias. Second, in children's 24-hour food recall, food frequency and diversity may be overestimated. Finally, this study could not establish a causal link between MAD and associated factors due to the study's cross-sectional nature. Nevertheless, this study has strengths. First, she used nationally representative data to assess factors associated with MAD using multilevel analyses.

CONCLUSION

The present study revealed a low prevalence of MAD in children aged 6-23 months, as measured by WHO indicators. However, possession of a radio, health decision-making, level of education, children's age group, and household wealth index was at MAD.

Given these results, the interventions of the Guinean government and these technical and financial partners should be in the field of nutritional education aimed at improving complementary feeding practices for children, promoting women's access to the media and other income-generating activities to achieve the Millennium Development Goal of achieving health and well-being for all by 2030.

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Conflict of interests

The authors declare that they have no competing interests

List of abbreviations

MAD: Minimum Acceptable Diet

AGVSAN: Global Analysis of Vulnerability, Food Security and Nutrition

AOR: Adjusted Odds Ratio

CI: Confidence Interval

WHO: World Health Organization

UNICEF: United Nations Children's Fund

VIF: Variance Inflation Factor

ICC: Intra-class Correlation Coefficient

Statements

None

Availability of data and materials

The datasets used during the current study are accessible

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Authors' contributions

AY, SS, FG and OO designed the study and developed the study protocol. AY, AMS and FG designed the analysis plan. AY, SS, AMS and DD performed the data

analyses, interpreted results, and drafted the manuscript with inputs from SS, DD, OO, FG, and SK. All authors critically revised and approved the final manuscript

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