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Research Article

Study of Factors Associated with Inappropriate Complementary Feeding Among Children Aged 6 to 23 Months, Western Health Region of the Gambia, 2020

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Abstract

Introduction: Inappropriate complementary feeding practices are a major cause of morbidity and mortality in the first two years of life. The aim was to investigate factors associated with inappropriate complementary feeding practices among mothers of children aged 6-23 months in the Western Health Region of The Gambia. Methodology: This was a cross-sectional, descriptive and analytical study conducted from 14 September to 14 October 2020. The study population consisted of mothers of children aged 6 to 23 months attending reproductive and child health clinics and enrolled in the "Every Child Counts - My Child Project" immunization and vaccination program. Simple random sampling was used to select participants using the project. Data were collected by means of a questionnaire administered by telephone interview and concerned the socio-demographic characteristics of the mothers, the professional and economic characteristics of the parents, the socio-demographic characteristics of the children, diet and complementary feeding practices. Results: The mean age of the mothers was 28.3 (±5.4) years and that of the children 14.2 (±4.8) months. Minimum dietary diversity was 33.3%, minimum meal frequency 88% and minimum acceptable dietary intake 14.5% for all children aged 6-23 months. Non-respect of minimum dietary diversity was associated with the child's female sex, with an OR = 16.3 [1.83-145.7], with the occurrence of both diarrhea and Acute Respiratory Infection (ARI) in the two weeks preceding the survey, with an OR = 27.2 [4.26-39.8], and with the child's birth in a public health facility, with an OR = 55.1 [1.53-197.7]. Children whose mothers were aged between 25 and 34 and whose fathers did not work had a higher risk of non-respect of the dietary diversity, with OR = 54.1 [2.4 6- 118.5] and OR = 22.5 [2.32 - 31.9] respectively. The factors associated with non-respect of the minimum meal frequency were the advanced age of the children: 12 to 17 months with an OR= 28.6 [1.65 - 49.5] and 18 to 23 months with an OR= 18.9 [1.67 - 215.0] and a history of both ARI and diarrhea with an OR=. 52,9 [1,61 - 173,7]. Non-respect of the minimum acceptable dietary intake was associated with older children aged 18 to 23 months OR= 14.4 [2.25- 93.0] and those whose mothers had vocational training OR=.24.2 [1.27- 46.3]. Conclusion: Complementary feeding practices are not very satisfactory. It is important to strengthen nutrition education in order to improve infant and young child feeding practices.

Keywords

Inappropriate Supplementary feeding, Associated Factors, Urban Environment, Gambia

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1. Introduction

According to the World Health Organization (WHO), malnutrition is defined as deficiencies, excesses or imbalances in an energy intake and/or nutritional intake. Undernutrition, a form of malnutrition, is on the increase among young children. Worldwide in 2020, almost 149.2 million children under the age of 5 will be stunted, 45.4 million will be wasted and 38.9 million will be overweight. The number of stunted children is falling in all regions except Africa [1]. The consequences of malnutrition in children during the first 1000 days of life are disastrous, with high rates of mortality and morbidity, as well as immune deficiencies in children in developing countries [2, 3]. The adverse effects of undernutrition on the health of these children can hinder the progress of human and economic development in these countries [2]. In Africa, malnutrition is a real public health problem and a brake on development efforts. It is responsible for 45% of deaths in children under the age of 5 [2]. Stunting is known to be a devastating result of poor nutrition in early childhood.

Nutrition in the first two years of life is crucial to a child's health, growth and development. [4]. Recent research reiterates the need to ensure adequate nutrition during pregnancy and the first two years of life - commonly known as the first 1,000 days which represent a real window of opportunity to prevent and combat malnutrition and ensure good growth and development potential throughout childhood [2]. Breastfeeding is one of the few interventions whose survival benefits extend across the entire childhood continuum: newborn, infant and toddler. In addition to breastfeeding for up to two years or more, timely complementary feeding adapted to the child's nutritional needs is essential for normal growth [5]. Breastfeeding has been shown to reduce the risk of gastrointestinal infections in infants and to protect them against many other conditions without hindering their growth and development. [6].

The optimal practices of breastfeeding, appropriate complementary feeding and the nutritional interventions available have been shown to be extremely effective in ensuring the child's harmonious development. Optimally implemented, these practices can reduce mortalitý and stunting in young children by around 20% [7]. In addition, a systematic review found that early initiation of breastfeeding is associated with a 44-45% reduction in all-cause neonatal mortalitý [8, 9]. At the same time, dietary diversification combined with an acceptable minimum food intake, would reduce the risks of stunting and underweight [10].

The World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) have defined a global strategy that recommends starting breastfeeding one hour after birth, breastfeeding the child exclusively for the first six months, then introducing a nutritious, adequate complementary food from 6 months onwards, and advocating that breastfeeding be continued for up to two years and beyond [11, 12].

Despite its well-known importance, the practice of exclusive breastfeeding is not widespread in developing countries, and its increase worldwide is still very modest, with room for improvement [13]. Supplementary feeding often starts too early or too late, and the foods are often non-diversified, inadequate and nutritionally dangerous [14]. Adherence to a minimum acceptable diet is also essential to reduce macronutrient and micronutrient deficiencies, which lead to improve linear growth [15]. Numerous studies have shown a correlation between diet and the nutritional status of children [16, 17]. The WHO recommends that children should be fed solid, semi-solid or soft foods, in addition to breast milk, when they reach the age of 6 months, and that they should be given a minimum variety of foods and a minimum frequency of meals, in order to achieve an acceptable diet [11].

According to more recent data from the DHS 2019-2020 in Gambia, the nutritional status of children under five has improved, with 18% stunting, 5% acute malnutrition and 12% underweight. According to the same source, almost all Gambian children were breastfed (98%), over a third (36%) of these children were put to the breast within an hour of birth and 54% were exclusively breastfed for the first 6 months after birth. Among breastfed children aged 6 to 8 months, 75.7% started complementary foods in a timely manner and only 14% of children aged 6 to 23 months were fed in accordance with WHO recommendations [18].

In The Gambia, optimal infant and young child feeding (IYCF) is also a priority of the country's national nutrition policy [19]. Over the years in The Gambia, progress has been observed in a number of indicators on IYCF but those concerning complementary feeding remain less satisfactory [18, 20] and few studies have been conducted to understand the situation.

Our aim is therefore to study the factors associated with inappropriate complementary feeding among mothers of children aged 6 to 23 months attending urban reproductive and child health clinics in the Western Health Region of the Gambia.

2. Materials and Methods

2.1. Study Framework

Presentation of the Western Health Region

The geographical description of the study site is based on the local government areas that make up the Western Health Region. According to the classification of the Ministry of Health of The Gambia, the Western Health Region includes, in addition to the local government area of Brikama, the local government areas of Banjul and Kanifing. This health region is further divided administratively into a Western Health

Region 1 and a Western Health Region 2, each headed by a Regional Director of Health [21-23]. The Western Health Region includes both rural and urban facilities. It is home to 18 public health facilities offering reproductive and child health clinics, which operate both basic and outreach clinics. In The Gambia, under-five mortality increased from 54 to 56 deaths per 1,000 live births, the infant mortality rate increased from 34 to 42 deaths per 1,000 live births, and the neonatal mortality rate increased from 22 to 29 deaths per 1,000 live births between 2013 and 2019-20 [18, 24].

2.2. Type of Study

This is a cross-sectional, descriptive and analytical study which took place in the Western Health Region from 14 September 2020 to 14 October 2020.

2.3. Study Population

The study was conducted among mothers of children aged 6 to 23 months attending urban reproductive and child health clinics in the Western Health Region of The Gambia.

2.3.1. Inclusion Criteria

Mothers of children aged 6 to 23 months:

1) attending reproductive and child health clinics in urban areas of the Western Health Region of The Gambia.
2) Had registered with their telephone number for the "Every Child Counts - My Child Project" immunization and vaccination program in the Western Health Region.

2.3.2. Non-Inclusion Criteria

Mothers of children aged 6-23 months

1) who refused to take part in the survey.
2) whose telephone details were missing
3) unreachable by telephone after three calls over several days.

2.4. Sampling

2.4.1. Sampling Method

Simple random sampling was used to select participants for the study using the "Every Child Counts - My Child Project" immunization reference guide [25]. This immunization repository is an electronic log managed by Action Aid The Gambia and the National Expanded Program on Immunization. Participants in the study were selected at random using a computer that selected random numbers from the existing list, taking into account age (6-23 months) during the study period, and the location of the clinic attended by the mothers.

2.4.2. Calculation of Sample Size

The Schwartz formula was used to calculate the sample size:

$$n=\varepsilon^2 * p*q / i^2$$

n: sample size, Ɛ =1.96, p = prevalence studied: 12.6% of children aged 6 to 23 months receive a minimum food intake [26], q = complement of p = 100 - 13 = 87%, i = the error threshold at 5%. The size of our sample is 174, taking into account a 10% non-response rate) the size is 192.

2.5. Data Collection

Data were collected using a questionnaire developed on the basis of similar studies [27-31] using electronic tablets with the KoBoCollect Version 1.29.3 application. The data collected concerned the socio-demographic characteristics of the mothers, the professional and economic characteristics of the parents, the socio-demographic characteristics of the children, diet and complementary feeding practices, and contextual information relating to the COVID 19 pandemic. A 24-hour recall of the child's food intake was carried out.

Data collection was carried out using a telephone interview lasting an average of 10 to 15 minutes with mothers aged 6-23 months by trained interviewers. At the beginning of the call, a letter of information about the aims of the survey and a declaration of informed consent were read out to allow them to participate freely in the study and give their approval.

2.6. Operational Definition of Variables

The different variables were studied:

The dependent variable is "The practice of complementary feeding", which was assessed on the basis of compliance with the practices recommended by the WHO [32]:

Minimum Meal Frequency (MMF) is the percentage of children who received solid, semi-solid or soft foods (including milk-based foods for non-breastfed children) the minimum number of times or more during the previous day. For breastfed children, the MMF is two meals a day from 6 to 8 months, and three meals a day from 9 to 23 months. For non-breastfed children aged between 6 and 23 months, the MMF is four meals a day.

Minimum Dietary Diversity (MDD) is the percentage of children aged 6 to 23 months who have eaten at least 5 of the 8 food groups in the previous day: breast milk; cereals, roots, tubers and plantains; pulses (beans, peas, lentils), nuts and seeds (peanuts, etc.); dairy products (milk, milk products, etc.); milk products (milk, milk products, etc.); dairy products (milk, infant formula, yoghurt, cheese); meat products (meat, fish, poultry, offal or liver); eggs; vitamin A-rich fruit and vegetables and other fruit and vegetables (aubergine, pineapple, cabbage, etc.).

Minimum Acceptable Dietary Intake (MADI): proportion of children aged 6 to 23 months having reached both the MMF and the MDD on a previous day.

Independent variables include:

Sociodemographic characteristics of the mother and father:

age, number of children, level of enrolment, level of education, marital status, occupation, socioeconomic level and type of household.

Socio-demographic characteristics of the child: sex, age, birth weight, medical history,

Nutrition and feeding practices: breast-feeding, still breast-feeding, start of complementary feeding, bottle-feeding, 24-hour consumption, frequency of meals.

Context of the COVID 19 pandemic: restrictions

2.7. Data Entry and Analysis

Data was entered at the same time as it was collected, using KoBoCollect Version 1.29.3.

Table Public software version 2020.4 and R version 4.04 were used to analyze the data collected. Microsoft Excel was also used to create certain graphical representations.

2.7.1. Descriptive Part

For qualitative variables, frequency calculations with a 95% confidence interval were carried out, and for quantitative variables, means and standard deviations were calculated.

2.7.2. Analytical Part

Bivariate analysis: Pearson's Chi-square test was used to compare proportions at the 5% significance level. A difference was found to be statistically significant when the p-value was less than 0.05.

Multivariate analysis: logistic regression was used to explore the association between individual-level, household-level and community-level characteristics with each of the three dependent variables: minimum meal frequency, minimum dietary diversity and minimum dietary intake. Each of the three dependent variables was coded as dichotomous variables 1=Yes and 0=No.

The next step was to estimate the adjusted odds ratios (AOR) by estimating the logistic regression model. A Wald test was performed to compare the multivariate model with a null model.

For the logistic regression analysis, pre-selection of predictors was not employed as our aim was to assess the association of all factors used in the study, so all factors were introduced simultaneously.

The Bayesian Information Criterion (BIC) and the likelihood ratio test, statistical tests that compare the null model with the multivariate model, were calculated for all models. Both statistical tests had p-values of less than 0.05, confirming the statistical validity of the multivariate model.

2.8. Ethical Considerations

Authorization to access data from the "Every Child Counts - My Child Project" was requested and obtained in advance from Action Aid Gambia and the Expanded Program on Immunization. Before the start of each interview, an information letter and a consent form were read. The objectives, the constraints of the study and the right to participate or not in the study were well explained to the women or guardians of children aged between 6 and 23 months in order to obtain informed consent. Anonymity and confidentiality were also respected.

2.9. Limitations of the Study

Stratified random sampling was the primary sampling method for this study, but due to restrictions on the free manipulation of the database, this was not possible. The study was conducted at a time when the first wave of the COVID 19 pandemic was taking hold. It was observed that mothers were using health facilities less for fear of contracting the disease. That's why we didn't choose to call mothers. It was also important to study socio-anthropological aspects to better understand certain factors revealed in this study.

3. Results

After cleaning the database, the results covered a total of 199 mother of children aged between 6 and 23 months.

3.1. Descriptive Study

3.1.1. Socio-Demographic Characteristics of Mothers and Fathers

The mother ranged in age from 17 to 45 years, with an average of 28.3 (±5.4) years. Mothers aged 25 to 34 accounted for more than half of the participants (52.7%).

The majority (61.3%) of the mother surveyed were housewives and 51.7% of the fathers were self-employed (own business). Around 69% of mothers and 76.4% of fathers were educated. The majority of mothers (94.4) were married and 60.8% lived with their husbands and children in an extended family. Around 52% of mothers stated that they had not received information on infant and young child feeding in the health facility they attended, and 17% of mothers had no source of information.

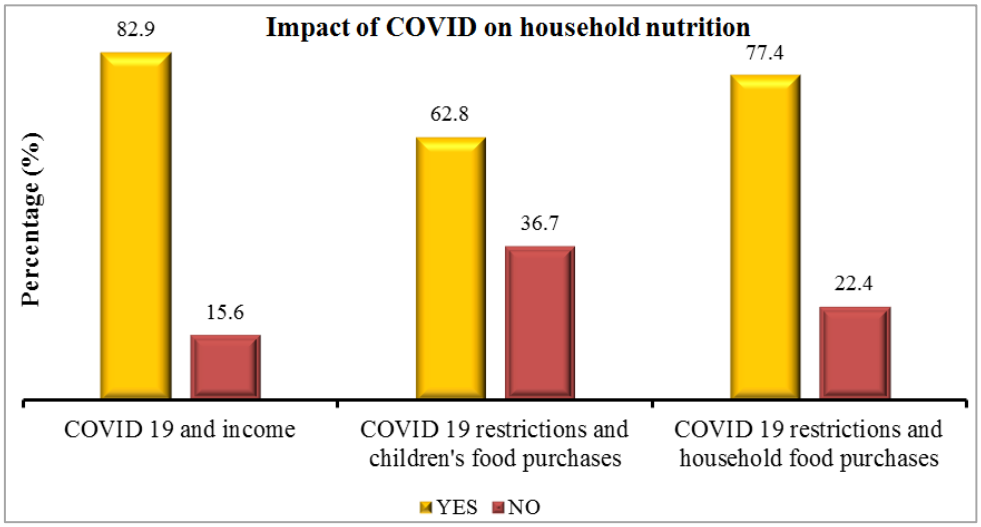

Figure 1. *Distribution of certain household characteristics according to COVID restrictions 19.*

3.1.2. Impact of COVID 19 on Certain Household Characteristics

According to figure 1, 82.9% of mothers had their household income affected by the COVID 19 pandemic. Around 63% of mothers said that restrictions such as fixed opening and closing times for markets and public places, curfews and social distancing due to the pandemic had affected food purchases for their children, and 77.4% said that these restrictions had had an impact on household food purchases.

3.1.3. Socio-Demographic Characteristics and Health Status of Children Aged 6 to 23 Months

The average age of the children was 14.2 (±4.8) months. The 6–11-month age group was the most represented with 38.7%. Their birth weights ranged from 2000 g to 5000 g with an average of 3041 (±719.7g). The sex ratio was 1.008. Approximately 97% of the babies were born in a health establishment, 70.8% of them in public establishments.

In the two weeks preceding the survey, 35.6% of the children had presented symptoms of Acute Respiratory Infection (ARI), 10.3% had diarrhea and 10.3% had both diarrhea and ARI at the same time.

3.1.4. Complementary Feeding Practices in Children Aged 6-23 Months

Figures 2, 3 and 4 show the distribution of feeding practices among children aged 6-23 months according to WHO criteria. All children aged 6-23 months (100%) had been breastfed once in their lives. During the interview period, 83% of the children were breastfed. Around 69% of children aged 6-23 months had received complementary food after 6 months. The majority (94.9%) of one-year-olds were still breastfeeding.

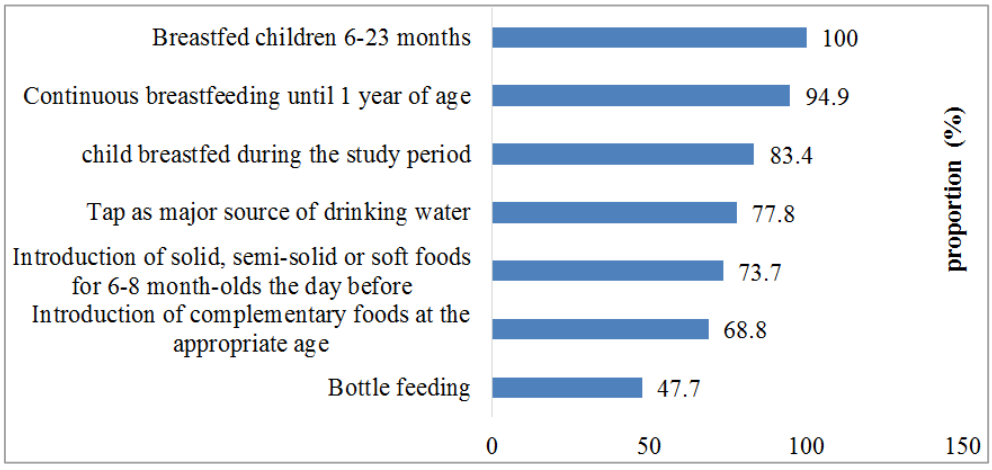

Figure 2. *Proportion of complementary feeding practices among children aged 6 to 23 months.*

With regard to the introduction of complementary foods, 73.7% of children aged 6-8 months received complementary foods. The majority (96.0%) of children aged 6-23 months took complementary food the day before the interview. The source of portable water for the majority of children (77.8%) was the tap and 49.7% of children had used a bottle for feeding.

Only 33.3% of children aged 6-23 months had a minimum dietary diversity and 88% of children (aged 6-23 months) received a minimum frequency of meals in the last 24 hours. In total, only 14.5% of children aged 6-23 months had received a minimum acceptable intake. (Figure 3).

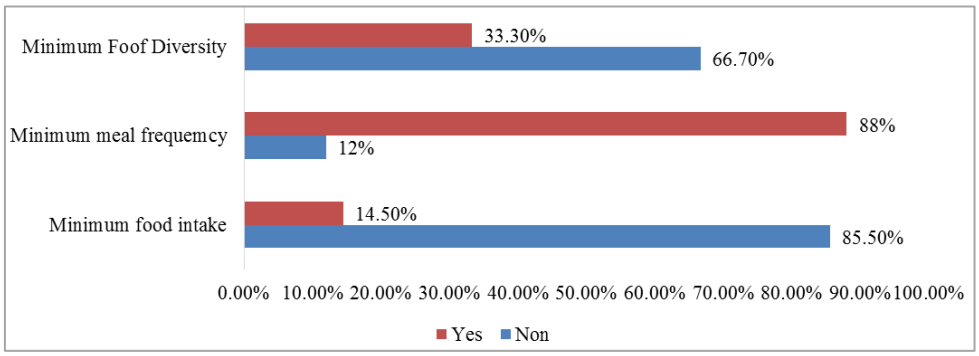

Figure 3. *Distribution of children aged 6 to 23 months according to dietary diversity, minimum meal frequency and minimum acceptable intake.*

Regarding the type of meal eaten by children aged 6 to 23 months the day before the survey, 54.8% had eaten the family meal, 49.8% instant cereals and 25.0% porridge.

In terms of the food groups consumed by the previous day's children in the last 24 hours, the results showed that starchy foods (cereals, roots and tubers) were the most widely consumed (91.5%), followed by dairy products (milk, yoghurt, cheese) (53.8%) and eggs were the least consumed (12.06%).

The minimum dietary diversity by age group was achieved by 39.7% of children aged 6-11 months, 26.4% aged 12-17 months and 33.7% aged 18-23 months (Figure 4).

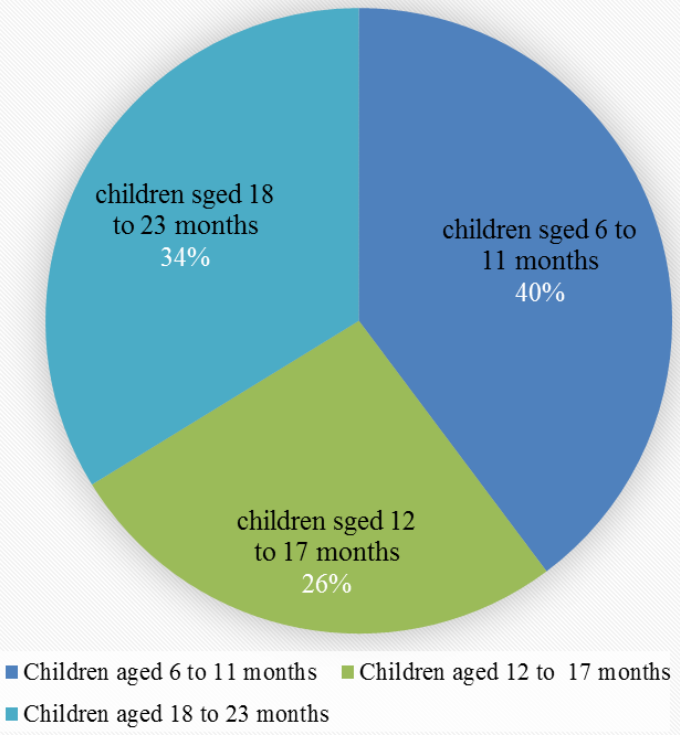

Figure 4. *Minimum dietary diversity by age group.*

The minimum frequency of meals in the last 24 hours for children aged 6-23 months was 100% for b reastfed children compared with 27% for non-breastfed children.

3.2. Analytical Study

This study identified the factors associated with the practice of inappropriate complementary feeding among mothers /caregivers of children aged 6 to 23.

1) Factors associated with non-respect of minimum dietary diversity.
2) Factors associated with non-respect of the minimum meal frequency.
3) Factors associated with non-respect of the minimum acceptable dietary intake.

3.2.1. Factors Associated with Non-Respect of Minimum Dietary Diversity

Table 1 shows that non-respect of minimum dietary diversity was associated with the child's female sex with an AOR = 16.3 [1.83 - 145.7], with the occurrence of both diarrhea and Acute Respiratory Infection (ARI) in the two weeks preceding the survey with an AOR = 27.2 [4.26 - 39.8]. It was also associated with birth of the child in a public health facility, with an AOR = 55.1 [1.53 - 197.7]. Children whose mothers were aged between 25 and 34 and whose fathers did not work had a higher risk of non-compliance with dietary diversity with an OR =54.1 [2.4 6- 118.5] and AOR = 22.5 [2.32 - 31.9] respectively.

Table 1. *Factors associated with non-respect of minimum dietary diversity.*

Variables	Non-respect of minimum dietary diversity Adjusted OR (95% CI)
Age group (months)	
6 to 11	1
12 to 17	0,08 [0,006- 1,04]
18 to 23	0,02 [0,001- 0,51]
Sex	
Male	1
Female	16,3 [1,83 - 145,7]
Birth weight (g)	1,002 [1,001 - 1,004]
Medical history	
ARI*	1
Diarrhea	0,97 [0,04 - 20,3]
ARI+ Diarrhea	27,2 [4,26 - 39,8]
No	0,04 [0,004 - 0,41]
Maternal age group	
15-24	1
25-34	54,1[2,4 6- 118,5]
35-49	0,29 [0,013- 6,31]
Mother's occupation	
Public employee	1
Housewife	0,03 [0,0002- 4,04]
Self-employed	0,0007[0,0001-0,42]
Student	0,0008[0,0002-2,79]
Trainee	*

Variables	Non-respect of minimum dietary diversity Adjusted OR (95% CI)
Private sector employee	0,0002[0,0009-0,26]
Father's occupation	
Public employee	1
Self-employed	0,88 [0,05 - 13,1]
Private sector employee	7,13 [0,43 - 116,7]
Works overseas	2,22 [0,02 - 29,1]
Does not work	22,5 [2,32 - 31,9]
Mother's education level	
Koranic school	1
Illiterate	0,05 [0,001- 2,11]
Primary	0,004[0,00006-0,28]
Secondary school	0,015[0,0005- 0,48]
High school	0,0012[0,00010,109]
Vocational training	0,0005[0,0000006- 0,061]
University	0,0003[0,00003-0,25]
Father's education level	
Koranic school	1
Primary	0,86 [0,01- 44,9]
Secondary school	0,18 [0,0006- 52,3]
High school	1,109 [0,079- 15,3]
Vocational training	0,59 [0,05- 6,41]
University	0,0004[0,00000005- 0,35]
lliterate	*
Marital status	
Married	1
Single	17,7 [0,01- 29,6]
Divorced	0,007[0,00001- 4,05]
Widowed	
Type of household	
Extended	1
Nuclear [monogamy]	2,13 [0,18- 24,8]
Nuclear [polygamy]	3,75 [0,12- 11,6]
Single parent	*
Source of portable water	
Mineral water,	1
Faucet	0,012 [0,0002- 0,51]
Place of birth	

Variables	Non-respect of minimum dietary diversity Adjusted OR (95% CI)
Health establishment	1
Home	1,83 [0,004- 72,4]
On the road	*
Type of healthcare establishment	
Public establishment	1
Private establishment	55,1 [1,53- 197,7]
Nutritional education in healthcare establishments	
Yes	1
No	0,069 [0,007 - 0,63]
Other sources of information on child nutrition	
Internet	1
Family	0,0002 [0,00000004 - 0,058]
T él évision	0,046 [0,0007 - 2,77]
None	1,45 [0,35 - 60,2]
Radio	0,0004[0,00001-1,30]
Women's groups / networks / neighbours	0,0000003 [0,00000007 - 0,012
Work colleagues	*
Print media	*
COVID 19 restrictions and purchases for child nutrition	
No	1
Yes	0,049 [0,004- 0,58]
COVID 19 restrictions and purchases for household food consumption	
No	1
Yes	19,2 [0,65- 55,9]

Results statistically significant at 5% are shown in bold.
*Acute Respiratory Infection
* Excluded from the model due to few observations

Table 2. *Factors associated with non-respect of the minimum meal frequency.*

Variables	Non-respect of the minimum meal frequency. Adjusted OR (95% CI)
Age group (months)	
6-11	1
12-17	28,6 [1,65 - 49,5]
18-23	18,9 [1,67 - 215,0]
Sex	

Variables	**Non-respect of the minimum meal frequency.** **Adjusted OR (95% CI)**
Male	1
Female	3,50 [0,21 - 19,9]
Birth weight (g)	0,99 [0,98 - 1,001]
Medical history	
ARI	1
Diarrhea	0,05 [0,002 - 1,32]
ARI + Diarrhea	52,9 [1,61 - 173,7]
No	0,78 [0,12 - 4,87]
Maternal age group	
15-24	1
25-34	0,48 [0,06 - 3,74]
35-49	2,93 [0,19 - 44,0]
Mother's occupation	
Public employee	1
Housewife	0,59 [0,03 - 12,05]
Self-employed	0,02 [0,0002 - 1,22]
Student	2,18 [0,005 -91,1]
Trainee	*
Private sector employee	*
Father's occupation	
Public employee	1
Self-employed	0,38 [0,030 - 4,82]
Private sector employee	0,61 [0,037 - 10,1]
Works overseas	1,59 [0,057- 44,1]
Does not work	0,038 [0,0004 -3,60]
Mother's education level	
Koranic school	1
Illiterate	0,49 [0,02 - 14,5]
Primary	1,31 [0,05 - 32,9]
Secondary school	0,84 [0,036 - 19,6]
High school	6,49 [0,25 - 16,3]
Vocational training	35,2 [0,97 - 127,1]
University	0,032 [0,00003- 33,1]
Father's education level	
Koranic school	1
Primary	*
Secondary school	0,23 [0,003 - 16,5]

Variables	Non-respect of the minimum meal frequency. Adjusted OR (95% CI)
High school	4,42 [0,064 - 30,1]
Vocational training	0,35 [0,030 -4,14]
University	4,68 [0,35 - 60,9]
lliterate	1,10 [0,02 - 59,6]
Marital status	
Married	1
Single	63,1 [0,25 - 156,8]
Divorced	*
Widowed	*
Type of household	
Extended	1
Nuclear [monogamy]	2,84 [0,25 - 31,1]
Nuclear [polygamy]	0,09 [0,0009 - 8,60]
Single parent	*
Source of portable water	
Mineral water,	1
Faucet	0,83 [0,107- 6,51]
Place of birth	
Health establishment	1
Home	*
On the road	*
Type of healthcare establishment	
Public establishment	1
Private establishment	2,39 [0,30 - 18,7]
Nutritional education in healthcare establishments	
Yes	1
No	2,07 [0,47 - 9,01]
Other sources of information on child nutrition	
Internet	1
Family	0,89 [0,021 - 37,2]
Television	1,65 [0,030 - 89,2]
None	1,11[0,02 -70,4]
Radio	0,46 [0,005 -40,0]
Women's groups / networks / neighbors	6,74 [0,09 -48,6]
Work colleagues	*
Print media	*
COVID 19 restrictions and purchases for child nutrition	

Variables	Non-respect of the minimum meal frequency. Adjusted OR (95% CI)
No	1
Yes	0,10 [0,009 - 1,16]
COVID 19 restrictions and purchases for household food consumption	
No	1
Yes	8,56 [0,44 - 16,5]

Results statistically significant at 5% are shown in bold.
*Acute Respiratory Infection
*Excluded from the model due to few observations

3.2.2. Factors Associated with Non-respect of the Minimum Meal Frequency

The factors associated with non-respect of the minimum meal frequency are presented in Table 2. Poor minimum meal frequency was associated with older children: children aged 12 to 17 months with an AOR= 28.6 [1.65 - 49.5] and children aged 18 to 23 months with an AOR= 18.9 [1.67 - 215.0] and with a history of both ARI and diarrhea with an AOR=52.9 [1.61 – 173.7].

3.2.3. Factors Associated with Non-respect of the Minimum Acceptable Dietary Intake

Non-respect of the minimum acceptable dietary intake was associated with older children aged 18 to 23 months OR= 14.4 [2.25- 93.0] and those whose mothers had vocational training OR=.24.2 [1.27- 46.3] (Table 3).

Table 3. *Factors associated with non-respect of the minimum acceptable dietary intake.*

Variables	Non-respect of the minimum acceptable dietary intake. Adjusted OR (95% CI)
Age group (months)	
6-11	1
12-17	4,54 [0,78- 26,2]
18-23	14,4 [2,25- 93,0]
Sex	
Male	1
Female	0,96 [0,23- 3,98]
Birth weight (g)	0,99 [0,99- 1,001]
Medical history	
ARI	1
Diarrhea	0,73 [0,06- 8,43]
ARI+ Diarrhea	4,52 [0,42- 48,3]
No	2,12 [0,48- 9,27]
Maternal age group	
15-24	1
25-34	0,53 [0,09- 3,19]

Variables	Non-respect of the minimum acceptable dietary intake. Adjusted OR (95% CI)
35-49	4,69 [0,44- 49,5]
Mother's occupation	
Public employee	1
Housewife	6,85 [0,40- 116,1]
Self-employed	0,89 [0,05- 15,7]
Student	8,41 [0,05- 11,8]
Trainee	48,6 [0,18- 126,7]
Private sector employee	*
Father's occupation	
Public employee	1
Self-employed	0,47 [0,06- 3,71]
Private sector employee	0,59 [0,07- 5,03]
Works overseas	1,18 [0,05- 25,7]
Does not work	0,03 [0,0004- 2,56]
Mother's education level	
Koranic school	1
Illiterate	0,34 [0,02- 4,87]
Primary	5,37 [0,31- 92,8]
Secondary school	1,01 [0,09- 10,2]
High school	8,99 [0,73- 110,3]
Vocational training	24,2 [1,27- 46,3]
University	1,72 [0,02- 18,0]
Father's education level	
Koranic school	1
Primary	*
Secondary school	12,5 [0,12- 123,8]
High school	44,3 [0,91- 213,8]
Vocational training	0,56 [0,07- 4,45]
University	1,79 [0,23- 13,4]
lliterate	1,11 [0,05- 21,2]
Marital status	
Married	1
Single	0,09 [0,001- 7,17]
Divorced	0,069 [0,0001- 33,6]
Widowed	*
Type of household	
Extended	1

Variables	Non-respect of the minimum acceptable dietary intake. Adjusted OR (95% CI)
Nuclear [monogamy]	2,92 [0,45- 18,6]
Nuclear [polygamy]	1,01 [0,03- 28,2]
Single parent	*
Source of portable water	
Mineral water,	1
Faucet	1,91 [0,27- 13,1]
Place of birth	
Health establishment	*
Home	*
On the road	*
Type of healthcare establishment	
Public establishment	1
Private establishment	2,0 [0,33- 11,9]
Nutritional education in healthcare establishments	
Yes	1
No	2,70 [0,77- 9,47]
Other sources of information on child nutrition	
Internet	1
Family	2,40 [0,16- 34,3]
T é évision	0,72 [0,04- 11,5]
None	0,44 [0,016- 11,9]
Radio	0,26 [0,008- 7,91]
Women's groups / networks / neighbours	9,35 [0,31- 28,0]
Work colleagues	*
Print media	*
COVID 19 restrictions and purchases for child nutrition	
No	1
Yes	0,83 [0,11- 6,07]
COVID 19 restrictions and purchases for household food consumption	
No	1
Yes	2,06 [0,31- 13,8]
Nutritional education in healthcare establishments	
Yes	1
No	1,27 [0,12- 13,1]

Results statistically significant at 5% are shown in bold.
*Acute Respiratory Infection
* Excluded from the model due to few observations

4. Discussion

4.1. Socio-Demographic Characteristics of Mothers of Children Aged 6 to 23 Months

The characteristics of the mothers of our children aged 6 to 23 months are in line with the results of demographic surveys conducted in the French-speaking West African sub-region and compiled in a study [33].

Around 52.3% of mothers reported not having received any information on infant and young child feeding in the health facility they attended. Providers often attributed this to workload. In a study of infant and young child feeding practices in Foni Kansala District, Western Region, The Gambia, the role of health workers, opinion leaders, traditional communicators, NGOs and grandmothers was highly valued in the region [34]. Another study by Issaka et al in The Gambia showed that mothers whose children aged between 6 and 36 months had inadequate dietary diversity did not have access to radio [20]. Other studies in South Africa also identified health facilities, family and friends as the most frequent sources of health information [35]. In Senegal, Princillia et al [36] found that 63.8% of mothers/caregivers had been informed about food diversification and 63.9% of them had good knowledge of food diversification.

The COVID 19 pandemic contributed to a reduction in household income for 82.9% of mothers. Restrictions linked to the COVID 19 pandemic affected 62.8% of mothers who had difficulty buying food for their children. The measures taken during the COVID 19 pandemic had an impact on household food security [37]. A study carried out in Nigeria on household food security and the COVID-19 pandemic showed that only 12% of households were food secure, 5% were mildly food insecure, 24.5% were moderately food insecure and more than half of households (58.5%) were severely food insecure [38].

4.2. Socio-Demographic Characteristics of Children Aged 6 to 23 Months

The mean age of the children was 14.2 (±4.8) months and the 6–11-month age group was the most represented with 38.7%, in contrast to the results of Bougma S. et al in Burkina Faso who found that more than half of the children in the study were aged between 12 and 23 months [39]. The sex ratio was 1.008 and around 97% of the children were born in a health facility.

During the two weeks preceding the survey, the majority (56.2%) of the children had been ill with a history of diarrhea (10.3%), ARI symptoms (35.6%), or both (10.3%).

4.3. Complementary Feeding Practices Among Mothers of Children Aged 6-23 Months

The results showed that all children aged 6-23 months (100%) had been breastfed once in their lives and 83% of children were breastfed the day before the survey. The majority (94.9%) of one-year-olds were still being breastfed. The same result was found in Senegal, where the results of the demographic and health survey show that virtually all children under six months are breastfed (99%) and 98% of children aged 12-15 months are still breastfed. [40]. This shows the level of acceptability of breastfeeding in this population group. This may be explained by the socio-cultural and religious basis of breastfeeding in Gambian society. The prevalence of continued breastfeeding at the age of 1 year is virtually the same as that obtained in the previous survey in the Demographic and Health Survey (DHS) 2019/2020 and Multiple Indicator Cluster Survey (MICS) 2018 in The Gambia, which revealed prevalence of 96% and 96.4% respectively [18-26]. The majority (96.0%) of children aged 6-23 months took complementary food the day before the interview. Regarding the timely introduction of complementary food, the majority of children aged 6-8 months (73.7%) received complementary food. This result corroborates those of the DHS 2019/2020 in The Gambia [18], which showed that 75.7% of children aged 6-8 months received the complementary food. However, the MICS 2018 showed a lower proportion of 58.5% [26]. This result is lower in Senegal, where the recommendation to introduce solid complementary foods from the age of six months is still not being properly followed: only 68% of children aged between 6 and 9 months receive complementary foods in addition to breast milk [40]. According to WHO recommendations, infants should be given safe and nutritionally adequate complementary foods after the age of 6 months, while continuing to be breastfed until the age of 2 or more. The early introduction of complementary foods increases morbidity and malnutrition in children [41].

In our study, minimum dietary diversity remained low. Only 33.3% of children aged 6-23 months had minimal dietary diversity. According to EDS 2019/2020 in Gambia, the prevalence of minimum dietary diversity in the Western Health Region is 23.4% and at national level 18.4% [18]. This rate is lower in Senegal, in 2019, where only 26% of children aged 6 to 23 months benefited from minimum dietary diversification [40]. The results of our study show that this rate decreases with age, with 39.7% of children aged 6-11 months receiving a minimum diet, compared with 33.7% of children aged 18-23 months. The decrease in the proportion of children benefiting from minimum dietary diversity as age increases was reported in a study carried out in Ethiopia, where almost 50.9% of children aged 6-8 months benefited from minimum dietary diversity and only 22.3% of children aged 18-23 months [42].

In terms of the food groups given, 91.5% of children ate starchy foods (cereals, roots and tubers) and 53.8% dairy products (milk, yoghurt, cheese). Less than 50% of children consumed other fruit and vegetables (37.7%), pulses and nuts (26.1%), meat and meat products (25.6%), vitamin A-rich fruit and vegetables (15.1%) and eggs (12.1%). These results are similar to those of studies carried out in The Gambia and Ethiopia [18, 26-43]. The World Health Organization (WHO) recommends that complementary foods should be varied and include daily quantities of meat, eggs, fruit and vegetables rich in vitamin A [44]. A minimum meal frequency of 88% was observed in all children aged 6-23 months. Our result is higher than that found by Bougma S. et al, with almost 60.2% receiving a minimum frequency of meals per day [39].

The minimum acceptable dietary intake was observed in only 14.5% of children aged 6-23 months. According to the DHS 2019/2020 in Gambia [18], only 13.6% of children aged 6 to 23 months were fed an acceptable minimum food intake. This result is even lower in Senegal according to the DHS 2019, where only 11% of children aged between 6 and 36 months received a minimum acceptable food intake [40]. In Burkina Faso, Bougma S. found a higher result, with 17.8% of children aged 6 to 23 months receiving a minimum acceptable diet [39].

4.4. Factors Associated with Non-compliance with Minimum Dietary Diversity

Lack of minimum dietary diversity was associated with female gender, the occurrence of diarrhea and ARI, birth in a public health facility, the mother's age (25 to 34) and the father's lack of work.

Our results show that girls receive preferential treatment when it comes to food. The existence of nutritional taboos, gender norms and roles in Gambian society, as in many other countries in Sub-Saharan Africa, may explain this situation [45-46]. A study by Elisabetta Aurino et al in India also showed gender disparities in dietary diversity and consumption among children [47].

Sick children tend to lose interest in food or have a reduced appetite, which increases the risk of inadequate food intake [48]. This is why it is recommended to feed sick children according to their food preferences, increasing breastfeeding for children who are still breastfeeding. Meals should also be divided, enriched with micronutrients and water intake increased.

The fact that the child was born in a public health establishment was also a factor associated with non-compliance with minimum dietary diversity. It was observed that the majority of participants (52.3%) had not received nutrition education in health establishments. For those who had received it, the information package was mainly given on general breastfeeding practices but not on guidelines for complementary feeding practices. These results raise concerns about the training provided to health professionals providers on infant and young child feeding practices and on compliance with the information package to be given to mothers of children.

The age of mothers (25 to 34) is a factor associated with low dietary diversity among children. This may be due to the fact that they have a worrying working life.

The father's lack of work has repercussions on household purchasing power, with repercussions on food expenditure for the purchase of a variety of foods for the household and even more so for the children. Studies have shown that families develop different coping mechanisms to meet basic needs, including food needs [49]. According to a study carried out in Jimma Town, in south-west Ethiopia, and another in Ghana, the most frequently adopted coping strategies are changing consumption habits, buying cheap food and reducing the frequency of meals [50, 51].

4.5. Factors Associated with Non-compliance with Minimum Meal Frequency

Low minimum meal frequency was associated with the child's age (12 to 23 months) and with a history of both ARI and diarrhea.

Non-breastfed children aged 12 to 23 months had inadequate minimum meal frequency and in Burkina Faso, Bougma S. et al found that the probability of minimum meal frequency was 60% lower in children aged 6 to 8 months than in those aged 12 to 23 months [39]. This could be explained by the lack of active monitoring of an older child's diet.

4.6. Factors Associated with Non-compliance with Minimum Acceptable Dietary Intake

Low minimum acceptable dietary intake was associated with the age of the children. Older children aged 18 to 23 months had a low food intake. Children whose mothers had vocational training had a low dietary intake.

The age of the children is still a factor associated with inappropriate complementary feeding practices. Similar results have been found in other studies [20, 43-52]. Non-compliance with the minimum acceptable dietary intake is also associated with women's professional occupations. This can be explained by the fact that they do not devote enough time to children, who are more often than not left to domestic servants. In our analysis, the mother's level of education did not show a statistically significant association with minimum acceptable dietary intake, contrary to the results of the predictive study conducted in Nepal (2001-2014), which found that the mother's education increasingly predicted the chances of reaching the minimum acceptable dietary intake level [53].

According to a study conducted in Tanzania, inappropriate complementary feeding practices can be explained by parents' low level of education, limited access to the media, lack of post-natal visits and low socio-economic level [54].

5. Conclusions

Infant and young child feeding practices are not satisfactory in The Gambia. It is important to take into consideration gender and infant and young child feeding, encourage feeding during illness, supervise the feeding of older children, promote nutrition education in health facilities on infant and young child feeding practices with emphasis on appropriate complementary feeding practices and the inclusion of social protection services in our Infant and young child feeding program.

Abbreviations

AOR: Ajusted Odds Ratio
BIC: Bayesian Information Criterion
DHS: Demographic and Health Survey
IYCF: Infant and Young Child Feeding
MADI: Minimum Acceptable Dietary Intake
MDD: Minimum Dietary Diversity
MICS: Multiple Indicator Cluster Survey
MMF: Minimum Meal Frequency
UNICEF: United Nations Children's Fund
WHO: World Health Organization

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Conflicts of Interest

The authors declare no conflicts of interest.

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