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HOUSEHOLD FOOD SECURITY AND CHILD MORBIDITY: A CASE STUDY IN BURKINA FASO

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ABSTRACT

Background: food security remains a major development challenge in Burkina Faso. Children represent a particularly vulnerable group in this environment due to their high nutritional needs and increased exposure to health risks. **Objective**: this paper aims to highlight the link between food security and child morbidity. **Method**: a bivariate analysis was conducted using Pearson's chi-square test to examine the association between morbidity and various factors, including household food security characteristics and the individual characteristics of children under five years of age. The threshold for statistical significance was set at 5%.**Result**: the approach identified age and water source as significant factors associated with the prevalence of child morbidity. The bivariate analysis showed that the age of the children is statistically linked to morbidity at 0.01% and water quality at 0.03%.**Conclusion**: the results highlight the need for multisectoral interventions targeting improvements in hygiene, access to safe water, economic support to vulnerable households, and health prevention among young children.

Key words: morbidity, bivariate analysis, food security, Burkina Faso

1. Introduction

Food security remains a major development issue in Burkina Faso, a country located in sub-Saharan Africa where most households contend with limited food availability, restricted access, and poor nutritional quality (Becquey, Martin-Prevel et al. 2010, Kaboré 2017, INSD et ICF 2022). Children are a particularly vulnerable group in this environment, owing to their high nutritional needs and increased exposure to health risks(Caulfield, de Onis et al. 2004, Humphrey 2009). While the interactions between food security, nutritional status, and child health are extensively documented in the literature (Haile, Gray et al. 2019, Shiratori, Tobita et al. 2023), understanding them on a more granular scale requires analyzing various dietary, environmental, and socioeconomic factors that impact the occurrence of morbidity episodes (Becquey 2012, Black, Victora *et al*. 2013, Haile, Gray *et al*. 2019, Muriithi 2023).

Child morbidity, most commonly characterized by diarrheal diseases, acute respiratory infections, or febrile episodes (largely attributed to malaria) can be exacerbated by poor dietary diversity (Arimond and Ruel 2004, Aboagye, Seidu *et al*. 2021), low food hygiene quality, limited access to safe drinking water, or inadequate sanitation conditions (Prüss-Ustün, Wolf et al. 2019, Wolf, Hubbard *et al*. 2022).

In contrast, households with higher levels of food security, measured specifically by indicators such as the Household Food Consumption Score (FCS) and the Household Dietary Diversity Score (HDDS), tend to provide a more protective nutritional and sanitary environment for young children (Hoddinott and Yohannes 2002). The core challenge lies in understanding the relationships between these various dimensions, particularly to guide public policies and humanitarian or nutritional interventions within a Sahelian environment characterized by significant structural vulnerabilities.

This study aims to highlight the links between household food security and child morbidity using a purely descriptive and bivariate approach based on the chi-square test, whose purpose is to identify significant associations between the occurrence of morbidity and a set of factors captured by key food security markers within household characteristics (FCS, HDDS), housing and hygiene variables (water source, type of toilet facilities), and the individual characteristics of children aged 6–59 months (age, nutritional status). This analysis provides critical insights into the immediate and underlying determinants of child health in Burkina Faso, further elucidating the nexus between food security, feeding practices, and household health vulnerabilities. This holistic approach highlights the central role of food security as a prerequisite for maintaining good health in children, and offers a coherent interpretive framework for the subsequent stages of the analysis.

2. Materials and Methods

2. 1. Methodological approach

The analysis consisted of an analytical cross-sectional study aimed to describe morbidity among children aged 6 to 59 months and identifying its associated factors. The dependent variable was recent morbidity (defined as the

occurrence of an episode of illness during the last two weeks preceding the surveyors' visit). The independent variables included individual child characteristics such as age and nutritional status; household characteristics; the Household Food Consumption Score (FCS); the Household Dietary Diversity Score (HDDS); the presence or absence of toilet facilities (type of toilet); and the source of safe drinking water.

A descriptive analysis was first performed to determine the prevalence of morbidity and to describe its distribution in the study population. Subsequently, a bivariate analysis was conducted using Pearson's chi-square test to examine the association between morbidity and the various factors studied. The threshold for statistical significance was set at 5%. The results are summarized in cross-tabulations, showing morbidity proportions by variable category along with their corresponding *p*-values. Variables showing a significant bivariate association were then considered for analysis.

2. 2. Survey period and area

The survey was conducted in February 2022 over 15 days in the Sanguié Province, located in the Centre-Ouest region of Burkina Faso. During the three years preceding this survey, the prevalence of Global Acute Malnutrition (GAM) consistently exceeded the WHO alert threshold of 10%, reflecting a worrying nutritional situation (Ministère de la Santé. BF 2021).

2. 3. Sampling

2. 3. 1. Sample size

The sampling took place in two stages. In the first stage, 15 villages in the Sanguié province were randomly selected from a total of 147 villages. In the second stage, 10 households were randomly drawn from each of these villages, bringing the total number of households included in the survey to 150. All children under the age of five living in these households were considered eligible for the study, with the household being the primary sampling unit.

A total of 268 children under the age of five were identified from this cluster survey. Following data processing and cleaning, 31 children were excluded, as they fell outside the age range selected for the analysis (6–59 months) The final study population thus consists of 237 children aged 6 to 59 months.

2. 3. 2. Selection criteria for children surveyed in the household

➢ **Inclusion criteria**

- Be between 6 and 59 months of age (or have completed 59 months of age) at the time of selection.
- Permanently reside in the selected household.

- Informed consent signed by a parent or legal guardian.

➢ **Non-inclusion criteria**

- Children with severe congenital malformations that may distort measurements.
- Children with a severe acute illness at the time of the survey (requiring immediate hospitalization).
- Children whose guardian is unable to give informed consent or answer questions.

2. 3. 3. Study variables

Table 1 summarizes all the variables included in the study and highlights their different modalities.

Table 1: Presentation of the study variables

Variables	Titles	Modalities
Morbidity	Sick child	Diarrhea and/or fever
Individual characteristics		
Child's age	Child aged 6–59 months	6–11 months; 12–23 months and 24–59 months
GAM	Nutritional status	0= not malnourished; 1= malnourished
Housing and hygiene variable		
Type of toilet	Presence of toilet	Yes; No
Source of drinking water	Source, open, closed, tap	Open (not drinkable); closed (drinkable)
Household characteristics		
Household dietary diversity score	Food diversity class	Low (1–3); Medium (4–5); High (6–12)
Household food consumption score	Food consumption class	Poor (0–28); Borderline (28.5-41); Acceptable (42)

2. 3. 4. Descriptive analysis of the study

Table 2 presents the individual and household characteristic data for the sample. The prevalence of Global Acute Malnutrition (GAM) is relatively high (11.4%), which is above the 10% WHO alert threshold and indicates a significant public health problem. Examining the age distribution of the children within the households, those between 24- and 59-months account for approximately 67%, indicating their predominance. The results also indicate that the majority of children do not have access to toilets within their households (57.81%).

The data show that a significant proportion of children consume drinking water, i.e., 65.4% of the target population. The dietary diversity of households is generally moderate for 71.31% of children. More than half of the children had an acceptable level of food consumption (59.07%).

Table 2: Distribution of the study variables within the target population

Variable	Modality	Number (n)	Percentage (%)
Age	0–11months	23	9.7
	12–23months	55	23.21
	24–59months	159	67.09
GAM	No	210	88.61
	Yes	27	11.39
Toilet	No	137	57,81
	Yes	100	42.19
Water source	Potable	155	65.4
	Non potable	82	34,6
FCS	Acceptable	140	59.07
	Borderline	81	34.18
	Poor	16	6.75
FDS	Average	169	71.31
	High	50	21.1
	Low	18	7.59

3. Results and Discussion

3. 1. Results

3.1. 1. Prevalence of morbidity

Table 3 indicates that out of a total of 237 children surveyed, 108 (45.57%) experienced a morbidity episode, compared to 129 (54.43%) who did not. This relatively high prevalence reflects significant child exposure to diseases. These results highlight the importance of examining factors associated with morbidity to better understand the observed disparities and to guide public health interventions.

Table 3: Prevalence of morbidity

Morbidity	Number	Percentage (%)
No	129	54.43
Yes	108	45.57
Total	237	100

3. .1. 2 Factors associated with morbidity (results of the Chi-square test)

Table 4 shows a series of chi-square tests aimed to measure the association between morbidity and various characteristics, at both the individual and household levels. The results identify some variables significantly associated with morbidity. The significance threshold is set at *P*<5%.

3. 1. 3. Factors significantly associated with morbidity (*P*<0.05)

- **Child's age (*p* = 0.01)**

Age appears as a determining factor. The proportions of sick children are particularly high among the youngest age groups.

- 56.52% in children aged 0 –11 months,
- 60% in children aged 12–23 months,
- 38.99% in children aged 24 –59 months.

The results indicate that morbidity decreases as age increases. Children under two years of age the first 1,000 days exhibit the highest levels of morbidity.

➢ **Source of drinking water (*p* = 0.03)**

Water quality is also significantly linked to morbidity, according to these results:

- 56.1% of sick children live in households that use non-potable water,
- 40% of sick children live in households that use non-potable water.

Morbidity is high among children from households using non-potable water.

3. 1. 4. Factors weakly associated with morbidity (P ≥ 0.05%)

➢ **Dietary diversity score (*P*=0.05)**

The chi-square test analysis revealed a borderline statistically significant association between the dependent variable (morbidity) and the explanatory variable (HDDS). The results show that the lower the HDDS, the more the children in that household tend to have higher morbidity. The HDDS variable could influence morbidity. However, this association should be interpreted cautiously.

➢ **Type of toilet (*P*=0.6)**

With a *p*-value slightly above the 5% threshold, the type of toilet facility tends to influence child morbidity, reaching 51.09% for households with no access to toilet.

Table 4: factors associated with morbidity

Variable	Modality	Morbidity		
		Yes (%)	No (%)	*P*-value
Age	0–11months	56.52	43.48	**0.01**
	12–23months	60.0	40.0	
	24–59months	38.99	61.01	
GAM	No	44.76	55.24	**0.62**
	Yes	51.85	48.15	
Type of toilet	No	51.09	48.91	**0.06**
	Yes	38.0	62.0	
Water source	Non potable	56,1	43,9	**0,03**
	Potable	40.0	60.0	
Household food consumption score (HFCS)	Acceptable	42.14	57.86	**0.39**
	Borderline	49.38	50.62	
	Poor	56.25	43.75	
Household dietary diversity score (HDDS)	Low	72.22	27.78	**0.05**
	Average	42.01	57.99	
	High	48.0	52.0	

3. 2. DISCUSSION

The analysis shows that the individual, household, and hygiene-related factors most closely linked to morbidity are the child's age and the household's drinking water quality. These results were obtained using the chi-square test.

Between 6 and 59 months, children are particularly susceptible to gastrointestinal infections, malaria (fever), and respiratory infections, which are the leading causes of child morbidity (Walker, Rudan *et al.* 2013). In the local context, the results of this study are consistent with research conducted in Burkina Faso, which has consistently shown that child morbidity varies significantly by age, with a higher prevalence among the youngest children, particularly in the 6–23 month age group, compared to older children (24–59 months) (Coulibaly and Boly 2023, Sere and Bado 2023). The 2010 Burkina Faso Demographic and Health Survey and Multiple Indicator Cluster Survey (EDSBF-MICS IV) indicates a higher prevalence of diarrhea among children aged 6–23 months compared to older children: 25% among 12–23 months vs. 10% among <6 months and 5% among 48–59 months (INSD & ICF 2012). Although this study focuses exclusively on Burkina Faso, the results are consistent with the literature on child health in low-income countries (Sanogo 2021, Fekadu, Wordofa *et al*. 2025).

One cause of the morbidity associated with this age group (6–59 months) could be the introduction of complementary foods (weaning), which also represents a critical phase. It can increase the risk of contamination when the food or water used is not sufficiently safe (Brown 2003, Checkley, Buckley *et al.* 2008). In the context of Burkina Faso, the increased vulnerability of infants and young children may be attributed to the quality of drinking water (Rouamba, Nikiema *et al.* 2016). A trend is observed showing higher morbidity levels in situations where access to an improved source of safe drinking water is low or absent, particularly in developing countries, including Burkina Faso(Merid, Alem *et al*. 2023). These findings confirm the major role of the sanitary environment and access to safe drinking water in disease prevention, particularly waterborne infections.

The trends observed in this study regarding the impact of the type of toilet facility, the Household Dietary Diversity Score (HDDS), and morbidity also warrant significant attention. They underscore the need to expand access to sanitation infrastructure and to continue nutritional prevention efforts.

4. CONCLUSION

The descriptive analysis, based on chi-square tests, highlights a high rate of infant morbidity within the study sample. This morbidity was associated with several factors, with a particularly marked contribution from child age and drinking water quality, while HDDS and toilet type showed more nuanced and weakly significant associations.

The lack of significance of the GAM could be explained by the sample size, particularly the small number of individuals in the "MAG = yes" category, or by the fact that recent morbidity did not necessarily coincide with the nutritional status measured, suggesting a non-immediate relationship between the nutritional status assessed and recent morbidity.

From a biological/physiological point of view, malnutrition remains a credible factor in increasing the risk of infection. The absence of a statistical effect in this trial warrants caution.

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Conflict of Interest
The authors declare that they have no competing interests.

Author Contributions
JSRK, EWRC and MHD, collaborated in the design and development of the study ; JSRK directed the organization and selection of indicators in the databases in collaboration with HS ; HS carried out the statistical analysis ; JSRK, HRO and BS interpreted the data ; JSRK wrote the first draft of the manuscript under the direction of EWRC and MHD. All authors contributed to the revision of the manuscript, and read and approved the submitted version.

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