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RESEARCH ARTICLE

STUDY OF DIETARY HABITS AND THEIR CONTRIBUTIONS TO SEVERE ACUTE MALNUTRITION IN CHILDREN AGED 6 TO 59 MONTHS IN THE BAGIRA HEALTH ZONE IN THE CITY OF BUKAVU: DRC

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Abstract

Introduction: Severe acute malnutrition is dependent on children's diet and particularly their eating habits. This study aimed to determine dietary habits and their contributions to severe acute malnutrition among children aged 6 to 49 months in the Bagira health zone.

Methodology: a cross-sectional analytical study was carried out in the Bagira health zone with 120 mothers with children aged 6 to 59 months. The selection of individuals was madein a random way. A questionnaire was administered to mothers using the Kobocollect application and analyzes using SPSS version 25 software.

Results: The analysis indicates that there was no statistically significant association between severe acute malnutrition and dietary frequency of children [OR = 4.205; 95% CI: 0.974–18.160], nor with foods consumed regularly [OR = 2.548; 95% CI: 0.593–10.939], nor yet with the main reasons for choosing the type of power supply [OR = 1.584; 95% CI: 0.222–11.279]. On the other hand, the dietary diversity score was significantly associated with severe acute malnutrition [OR = 8.381; 95% CI: 1.051–66.820]. Thus, households with a low or medium diversity score were 8.4 times more at risk of seeing their children develop severe acute malnutrition.

Conclusion: Severe acute malnutrition among children aged 6 to 59 months in the Bagira health zone is mainly associated withnutritional and dietary factors, including low weight, low dietary diversity, lack of exclusive breastfeeding and inappropriate weaning. In contrast, sociodemographic and economic factors such as maternal age, education level or overall household income did not show a significant association. These results highlight the importance of strengthening dietary and care practices for the prevention of malnutrition.

Introduction:-

Severe acute malnutrition remains a public health problem throughout the world and particularly in the DRC in all its forms. It is also a socio-economic problem which delays development in the DRC and whose human consequences are unacceptable. It is one of the leading causes of death from infectious diseases among children under 5 years of age in developing countries. She is thereresulting from inadequate nutrition due to inappropriate dietary practices and the prevalence of infectious and parasitic diseases which develop in conditions of individual

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and collective environmental hygiene (Olivier et al., 2020). This phenomenon is often aggravated by parental ignorance, close births, as well as inappropriate behavior, all accentuated by poverty (Ajuamungu, Ahana, Musaada, Ishara, et al., 2025).
However, adequate nutrition during early childhood is fundamental to the development of each child's full potential. It is well recognized that the period between birth and age two is a critical time for promoting optimal growth, health and development of the child (Olivier et al., 2020).

Furthermore, malnutrition is responsible for almost half (45%) of all deaths among children under five, according to a study published as part of the seriesLaunched on maternal and child nutrition. And the results show that malnutrition was responsible for approximately 3.1 million deaths of children under the age of five (Black et al., 2024). It is also possible that other factors, such as health or psychological problems, contribute to malnutrition due to a mismatch between the body's metabolic needs and nutrient availability. A poor diet contributes to low calorie and energy consumption which, alone or in combination with other factors, can accelerate the process leading to malnutrition (Blössner et al., 2024). In Bagira, we observe very frequent cases of malnutrition in certain health areas, they are justified among other things by social, economic, health, cultural problems...and cause thousands of deaths and cases of disability. Many projects have been developed with different partners and therefore they have sent theagents, for the management of this case of severe acute malnutrition in the most affected health areas by distributing inputs (PLUMPY), by carrying out supervision to see how the health of the children who use these inputs is evolving, by consulting the sheets on nutrition and this with the authorization of the head doctor of the Zone. It is in this sense that we opted to carry out the present study in the Bagira Health Zone, to study eating habits and their contributions to malnutrition in children aged 6 to 59 months.

Globally, 60% of infant and young child deaths occur due to inappropriate infant feeding practices and infectious diseases, two-thirds of which are attributable to insufficient breastfeeding practices (United Nations, 2022). However, every minute, around 10 malnourished children die, or nearly 5 million each year (Ibrahim, 2023). The WHO estimated thatSevere acute malnutrition (SAM) affects around 16 million children under the age of 5 (UNICEF / WHO, 2020). However, boys are more often affected by wasting than girls (9% versus 7%). According to demographic and health surveys in the DRC, the level of acute malnutrition fluctuates depending on the place of residence: 5% in urban areas compared to 9% in rural areas. If adequate and effective care actions are not quickly put in place, children are exposed to a high risk of mortality. The city of Butembo is also suffering the consequences of this scourge and the situation has worsened due to the continuity of armed conflicts as well as the presence of armed groups in the villages (Ndaliko, 2019).

In South Kivu, 39,349 children are severely malnourished and taken care of, 52% of children under 5 years old suffer from chronic malnutrition. The main indicators affecting child survival, development and protection arealarming: the infant mortality rate is 139 per 1000 live births; one in two children suffer from chronic malnutrition (Sahawal Alidou, 2021). The prevalence of severe acute malnutrition (SAM) in the Bagira health zone for the period 2024-2025 is estimated at 7.8%. This data reflects a critical public health situation in this region, requiring targeted interventions to combat malnutrition (Integrated Security Classification Framework, 2025). It is in view of the above that we want to know what are the main dietary habits and their contributions to severe acute malnutrition of children aged 6 to 59 months in the Bagira health zone?

Material and Method :-

The framework of the study

Our study took place in the Bagira health zone; city of Bukavu, province of South Kivu in the Democratic Republic of Congo. This area is home to a diverse population, with a significant proportionchildren under the age of five. Demographic data reveals that almost 40% of the total population is made up of children in this age group, which highlights the importance of directing interventions towards this vulnerable category. It has an estimated population of 172,065 inhabitants, or an average density of 415 inhabitants/km². This population comes from the updated 2020 population count (Increase factor 1.031). However, access to medical care is limited due to the lack of adequate health infrastructure. Health centers are often under-equipped and lack qualified staff to effectively treat cases of malnutrition.

Type of study: This was a descriptive, cross-sectional, analytically informed study in which the objective was to determine and analyze dietary habits and their contributions to severe acute malnutrition in children aged 6 to 49 months in the Bagira health zone.

Study population: Mothers with children aged 6 to 59 months made up our study population, namely 36,113 mothers (15-49 years old), representing (21%) of the total population.

$$\boldsymbol{n} = \frac{\mathrm{NZ}\alpha^2.\,\mathrm{p}.\,(1-\mathrm{p})}{\mathrm{Nd}^2 + \mathrm{Z}\alpha^2.\,(1-\mathrm{p})} = \frac{36133 \cdot (1{,}96)^2 \cdot 0{,}08 \cdot (1-0{,}08)}{36133 \cdot (0{,}05)^2 + (1{,}96)^2 \cdot (1-0{,}08)} = \frac{10216{,}308}{90{,}332 + 3{,}534} = \frac{10216{,}308}{93{,}866}$$
$$= 108{,}8 \pm 109$$

Sample: To find the sample for this study, we used the LUNCH formula, According to this formula, : n: Sample size; P: Prevalence of children aged 0-5 years with the problem of malnutrition is 8% (Integrated Safety Classification Framework, 2025) N: Total population = 36,133 mothers of children aged 6 to 59 months; d: Corresponds to the margin of error which is 5%; Z: Coefficient corresponding to the degree of confidence at 95%) Taking into account 10% of the imponderables, our sample was: n= 109+1O% =**120 mothers of children under 5 years old.**

We used the stratified proportional random sampling technique, considering health areas as strata. the number of respondents in each stratum wasobtained by multiplying the proportionality coefficient obtained (by the formula n/N) by the population of each stratum.

Inclusion and non-inclusion criteria:-
As part of this work, participants were subject to inclusion criteria such as: Being a resident of the Bagira health zone and agreeing to answer the questions: Being the mother of one or more children under 5 years old; Agree to participate in our study by responding favorably to our research questions; be present during data collection. On the other hand, any mother not residing in the study zone and not having had children aged 0 to 59 months was not included in this study.

Data collection technique:
Departing from our work subject and the sampling techniques chosen, we opted for a survey. In the actual field survey, we randomly took a number between the minimum and maximum of the sample size of each strata,which allowed us to skip households during the survey using the randomness function between limits in Excel.

Data collection tools.
Data collection was done using the survey questionnaire that we submitted to mothers with children aged 6 to 49. So, given our expertise in the use of these tools (from previous scientific research) and the configuration of the Kobotoolbox account, we carried out a pre-survey to try to reframe our research questions. We also provided a little training on using the KoboCollect tool for our friends who helped us collect this data.

Validation of the study: Throughout the completion of this work we scrupulously observed the following plan: Obtain authorization from the official University of Bukavu via the public health sector to conduct this study and in the field, obtain prior informed consent from theparticipants.

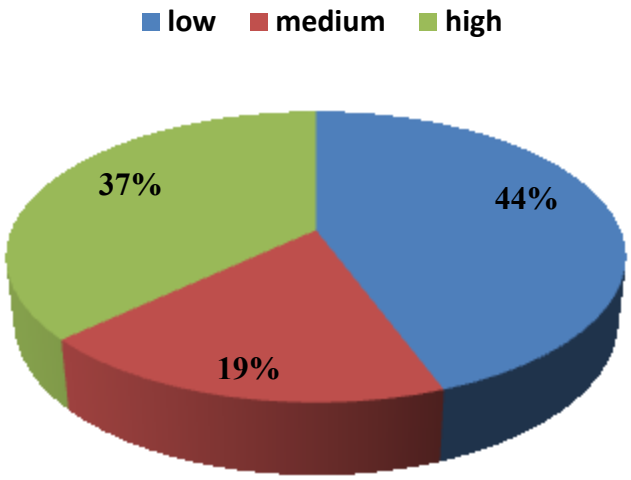
Data Processing and Analysis: The collected data was initially processed using Microsoft Excel software, which allowed for entry, cleaning and organization of variables. The statistical analysis was carried out using SPSS version 25 software.

The results were presented in the form of frequencies, percentages, medians, means and standard deviations, depending on the nature of the variables studied. We carried out correlation analyzes between our study variables using the correlation test; multivariate to measure associations between several independent variables in relation to the dependent variable of the present study

Ethical considerations: This study was conducted in accordance with the ethical principles in force in biomedical research. Approval was obtained from the Medical Ethics Committee of the Official University of Bukavu, under reference number 017/2025. All stepsThe research was conducted in accordance with national and international ethical guidelines, including those set out in the Declaration of Helsinki. The confidentiality of participant data was strictly respected, and informed consent was obtained from the mothers before any questioning.

Results:-

The objective of this study was to determine and analyze dietary habits and their contributions to child malnutrition in the Bagira health zone. After our analyses, the dietary diversity score was low in almost half of the respondents.



1Figure 1. Distribution of respondents according to dietary diversity score

It appearsfromthis,that more than 3 out of 7 households had a low dietary diversity score and more than a third of them had a high score.

1Table 1. sociodemographic variables of parents

Caractéristique	**n=120**	**%**	**Moyenne**
Mother's Age			**28ans (15 – 49)**
17-29 years	71	59,2	
30-40 years	44	36,7	
41-50 years	5	4,2	
Household size			
3-6 peaple	65	54,2	
7-12 peaple	55	45,8	
Education level			
No éducation	32	26,6	
Primary	27	22,5	
Secondary	56	46,6	
University	5	4,1	
Religion			

Protestant	65	54,17	
Catholic	50	41,67	
Branamist	3	2,50	
Muslim	2	1,66	
Father's occupation			
Sans	49	40,8	
Artisan	29	24,1	
Governmentemplyee	20	16,6	
Smoll trader	22	18,3	

Analysis of the table reveals that the median age of women with children aged 6 to 59 months was 28 years (15 – 49), and almost 60% of them were under 30 years old. The household size was less than seven people in more than one in two households. Almost all of the respondents were married. Concerning the level of education, one in two respondents had reached a secondary or university level of study. Religiously, the overwhelming majority belonged to the Christian faith, mainly Protestant and Catholic. Furthermore, it appears that 40% of fathers and 60% of mothers were unemployed, reflecting a high proportion of economic inactivity within the households surveyed.

2Table 2. sociodemographic variables of children

Caractéristique	**n=120**	**%**
Child's Age		
6-18months	37	30,8
19-40months	78	65
41-59months	5	4,1
Child'sweight		
5-12kg	86	71,6
13-25kg	34	28,3
Child'sheight		
25cm-41cm	36	30
42-70cm	84	70
Mid-upper arm circonference		
112-115mm	83	69
116-125mm	30	25
126-130mm	7	5,8
Number of childrenunder 5years		
2	85	70,0
3	35	29,1

Nearly two-thirds of the children were aged between 19 and 40 months. More than 70% weighed less than 12 kg, and their height was mainly between 42 and 70 cm. The upper arm circumference (MUAC) of seven out of ten children varied between 112 and 115 mm, indicating a notable prevalence of measurements fallingin the nutritional risk zone. Furthermore, in seven out of ten households, there were two children under the age of five, reflecting a significant child demographic burden within the households surveyed.

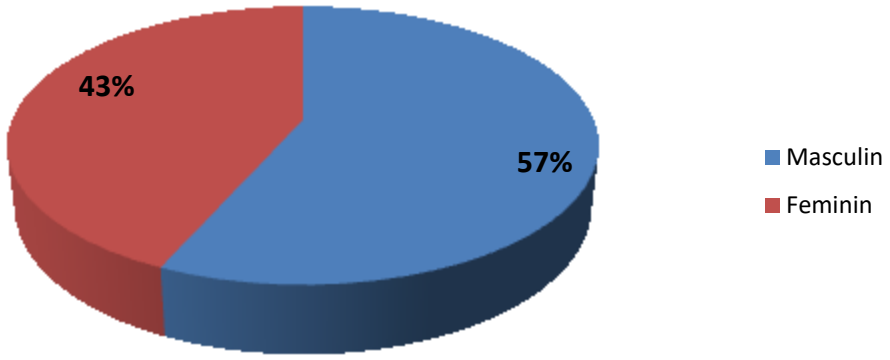


Figure5. Gender of children

This graph shows that almost 6 in 10 children were male

3Table 3. socio-economic characteristics of the respondents

Caractéristics	n=120	%
Monthlyincome		
Moins de 50000	58	48,33
50000-100000	26	21,66
100000-150000	17	14,16
Plus de 200000	19	15,83
Ration amount		
1500-4000	28	23,33
5000-10000	85	70,8
11000-30000	7	5,83
Housingstatus		
Tenant	63	52,5
Owner	57	47,5
Water source		
Tap water	113	94
Spring water	7	5,8

Nearly half of the households had a monthly income of less than 50,000 FC. For seven out of ten households, the share of the budget devoted to food was between 5,000 and 10,000 FC, reflecting a limited financial capacity to acquire an adequate food ration. More than half of the participants were renters, indicating low residential stability.

Furthermore, almost all households reported obtaining drinking water from the tap, which constitutes a favorable indicator in terms of access to drinking water.

4Table 4. factors related to theknowledge and practice

Variable	n=120	%
Signs of known malnutrition in children		
Présence of edema		
yes	13	10,83
No	107	89,17
Frequency of children'sfeeding		
Once a day	6	5
Twice a day	62	51,6
Three times a day	49	40,83
Four times a day	3	2,5

It appears from this table that almost 9 out of 10 participants did not present bilateral edema and that more than one in 2 children were fed twice a day.

5Table 5. factors related to knowledge and practice

Variable	n=120	%
Foodsregularlyconsumed		
Animal-basedfood	10	8,33
Plant-basedfood	72	60
Vitamins	2	1,66
Mixed all types	36	30
Main reasons for foodchoice		
Cost	105	87,5
Child'spreference	1	0,83
Habit	9	7,5
Complet meal	1	0,83
availability	4	3,33
Barriers to feeding		
luck of money	103	85,8
Luck of knowledge	3	2,5
Food not avilable	7	5,8
Luck of time	3	2,5
Child'sillness	1	0,83
Distance to market	2	1,66

It appears from this table that six households out of 10 regularly consumed foods of plant origin, nearly 9 households out of 10 chose these foods taking into account the cost of food on the market and the lack of money constituted a barrier to good nutrition.

6Table 6. biological health factors

Variable	n=120	%
Exclusive breastfeeding		
yes	90	75

No	30	25
Weaningage		
<6months	39	32,5
6-12months	81	67,5
Causes foweaning		
illness	13	10,8
pregnancy	2	1,66
Child reachedage	80	66,66
Hunger	16	13,33
Milk unavailable	4	3,33
work	5	4,16

It appears from this table that three quarters of the participants had practiced exclusive breastfeeding for their children. Furthermore, more than two thirds of mothers had weaned after the age of six months, mainly because the child had reached the age considered appropriate for thisdietary transition.

7Table 7. Bivariate analysis of sociodemographic factors ofparents

Variable	***Ont la malnutrition (%)***	**Non malade**	**P-value**	***OR (IC à 95%)***
Motherage				
17-28ans	6 (9,52)	57 (90,48)	**0,848**	**0,775 (0,276-2,172)**
29-50ans	7 (12,28)	50 (87,72)		
Household size				
3-6 peaple	7 (10,77)	58 (89,23)	**1,000**	**0,987 (0,352-2,764)**
7-12 peaple	6 (10,91)	49 (89,09)		
Niveau d'étude de la mère				
No level	3 (9,38)	29 (90,63)	**1,000**	**0,825 (0,242-2,808)**
edicate	10 (11,36)	78 (88,64)		
Fatherocupation				
No occupation	7 (14,29)	42 (85,71)	**0,476**	**1,690 (0,604-4,725)**
Has occupation	6 (8,45)	65 (91,55)		

The bivariate analysis of factors likely to contribute to the occurrence of severe acute malnutrition in children aged 6 to 59 months in the Bagira health zone shows that no statistically significant association was observed with the sociodemographic characteristics of the parents. Indeed, neither the age of the mother [OR = 0.775; 95% CI: 0.276–

2.172], nor household size [OR = 0.987; 95% CI: 0.352–2.764], nor the mother's educational level [OR = 0.825; 95% CI: 0.242–2.808], nor the father's profession [OR = 1.690; 95% CI: 0.604–4.725] did not present a significant link with the occurrence of severe acute malnutrition in children.

8Table 8. Association between malnutrition and sociodemographic factors of children

Variable	Ont la malnutrition	N'ont pas la malnutrition	P-value	OR (IC à 95%)
Child'sweight				
04-9kg	8 (33,33)	16 (66,67)	0,000	6,400 (2,298-17,818)
10-25kg	5 (21,5)	97 (94,79)		
Child'sheight				
20-40cm	7 (20)	28 (80)		
41-70cm	6 (7,06)	79 (92,94)	0,080	2,833 (1,024-7,833)
Mid-upper arm circonference				
110-122	12 (11,21)	95 (88,79)		1,457 (0,206-10,320)
125-155	1 (7,69)	12 (92,31)	1,000	
Number of childrenunder 5years				
1	8 (9,41)	77 (90,59)		
3	5 (14,29)	30 (85,71)	0,647	0,658 (0,231-1,874)

According to the results presented in the table, children weighing between 4 and 9 kg were 6.4 times more exposed to severe acute malnutrition than those weighing between 10 and 25 kg, astatistically significant association (p = 0.000). An association was also observed between child height and severe acute malnutrition, although this was not statistically significant [OR = 2.833; 95% CI: 1.024–7.833]. On the other hand, the upper arm circumference [OR = 1.457; 95% CI: 0.206–10.320] as well as the number of children under five years of age in the household [OR = 0.658; 95% CI: 0.231–1.874] did not present a significant association with severe acute malnutrition.

9Table 9. Association of respondents between malnutrition and socioeconomic factors

Variable	Ont la malnutrition	Non Malade	P-value	OR (IC à 95%)
Monthlyincome				
≤50000	12 (13,19)	79 (86,81)	0,260	3,824 (0,519-28,165)
≥250000	1 (3,45)	28 (96,55)		
Ration amount				
2000-5000	12 (17,14)	58 (82,86)	0,019	8,571 (1,151-63,811)
6000-20000	1 (2)	49 (98)		
Housingstatus				
Tenant	8 (12,70)	55 (87,30)	0,691	1,447 (0,502-4,171)
Owner	5 (8,77)	52 (91,23)		

The results show that monthly household income was not associated with the occurrence of severe acute malnutrition in children [OR = 3.824; 95% CI: 0.519–28.165]. On the other hand, a statistically significant association was observed between the amount allocated daily to food and severe acute malnutrition [OR = 8.571; 95% CI: 1.151–63.811]. Households spending between2,000 and 5,000 FC per day in food thus presented an 8.57 times higher risk of severe acute malnutrition. Furthermore, belonging to a concession (ownership or rental) did not

show a statistically significant link with the occurrence of severe acute malnutrition [OR = 1.447; 95% CI: 0.502–4.171].

10Table 10. Association of severe acute malnutrition with knowledge, practice and biological health factors

Variable	Ont la malnutrition	N'ont pas la malnutrition	P-value	OR (IC à 95%)
Frequency of children'sfeeding				
1 à 2times/day	11 (16,18)	57 (83,82)	0,063	4,205 (0,9741-18,160)
3 à 4times/day	2 (3,85)	50 (96,15)		
Foodsregularyconsumed				
Plant and animal-basedfoods	11 (13,41)	71 (86,59)	0,307	2,548 (0,593-10,939)
Vitamins and mixed foods	2 (5,26)	36 (94,74)		
Main reason for choice				
Cost and child'spreference	12 (11,32)	94 (88,68)	0,987	1,584 (0,222-11,279)
Habit, completemeal,	1 (7,14)	13 (92,86)		
24-hour dieterydiversity score				
Low and medium	12 (16)	63 (84)	0,040	8,381 (1,051-66,82)
high	1 (2,22)	44 (97,7)		

The results indicate that there was no statistically significant association between severe acute malnutrition and dietary frequency of children [OR = 4.205; 95% CI: 0.974–18.160], nor with foods consumed regularly [OR = 2.548; 95% CI: 0.593–10.939], nor yet with the main reasons for choosing the type of power supply [OR = 1.584; 95% CI: 0.222–11.279]. On the other hand, the dietary diversity score was significantly associated with severe acute malnutrition [OR = 8.381; 95% CI: 1.051–66.820]. So,Households with a low or medium diversity score were 8.4 times more likely to have their children develop severe acute malnutrition.

11Table 11. Distribution of respondents according to biological and health factors

Variable	Ont la malnutrition	N'ont pas la malnutrition	P-value	OR (IC à 95%)
Exclusive brastfeeding				
yes	5 (5,56)	85 (94,44)	0,003	0,208 (0,073-0,588)
No	8 (26,67)	22 (73,33)		
Child'sweaningage				
<6months	8 (20,51)	40 (95,24)	0,040	3,323 (1,162-9,496)
≥6months	5 (6,17)	76 (93,83)		

Cause of weaning				
Reachedage, workhunger	8 (7,92)	93 (92,08)	0,152	0,356 (0,119-1,060)
Illness, prognancy	4 (22,22)	14 (77,78)		
Edication of healthyfeeding habits				
no	6 (7,41)	75 (92,59)	0,153	0,412 (0,148-1,146)
yes	7 (17,95)	32 (82,05)		

The results of bivariate analysis show a statistically significant relationship between exclusive breastfeeding and the occurrence of severe acute malnutrition [OR = 0.208; 95% CI: 0.073–0.588], suggesting a protective effect of exclusive breastfeeding. Likewise, weaning age was significantly associated with the risk of malnutrition [OR = 3.323; 95% CI: 1.162–9.496], indicating that children weaned late were more exposed. On the other hand, neither is the cause of withdrawal [OR = 0.356; 95% CI: 0.119–1.060], nor the education received on healthy eating habits [OR = 0.412; 95% CI: 0.148–1.146] did not show a significant association with severe acute malnutrition.

DISCUSSION:-

Bivariate analysis of parents' sociodemographic factors

In our study conducted in the Bagira health zone, bivariate analysis did not reveal a statistically significant association between the occurrence of severe acute malnutrition (SAM) in children aged 6 to 59 months and several sociodemographic variables: the age of the mother, the size of the household, the mother's education level, as well as the father's profession. These results suggest that, in this specific context, these traditional factors of social vulnerability are not major determinants of SAM. However, these observations contrast with several previous studies. For example, in a case-control study conducted in Gondar, Ethiopia, maternal and paternal illiteracy and low monthly family income were associated with an increased risk of SAM. Similarly, in work carried out in India, the absence of exclusive breastfeeding, large family size, and low maternal education were among the main risk factors. Anda meta-analysis at the level of low- and middle-income countries noted that family characteristics, low level of education of mothers, young mothers (15–24 years old), low wealth quintile increase the probabilities of SAM. Several explanations can be put forward to account for the absence of association in our population: It is possible that the variability of socioeconomic conditions within our sample is insufficient to detect significant effects, for example if most households share a relatively homogeneous level of vulnerability (poor income, low purchasing power, similar living conditions).

The determinants of SAM may, in this context, be linked more to nutritional, dietary or health factors (quality and diversity of the diet, feeding practices, childhood illnesses) than to sociodemographic characteristics. Bivariate data alone may lack powerexplanatory: the absence of statistical significance does not necessarily mean that there is no effect, but may reflect low numbers, classification errors, or unmeasured confounding factors. In this sense, previous studies have highlighted the importance of feeding and care practices. A cohort study in rural Ethiopia showed that dietary diversity, the duration of exclusive breastfeeding, as well as the nutritional status of the mother significantly influence the recovery or deterioration of children suffering from moderate malnutrition. Another international study (51 low/middle income countries) confirmed that lack of maternal education, low household wealth, and very young maternal age are consistent risk factors for SAM. This is consistent with the observation in our population according to which dietary and care determinants (diversity of diet, breastfeeding, weaning, etc.) — rather thanOnly sociodemographic characteristics play a central role in the occurrence of SAM. Based on these findings, our study suggests that an approach to preventing malnutrition in the Bagira health zone should favor interventions focused on nutritional education, dietary diversification, strengthening exclusive breastfeeding up to 6 months, and support for the most vulnerable families. This approach is in line with international recommendations for the fight against SAM. That said, it will be important in the next steps to carry out a multivariate analysis in order to control for potential confounding factors (childhood illnesses, infant mortality, sanitary conditions, access to water and sanitation, etc.), and to identify the independent determinants of SAM in your context.

Sociodemographic factors of children

The results of our study show that children with a weight betweenbetween 4 and 9 kg were 6.4 times more exposed to severe acute malnutrition than those weighing between 10 and 25 kg, a statistically significant association (p = 0.000). This result highlights the central role of low weight as an indicator of immediate risk of severe malnutrition, which is consistent with the observations of Black et al., who demonstrated that low weight in children under five years of age is strongly associated with morbidity and mortality in resource-limited countries [1]. An association was also observed between child height and malnutrition (OR = 2.833; 95% CI: 1.024–7.833), although this relationship did not reach statistical significance. This suggests that low stature could be a contributing factor to severe acute malnutrition, but that the effect could be modulated by other variables, such as feeding practices or childhood illnesses. Previous studies have shown that malnutritionChronic malnutrition, reflected by short stature for age, predisposes children to acute episodes of malnutrition and severe complications [2,3]. On the other hand, the upper arm circumference [OR = 1.457; 95% CI: 0.206–10.320] and the number of children under five per household [OR = 0.658; 95% CI: 0.231–1.874] did not present a significant association with severe acute malnutrition in our population. Although MUAC is recognized as a rapid indicator of acute malnutrition, its low variation in the sample studied could explain the lack of statistical association [4]. Likewise, the number of children per household was not a determining factor in our context, which may reflect adaptive strategies of families to manage nutritional burden or biases related to sample size. These results highlight the importance of regular monitoring of children's weight and growth, particularly in areaswith a high prevalence of malnutrition, and suggest that targeted interventions should focus on children with low weight, while taking into account additional risk factors such as height and dietary diversification [1,5].

Association of respondents between malnutrition and socioeconomic factors

The analysis shows that monthly household income was not significantly associated with the occurrence of severe acute malnutrition (SAM) in children [OR = 3.824; 95% CI: 0.519–28.165]. On the other hand, the amount allocated daily to food appeared to be an important determinant: households spending between 2,000 and 5,000 FC per day presented an 8.57 times higher risk of SAM [OR = 8.571; 95% CI: 1.151–63.811]. This statistically significant association underlines that it is not only the overall household income that influences the risk of malnutrition, but the proportion of resources actuallyintended for food. This result is in agreement with studies showing that childhood malnutrition is strongly correlated with food security and the ability of families to ensure sufficient and diversified caloric and nutrient intake [1,2]. For example, a study in Nigeria showed that the risk of severe malnutrition increases significantly in households spending less on food, independent of total household income [3]. On the other hand, belonging to a concession (owner or tenant) was not significantly associated with MAS [OR = 1.447; 95% CI: 0.502–4.171], which suggests that residential stability or land status is not a direct determinant of malnutrition in this context, unlike in other environments where residential insecurity has been correlated with increased nutritional risk [4]. These results highlight the importance of targeting interventions on food securitydaily, for example through nutritional education programs, food support or conditioned cash transfers, rather than focusing solely on overall household income. This is consistent with international recommendations that allocating adequate resources to food is a key factor in reducing child malnutrition in low-income areas [5].

Knowledge, practice and biological health factors

Analysis of our data indicates that no statistically significant association was observed between the frequency of meals, foods consumed regularly, or the reasons for choosing types of food and the occurrence of severe acute malnutrition (SAM) in children aged 6 to 59 months. These results suggest that simple meal frequency or the types of foods routinely consumed are not sufficient to explain the risk of SAM in this population, a finding similar tothat observed in certain African studies where the quality and diversity of the diet prevailed over the frequency of meals [1,2]. On the other hand, the dietary diversity score was strongly associated with SAM [OR = 8.381; 95% CI: 1.051–66.82]. Children living in households with a low or medium diversity score thus had an 8.4 times higher risk of developing malnutrition. This observation highlights the importance of dietary diversity as a critical indicator of nutritional security, consistent with the recommendations of the WHO and FAO, which consider that diet diversity is a major predictor of adequate micronutrient intake and the prevention of childhood malnutrition [3,4]. Previous studies confirm this link. For example, a study conducted in Ethiopia showed that children from households with low dietary diversity were significantly more exposed to malnutrition.acute and chronic [5]. Similarly, in several low-income countries, increasing dietary diversity has been associated with reduced stunting and wasting among children under five [6]. These results suggest that interventions aimed at reducing malnutrition should prioritize improving dietary diversity within households, particularly through nutritional education programs, strengthening domestic production of fruits and vegetables, or access to fortified or complementary foods. This approach could be

more effective than strategies based solely on meal frequency or on increasing the number of foods consumed without considering their diversity and nutritional value.

Distribution of respondents according to biological and health factors

Bivariate analysis of dietary habits revealed that exclusive breastfeeding was strongly protective againstsevere acute malnutrition (SAM) in children aged 6 to 59 months [OR = 0.208; 95% CI: 0.073–0.588]. This result is consistent with numerous studies showing that exclusive breastfeeding during the first six months of life reduces the risk of malnutrition, protects against gastrointestinal infections and improves the overall nutritional status of the child [1,2]. Furthermore, the age of weaning appears to be a significant factor in SAM [OR = 3.323; 95% CI: 1.162–9.496]. Children weaned too early or too late were more exposed to malnutrition, highlighting the importance of following recommendations for gradual, age-appropriate weaning, introducing nutrient-rich complementary foods from six months while continuing breastfeeding [3,4]. On the other hand, the cause of withdrawal [OR = 0.356; 95% CI: 0.119–1.060] and maternal education on healthy eating habits [OR = 0.412; 95% CI: 0.148–1.146] were not significantly associatedstatistically significant to the occurrence of SAM in our population. This could be explained by the low variability of these factors in the sample studied or by methodological limitations linked to self-declaration of dietary practices. These results highlight the central role of exclusive breastfeeding practices and appropriate weaning as protective factors against severe malnutrition. They confirm the recommendations of the WHO and UNICEF, which recommend exclusive breastfeeding for up to six months, followed by progressive and appropriate dietary diversification to prevent child malnutrition [5].

Limitations of the study

Several limitations must be taken into account within the framework of this study:

Cross-sectional design: the study does not make it possible to establish causal relationships between the identified factors and severe acute malnutrition, but only associations. Limited numbers can reduce statistical power and explainthe absence of significant associations for certain factors; income and food expenditure were estimated approximately, which could limit the precision of the analysis of links with malnutrition. Despite these limitations, the study provides relevant information on the nutritional and dietary factors associated with severe acute malnutrition in the Bagira health zone.

Conclusion:-

Severe acute malnutrition among children aged 6 to 59 months in the Bagira health zone is mainly associated with nutritional and dietary factors, including low weight, low dietary diversity, lack of exclusive breastfeeding and inappropriate weaning. In contrast, sociodemographic and economic factors such as maternal age, education level or overall household income did not show a significant association. These results highlight the importance of strengthening dietary and care practices forprevention of malnutrition.

Outlook :-

Promote exclusive breastfeeding for up to six months and gradual and appropriate weaning; Strengthen children's dietary diversity, in particular through nutritional education of parents and access to nutritious foods; Raise awareness and support vulnerable families on the planning and allocation of food resources to guarantee adequate nutrition; Implement regular anthropometric monitoring of children in order to detect cases of malnutrition early and intervene quickly.

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