



# Prevalence and Factors Associated with Acute Malnutrition among Children

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## ABSTRACT

**Background:** Acute malnutrition among children is common in developing countries. Ethiopia is one of the Sub-Saharan African countries with high level of child malnutrition. This study aimed to assess the prevalence of acute malnutrition and associated factors among children aged 6-59 months in Kamashi district, Benishangul Gumuz Region, Ethiopia.

**Methods:** A community based cross-sectional study design was conducted from October 26 to December 15, 2019, at Kamashi district. Eight hundred fourteen children were included in the study. The sample size was calculated using a single population proportion formula. Multistage sampling technique was employed to select children from households. Data was collected using structured questionnaire and anthropometric measurements were taken. Descriptive and analytical data analysis was done using SPSS.

**Results:** About 10% of children, aged 6-59 months in Kamashi district were acutely malnourished (95%CI:8.7-13.1). From these, 5.5% (95%CI: 4.5-7.9) were moderately malnourished and 4.3% (95%CI: 3.4-6.4) were severely malnourished. About 0.4% children had edema. Children from care givers who attended primary (AOR=0.16, 95% CI: 0.06-0.41) or secondary education (AOR=0.21, 95%CI: 0.07-0.68), children who had been vaccinated to their age (AOR=0.38, 95%CI: 0.18-0.82) and children from mothers who attended postnatal care (AOR=0.13, 95%CI: 0.06-0.30) had lower odds of having acute malnutrition. On the other hand, children who had history of fever in the two weeks preceding the survey (AOR=4.01, 95%CI: 1.86-8.66), those children from families with <2 number of under-five children (AOR=3.63, 95%CI: 1.60-8.31) and children with lower birth interval (AOR=3.27, 95%CI: 1.75-6.12) had higher odds of developing acute malnutrition.

**Conclusion:** Acute malnutrition among children in Kamashi district was high. Increasing girl's education may help to reduce acute malnutrition among children in Kamashi district. In addition, the district health office shall increase postnatal care attendance and vaccination at age to reduce acute malnutrition among children. The district health office shall work to increase inter-birth interval and prevent febrile illnesses among children.

**Keywords:** Acute malnutrition; Post natal care; Inter-birth interval

## LIST OF ABBREVIATIONS

ANC: Antenatal Care; AOR: Adjusted Odds Ratio; COR: Crude Odds Ratio; ENA: Emergency Nutrition Assessment MAM: Moderate Acute Malnutrition; NCHIS: National Center for Health Statistics; PNC: Postnatal Care; SAM: Severe Acute Malnutrition; SPSS: Statistical Package for Social Sciences; WHO: World Health Organization.

## INTRODUCTION

Acute malnutrition among children is a serious global health concern affecting an estimated 50 million children aged <5 years in low and middle income countries [1,2]. It is the leading cause of mortality, accounting for 11.5% of total deaths and contributes

significantly to the overall disease burden [1]. Asia and Africa accounted for more than two thirds and a quarter of all wasted children globally [2]. According to the Ethiopian demographic and health survey report, about 10% of Ethiopian children were wasted. From these, 3% were severely wasted. In Benishangul Gumuz Region, the region where the study was conducted, 11.5% under five children were acutely malnourished of whom 3.1% were with severe acute malnutrition [3].

Acute malnutrition results from sudden reductions in food intake or diet quality and is often combined with pathological causes [4]. Causes of acute malnutrition are numerous and multifaceted. It depends on complex interactions of factors including socioeconomic, environmental, reproductive, institutional,

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cultural, political and regional factors [5,6]. The effect of these factors on acute malnutrition varies from place to place. Area specific scientific evidence is important to reduce the prevalence of acute malnutrition among children. People whose livelihood was mainly traditional agricultural practice dominate the study area. These, the authors hypothesized that the prevalence of acute malnutrition among children might be high. Therefore, this study aimed to estimate the prevalence of acute malnutrition and identify factors associated with acute malnutrition among children in Kamashi District.

## MATERIALS AND METHODS

### Study design, area and period

A community based cross sectional study design was used. Data was collected from October 26 to December 15, 2019 at Kamashi district, one of the 20 districts in the Benishangul Gumuz region, Ethiopia. The District was divided in to 15 kebeles with a total population of 25,295. There were 5,621 households in District. From these, there were under-five children aged 6-59 months in 3,899 households [7].

### Source and study population

The source population and study population for this study were all children aged 6-59 months living in Kamashi district and children aged 6-59 months in randomly selected kebeles respectively. Children whose care takers were not around on the time of survey and children with disabilities which affect anthropometric measurements were excluded.

### Sample size and sampling technique

A total of 814 children were included in the study. The sample size was calculated considering prevalence, design effect, margin of error and non-response. Multi-stage sampling technique was used to select children. First, four kebeles (the smallest administrative unit in Ethiopia) from 15 were selected by simple random sampling (lottery method) technique. Then, households with children aged 6-59 months were selected using simple random sampling technique using the health extension workers register as sampling frame. Samples were proportionally allocated to each kebele.

### Data collection and analysis

Data were collected using structured questionnaire. In addition, anthropometric measurements were taken. The questionnaire was developed by reviewing different literatures. The questionnaire was prepared in Amharic (the Ethiopian national language). Mothers or care givers were interviewed about the socio-demographic characteristics, childcare practices, maternal health care services use, environmental factors and household assets. In households with more than one eligible child, only one was selected using lottery method. The anthropometric data were collected based on the Emergency Nutrition Assessment [2004] guideline for measuring anthropometric measurements [8].

The weight and height of children are used as proxy measures for the general health of the entire population. Weight-for-height (wasting) provides the clearest picture of acute malnutrition in a population at a specific point in time. For children aged 6-59 months, moderate acute malnutrition (MAM) is defined as moderate wasting (weight-for-height between  $<2$  and  $-3$  Z score) and severe acute malnutrition (SAM) is identified by severe wasting (weight-for-height  $<3$  Z score) or the presence of bilateral pitting edema [9]. Sex, age, height and weight of children were entered to

ENA SMART 2011 software to convert nutritional data to Z-score using NCHS reference population standard of WHO. Data entry and analysis was done using SPSS. Binary logistic regression model was done to identify factors associated with acute malnutrition. A p-value less than 0.05 and 95% CI were used to declare statistical significance.

## RESULTS

### Characteristics of the study participants

Eight hundred fourteen children and their caregivers were included in the study with response rate of 98%. The mean age of children was 31.8 with SD of 13.8 months. Children aged 36-47 months accounted for 25.6% of all samples included in the survey. About 42% children were females. About 41.9% of caregivers attended primary education. In terms of occupation, about 590 (72.5%) of care givers were farmers.

Ninety one percent of caregivers reported that their child was breast fed within one hour after delivery. About 14% caregivers reported that they bottle fed their children. About 48% reported that they attended four or more ANC visits. About 77% reported that they delivered the index child in health facilities. Regarding postnatal care attendance, 26.3% mothers reported that they did not attend postnatal care. Regarding household assets, about 67% reported that they own land for agriculture. About 89% reported that they owned house.

### Prevalence of acute malnutrition

Overall about 80 (9.8%) (95%CI: 8.7-13.1) children were malnourished. From these, 5.5% (95%CI: 4.5-7.9) were moderately malnourished and 4.3% (95%CI: 3.4-6.4) were acutely malnourished.

### Factors associated with acute malnutrition

In the bivariable logistic regression analysis, the care givers level of education, preceding birth interval, source of drinking water, diarrhea and fever in the past two weeks prior to data collection, bottle feeding, initiation of breast feeding, latrine availability for the family, role of mothers on child feeding, ANC and PNC follow up, vaccination status of children, number of under five children, monthly income, owning house, mother's history of illness and place of delivery were found associated with acute malnutrition. Education status of care givers, history of fever, vaccination status, number of living children, postnatal follow up and preceding birth interval were significantly associated with acute malnutrition among children.

Children from mothers who attended primary (AOR=0.16; 95%CI: 0.06-0.41) or secondary or more (AOR=0.21; 95%CI: 0.07-0.68) education had lower odds of being acutely malnourished compared to children who did not attend formal education. Children who had history fever two weeks before the survey had higher odds (AOR=4.01; 95%CI: 1.86-8.66) of being acutely malnourished. Children who received the vaccine to their age had lower odds (AOR=0.38; 95% CI: 0.18-0.82) of developing acute malnutrition. Children who lived in households where there were two or more children had higher odds (AOR=3.63; 95%CI: 1.60-8.31) of developing acute malnutrition among children. Similarly, children who were born after 24 or more months of birth interval had higher odds (AOR=3.27; 95%CI: 1.75-6.122) of developing acute malnutrition. Children from mothers who attended PNC had lower odds (AOR=0.13; 95%CI: 0.06-0.30) of developing acute malnutrition are observed in Table 1.

**Table 1:** Factors associated with acute malnutrition among children aged 6-59 months in Kamashi district, Benishangul Gumuz Region, Western Ethiopia 2019 (n=814) [12].

Explanatory variable	Categories	Acute malnutrition		COR (95% CI)	AOR (95% CI)
		Yes (%)	No (%)		
Care givers level of education	No formal education	64 (80)	236 (32.2)	1	1
	Primary education	9 (11.3)	332 (45.2)	0.10 (0.05-0.21)	0.16 (0.06-0.41)
	Secondary or above	7 (8.7)	166 (22.6)	0.16 (0.07-0.35)	0.21 (0.07-0.68)
Initiation of breast feeding	Within one hour	56 (70)	685 (93.3)	1	1
	After one hour of delivery	24 (30)	49 (6.7)	5.99 (3.43 -10.48)	2.38 (0.98-5.76)
History of fever	Yes	31 (38.7)	67 (9.1)	6.29 (3.76-10.54)	4.01 (1.86-8.66)
	No	49 (61.3)	667 (90.9)	1	1
Vaccination status of children	Yes	19 (23.8)	590 (80.4)	0.76 (0.04-0.13)	0.38 (0.18-0.82)
	No	61 (76.2)	144 (19.6)	1	1
Number of under five children	<2	55 (68.7)	679 (92.5)	1	1
	≥ 2	25 (31.3)	55(7.5)	5.61 (3.25-9.69)	3.63 (1.60-8.31)
PNC follow up	Yes	18 (22.5)	582 (79.3)	0.08 (0.04-0.13)	0.13 (0.06-0.30)
	No	62 (77.5)	152 (20.7)	1	1
Preceding birth interval	<24 months	53 (66.3)	255 (34.7)	3.68 (2.26-6.01)	3.27 (1.75-6.122)
	≥ 24 months	27 (33.7)	479 (65.3)	1	1

## DISCUSSION

The prevalence of acute malnutrition among children aged 6-59 months in this study was 9.8%. According to the WHO threshold for acute malnutrition (which ranges 5%-9.9%), the prevalence is considered high [9]. The findings of this study was consistent with studies from Nigeria [10], Afghanistan [11] and other studies in Ethiopia, [3,12-14]. But the prevalence of acute malnutrition was lower than studies done in Shinille [15], Dabat [6] and Hidabu Abote [16] districts of Ethiopia. The reason for the variation in the prevalence of acute malnutrition among children may be difference in study period, study area and socio-demographic characteristics.

This study showed that the odds of having acute malnutrition among children whose mothers attended primary or secondary or more education decreased by 84% and 79% respectively. This finding was consistent with a study on prevalence of acute malnutrition in Afghanistan [17] but in contrast with a studies done in Pakistan [18], Nepal [19] and Ethiopia [16].The lower prevalence of acute malnutrition among children from mothers who attend primary or higher level of education may be due to better knowledge of child feeding among these mothers [17].It is known that maternal education can improve childcare practices including child feeding [20]. Mothers who attended formal education are also more likely to use contraceptives and space births, which in turn can reduce the risk of acute malnutrition [21].

The odds of acute malnutrition was 4.01 times higher among children who had history fever in the past two weeks prior to the study compared to those who did not have. This finding was similar with a study done in Gimbi district [22,23]. This might be due to the effect of febrile illnesses on dietary intake and increased losses

of fluid which in turn impairs nutritional status [23].

The odd of acute malnutrition was 62% lower among children who had received vaccination to their age compared to those who didn't receive. This finding was consistent with studies done in Hadaleala district, Afar region, Gambella town and Shinille district [12,13,15]. The reason for this is that vaccinated children are less likely to be infected with vaccine preventable diseases.

In this study, the odds of acute malnutrition was 3.63 times higher among children from households with two or more under five children compared to children from households with one or no other under five children. This finding was consistent with studies done in Dilla and Hawassa towns, Southern Ethiopia [24]. This could be related to sharing of resources available at home. When there are more children at home, they may not be able to get enough food required for their growth and development [12].

This study showed that children with short birth interval (born with less than 24 months before the previous birth) had higher odds of developing acute malnutrition. This finding was in line with studies done in Nepal [19] and Hawassa, Ethiopia (reference) The reason for this might be maternal depletion, which may lead to child malnutrition.

Recall bias may have affected this study. Mothers of older children may not exactly remember breastfeeding history. The study did not include family planning use and vitamin A supplementation.

## CONCLUSION

The prevalence of acute malnutrition was a public health problem in Kamashi district. Children from mothers who attended formal education, those who were vaccinated and children

whose mothers attended postnatal care had lower odds of having acute malnutrition. On the other hand, children with history of fever, those living in households with two or more under five children and children with high birth interval had higher odds of developing acute malnutrition. Kamashi district in collaboration with development partners shall increase girls' school attendance to prevent acute malnutrition among children. The district shall work to increase birth interval. In addition, efforts to prevent febrile illnesses, increase postnatal care and increase vaccination should be strengthened in the district.

## DECLARATIONS

### Ethics approval and consent to participate

Ethical clearance was obtained from Bahir Dar University, College of Medicine and Health Science Research Ethics Review Board and consent was obtained from each respondent. Permission to conduct the study was obtained from Benishangul Gumuz Regional Health Bureau, Kamashi Zonal Health Department and kebele administrative offices. Written informed consent was also obtained from parents of study participants.

## CONSENT FOR PUBLICATION

Not applicable.

## AVAILABILITY OF DATA AND MATERIALS

The datasets used during the current study are available from the corresponding author on reasonable request.

## COMPETING INTERESTS

The authors declare that they have no competing interests.

## FUNDING

There was no funding for this study.

## AUTHORS' CONTRIBUTIONS

SAB initiated the study. He prepared the proposal, supervised the data collection, entered the data to SPSS and involved in the analysis and manuscript preparation. GAF assisted the proposal development, research tool development, analysis and writing of the manuscript. AA was involved in the proposal development, data analysis, interpretation and writing of the manuscript. All authors edited and approved the manuscript.

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