

Epidemiology and outcomes of malnutrition among infants aged 1 to 5 months in North-East Nigeria: retrospective cohort study



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INTRODUCTION

Around **24.5 million infants aged less than six months (<6m) are estimated to be acutely malnourished globally**, many of those living in countries affected by humanitarian emergencies. Yet, there is no current consensus on the optimal anthropometric criterion to be used to identify malnourished infants <6m at high risk of mortality and the latest recommendations for the management of malnutrition in this age group are based on scarce and low-quality evidence.

Aim

The aim of this study was to describe the characteristics and treatment outcomes of malnourished infants aged 1-5 months admitted at MSF Inpatient Therapeutic Feeding Center (ITFC) and Ambulatory Therapeutic Feeding Center (ATFC) in Maiduguri, and identify factors associated with key treatment outcomes.

METHODS

Retrospective hospital-based cohort study using routinely collected data at MSF project. All infants aged 1-5 months admitted at ITFC and ATFC from 1st July 2019 until 30th June 2022 were included. Data was cleaned and analyzed using STATA. Analysis included:

- Descriptive statistics
- Univariate logistic regression to measure the association between selected outcomes (i.e., death at ITFC and defaulting at ATFC) and possible associated variables. Odds ratio with 95% CI were calculated and a p-value <0.05 was considered statistically significant.



ITFC ward at MSF facility in Maiduguri, 2022

STUDY SETTING

The MSF 'Nilefa Keji' hospital in Maiduguri provides ITFC and ATFC services for children aged 1-59 months, including a dedicated ward for infants <6m (around 20 beds) and ATFC consultations to follow them up after discharge from ITFC.

Admission and discharge criteria for infants <6m

ITFC	ATFC
Criteria for admission	
Anthropometrics Oedema and/or WAZ or WLZ <-2 AND either condition affecting feeding or medical complication	Referral for follow-up after discharge from ITFC
Criteria for discharge	
- Clinically well - Effective breastfeeding or effective and safe feeding with breastmilk substitutes - Weight gain of approximately 10-20g/day on exclusive breastfeeding or standard BMS volumes for at least 2-3 days	- WAZ/WLZ ≥-2 on 2 consecutive visits and MUAC ≥ 125mm (if >6m), no oedema - Adequate weight gain over at least 2 weeks of approximately 10-20g/day - Breastfeeding effectively or feeding well with breastmilk substitute

ITFC: Inpatient Therapeutic Feeding Centre; ATFC: Outpatient Therapeutic Feeding Centre; WAZ: Weight-for-age Z score; WLZ: Weight-for-length Z score; MUAC: Middle-Upper Arm Circumference; BMS: Breast Milk Substitute

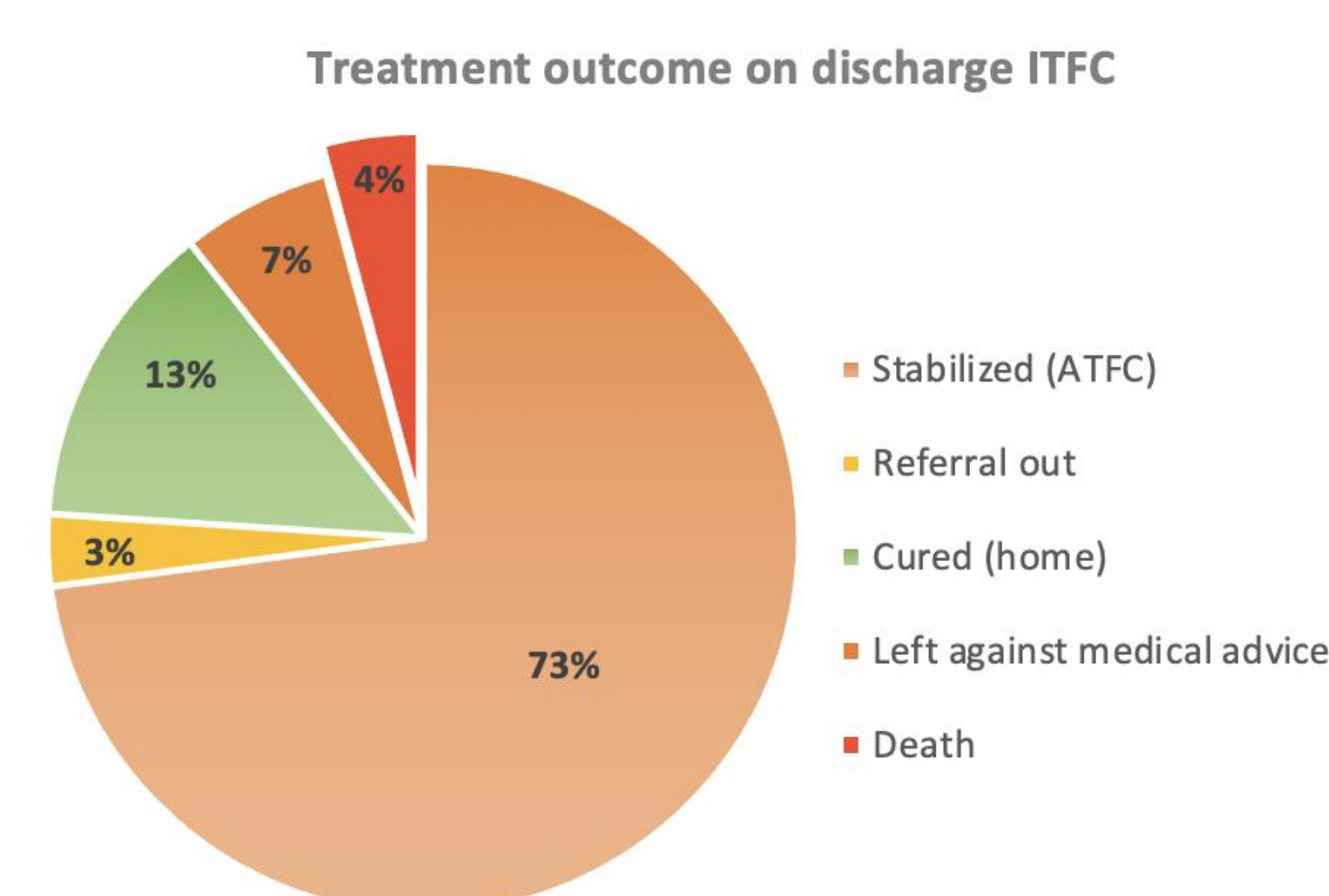
Anthropometry among infants <6m on admission at ITFC and ATFC

	ITFC	ATFC
WAZ		
N (%)		
<-3 Z-score	613 (83.29)	412 (78.93)
-3 to <-2 Z-score	73 (09.92)	64 (12.26)
>=-2 Z-Score	50 (06.79)	46 (08.81)
WLZ		
<-3 Z-score	519 (75.22)	191 (35.90)
-3 to <-2 Z-score	128 (18.55)	177 (33.27)
>=-2 Z-Score	43 (06.23)	164 (30.83)
MUAC (mm)		
< 110	301 (77.78)	43 (51.19)
110 to 114	37 (09.56)	16 (19.05)
115 to 125	40 (10.34)	19 (22.62)
>125	9 (02.33)	6 (07.33)

RESULTS

ITFC

- 940 admissions - increasing yearly
- Median age: 3.2 months
- 55.8% male vs 44.2% female – 37.5% IDPs
- Almost all had comorbidities – most common: gastroenteritis (33.6%) and respiratory infections (21.4%)
- Mean length of stay at ITFC: 10.9 days (SD 0.34)



Identified risk factors of in-hospital mortality on univariate logistic regression:

- hospital stay <10 days (OR= 7.21, 95%CI= 2.9-17.3, p= 0.001)
- presence of comorbidities such as dehydration, hypoglycemia or sepsis (OR= 4.69, 95%CI= 1.79-12.27, p= 0.002).

ATFC

- 561 admissions
- Comorbidities only recorded in 2.8% of cases
- Infants were followed up a median of 49 days (IQR 35-69)
- On discharge, **80.9% were cured, 16.2% defaulted and 1.1% died.**

On univariate analysis, the following variables were significantly associated with program defaulting:

- male sex (OR=1.49, 95%CI=1.09-2.92, p=0.001)
- IDP status (OR=1.67, 95%CI=1.05-2.68, p=0.03)
- <-3 WLZ (OR=1.93, 95%CI=1.05-3.57, p=0.03)

! This study was limited to the restricted number of variables routinely encoded in the project. The link between ITFC and ATFC data was not possible due to the different patient ID used.

Conclusion

The management of malnourished infants <6m can lead to high stabilization and recovery rates, when involving comprehensive inpatient care and outpatient follow-up for mother-infant dyads. The influence of different mother, infant and treatment characteristics on patient outcomes should be further explored. Reasons for defaulting from ambulatory nutrition programs need to be investigated in this context.

Acknowledgements

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This study went through ethical review and was granted an exemption from the Ethical Review Board in Borno State (Nigeria) and MSF Ethics Review Board (ref. 2254)



Management of malnourished infants <6m

Inpatient

- Stabilization and medical treatment of co-morbidities
- Nutritional treatment: provision of diluted F-100 therapeutic milk by supplementary suckling technique + BF on demand
- Caregivers receive adequate nutrition, mental health support and intensive lactation support with the aim to re-establish exclusive breastfeeding.

Outpatient

- Weekly consultations including infant anthropometric measurement, reporting of co-morbidities or feeding difficulties
- Referral for inpatient treatment of BF support if needed
- Provision of breastmilk substitutes when BF is not possible, and nutritional supplements to lactating mothers/wet nurses.

