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Tess A. Palmer Date

Post-enrollment Risk Factors for Defaulting from Supplementary Feeding Programs in Chad, Kenya, and Sudan

By

Tess A. Palmer

Master of Public Health

Global Epidemiology

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Carlos Navarro-Colorado, MD PhD

Committee Member

_____

Kristin Wall, PhD

Committee Chair

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By

Tess A. Palmer

Bachelor of Arts in Biology

University of Missouri

2012

Thesis Committee Chair: Kristin Wall, PhD

Committee Member: Carlos Navarro-Colorado, MD PhD

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Abstract

Post-enrollment Risk Factors for Defaulting from Supplementary Feeding Programs in Chad, Kenya, and Sudan

By Tess Palmer

Background. Defaulting, defined as more than two consecutively missed appointments at a Supplementary Feeding Program (SFP), undermines recovery from Moderate Acute Malnutrition in SFPs. Limited research has investigated factors associated with defaulting based on patient baseline demographic information. Even less research has explored unexpected events (ie. post-enrollment) as predictors of defaulting in such programs.

Objective. This study identified factors associated with children defaulting from SFPs based on responses to an exit interview administered upon leaving the SFP in three settings: an urban/semi-urban community in Chad, a rural/semi-nomadic community in Kenya, and an internally displaced persons (IDP) camp in Sudan.

Methods. Data were collected from questionnaires (N = 687 (Chad), N = 275 (Kenya), N = 808 (Sudan)) administered to caregivers of children with moderate acute malnutrition (MAM) ages 6-59 months upon their exit from an SFP. The questionnaire collected information on the family's experience in the program, perceptions of the program, as well as unexpected events that occurred during their time enrolled in the program. Country-specific multivariate logistic regression models identified factors associated with SFP defaulting.

Results. Program defaulting was common (48.5% (Chad), 25.6% (Kenya), 42.9% (Sudan)). In multivariable, country-specific analyses, factors ($p<0.05$) associated with defaulting included: reporting that the staff of the SFP were giving out the incorrect ration (Chad), the patient's dislike for the food at the SFP (Chad), reporting that the SFP was too far away (Kenya, Sudan), describing the past year as busier than expected (Kenya), families who described the last year as less busy than expected (Kenya), participating in nomadic travel (Kenya), reports of being too busy (Sudan), and having no one to care for the other children at home (Sudan). Factors associated with not defaulting were experiencing illness of the child while in the program (Chad), reporting that the SFP was too far away (Chad), caretakers being happy about the way they were treated at the SFP (Kenya), reporting that the last three months were less busy than other times (Kenya), feeling that their child seemed to be recovering (Chad, Kenya, Sudan), experiencing that there was no food at the SFP (Kenya), and reporting that the child had no one to accompany them to the SFP (Sudan).

Conclusions. Significant risk factors for defaulting from SFPs should be taken into account in planning programs as well as redesigning programs to target potentially high-risk beneficiaries in order to avoid high rates of defaulting.

Keywords: Supplemental Feeding Programs (SFP); Moderate Acute Malnutrition (MAM); Defaulting; sub-Saharan Africa

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Introduction

Malnutrition is an umbrella term which encompasses stunting, wasting, and overweight. In emergency response settings, moderate acute malnutrition (MAM), defined as a weight for age between -3 and -2 z-scores below the median of the World Health Organization's (WHO 2005) child growth standards, is often a major concern. MAM is characterized by children who are thin for their age (wasting), short for their age (stunting), or a combination of both.[1] Wasting threatens the lives of over 50 million children under five years old globally, and Africa and Asia have the heaviest burdens of all forms of malnutrition compared to the rest of the world.[2] Over 14 million of these children live in Africa, of whom 4.3 million suffer from severe wasting.[2] Apart from death, malnutrition has devastating short term consequences such as morbidity and disability, as well as long term consequences including decreased economic productivity and reproductive performance. [3]

Food insecurity due to drought or flood, infectious disease outbreaks, poor sanitation, conflict and displacement can be causes and/or effects of humanitarian emergencies and malnutrition. Nutritional intervention, ranging from a general food ration to cash transfers for food purchases, is a cornerstone of humanitarian response efforts, but the degree to which malnutrition is addressed depends on the implementing organization and the context of the emergency. One way to determine the need for nutrition programming beyond a general food ration is to measure the Global Acute Malnutrition (GAM) prevalence, defined as the total prevalence of severe and moderate acute malnutrition in a population. WHO determined that a GAM prevalence over 5% in a population is "unacceptable", an over 15% GAM is "critical".[4] Supplementary feeding programs (SFP) in emergency situations have been the standard approach to address malnutrition in refugee and internally displaced person (IDP) populations for over thirty years. SFPs provide a supplemental food ration to populations who are at risk of becoming malnourished or to patients who have already been diagnosed with MAM, known as either blanket or targeted programs, respectively.

Recently, the effectiveness of SFPs has been called into question, largely due to lack of evidence of a measurable effect on nutrition status, as well as lack of standardization of program reporting and measurement of outcome indicators. Some studies even purport that the causes of malnutrition are misunderstood and SFPs are very weakly justified. [5] WHO is a proponent of a thorough review of SFP efforts to update practices and quantify program effectiveness in order to improve overall impact.[1]

A retrospective study of 82 SFPs revealed that less than 40% of the SFPs examined had acceptable recovery rates, defined in the SPHERE standards as at least 70% of participants reaching program discharge criteria; criterion which can vary by SFP. [6] [7]This study found that the main factor contributing to unacceptably low recovery rates were high rates of participant defaulting. Defaulting occurs when a program participant is lost to follow-up or leaves a program before reaching discharge criteria and without a recorded outcome. In most programs, a patient is designated as a defaulter after they have missed two consecutive appointments and their actual outcome is unknown [6].

There is a demonstrated need for further understanding of the factors that lead to defaulting in order to generate evidence to adapt and improve programs, reinvigorate practitioners who are frustrated by current defaulting rates, and ensure measurable positive impacts on the nutrition status of emergency-affected populations. The purpose of this research is to describe the unexpected events that may occur in the lives of beneficiaries after SFP enrollment which make them more or less likely to default from emergency supplementary feeding programs and to compare the determinants of defaulting between different emergency settings in Chad, Sudan, and Kenya.

Methods

Ethics statement

This study was approved by the Director of the CNNTA (Nutrition Department for the Chad Ministry of Health), Nutrition Manager in the Kenyan Division of Nutrition, and the

General Secretary in the Sudan Ministry of Public Health. All participants provided oral informed consent.

Children between the ages of 6 and 59 months were admitted to SFPs in three countries in 2010 based on a MAM diagnosis using a weight for height z-score (WHZ) $\geq$-3 and WHZ < -2 according to WHO standards (Kenya, Sudan), a mid-upper arm circumference (MUAC) $\geq$ 115 mm and MUAC < 125 mm (Chad, Kenya, Sudan), or weight for height median percent (WHM) of $\geq$ 70% and < 80% without edema according to National Center for Health Statistics standards (Chad). Children were excluded if they had been referred from a therapeutic feeding program (TFP) as time spent in a TFP could affect SFP compliance, introducing possible bias or confusing conclusions. Included in the study were sites in Abéché, Chad managed by Action Contre le Faim (ACF) with urban and semi-urban residents; Mandera, Kenya managed by Save the Children with a rural, semi-nomadic population; and El Geneina, an Internally Displaced Persons Camp in Darfur, Sudan managed by Concern Worldwide. Each cohort site used the same methods and data collection instruments and procedures. All sites were selected because of their known high defaulting rates.

The Defaulting and Access study (DAS) is comprised of three target populations participating in SFP programs located in different Sub-Saharan African countries. The program in Abéché, Chad was started by Save the Children in 2007 and subsequently taken over by Action Contre le Faim in 2008. The program targets Chadian children and also serves the large number of refugees from Darfur that have fled across the nearby border with Sudan, through both stationary and mobile treatment units.

In June 2009, Save the Children expanded an existing Community Based Therapeutic Care (CTC) program in Mandera, Kenya to include nutrition services to serve the rural pastoralist populations across the North Eastern Province of the country. This program strives to provide access to nutrition services to the most remote areas of the region by deploying mobile teams to populations with very low resources,

whose situations are compounded by unpredictable, low levels of rainfall and disputes over waning resources.

The Concern Worldwide SFP in El Geneina, Sudan has been admitting Internally Displaced Persons (IDPs) from four local IDP camps (Riyad, Durti, Abozar and Ardamatta) as well as residents of the local town since August 2004. An average of 3,631 patients are admitted annually.

Collection of data from the programs in Chad, Kenya, and Sudan began in January 2010, February 2010, and March 2010, respectively. All new admissions to programs were eligible to be admitted into the study and were administered an Entry Interview during the next SFP distribution. Children admitted to the study were monitored daily in logbooks to determine their nutritional evolution and whether they had exited the SFP or defaulted on the program. An exit interview was administered to the caregivers of these children in order to gather data on experiences while attending the SFP, problems while attending the SFP, perceptions of the program, and occurrence of unexpected events during their time in the program.

The outcome of interest in this analysis is defaulting from an SFP, which was defined in all three countries as a patient missing at least two consecutive scheduled appointments. “Non-defaulters” were patients who were cured, as determined by meeting the program’s discharge criteria for three consecutive visits as well as those who did not respond to treatment, defined as those who did not meet the discharge criteria throughout the course of treatment but continued regularly attending visits. Cases where the patient’s caregiver refused to participate, no entry interview existed, no exit interview existed, the child died, or was transferred, were excluded from analysis.

The exit interview administered to all SFP patients at the termination of their involvement with the program is the focus of this analysis. Each country was analyzed separately to detect country-specific associations. Descriptive statistics (frequency and percent) were calculated for all covariates stratified by

defaulting status. Logistic regression was used to estimate the unadjusted odds of defaulting versus not defaulting by each individual-level variable in the exit questionnaire. All covariates with p-values < 0.05 and less than 15% missing values were included in multivariable logistic regression models. Each model was assessed for multicollinearity by examining variable condition indices (cutoff: > 30) and variance decomposition proportions (cutoff: ≥ 0.5). Unadjusted and adjusted odds ratios (OR, aOR) and 95% confidence intervals (CIs) are reported. All p-values are two-tailed. The Statistical Analysis System (SAS) 9.4 English version was used for all data analysis.

Results

The final sample of patients admitted to SFPs in 2010, following exclusion of respondents who were missing exit interviews, included 687 households of children 6-59 months old in Chad, 275 households of children 6-59 months old in Kenya, and 808 households of children 6-59 months old in Sudan. Recovery rates at the three sites were 35.1%, 54.7%, and 18.9% for Chad, Kenya, and Sudan, respectively. Slightly less than half (48.5%) of the children sampled in Chad defaulted on the SFP. Approximately a quarter (25.6%) of children in Kenya and 42.9% of children in Sudan defaulted on the SFP.

Factors significantly associated with an increased risk of defaulting in Chad included reporting that the staff of the SFP were giving out the incorrect ration (aOR: 5.4; 95% CI: 1.01, 28.6) and the patient's dislike for the food at the SFP (aOR: 1.90; 95% CI: 1.17, 3.1). Experiencing illness of the child while in the program (aOR: 0.33; 95% CI: 0.22,0.51), reporting that the SFP was too far away (aOR: 0.32; 95% CI: 0.12, 0.83) and reporting that the child seemed to be recovered (aOR: 0.16; 95% CI: 0.10, 0.24) were associated with a decreased risk of defaulting in Chad.

In Kenya, households who reported that the SFP was too far away were more likely to default (aOR: 6.59; 95% CI: 2.54, 17.10) as well as families who described the past year as busier than expected (aOR: 3.10; 95% CI: 1.14, 8.43), families who described the last year as less busy than expected (aOR: 7.98; 95% CI:

1.86, 34.27), and those who participated in nomadic travel (aOR: 3.55, 95% CI: 1.40, 9.01). Respondents in Kenya who were less likely to default included those who were happy about the way they were treated at the SFP (aOR: 0.20; 95% CI: 0.06, 0.67), those who reported that the last three months were less busy than other times (aOR: 0.12; 95% CI: 0.02, 0.77), those who felt that their child seemed to be recovered (aOR: 0.16; 95% CI: 0.05, 0.50), and those who experienced that there was no food at the SFP (aOR: 0.08; 95% CI: 0.02, 0.30).

In Sudan, reporting that the SFP was too far away (aOR: 4.71; 95% CI: 1.15, 19.35), reports of being too busy (aOR: 3.35; 95% CI: 2.29, 4.92), and having no one to care for the other children at home (aOR: 1.93; 95% CI: 1.01, 3.68) were associated with an increased probability of defaulting on the program. Households were less likely to default if they reported that their child had no one to accompany them to the SFP (aOR: 0.49; 95%CI: 0.25, 0.93), and if they felt that the child seemed to be recovered (aOR: 0.15; 95% CI: 0.1, 0.21).

There were no statistically significant differences between defaulters and non-defaulters for child's age, gender, weight or height at admission, across all countries. No multicollinearity was indicated.

Discussion

This study describes the unexpected and post-enrollment factors associated with defaulting from SFPs treating MAM in three different contexts: an urban and semi-urban population (Chad), a rural, semi-nomadic population (Kenya), and an IDP camp setting (Sudan). Our findings suggest that factors associated with defaulting are primarily country specific although, reporting that the SFP was too far away and being too busy were common factors related to defaulting in both Kenya and Sudan and reporting that that the child seemed to be recovered was associated with not defaulting in all three countries.

The goal of SFPs in emergencies is to decrease morbidity and mortality from malnutrition. Therefore, it would be reasonable to measure the effectiveness of a program based on the change in rate of malnutrition at the population level. An Emergency Nutrition Network (ENN) and Save the Children United Kingdom (SCUK) study[6] argues that this measurement is confounded by other factors in the population, such as new cases who are not enrolled in the SFP and patients who recover from MAM without treatment. This study asserts that calculation of a GAM to SAM (Severe Acute Malnutrition) ratio would be a better representation of the impacts of an SFP, as an effective SFP would lower the number of children who progress to SAM even though rates of GAM may remain approximately the same due to incident cases of MAM joining the population.

Among the urban and semi-urban beneficiaries in Chad, factors associated with defaulting were related to the program itself and personal perceptions such as distaste for the ration being distributed from the SFP. Beneficiaries were less likely to default if their caretakers reported that the child had been ill while enrolled in the program. The survey does not provide information regarding when the child's illness occurred, and experiencing illness during the program could be linked to severity of illness at admission. Furthermore, often the caregivers of children presenting with MAM do not see their child as ill, rather simply "thin" or even "normal". If a child presents in a more severe state of illness, the caregiver will be more likely to invest the time in proper attendance of the SFP. [8]

The only significant risk factor for defaulting unique to Kenya was the practice of nomadic travel. This finding showcases the economy-specific nature of success in SFPs, wherein the opportunity costs of program attendance must be taken into account in planning. The program included 56 (20%) beneficiaries who practiced nomadic travel, making those participants more likely to miss two or more consecutive appointments. Reporting that the past year was less busy than was expected was also associated with

defaulting in the data, but this finding is most likely spurious due to high degrees of missingness for other variables.

At the IDP camp in Sudan, caretakers were more likely to default when there was no one to care for their children left at home. This factor could be associated with the opportunity costs of making the decision to leave all other children unattended to accompany only one child to the SFP. Issues with having no one to take care of the other children in the home could also be linked to the distance between the beneficiary's home and the SFP. In this country as well, experiencing a food stock-out at the SFP made beneficiaries less likely to default on the program. This finding may be a function of desperation, where families who miss out on their ration at one visit are more likely to return the next time because their need had grown that much more over the interim time period.

In both Kenya and Sudan, reporting that the SFP was too far away presented a higher probability of defaulting. While this finding is not surprising and has been seen in other contexts such as an SFP in Afghanistan, it reiterates the importance of thoughtfulness during SFP planning regarding the location of the program in relation to the target population. [6] Interestingly, reports that the SFP was too far away were associated with a decreased risk of defaulting in Chad; this unexpected finding indicates that in some locales, while distance is a concern, it is not necessarily a barrier. This finding may also be the result of context, as the average distance from the residences to the SFPs in Chad was much shorter than in the other settings. [8] Seasonal trends play a role in reports of how busy a certain time of year is and in Sudan and Kenya, being 'too busy' was predictive of defaulting. In Kenya, the level of busyness was important, as respondents who reported that they were less busy than usual were less likely to default, demonstrating that the association goes in both directions. This self-reported measure of being busy may be a component of opportunity costs that have been found to be significantly associated with defaulting in other studies[6].

In all three countries, feeling that the child seemed to be recovered made caretakers and beneficiaries less likely to default. This result could be indicative of a growing interest in program attendance on the part of the caretaker based upon noticeable positive progress in the beneficiary.

Previous studies of factors associated with defaulting in SFPs as well as tuberculosis (TB) and HIV programs, have had similar findings as this study. An HIV undernutrition program in Ethiopia found that the distance to the program was significantly associated with defaulting and a TB treatment program in Indonesia found that knowledge and perception factors were associated with defaulting (ie. better TB knowledge, less likely to default). [9] [10] The analysis of entrance interviews completed by the participants in our study found similar risk factors as a study of a first-line health program in Burkina treating MAM, where the age of the caretaker was inversely related to the risk of defaulting. [11] Interestingly, a study of a hospital based nutrition rehabilitation clinic in Bangladesh found that the main reason for defaulting among caretakers was that 'follow up was not needed since the child was okay', which may contradict our findings, though this should be studied further as 'the child was okay' and 'the child had recovered', as was examined in our study, may not have the same meaning. [12] Perhaps the explanation of the difference in findings lies in the contextual variance between our emergency situations and non-emergency settings such as Bangladesh along with possible differences in underlying meaning of the question posed in the interview.

Limitations

Thirty-five interviews (16 in Chad, 16 in Kenya, and 3 in Sudan) were excluded because there was no exit interview to accompany the admission interview, and thus the proportion of defaulters may be underestimated if the excluded beneficiaries were more likely to default on the program. As with all self-reported data, there is potential for misclassification of which could be differential by the outcome and thus bias our results in an unknown direction. High levels of missingness in responses for some variables may have skewed conclusions found in multivariable models as only variables with less than

15% missingness were included in these models. A sensitivity analysis involving multiple imputation of these missing values is currently being conducted to compare our results to possible results when all variables from the exit survey are eligible to be included in multivariable models.

Conclusions

Defaulting in SFPs is most often associated with seasonal and secular trends, quality of program management, opportunity costs, quality of service, and lack of adaptation of the program to local context. [6] The Defaulting and Access Study strengthens the body of knowledge regarding reasons for defaulting from SFPs in emergency settings and reiterates the context-specific nature of these programs. Program managers should take these risk factors into account both when planning new programs and updating existing programs, to provide services closer to the target population and to improve user friendliness. Furthermore, the findings of this analysis should be utilized to target SFP beneficiaries who may be at higher risk of defaulting in order to facilitate their continued attendance of the program. Defaulting rates should be continuously monitored in order to inform program redesign as needed.

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Table 1. Descriptive, Bivariate, and Multivariate Analysis of Significant Factors Associated with Defaulting in Supplementary Feeding Programs (SFP) for Children 6 - 59 months (N = 687) in **Chad** in 2010

Factor	Defaulters (N = 333) (%)	Non-Defaulters (N = 354) (%)	Bivariate Analysis				Primary Multivariate Analysis			
			OR	95% Confidence Interval		P-value	aOR	95% Confidence Interval		P-value
				Lower	Upper			Lower	Upper	
Experienced Illness of Child in the program	91 (27.3)	144 (40.7)	0.55	0.40	0.756	0.000	0.33	0.22	0.51	**0.000**
Illness of person normally accompanying the child	31 (9.3)	53 (15.0)	0.58	0.36	0.93	0.025	1.94	1.00	3.77	**0.051**
Mother pregnant or giving birth	15 (4.5)	37 (10.5)	0.40	0.22	0.75	0.004	0.71	0.32	1.58	0.401
Illness of other family member	16 (4.8)	25 (7.1)	0.66	0.35	1.27	0.215				
Death in family/funeral	20 (6.0)	30 (8.5)	0.69	0.38	1.24	0.215				
Visiting Relatives	21 (6.3)	48 (13.6)	0.43	0.25	0.73	0.002	0.72	0.36	1.43	0.353
No one to care for other children	10 (3.0)	7 (2.0)	1.54	0.58	4.08	0.391				
No one to accompany to SFP	4 (1.2)	4 (1.1)	1.06	0.26	4.29	0.931				
Lost Card	7 (2.1)	15 (4.2)	0.49	0.20	1.21	0.120				
SFP too far	8 (2.4)	26 (7.3)	0.31	0.14	0.70	0.005	0.32	0.12	0.83	**0.020**
Told not to return by SFP staff	3 (0.9)	1 (0.3)	3.20	0.33	30.90	0.314				
Transferred to another program	2 (0.6)	0 (0)				-				
No food at SFP	1 (0.3)	0 (0)				-				
Didn't hear my name called out	6 (0.3)	13 (0.3)	1.06	0.07	17.07	0.965				

Staff were giving out incorrect ration	10 (3)	2 (0.6)	5.45	1.19	25.05	0.029	5.40	1.02	28.63	**0.048**
Inconvenience of weighing day	0 (0)	0 (0)	-	-	-	-	-	-	-	-
Unfriendliness of SFP staff	1 (0.3)	0 (0)	-	-	-	-	-	-	-	-
Too busy	30 (9.0)	36 (10.2)	0.88	0.53	1.46	0.607				
Nomadic travel	3 (0.9)	3 (0.9)	1.06	0.21	5.31	0.940				
Labor migration	6 (1.8)	2 (0.6)	3.23	0.65	16.11	0.153				
No money for transport	4 (1.2)	7 (2.0)	0.60	0.18	2.08	0.423				
Costs associated with attending	0 (0)	1 (0.3)	-	-	-	-	-	-	-	-
Involuntary displacement (fire, flood, outbreak)	7 (2.1)	5 (1.4)	1.50	0.47	4.77	0.493				
Festivity/Marriage/Baptism	22 (6.6)	49 (13.8)	0.44	0.26	0.75	0.002	0.76	0.40	1.45	0.407
Insecurity	0 (0)	1 (0.3)	-	-	-	-	-	-	-	-
Child dislikes food	90 (27.0)	50 (14.1)	2.25	1.53	3.31	0.000	1.90	1.17	3.09	**0.010**
Child seemed to be recovered	48 (14.4)	195 (55.1)	0.14	0.10	0.20	0.000	0.16	0.10	0.24	**0.000**
Husband/partner refused	3 (0.9)	5 (1.4)	0.64	0.15	2.68	0.536				
Preferred traditional medicine	1 (0.3)	1 (0.3)	1.06	0.07	17.07	0.965				

All Factors are modeling the answer “Yes” to the given occurrence, with “No” as the reference group

OR: odds ratio; aOR: adjusted odds ratio

p-values are two-tailed

Table 2. Descriptive, Bivariate, and Multivariate Analysis of Significant Factors Associated with Defaulting in Supplementary Feeding Programs (SFP) for Children 6 - 59 months (N = 275) in **Kenya** in 2010

Factor	Defaulters (N = 70) (%)	Non-Defaulters (N = 205) (%)	Bivariate Analysis				Primary Multivariate Analysis			
			OR	95% Confidence Interval		P-value	aOR	95% Confidence Interval		P-value
				Lower	Upper			Lower	Upper	
Experienced Illness of Child in the program	20 (26.3)	83 (37.6)	0.59	0.33	1.06	0.078				
Illness of person normally accompanying the child	17 (22.4)	40 (18.1)	1.30	0.69	2.47	0.416				
Mother pregnant or giving birth	14 (18.4)	39 (17.6)	1.05	0.54	2.07	0.879				
Illness of other family member	6 (7.9)	18 (8.1)	0.97	0.37	2.53	0.945				
Death in family/funeral	0 (0)	2 (0.9)	-	-	-	-	-	-	-	-
Visiting Relatives	19 (25)	41 (18.6)	1.46	0.79	2.72	0.229				
No one to care for other children	9 (11.8)	28 (12.7)	0.93	0.42	2.06	0.851				
No one to accompany to SFP	18 (10.5)	21 (9.5)	1.12	0.47	2.65	0.795				
Lost Card	6 (7.9)	7 (3.2)	2.62	0.85	8.06	0.093				
SFP too far	40 (52.6)	45 (20.4)	4.35	2.49	7.58	0.000	6.60	2.55	17.07	0.000
Told not to return by SFP staff	0 (0)	3 (1.4)	-	-	-	-	-	-	-	-
Transferred to another program	0 (0)	4 (1.8)	-	-	-	-	-	-	-	-
No food at SFP	7 (9.2)	70 (31.7)	0.22	0.10	0.50	0.000	0.08	0.02	0.30	0.000
Didn't hear my name called out	1 (1.3)	5 (2.3)	0.58	0.07	5.01	0.617				

Staff were giving out incorrect ration	0 (0)	1 (0.5)	-	-	-	-	-	-	-	-
Inconvenience of weighing day	21 (27.6)	43 (19.5)	1.58	0.87	2.89	0.137				
Unfriendliness of SFP staff	0 (0)	0 (0)	-	-	-	-	-	-	-	-
Too busy	29 (38.2)	48 (21.7)	2.22	1.27	3.90	0.005	2.21	0.90	5.43	0.085
Nomadic travel	30 (39.5)	25 (11.3)	5.11	2.75	9.51	0.000	3.55	1.40	9.01	0.008
Labor migration	0 (0)	1 (0.5)	-	-	-	-	-	-	-	-
No money for transport	5 (6.6)	6 (2.7)	2.53	0.75	8.52	0.136				
Costs associated with attending	0 (0)	2 (0.9)	-	-	-	-	-	-	-	-
Involuntary displacement (fire, flood, outbreak)	1 (1.3)	4 (1.8)	0.72	0.08	6.57	0.774				
Festivity/Marriage/Baptism	0 (0)	7 (3.2)	-	-	-	-	-	-	-	-
Insecurity	3 (4.0)	4 (1.8)	2.23	0.489	10.20	0.301				
Child dislikes food	20 (26.3)	33 (14.9)	2.04	1.08	3.82	0.027	2.17	0.67	6.96	0.194
Child seemed to be recovered	9 (11.8)	64 (29.0)	0.33	0.16	0.70	0.004	0.16	0.05	0.50	0.002
Husband/partner refused	0 (0)	4 (1.8)	-	-	-	-	-	-	-	-
Preferred traditional medicine	0 (0)	3 (1.4)	-	-	-	-	-	-	-	-
Had problems getting to SFP	26 (35.6)	41 (19.3)	2.32	1.29	4.18	0.005	1.50	0.61	3.68	0.380
How Busy in the last 3 months?										
Less busy than other times	2 (2.7)	29 (13.6)	0.25	0.06	1.10	0.067	0.12	0.02	0.77	0.026
As busy as usual	37 (50.7)	135 (63.1)	ref	ref	ref	ref				
More busy than usual	32 (43.8)	44 (20.6)	2.65	1.48	4.75	0.001	2.05	0.81	5.19	0.128
In Relation to Other years was this:										
Busier than expected	42 (57.5)	81 (37.3)	2.22	1.22	4.06	0.010	3.10	1.14	8.43	0.026

Less busy than expected	9 (12.3)	38 (17.5)	1.02	0.43	2.42	0.973	7.98	1.86	34.27	0.005
As Expected	21 (28.7)	90 (41.5)	ref	ref	ref	ref	ref	ref	ref	ref
How would you describe experience at SFP?										
Good	193 (38.9)	348 (56.5)	-	-	-	-	-	-	-	-
Average	40 (55.6)	90 (41.7)	-	-	-	-	-	-	-	-
Bad	4 (5.6)	3 (1.4)	-	-	-	-	-	-	-	-
Don't Know	0 (0)	1 (0.5)	-	-	-	-	-	-	-	-
How could things be improved at SFP?										
Better staff training	0 (0)	0 (0)	-	-	-	-	-	-	-	-
Provide shade in waiting area	12 (16.4)	24 (11.1)	1.57	0.74	3.33	0.236				
Shorter waiting times	25 (34.3)	63 (29.2)	1.27	0.72	2.23	0.415				
Give priority to cases from far	13 (17.8)	45 (20.8)	0.82	0.42	1.63	0.577				
Attend new comers first	5 (6.9)	15 (6.9)	0.99	0.35	2.81	0.978				
Ask to come less often	2 (2.7)	8 (3.7)	0.73	0.15	3.53	0.698				
Better quality food	65 (89.0)	188 (87.0)	1.21	0.53	2.79	0.654				
Avoid days without food	14 (19.2)	71 (32.9)	0.49	0.25	0.93	0.029	1.18	0.42	3.35	0.753
Staff be more friendly	0 (0)	1 (0.5)	-	-	-	-	-	-	-	-
Be less strict with admission criteria	16 (21.9)	37 (17.1)	1.36	0.70	2.62	0.362				
Open another SFP closer from home	24 (32.9)	60 (27.8)	1.27	0.72	2.26	0.407				
Provide transport	13 (17.8)	37 (17.1)	1.05	0.52	2.10	0.894				
Weight same village each day	0 (0)	2 (0.9)	-	-	-	-	-	-	-	-
Other	0 (0)	0 (0)	-	-	-	-	-	-	-	-
Don't know	1 (1.4)	2 (0.9)	-	-	-	-	-	-	-	-

Situation makes caretaker unhappy	21 (28.4)	58 (26.7)	1.11	0.61	2.00	0.735				
Unhappy for Other Reasons	13 (17.6)	42 (19.4)	0.95	0.48	1.90	0.099				
Received Other things from SFP?										
Yes, Family Rations	1 (1.4)	7 (3.2)	-	-	-	-	-	-	-	-
Yes, NFI's	65 (87.8)	192 (88.5)	-	-	-	-	-	-	-	-
Yes, Other	0 (0)	1 (0.5)	-	-	-	-	-	-	-	-
No	8 (10.8)	17 (7.8)	-	-	-	-	-	-	-	-
Child Liked Food Received (CSB)	50 (67.6)	184 (85.2)	0.36	0.20	0.67	0.001	0.35	0.12	1.07	0.066
Child ever refused to eat the food	53 (71.6)	112 (51.9)	2.34	1.32	4.15	0.004	1.51	0.63	3.64	0.358
Child Continued eating other foods as usual	45 (60.8)	177 (81.6)	0.35	0.20	0.63	0.000	1.22	0.48	3.10	0.677
SFP food was shared with others besides child	72 (97.3)	202 (94.0)	2.32	0.51	10.52	0.276				
Did this aspect of the SFP make you happy?										
Time spent waiting in the center	28 (37.8)	103 (47.5)	0.67	0.39	1.16	0.152				
Comfort and shading of the waiting area	35 (47.3)	148 (68.2)	0.42	0.24	0.72	0.002	1.59	0.62	4.08	0.338
Staff competency	51 (68.9)	175 (80.7)	0.53	0.29	0.97	0.038	1.45	0.50	4.30	0.503
The type of food given (quantity or quality)	20 (27.0)	84 (38.7)	0.59	0.33	1.05	0.072				
The way your child was treated	58 (78.4)	187 (86.2)	0.58	0.30	1.14	0.115				
The way you were treated	175 (81.1)	337 (94.5)	0.25	0.11	0.57	0.001	0.20	0.06	0.67	0.009

All Factors are modeling the answer “Yes” to the given occurrence, with “No” as the reference group

OR: odds ratio; aOR: adjusted odds ratio

p-values are two-tailed

Table 3. Descriptive, Bivariate, and Multivariate Analysis of Significant Factors Associated with Defaulting in Supplementary Feeding Programs (SFP) for Children 6 - 59 months (N = 808) in **Sudan** in 2010

Factor	Defaulters (N = 347) (%)	Non-Defaulters (N = 461) (%)	Bivariate Analysis				Primary Multivariate Analysis			
			OR	95% Confidence Interval		P-value	aOR	95% Confidence Interval		P-value
				Lower	Upper			Lower	Upper	
Experienced Illness of Child in the program	174 (50.1)	312 (67.7)	0.48	0.36	0.64	0.000	0.75	0.49	1.14	0.182
Illness of person normally accompanying the child	45 (13.0)	56 (14.3)	0.89	0.59	1.34	0.582				
Mother pregnant or giving birth	18 (5.2)	25 (5.4)	0.95	0.51	1.78	0.883				
Illness of other family member	63 (18.2)	88 (19.1)	0.94	0.66	1.35	0.737				
Death in family/funeral	28 (8.1)	59 (12.8)	0.60	0.37	0.96	0.033	0.87	0.50	1.51	0.608
Visiting Relatives	100 (28.8)	221 (48.0)	0.44	0.33	0.59	0.000	1.02	0.60	1.76	0.937
No one to care for other children	48 (13.8)	113 (24.5)	0.50	0.34	0.72	0.000	1.93	1.01	3.68	0.047
No one to accompany to SFP	59 (17)	159 (34.5)	0.39	0.28	0.55	0.000	0.49	0.25	0.93	0.030
Lost Card	8 (2.3)	3 (0.7)	3.60	0.95	13.67	0.060				
SFP too far	10 (2.9)	3 (0.7)	4.53	1.24	16.59	0.023	4.71	1.15	19.35	0.032
Told not to return by SFP staff	2 (0.6)	0 (0)	-	-	-	-	-	-	-	-
Transferred to another program	2 (0.6)	0 (0)	-	-	-	-	-	-	-	-
No food at SFP	6 (1.7)	13 (2.8)	0.61	0.23	1.61	0.316				

Didn't hear my name called out	0 (0)	0 (0)	-	-	-	-	-	-	-	-
Staff were giving out incorrect ration	0 (0)	0 (0)	-	-	-	-	-	-	-	-
Inconvenience of weighing day	1 (0.3)	0 (0)	-	-	-	-	-	-	-	-
Unfriendliness of SFP staff	0 (0)	0 (0)	-	-	-	-	-	-	-	-
Too busy	134 (38.6)	119 (25.8)	1.81	1.34	2.44	0.000	3.35	2.29	4.92	0.000
Nomadic travel	17 (4.9)	9 (2.0)	2.59	1.14	5.88	0.023	1.89	0.75	4.78	0.176
Labor migration	56 (16.1)	59 (12.8)	1.31	0.88	1.95	0.179				
No money for transport	9 (2.6)	5 (1.1)	2.43	0.81	7.30	0.115				
Costs associated with attending	4 (1.2)	2 (0.4)	2.68	0.49	14.69	0.257				
Involuntary displacement (fire, flood, outbreak)	1 (0.3)	4 (0.9)	0.33	0.04	2.97	0.323				
Festivity/Marriage/Baptism	29 (8.4)	80 (17.4)	0.43	0.28	0.68	0.000	0.61	0.35	1.09	0.097
Insecurity	3 (0.9)	6 (1.3)	0.66	0.16	2.66	0.561				
Child dislikes food	26 (7.5)	14 (3.0)	2.59	1.33	5.03	0.005	1.45	0.64	3.30	0.377
Child seemed to be recovered	136 (39.2)	375 (81.3)	0.15	0.11	0.20	0.000	0.15	0.10	0.21	0.000
Husband/partner refused	2 (0.6)	1 (0.2)	2.67	0.24	29.53	0.424				
Preferred traditional medicine	6 (1.7)	0 (0)	-	-	-	-	-	-	-	-

All Factors are modeling the answer “Yes” to the given occurrence, with “No” as the reference group

OR: odds ratio; aOR: adjusted odds ratio

p-values are two-tailed