Wasting and stunting risk factors in Somali internally displaced person settlements

Women and their children wait to receive assistance at Community Empowerment and Development Action Health Centre in Dolow, Somalia

This article summarises the key findings of a recent Link Nutrition Causal Analysis (NCA) study conducted in Settlements for the Internally Displaced Population in Dollow, Somalia. The primary quantitative data collection was substituted by secondary quantitative data analyses using datasets provided by the Food Security and Nutrition Analysis Unit (FSNAU) covering the Gu and Deyr seasons between 2014 and 2020. Therefore, this is the first Link NCA study with a longitudinal perspective

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Key messages:

- While the overlap between the risk factors of wasting and stunting in Dollow was considerable, not all the studied risk factors were consistently relevant for every nutrition outcome and/or season. The observed differences, therefore, need to be studied, especially in the case of reverse or counter-intuitive associations, and properly considered in future programming.
- Common risk factors for wasting and stunting include a male child, the occurrence of morbidities, including diarrhoea and pneumonia, and the household's dependence on gifts/*zakaat* as their primary source of income. Children younger than 24 months also had higher odds of being wasted or stunted.
- On the other hand, children were less likely to be wasted or stunted if their household owned land or declared petty trade as their primary source of income.

Background

Dollow – also spelt Dolow or Doolow (Somali) – is a town in the Gedo region of South-Central Somalia, on the border with Ethiopia and Kenya, and around which numerous internally displaced person (IDP) settlements exist. The Gedo region has long been burdened with the cumulative effects of protracted conflict and recurrent natural disasters such as drought. These events have resulted in the disruption of livelihood systems and the displacement of the population from within and around the region. The internally displaced population has settled predominantly in two informal settlements, Kabasa and Qansahley, representing 70% of Dollow's total population. The population is food insecure and reliant on casual labour to earn money as other livelihoods options are scarce.

The level of global acute malnutrition (GAM) across the Dollow IDP settlements remains consistently high and often at the emergency threshold. The latest data shows that 14.3% of children under five years of age are wasted and 25.3% are stunted (GNR, 2021). Multiple root causes such as poverty, lack of education and cultural practices – such as early marriage and pregnancy – contribute to the serious nutrition situation, exacerbated by environmental threats and continual conflict (GNC, 2021).

Most interventions in the Dollow IDP settlements are primarily provided by United Nations (UN) agencies either directly or via their local partners. They predominantly cover the health, nutrition and water, sanitation and hygiene (WASH) sectors. Food security and livelihoods projects are scarce.

A joint World Food Programme/UNICEF resilience project was designed based on the key findings of the Strengthening Nutrition Security Nutrition Causal Analysis conducted in 2015. However, years of multi-sector programming did not bring a desired effect and the GAM prevalence in Dollow remained critically high. Therefore, the need to better understand the key drivers of undernutrition and to adapt response programming more effectively remained relevant. In November 2019, a more comprehensive analysis was requested by UNICEF, and Action Against Hunger UK conducted a Link Nutrition Causal Analysis (NCA) (See Box 1).

Box 1 About Link NCA

Link NCA (Nutrition Causal Analysis) is an established participatory and results-oriented methodology for analysing the multi-causality of undernutrition to inform context-specific nutrition-sensitive programming. The Link NCA methodology was developed to help researchers to discover the causal pathways of undernutrition, considering multiple sources of data including statistical associations with a variety of individual and household indicators that depict the broader environment, changes in the patterns of undernutrition over time and seasonally and recommendations for programming based on the risk factors likely to be the most modifiable by stakeholders.

To answer these questions, Link NCA studies employ a mixed-methods approach, combining both qualitative and quantitative research methods, and draw conclusions from a synthesis of the results. The Link NCA is carried out in the following five steps: the preparatory phase, the identification of hypothesised risk factors and pathways, community-level data collection, a synthesis of the results and building technical consensus and communicating results and planning for a response.

For more information see https://www.linknca.org/

Methodology

The main objective of this Link NCA study was to identify the drivers of persistently high levels of wasting in order to strengthen the holistic programmatic response to this burden. The focus on wasting was expanded to include stunting over the course of the study to consider the potential similarities or differences in the risk factors associated with both nutrition outcomes.

Due to the COVID-19 pandemic, the preparatory phase of the study spanned from February to December 2020, the review of available literature on risk factors of undernutrition in the study zone being conducted twice to capture all the available evidence that could have been published between the two runs. With ethical approval issued in November 2020, the hypothesised risk factors were presented, examined and validated for field testing during the Initial Technical Workshop organised via a teleconference on 13th December 2020.

The qualitative study lasted four weeks, spanning from 1st April 2021 to 2nd May 2021. It comprised of an in-depth inquiry including 32 focus group discussions, 29 semi-structured interviews and 14 observations with a total of 285 participants, of which 111 were female. All the qualitative data was recorded manually in a notebook and reproduced electronically. The data was grouped by themes and analysed using qualitative content analysis methods.

For financial reasons, the usual quantitative survey was replaced by secondary quantitative data analyses using datasets provided by the Food Security and Nutrition Analysis Unit (FSNAU), covering the Gu and Deyr[1] seasons between 2014 and 2020. Each dataset included a range of indicators including anthropometrics and health status for children 6-59 months and their caregivers, household food security and dietary diversity indicators. The exact indicators differed by dataset. The number of observations (children 6-59 months) after the exclusions of World Health Organization (WHO) flags[2] is presented in Table 1.

Both bivariate logistic and linear regression were undertaken using STATA software to determine the associations between the various risk factors and child nutrition status (being stunted or wasted).

The final stage involved the synthesis and triangulation of the data which included the design of causal pathways based on community perceptions and all the generated evidence.

Findings

The analyses undertaken during this Link NCA study identified 17 risk factors believed to have an impact on the prevalence of undernutrition in the study zone. Following a triangulation of data from diverse sources,[3] four risk factors were identified as having a major impact, eight risk factors were classified as having an important impact and five risk factors were judged to have a minor impact on the incidence of undernutrition in the zone of study. Among the major risk factors, two were identified in the sector of mental health and care practices, namely **non-optimal breastfeeding practices** and **non-optimal complementary feeding practices**, while the other two major risk factors, **low access to income sources** and **low coping capacities**, were identified in the sector of food security and livelihoods.

As per community explanations, the dominant pathway to undernutrition likely takes its roots in limited access to income sources which triggers inadequate coping strategies with an effect on the dietary intake of the household, mostly affecting women of reproductive age and children under five years of age. Limited access to income sources coupled with low social support for women increases women's workload as they absorb income-generating responsibilities subsequently distancing them from childcare. Women's workload can be further exacerbated by repetitive pregnancies with negative consequences on their nutritional status which in turn lowers their capacity and/or their perception of their capacity to breastfeed. Inadequate childcare practices then translate into greater child vulnerability to diseases and inadequate nutritional intake and consequently undernutrition. This pathway resembles the pathway designed for the SO-19 livelihood zone covering IDP settlements in the Kahda district during a Link NCA study in 2019.[4]

Based on available data provided by FSNAU, the calculation of the statistical associations between individual risk factors and the nutritional status of children in the surveyed households allowed researchers to differentiate between the risk factors of wasting and stunting (See Table 2).

Common risk factors for wasting (based on at least one index: weight for height z-score (WHZ) or mid-upper-arm circumference (MUAC) or WHZ and/or MUAC) and stunting include a **male child**,[5] the occurrence of morbidities – such as **diarrhoea** or **pneumonia** – and the household's dependence on **gifts/*zakaat***[6] as their primary source of income. Children younger than 24 months also had higher odds of being wasted or stunted. On the other hand, children were less likely to be wasted or stunted if their household **owned land** or declared **petty trade** as their primary source of income.

Key risk factors for wasting (based on at least one index: WHZ or MUAC or WHZ and/or MUAC) – but not stunting included **fever** or **measles**, **above average household size** (≥6 members) and income from **camel or cattle sales**. On the other hand, children were less likely to be wasted if they received a **polio vaccination**, **vitamin A supplementation** or their household declared **self-employment** as their primary source of income. The **mother's education** was associated with a decreased likelihood of having a wasted

Table 1 Summary of observations per dataset after the exclusion of WHO flags

Final sample	Deyr			Gu		
Year	WHZ	HAZ	WAZ	WHZ	HAZ	WAZ
2014	827	833	833			
2015	714	715	715	861	867	866
2016	706	707	707	633	631	636
2017	576	576	576	623	623	622
2018	709	710	710	626	625	627
2020	622	621	624	613	611	615

WHZ: weight-for-height Z-score, HAZ: height-for-age Z-score, WAZ: weight-for-age Z-score

[1] Rainy seasons: The Deyr (Oct-Dec) season rainfall is usually of shorter duration and less amount and intensity compared to the Gu (Mar-May) season rainfall but both are beneficial in supporting seasonal agricultural activities and replenishing water and pasture resources.

[2] The WHO flags aim to remove extreme (i.e., likely implausible) values that are more likely to be measurement error rather than reflect true measurements. The range for suggested outliers varies according to the indicator:
HAZ <-6, HAZ >+6; WAZ<-6, WAZ>+5; WHZ<-5, WHZ>+5.

[3] Per Link NCA guidelines, the following sources are consistently included in the triangulation exercise: scientific literature compiled in Link NCA "Pathways to Undernutrition", a secondary data review relevant for the study zone, technical experts' rating during an Initial Technical Workshop, statistical analyses – in this case based on FSNAU datasets, community rating of risk factors collected during the qualitative inquiry and qualitative team rating.

[4] Conducted by Action Against Hunger Somalia for the BRCIS consortium in the SO-19 livelihood zone of the Kahda district in 2019.

[5] The vulnerability of male children towards wasting was most pronounced during the Deyr seasons of 2014 and 2016.

[6] Cash, food-in-kind, animals, etc.

child based on WHZ but an increased likelihood of wasting by MUAC.

Key protective factors for stunting but not wasting (based on at least one index: WHZ or MUAC or WHZ and/or MUAC) include the **mother's MUAC** and a consumption of **fruits** and **organ meat**. Children living in households with a **woman decision-maker** were potentially less likely to be stunted.

Discussion

The Link NCA study in the Dollow IDP settlements generated substantial evidence demonstrating considerable overlaps between the risk factors of wasting and stunting. However, not all risk factors were consistently relevant for each studied nutrition outcome. The observed differences need to be studied, especially in case of reverse or counter-intuitive associations, and properly considered in future programming. In the case of Dollow, for example, targeted interventions for above average sized households may be more effective in the fight against wasting rather than stunting while the support of land ownership might be a beneficial tool for tackling multiple nutrition deficits and decreasing a household's vulnerability and dependency on aid.

In addition, the Link NCA study in Dollow was the first of its kind with a longitudinal perspective. Logistic and linear regressions were undertaken for each dataset separately as well as for a combined dataset that included all data from 2014 to 2020. This allowed the exploration of the relationships between nutritional outcomes and personal and household indicators of more than 8,000 children under five years of age while considering the potential seasonal variations in those relationships. For example, children who had pneumonia, fever or measles in the two weeks prior to data collection were more likely to be wasted in the Deyr season while the consumption of nutritious foods such as vitamin A rich fruits and vegetables was more likely to be protective of wasting during the Gu season. As such, the study's findings will not only allow the prioritisation of interventions tailored to the population's needs but also help implementing partners to roll these out during periods of their increased vulnerability. In other words, a solid base of evidence around child's vulnerability within the 1,000 days' window reinforced the need for supporting vulnerable households/persons (e.g., male children, children from above-average sized households, children at heightened risk of child morbidities) to adopt and maintain optimal child care behaviours especially during the Deyr season.

Recent research from Chad (Marshak et al, 2021) suggests that future programming and research must better understand and incorporate the seasonal nature of both wasting and all its drivers in order to be effective. The experience harnessed during the Link NCA study in the Dollow IDP settlements supports these conclusions while it also unveiled the potential of existing data to feed into longitudinal analyses. In contexts where annual surveys or effective surveillance systems are in place, additional primary data collection, tailored to the specific needs of in-depth studies, which spans multiple years may be too slow to advise meaningful, multi-sector programming in the immediate term. Therefore, where such data exists, it should be appropriately explored and used to build a case for further research.

Table 2 Notable statistical associations between risk factors and wasting and stunting demonstrated by logistic regression (All FSNAU data combined 2014-2020)

Risk factor		Wasting (WHZ)	Wasting (MUAC)	Wasting (MUAC and/or WHZ)	Stunting
Logistic Regression		*Children 6-59 months*	*Children 6-59 months*	*Children 6-59 months*	*Children 6-59 months*
Indicator	**N (%)**	**Odds Ratio [95% CI]**	**Odds Ratio [95% CI]**	**Odds Ratio [95% CI]**	**Odds Ratio [95% CI]**
Male child	4,303 (50.9)	1.3** [1.14-1.48]	0.77* [0.65-0.93]	1.17* [1.03-1.33]	1.38** [1.27-1.50]
Age group -<24 months	2,967 (35.1)	1 [0.87-1.13]	9.32** [7.24-11.99]	1.5** [1.32-1.70]	1.74** [1.53-1.97]
Above average household size (> =6 members)	3,001 (41)	1.17* [1.03-1.32]	0.99 [0.81-1.22]	1.15* [1.03-1.29]	0.93 [0.84-1.04]
Income from: Sales of camel and cattle	7 (0.2)	2.93* [1.09-7.82]	1 [1.00-1.00]	2.45 [0.92-6.54]	1 [1.00-1.00]
Income from: Petty trade	604 (16.8)	0.95 [0.72-1.25]	0.6* [0.39-0.92]	0.87 [0.68-1.12]	0.74* [0.59-0.92]
Income from: Gifts/Zakaat (cash, food-in-kind, animals, etc.)	147 (4.1)	1.36 [0.87-2.13]	1.71* [1.10-2.67]	1.37 [0.95-1.97]	1.5* [1.06-2.14]
Has assets: land	1,705 (47.4)	0.8* [0.64-0.99]	0.85 [0.61-1.18]	0.84 [0.67-1.04]	0.83* [0.70-0.99]
Diarrhoea in last 2 weeks	431 (5.1)	1.41* [1.08-1.83]	5.18** [3.73-7.18]	2.02** [1.55-2.63]	1.58** [1.26-1.97]
Pneumonia in last 2 weeks	414 (4.9)	1.12 [0.85-1.48]	3.99** [2.76-5.76]	1.61** [1.23-2.12]	1.44* [1.14-1.81]
Fever in last 2 weeks	735 (8.7)	1.49* [1.15-1.94]	2.13** [1.55-2.94]	1.53** [1.21-1.93]	1.13 [0.93-1.37]
Measles in last 2 weeks	59 (0.7)	1.22* [1.01-1.47]	1.42** [1.15-1.74]	1.29 [0.98-1.69]	1.05 [0.85-1.29]
Morbidity in last two weeks	1,718 (20.2)	1.51** [1.25-1.82]	3.31** [2.59-4.23]	1.77** [1.47-2.12]	1.18* [1.02-1.37]
WASH: Toilet used by most members of the household	278 (8.8)	1.53 [1.00-2.34]	2.31* [1.06-4.99]	1.53 [0.99-2.37]	1.18 [0.76-1.83]
Mother has any education	4,020 (59.4)	0.79** [0.69-0.89]	15.31** [9.70-24.18]	1.1 [0.98-1.24]	3.34** [2.86-3.91]

*p <.05 **p <.001
Green shading indicates a significant positive association and red shading indicates a significant negative association

Limitations

While the use of secondary datasets yielded meaningful supportive evidence, it was accompanied with a trade-off, especially in terms of indicator selection. Considering the priority focus of the FSNAU datasets on food security and nutrition, the supporting evidence for the gender and WASH sectors was scarcer. This essentially created evidence gaps during the design of the causal pathways resulting in a disproportionate representation of certain risk factors at the expense of others which might have been invoked during the qualitative inquiry.

Conclusion

The Link NCA study in the Dollow IDP settlements confirmed the observations from previous studies that risk factors of undernutrition are context-specific and do not automatically apply to all nutrition outcomes. While the overlap between the risk factors of wasting and stunting in Dollow was considerable, it could not have been predicted based on the available analyses. The analyses included in the Link NCA study will allow the implementing partners to adjust the programmatic priorities so that they address the identified key drivers of undernutrition and the programmatic gaps as outlined by the participating communities. This may include, among others, more development-type programming which would enhance in a sustainable manner their capacity to provide for their households instead of depending on emergency humanitarian assistance. Particular attention should be given to gender-sensitive programming, considering the practical implications of women-centred targeting on their workload and consequent capacity to follow recommendations on optimal childcare practices.

Detailed findings can be found in the full report which is available at
https://linknca.org/etude/dollow.htm
For more information, please contact the Link NCA Technical Unit at Action Against Hunger UK/ Action Against Hunger France at
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