Advancing the SDG's Leave-no-one-behind Agenda: mHealth for Delivering an Anemia Prevention and Treatment Program for Children with Disabilities

Zeina Makhoul,[1] ✉ Jon Baldivieso,[1] Kate Miller,[1] and Douglas Taren[2]
[1]SPOON, Portland, OR, USA   [2]University of Arizona, Tucson, AZ, USA

> *"As we embark on this great collective journey, we pledge that no one will be left behind. Recognizing that the dignity of the human person is fundamental, we wish to see the Goals and targets met for all."*
>
> —United Nations General Assembly[1]

A health professional in Zambia counseling a mother of a child with cerebral palsy on anemia prevention.

Introduction

Despite global efforts, progress to reduce malnutrition has been too slow to achieve Sustainable Development Goal 2 (SDG2)[2] and is now being threatened by the COVID-19 pandemic. This lag in progress is particularly true for the estimated 291 million children with disabilities worldwide.[3]

2 ZERO HUNGER — End hunger, achieve food security and improved nutrition, and promote sustainable agriculture

Children with disabilities, especially those with feeding difficulties, are three times more likely to be malnourished and twice as likely to die from malnutrition compared to children without disabilities.[4] They are often excluded from national and global nutrition programs, contributing to gaps in data and data-driven programming.[5] To advance the SDG's leave-no-one-behind Agenda, this program's objective was to determine how mHealth can be used in low-resource settings to improve the nutritional status of children with disabilities.

Count Me In mHealth App

SPOON has worked with 15 facilities that serve children with disabilities to incorporate *Count Me In*, a cloud-based mHealth app that enables caregivers to assess and monitor anemia status of children with disabilities over time. It interprets hemoglobin values and generates iron supplement and practical dietary recommendations for anemia prevention and treatment (Figure 1). It accounts for causes of anemia such as inflammation, infection, malaria, and chronic disease. The app complements anemia interventions with growth monitoring and recommendations on feeding best practices and specialized techniques. It also generates, in real-time, data to assist with decision-making.

Figure 1. Anemia assessment in Count Me In
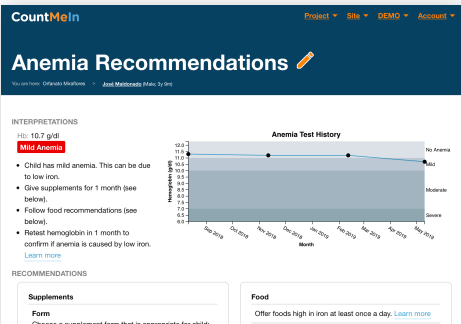
Results

To date, 295 children with reported disabilities in Zambia, Uganda, Vietnam, China, and Mauritius have been enrolled in *Count Me In*. Table 1 presents preliminary data on a subset of children with disabilities (n=118) who had more than two anemia assessments. The most common reported disability was cerebral palsy. Most children live in residential care institutions. Preliminary data show that, over a mean period of 9.6 months, anemia attributed to iron deficiency has decreased by 54%.

Table 1. Preliminary data for children with disabilities with at least two anemia assessments in Count Me In

	N = 118*
Female, %	39
Mean age, y	4.7 ± 3.7
Younger than 5 years, %	56.8
In residential care, %	90.7
Ever took iron supplements, %	36.4%
Mean follow-up period, m	9.6 ± 5.9
Baseline anemia prevalence, %	57.6
Follow-up anemia prevalence, %	26.3

* Data updated since abstract submission.

Conclusion

SPOON's preliminary data suggest that the use of mHealth, like *Count Me In*, could reach a neglected population with essential nutrition interventions to improve health outcomes. It could also fill a long-standing gap in data for children with disabilities. Technology alone cannot solve these issues, however. Governments and civil society must 1) intentionally target children with disabilities; 2) adopt tools that facilitate the delivery of quality adapted nutrition and feeding care; and 3) properly train service providers across various sectors.

[1] UN Resolution A/RES/70/1, September 2015.
[2] FAO, IFAD, UNICEF, WFP & WHO. 2019. https://www.unicef.org/reports/state-of-food-security-and-nutrition-2019.
[3] Olusanya BO, et al. Pediatrics 2020;146(1).
[4] Kuper H & Heydt P. 2019. https://www.lshtm.ac.uk/media/38726.
[5] Groce N, et al. 2014. *Pediatrics & international child health*, 34(4): 308–14.

Building a world where children with disabilities are seen, nourished, and given a chance to thrive.