Scientific Research Publishing

Food and Nutrition Sciences, 2026, 17(8), 672-681
https://www.scirp.org/journal/fns
ISSN Online: 2157-9458
ISSN Print: 2157-944X

Small-Quantity Lipid-Based Nutrient Supplementation (SQ-LNS) among Children Aged 6 - 18 Months in Three Districts of Togo: Results of a Pilot Evaluation and Programmatic Perspectives

Tchasso Kenao[1*], Mouawiyatou Bouraima[2], Midassirou Bebou[2], Komlan Kwadjode[1], Soliou Badarou[1], Basilia Sodabi[1], Erinna Dia[1]

[1]Togo Country Office, United Nations Children's Fund (UNICEF), Lomé, Togo
[2]Nutrition Division, Ministry of Health, Public Hygiene, Universal Health Coverage and Insurance, Lomé, Togo
Email: *tkenao@unicef.org

How to cite this paper: Kenao, T., Bouraima, M., Bebou, M., Kwadjode, K., Badarou, S., Sodabi, B. and Dia, E. (2026) Small-Quantity Lipid-Based Nutrient Supplementation (SQ-LNS) among Children Aged 6 - 18 Months in Three Districts of Togo: Results of a Pilot Evaluation and Programmatic Perspectives. *Food and Nutrition Sciences*, **17**, 672-681.
https://doi.org/10.4236/fns.2026.178044

Received: March 28, 2026
Accepted: August 14, 2026
Published: August 17, 2026

Abstract

Background: Small-quantity Lipid-Based nutrient supplements (SQ-LNS) are a recommended intervention to contribute to the prevention of malnutrition among children living in highly vulnerable nutritional settings. This evaluation aims to document the implementation of a pilot phase of SQ-LNS supplementation among infants and young children aged 6 to 18 months in three districts in northern Togo. **Methods:** A non-probabilistic descriptive cross-sectional study was conducted in the Binah, Oti, and Tandjoaré districts among infants and young children aged 6 to 18 months who received SQ-LNS supplementation over a six-month period, in addition to breast milk, as well as their mothers and key informants. Quantitative data focused on the evolution of mid-upper arm circumference (MUAC) in 41 children present at the time of the evaluation. Qualitative data was collected from 90 mothers and key informants through focus group discussions and individual interviews. **Results:** Median MUAC increased from 134 mm to 148 mm after the supplementation period, with a statistically significant difference (Wilcoxon test, $p < 0.001$). Acceptability of the product was high: 93% of children consumed SQ-LNS from the first days of distribution, and 100% of households expressed willingness to continue the intervention. The main challenges reported included early cessation of breastfeeding in some children, occasional stock-outs, and instances of product sharing within households. **Conclusion:** This evaluation highlights positive trends associated with the implementation of

SQ-LNS supplementation, particularly in terms of acceptability and changes in nutritional indicators among beneficiary children. However, these findings should be interpreted as implementation-level observations rather than evidence of causal effectiveness. Scaling up the intervention will require strengthened communication on breastfeeding, a more reliable supply system, and community-based sustainability strategies.

Keywords

SQ-LNS, Infant Nutrition, Malnutrition, Togo, Program Implementation

1. Introduction

Child malnutrition remains one of the leading determinants of morbidity and mortality among children under five years of age in sub-Saharan Africa. In Togo, recent nutrition surveys indicate a particularly concerning situation in the Savanes, Kara, and Maritime regions, where the prevalence of acute malnutrition ranges between 8% and 10%, and stunting exceeds 27%. These levels reflect persistent nutritional vulnerability, exacerbated by food insecurity, limited access to essential health services, and constraints related to safe water, hygiene, and sanitation. In this context, evidence-based interventions are needed to prevent deterioration in nutritional status during the critical window of 6 - 24 months [1]-[3].

Small-Quantity Lipid-Based Nutrient Supplements (SQ-LNS) represent one of the most well-documented approaches to improving complementary feeding and reducing the burden of malnutrition. SQ-LNS provide an additional daily intake of energy (100 - 120 kcal/day), essential fats, proteins, and 22 micronutrients, including vitamin A, B vitamins, iron, zinc, and magnesium. Their daily use aims to fill the nutritional gap observed in infant diets that are often poorly diversified and deficient in micronutrients [4] [5].

Numerous multicenter analyses have demonstrated the effectiveness of SQ-LNS in improving linear growth, reducing waste, and preventing micronutrient deficiencies. Recent meta-analyses show significant impacts, including a 27% reduction in child mortality, a 14% reduction in acute malnutrition (including a 31% reduction in severe forms), a 12% reduction in stunting, and a 64% reduction in iron-deficiency anemia among children receiving this intervention. Based on this evidence, the World Health Organization recommends the use of SQ-LNS in its guidelines on complementary feeding and the management of wasting, while the 2021 Lancet series support their integration into nutrition prevention programs [6]-[9].

These findings have led several African countries to incorporate SQ-LNS into their national strategies. An international technical meeting held in 2022 in Washington reaffirmed the importance of adopting this approach to improve child survival and development in high-risk nutritional settings. In Togo, the analysis of

the nutrition situation prompted the launch of a pilot program in three priority districts in the Savanes and Kara regions, targeting children aged 6 to 18 months. The program is based on a concept note outlining operational strategies, capacity building for stakeholders, and regular monitoring conducted by health workers and community volunteers.

After six months of implementation, a joint evaluation by the Ministry of Health and UNICEF documented the implementation process, assessed early outcomes, analyzed community acceptability, and identified challenges related to adherence, supply, and nutrition communication. This article synthesizes the findings of this evaluation and proposes recommendations to guide national nutrition policies toward a scalable approach grounded in strong and sustainable operational conditions.

2. Methods

2.1. Study Design

A descriptive cross-sectional non-probability study was conducted between January 2024 and June 2025 in the districts of Binah, Oti, and Tandjoaré. The baseline MUAC was obtained from programmatic records, and the 41 children have paired measurements (pre/post). MUAC measurements were collected before and after supplementation.

Study setting: The evaluation took place in the districts of Tandjoaré and Oti, located in the Savanes region, and in the district of Binah, in the Kara region. These districts are among the most affected by child malnutrition. The Savanes and Kara regions, located in the far north of Togo, are particularly vulnerable due to insecurity linked to the Sahelian crisis and frequent seasonal lean periods between May and October, as shown in Figure 1. In 2024, the population was estimated at 88,117 inhabitants for Binah, 130,657 for Oti, and 145,328 for Tandjoaré. The health system operates through a pyramidal structure, with strong community participation facilitated by Community Health Workers.

Study population: Infants and young children aged 6 to 18 months enrolled in the program and their mothers/caregivers.

Inclusion criteria: Residence of at least 6 months and completion of SQ-LNS supplementation.

2.2. Data Collection

2.2.1. Organization of Data Collection

Data on infants and young children aged 6 - 18 months who received SQ-LNS supplementation were recorded in registers and monthly reporting forms at the time of distribution by community health workers (CHWs). During this post-intervention evaluation, CHWs assisted the survey teams in locating the mothers of beneficiary children who had received SQ-LNS and other interventions, including IYCF (Infant and Young Child Feeding) counseling, within their respective households.

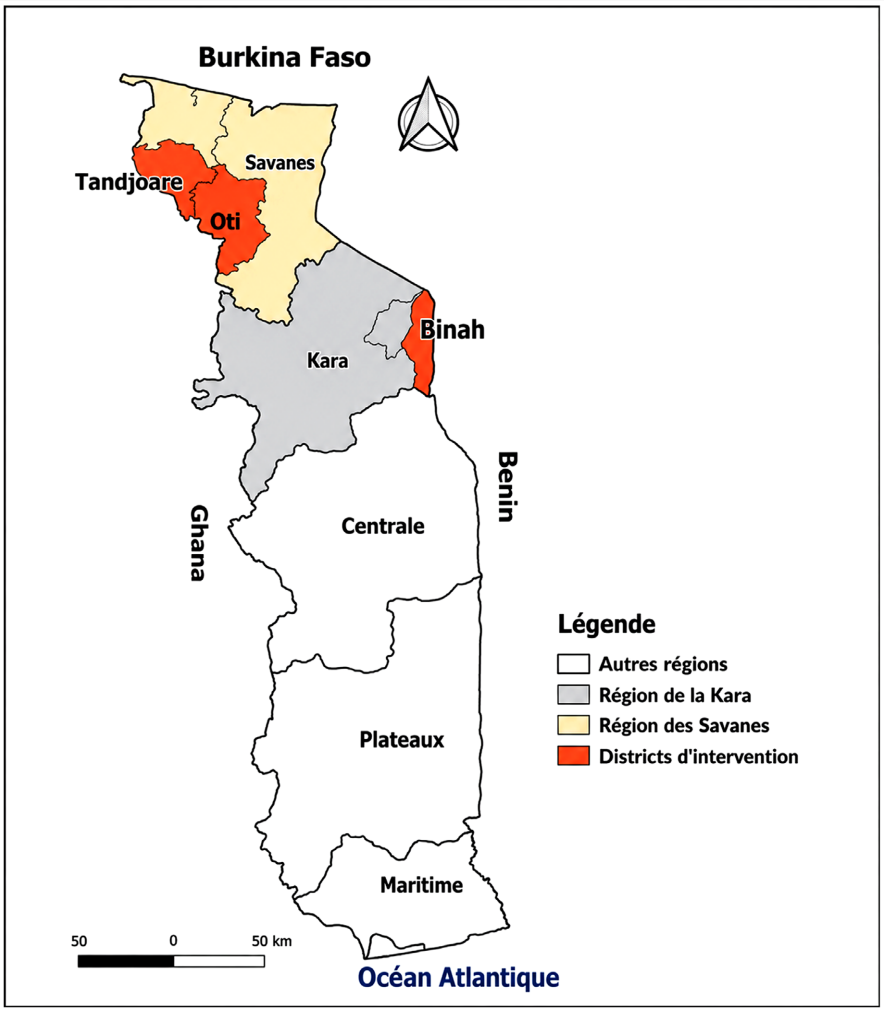

Figure 1. Map of Togo showing the SQ-LNS distribution districts.

These mothers were invited either to nearby health facilities or to community gathering points, particularly during vaccination sessions conducted through outreach strategies. Survey teams traveled to these locations to carry out data collection activities, including focus group discussions.

A data extraction form was used to collect information on children aged 6 - 18 months who received SQ-LNS, drawing from various reporting tools such as registers, monthly reporting forms, and electronic databases (e.g., Kobocollect).

In addition, interviews with mothers and caregivers were conducted through focus group discussions in local languages, with the support of field supervisors or collaborators fluent in those languages. Key informants (e.g., village chiefs, community leaders) were interviewed in the official language. These discussions aimed to assess participants' knowledge of SQ-LNS as well as the level of community ownership of the intervention. Specifically, the focus was on mothers' and caregivers' knowledge and practices related to SQ-LNS and IYCF, as well as the motivating factors and barriers affecting adherence to the program.

Assessment of knowledge and acceptability of SQ-LNS was conducted using a

questionnaire adapted from the WHO Frequently Asked Questions (FAQ) model, which has also been used in similar studies (Adu-Afarwuah *et al*., 2008; Adu-Afarwuah *et al*., 2011; Hess *et al*., 2011; Phuka *et al*., 2011; Ashorn *et al*., 2015).

In total, three focus group discussions were conducted in each of the three localities, resulting in nine focus group discussions altogether. Each focus group included 8 to 12 participants, allowing for in-depth exploration of mothers' perspectives on the intervention. In short:

- Extraction of data from registers and monitoring forms;
- Measurement of mid-upper arm circumference (MUAC) among children present at the time of evaluation;
- Nine focus group discussions with mothers (n = 90);
- Individual interviews with community leaders and health personnel.

2.2.2. Analysis

Comparison of MUAC values before and after supplementation using the Wilcoxon test ($p < 0.05$). Thematic analysis was conducted for qualitative data. Data was analyzed using STATA software version 16.1. In addition to descriptive sociodemographic analysis among mothers, a qualitative analysis was conducted [10].

2.2.3. Ethical Considerations

Data collection was carried out in the three localities with authorization from the Ministry of Health. Within the communities, the objectives and purpose of the data collection were clearly explained to participants before administering questionnaires. Only individuals who provided free and informed consent were included. As for the data, they were collected and used within the framework of the pilot SQ-LNS supplementation project in Togo.

3. Results

3.1. Participant Characteristics

A total of 90 women were interviewed, and 41 children were measured (20 in the Kara region and 21 in the Savanes region).

3.2. Changes in Mid-Upper Arm Circumference

The median MUAC increased from 134 mm to 148 mm after supplementation.

- Kara region: 137 mm → 150 mm
- Savanes region: 131 mm → 145 mm

The Wilcoxon test showed a statistically significant improvement ($p < 0.001$), with 37 increases compared to only 2 decreases.

3.3. Acceptability and Community Perceptions

- 93% of children accepted SQ-LNS within the first few days.
- 33% of women report their child eats the entire SQ-LNS sachet, prefers it over other foods, and won't share it, as shown in **Figure 2**.
- 100% of families expressed willingness to continue the program.

- 40% of women report that their child falls ill less often since taking SQ-LNS, as shown in Figure 3.
- Some mothers reported a decrease in breastfeeding among older children, linked to the high palatability of the product.
- Most women observed improvements in their child's appetite and vitality.

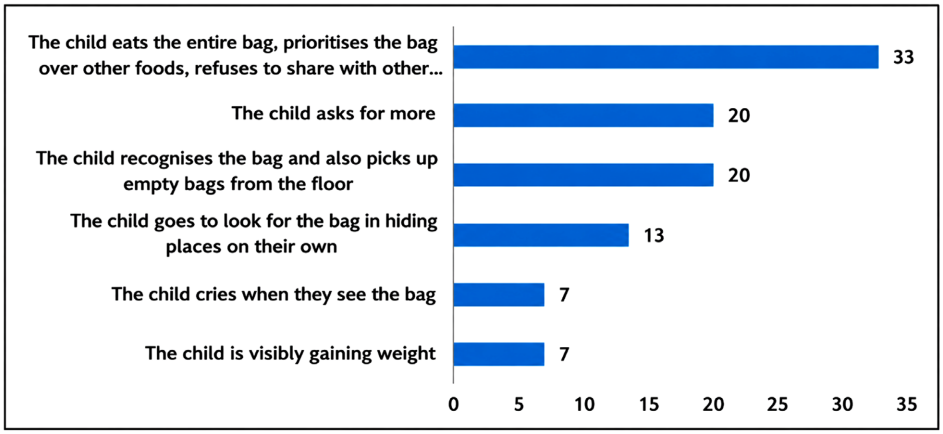

Figure 2. Acceptability of SQ-LNS among children according to mothers.

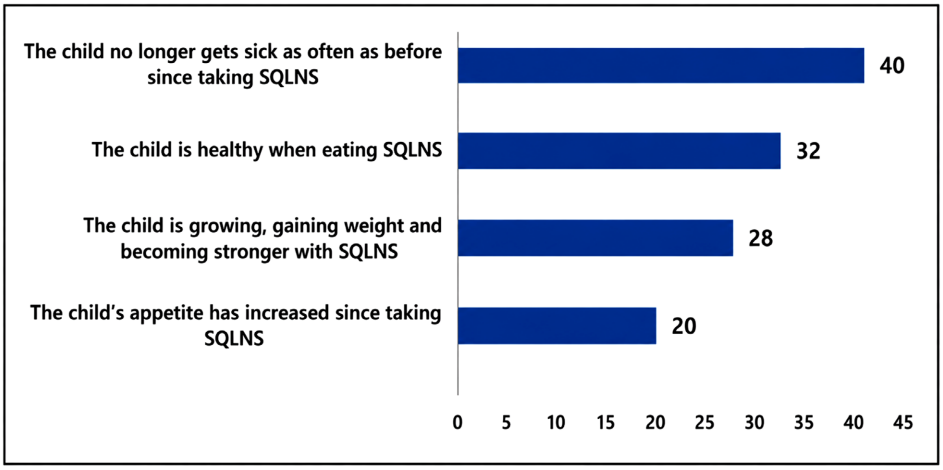

Figure 3. Perceptions of surveyed women regarding SQ-LNS.

3.4. Identified Challenges

- Occasional supply stock-outs.
- Early cessation of breastfeeding (before two years of age) among some children.
- Intra-household sharing of the product in certain cases.
- Missed appointments and low adherence among some families.

4. Discussion

4.1. Relevance and Effectiveness of the Intervention

Although the effectiveness of SQ-LNS is already well established, the results ob-

served at the operational level are consistent with those reported in randomized trials conducted in sub-Saharan Africa and South Asia. Indeed, the findings show that regular administration of SQ-LNS significantly improves certain nutritional and growth parameters, particularly MUAC, as observed in several studies [11] [12].

Furthermore, the evaluation of SQ-LNS supplementation among vulnerable children provides useful evidence to document the relevance of this intervention and its potential associations with the prevention of childhood malnutrition in a context of vulnerability in Togo.

4.2. Nutritional Impact and Growth

SQ-LNS supplementation has been shown in some studies to reduce the prevalence of stunting and to improve overall child growth [13] [14]. The observed effects appear more pronounced in settings characterized by high food insecurity and a high prevalence of chronic malnutrition. However, measured impacts vary depending on the context, suggesting that SQ-LNS are not a universal solution but should be adapted to local needs and vulnerabilities.

In our context, it is still premature to speak of impact, given that the implementation period lasted only six months and was marked by some limitations related to adherence. Nevertheless, the observed effects are consistent with findings from previous studies. Randomized trials conducted in Ghana, Haiti, Madagascar, Burkina Faso, and Bangladesh have shown improvements in the nutritional status of children receiving SQ-LNS [14].

However, other studies, particularly in Malawi, have not demonstrated a significant effect on child growth when comparing intervention and control groups [15] [16], which contrasts with our findings.

The fight against chronic malnutrition is multifactorial and requires actions across several sectors: nutrition, water, hygiene, health, and women's education. The lack of significant results in some studies, such as in Malawi, may be explained by factors such as lack of access to safe water, high prevalence of infections, reduced usual dietary intake, and poor adherence (e.g., sharing the product with another child) [17].

4.3. Acceptability and Use

Prior to implementation, acceptability testing of the product among children was not conducted.

Based on our findings, the acceptability of the product among children and their families is generally satisfactory, as observed in most countries implementing this intervention. However, two major challenges remain:

- The abandonment of breastfeeding in favor of SQ-LNS poses an increased risk of malnutrition among target children. Some children aged 18 to 24 months discontinued breastfeeding and consumed only SQ-LNS. This situation was sometimes encouraged by mothers themselves, who used the opportunity to

stop breastfeeding early (before two years), contrary to current recommendations.

- Non-adherence, sometimes linked to missed appointments, limited understanding of instructions, or supply disruptions of SQ-LNS. These factors must be considered in the design of sustainable programs, particularly through appropriate communication strategies, reliable supply systems, and strengthened community-based follow-up.

4.4. Programmatic Implications

The results of this evaluation confirm the relevance of SQ-LNS, particularly in contexts of food insecurity, as a complementary transitional intervention alongside other malnutrition prevention strategies such as exclusive breastfeeding, dietary diversification, vitamin A supplementation, and WASH interventions. However, their impact is optimized when delivered through an integrated community-based approach involving trained community health workers, well-functioning health facilities, and strong social mobilization.

4.5. Limitations of the Study

This study has several limitations that should be considered when interpreting the findings. The non-probabilistic cross-sectional design and the absence of a control group limit any causal inference regarding the observed changes in nutritional indicators. The small sample size of children with paired measurements (n = 41) also reduces statistical power and generalizability. In addition, the selection of children available at the time of the survey may introduce selection bias. Qualitative findings are based on self-reported information from caregivers and key informants, which may be subject to recall and social desirability bias. Finally, the relatively short implementation period (six months) does not allow assessment of long-term effects or sustainability of the intervention.

5. Conclusion

This pilot evaluation shows that SQ-LNS supplementation is feasible, well accepted, and associated with improvements in nutritional indicators, particularly mid-upper arm circumference, among infants and young children aged 6 - 18 months in three districts of northern Togo. Its integration as a complementary transitional intervention should be accompanied by strengthened health and nutrition services, tailored communication on infant and young child feeding, a reliable supply system, and sustained community engagement.

Author Contributions

Tchasso Kenao conceptualized the study and contributed to the study design and methodology. Mouawiyatou Bouraima and Midassirou Bebou coordinated and supervised the implementation of the SQ-LNS intervention and data collection. Komlan Kwadjode contributed to data management and statistical analysis.

Tchasso Kenao and Komlan Kwadjode interpreted the findings and drafted the manuscript. All authors contributed to the critical revision of the manuscript, approved the final version, and agreed to be accountable for all aspects of the work.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Keats, E.C., Das, J.K., Salam, R.A., Lassi, Z.S., Imdad, A., Black, R.E., *et al.* (2021) Effective Interventions to Address Maternal and Child Malnutrition: An Update of the Evidence. *The Lancet Child & Adolescent Health*, **5**, 367-384. https://doi.org/10.1016/s2352-4642(20)30274-1

[2] World Health Organization (2023) WHO Guideline for Complementary Feeding of Infants and Young Children 6 - 23 Months of Age. World Health Organization. https://www.who.int/publications/i/item/9789240081864

[3] World Health Organization (2023) WHO Guideline on the Prevention and Management of Wasting and Nutritional Oedema (Acute Malnutrition) in Infants and Children under 5 Years. World Health Organization. https://app.magicapp.org/#/guideline/noPQkE

[4] USAID Advancing Nutrition (2021) Lipid-Based Nutrient Supplements: Evidence and Program Guidance. USAID Advancing Nutrition Technical Brief. https://sqlns.ucdavis.edu/resource/usaid-lns-evidence-and-program-guidance

[5] UNICEF (2023) Small Supplements for the Prevention of Malnutrition in Early Childhood (Small Quantity Lipid Nutrient Supplement). Brief Guidance Note. Version 1.0. UNICEF. https://www.unicef.org/documents/nutrition/SQLNS-Guidance

[6] World Health Organization (2023) WHO Guideline for Complementary Feeding of Infants and Young Children 6 - 23 Months of Age. https://www.who.int/publications/i/item/9789240081864

[7] Klevor, M.K., Adu-Afarwuah, S., Ashorn, P., Arimond, M., Dewey, K.G., Lartey, A., *et al.* (2016) A Mixed Method Study Exploring Adherence to and Acceptability of Small Quantity Lipid-Based Nutrient Supplements (SQ-LNS) among Pregnant and Lactating Women in Ghana and Malawi. *BMC Pregnancy and Childbirth*, **16**, Article No. 253. https://doi.org/10.1186/s12884-016-1039-0

[8] Lufumpa, N., Hilger, A., Ng, O. and de la Briere, B. (2023) Preventing Early Childhood Undernutrition in the Sahel Region: Recommendations for Small-Quantity Lipid-Based Nutrient Supplement Interventions. Sahel Adaptive Social Protection Program, World Bank Group. https://www.worldbank.org/en/programs/sahel-adaptive-social-protection-program-trust-fund/publications

[9] World Food Programme (2023) Technical Specifications for Lipid-Based Nutrient Supplement—Small Quantity (LNS-SQ). Version 4. https://docs.wfp.org/api/documents/WFP-0000149100/download/

[10] Hubinon, M. (2010) Management des unités de soins, de l'analyse systémique à l'évaluation de la qualité [Gestion des unités de soins, analyse systémique jusqu'à l'évaluation de la qualité]. Breckuniv, 395 p.

[11] Dewey, K.G., Mridha, M.K., Matias, S.L., Arnold, C.D., Cummins, J.R., Khan, M.S.A., *et al.* (2017) Lipid-Based Nutrient Supplementation in the First 1000 d Improves

Child Growth in Bangladesh: A Cluster-Randomized Effectiveness Trial. *The American Journal of Clinical Nutrition*, **105**, 944-957. https://doi.org/10.3945/ajcn.116.147942

[12] Matias, S.L., Mridha, M.K., Tofail, F., Arnold, C.D., Khan, M.S.A., Siddiqui, Z., *et al*. (2017) Home Fortification during the First 1000 d Improves Child Development in Bangladesh: A Cluster-Randomized Effectiveness Trial. *The American Journal of Clinical Nutrition*, **105**, 958-969. https://doi.org/10.3945/ajcn.116.150318

[13] Prado, E.L., Arnold, C.D., Wessells, K.R., Stewart, C.P., Abbeddou, S., Adu-Afarwuah, S., *et al*. (2021) Small-Quantity Lipid-Based Nutrient Supplements for Children Age 6 - 24 Months: A Systematic Review and Individual Participant Data Meta-Analysis of Effects on Developmental Outcomes and Effect Modifiers. *The American Journal of Clinical Nutrition*, **114**, 43S-67S. https://doi.org/10.1093/ajcn/nqab277

[14] Dewey, K.G., Stewart, C.P., Wessells, K.R., Prado, E.L. and Arnold, C.D. (2021) Small-Quantity Lipid-Based Nutrient Supplements for the Prevention of Child Malnutrition and Promotion of Healthy Development: Overview of Individual Participant Data Meta-Analysis and Programmatic Implications. *The American Journal of Clinical Nutrition*, **114**, 3S-14S. https://doi.org/10.1093/ajcn/nqab279

[15] Maleta, K.M., Phuka, J., Alho, L., Cheung, Y.B., Dewey, K.G., Ashorn, U., *et al*. (2015) Provision of 10 - 40 G/D Lipid-Based Nutrient Supplements from 6 to 18 Months of Age Does Not Prevent Linear Growth Faltering in Malawi. *The Journal of Nutrition*, **145**, 1909-1915. https://doi.org/10.3945/jn.114.208181

[16] Ashorn, P., Alho, L., Ashorn, U., Cheung, Y.B., Dewey, K.G., Gondwe, A., *et al*. (2015) Supplementation of Maternal Diets during Pregnancy and for 6 Months Postpartum and Infant Diets Thereafter with Small-Quantity Lipid-Based Nutrient Supplements Does Not Promote Child Growth by 18 Months of Age in Rural Malawi: A Randomized Controlled Trial. *The Journal of Nutrition*, **145**, 1345-1353.

[17] Dewey, K.G., Arnold, C.D., Wessells, K.R. and Stewart, C.P. (2023) Lipid-Based Nutrient Supplements for Prevention of Child Undernutrition: When Less May Be More. *The American Journal of Clinical Nutrition*, **118**, 1133-1144. https://doi.org/10.1016/j.ajcnut.2023.09.007