A NUTRIENT-DENSE FORMULA IN UNDERNOURISHED CHILDREN IN INDONESIA: A COST-EFFECTIVE STRATEGY

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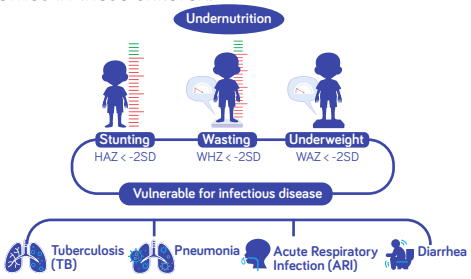
INTRODUCTION

Undernutrition (wasting, stunting, and underweight) remains a major health issue in Indonesia. The global annual economic cost of inaction on nutrition is estimated to be **£511.06 billion (€31.8 billion)** for stunting. Children affected by undernutrition are more likely to suffer from infections such as **tuberculosis (TB)**, **pneumonia, acute respiratory infections (ARI), and diarrhea. Nutrient-dense formula (NDF)** has shown promise to improve health outcomes in these children.



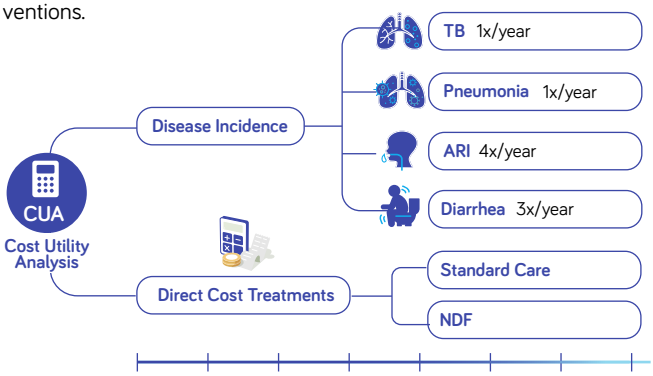
AIM

This study assessed the health benefit and cost-effectiveness of a 90-day NDF* intervention (400 kcal/day/child) for undernourished children aged 0–5 years compared to standard care.

*This product is a breast-milk substitute and should only be used upon the recommendation or prescription of a healthcare professional. Breastfeeding is the best.

METHOD

A cost-utility analysis (CUA) was performed using a decision tree model. The analysis incorporated both reductions in the incidence and direct cost treatments of TB, pneumonia, diarrhea, and ARI, as well as gains in quality-adjusted life years (QALYs) over a five-year time horizon. Disease incidence rates were modelled based on estimated frequencies, with TB and pneumonia assessed annually, ARI 4x/year, and diarrhea 3x/year. Local data on undernutrition-related illnesses and conditions in children were gathered and analysed to determine the cost-effectiveness of nutritional interventions.



RESULTS

Providing NDF to undernourished children has been clinically shown to reduce cases of undernutrition. Moreover, the decline in the prevalence of undernutrition (stunting, underweight, and wasting) indirectly contributes to lowering the incidence of secondary health problems such as TB, pneumonia, ARI, and diarrhea. NDF administration could prevent approximately 1.6 Mio cases of stunting, 1.2 Mio cases of wasting, and 1.9 Mio cases of underweight. It also may reduce the incidence of TB, pneumonia, ARI, and diarrhea by 47.2% (1.2 Mio), 44.7% (1 Mio), 47.2% (2.6 Mio), and 48.9% (2 Mio), respectively.

These reductions are also associated with substantial cost savings with utility value significant between healthy children compared to undernourished children (Figure 1). These reductions are also associated with substantial cost savings: IDR 2.46T (€142.8M) for TB, IDR 3.88T (€225.1M) for pneumonia, IDR 2.40T (€139.3M) for ARI, IDR 3.38T (€196.1M) for diarrhea. ICER of IDR 6.23M/QALY (€362/QALY) (Figure 2), which is well below Indonesia's cost- effectiveness threshold of three times the GDP/capita (Figure 3).

The univariate sensitivity analysis (Figure 4) showed that changes in the utility of healthy children, pneumonia prevalence in underweight children, and cost of childhood diarrhea had the greatest impact on ICER values, but did not affect the overall decision, confirming the model's robustness.

Figure 1. Utility value of Indonesian children year 2 - 5 years old

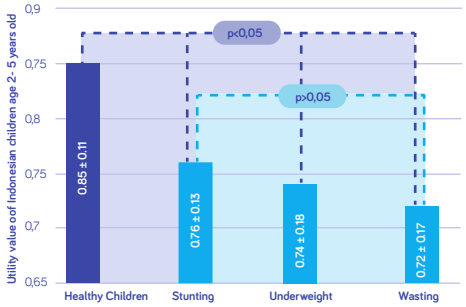


Figure 2. Cost-Utility Analysis of NDF supplementation

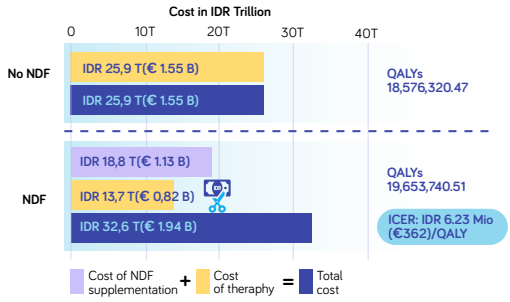


Figure 3. Cost-Effectiveness Plane of NDF Supplementation

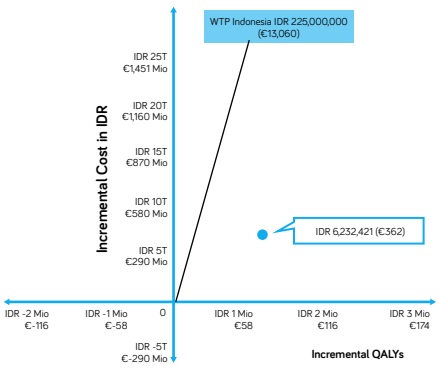
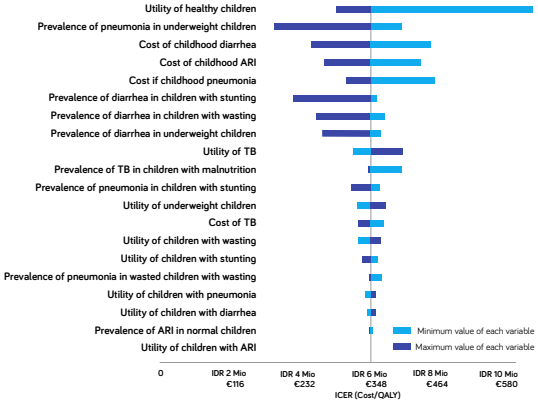


Figure 4. A Univariate Sensitivity Analysis (Tornado Diagram) ICER NDF supplementation



CONCLUSION

The provision of NDF to children with nutritional deficiencies is a cost-effective public health strategy in Indonesia. It potentially prevents the progression of adverse health outcomes associated with undernutrition and malnutrition and reduces healthcare costs through decreased treatment costs.

Reference:

• SSGI. Hasil Survei Status Gizi Indonesia. Kementeri Kesehat Republik Indones [Internet]. 2023;77–77. Available from: https://promkes.kemkes.go.id/materi-hasil-survei-status-gizi-indonesia-ssgi-2022 • Morales F, Montserrat-de la Paz S, Leon MJ, Rivero-Pino F. Effects of Malnutrition on the Immune System and Infection and the Role of Nutritional Strategies Regarding Improvements in Children's Health Status: A Literature Review. Nutrients. 2024;16(1):1–16. • Widjaja NA, Hamida A, Purnomo MT, Satjadibrata A, Sari PP, Handini LS, et al. Effect of high-calorieformula on weight, height increment, IGF-1 and TLC in growth faltering children: A quasi-experimental study. Heliyon. 2024;10(7):e28834. • Bahar MA, Galistiani GF, Eliyanti U, Mohi, AR,Gambaran Nilai Utilitas Kesehatan Anak dengan Malnutrisi: Studi pada Kasus Stunting, Wasting, dan Underweight di Indonesia, JMPI, 10(2), 2024, 610-617, doi: 10.35311/jmpi.v10i2.656

Funding: This study was supported by Danone SN Indonesia.