COST-UTILITY ANALYSIS OF NUTRIENT-DENSE SUPPLEMENTATION IN UNDERNOURISHED CHILDREN IN INDONESIA

ACCEPTANCE CODE
EE469

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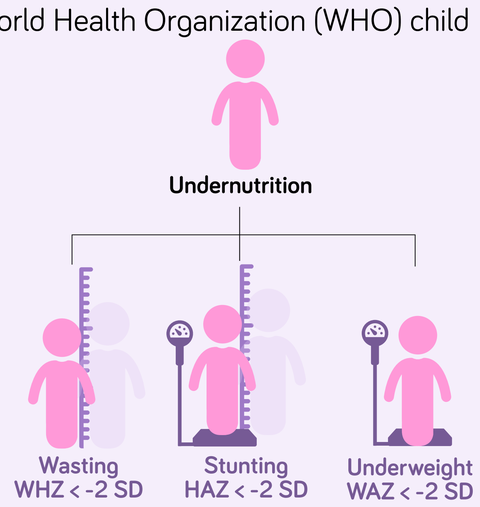
INTRODUCTION

Undernutrition—stunting, underweight and wasting—is a major health concern in developing countries like Indonesia.

The global annual economic cost of inaction on nutrition is estimated to be £511.06 Bio (US$548 billion) for stunting. Using the World Health Organization (WHO) child growth standard based on age, stunting was assessed with a height-for-age z-score (HAZ) <–2 SD, and wasting with *a weight-for-height z-score* (WHZ) <–2 SD. Undernourished children are more susceptible to infectious diseases such as tuberculosis (TB), pneumonia, acute respiratory infections (ARI), and diarrhoea. Giving nutrient-dense formulas (NDF) that have been used to promote catch-up growth in undernourished children is a practical intervention for addressing this problem.



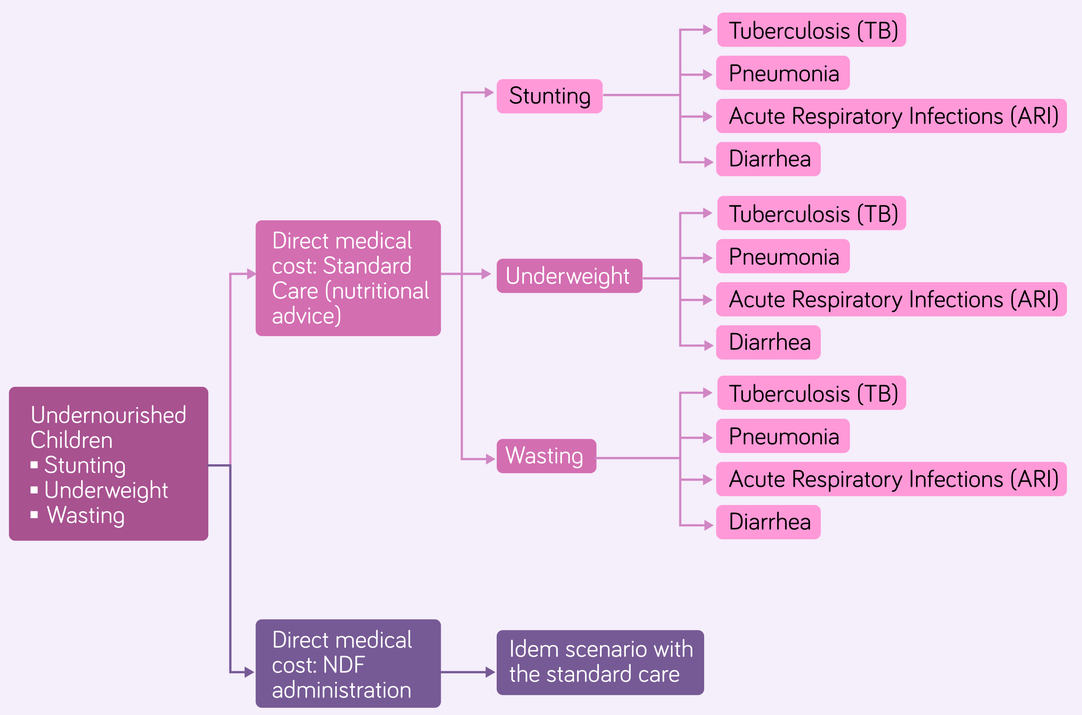
AIM

This study aimed to conduct a cost-utility analysis (CUA) to evaluate the cost-effectiveness of NDF supplementation in undernourished children aged 0–5. It compared the health outcomes and direct medical costs of NDF administration with dietary guidance versus standard care (nutritional advice).

METHOD

A CUA compared the direct medical costs and QALYs of providing NDF (400kcal/day/child for 90 days) to undernourished children versus standard care (nutritional advice), using a decision tree model to assess its impact on conditions like TB, pneumonia, diarrhoea, and ARI. Input parameters included prevalence and disease-related direct medical costs from public domain. TB and pneumonia were estimated once each year, whereas ARI and diarrhoea were assessed four and three times respectively. Sensitivity analysis was performed and cost/QALY gained was expressed by the ICER.

Figure 1. Decision Tree Model for Giving NDF to Undernourished Children



RESULTS

Giving NDF to children with undernourished has been clinically proven by reducing cases of the undernourished. Furthermore, the decrease in the incidence of undernourished (stunting, underweight, wasting) also indirectly results in a decrease in the incidence of secondary impacts (TB, pneumonia, ARI, and diarrhoea). In accordance with previous clinical trials, administering NDF to patient populations experiencing undernourished can potentially reduce the incidence of stunting, wasting, and underweight by 34.5%, 51.7%, and 72.7%, or reduce the incidence of 1.6 million cases of stunting, 1.9 million cases of underweight and 1.2 million cases of wasting. Administering NDF can reduce the incidence of TB by 47.2% and pneumonia by 44.7% or reduce the incidence of TB by around 1.2 million cases and pneumonia by around 1 million cases. The ICER was IDR 4.41 million/QALY (about €262.48/QALY) (Table 1), falling below Indonesia's willingness-to-pay threshold of three times GDP per capita (Figure 2). The long-term benefits include improved intelligence, better work productivity, and reduced susceptibility to certain diseases. And in the short term, it reduces the prevalence of stunting, wasting, and underweight, helping to meet national health targets.

Table 1. Cost-Utility Analysis of NDF supplementation

Scenario	Cost of NDF supplementation (a)	Cost of therapy (a)	Total cost (a+b)	QALYs	Incremental Cost (x)	Incremental QALYs (y)	ICER (x/y)
Standard care (nutritional advice)	0	IDR 25,907 T (€1,542 Bio)	IDR 25,907T (€1,542 Bio)	17,614,217	Reff	Reff	Reff
NDF	IDR 18,838 T (€1,121 Bio)	IDR 13,783 Bio (€820 Mio)	IDR 32,622 T (€1,942 Bio)	19,137,286	IDR 6,714 T (€399 Bio)	1,523,069	IDR 4,41 Mio (€262.48)

Figure 2. Cost Effectiveness Plane (CFP) of NDF Supplementation

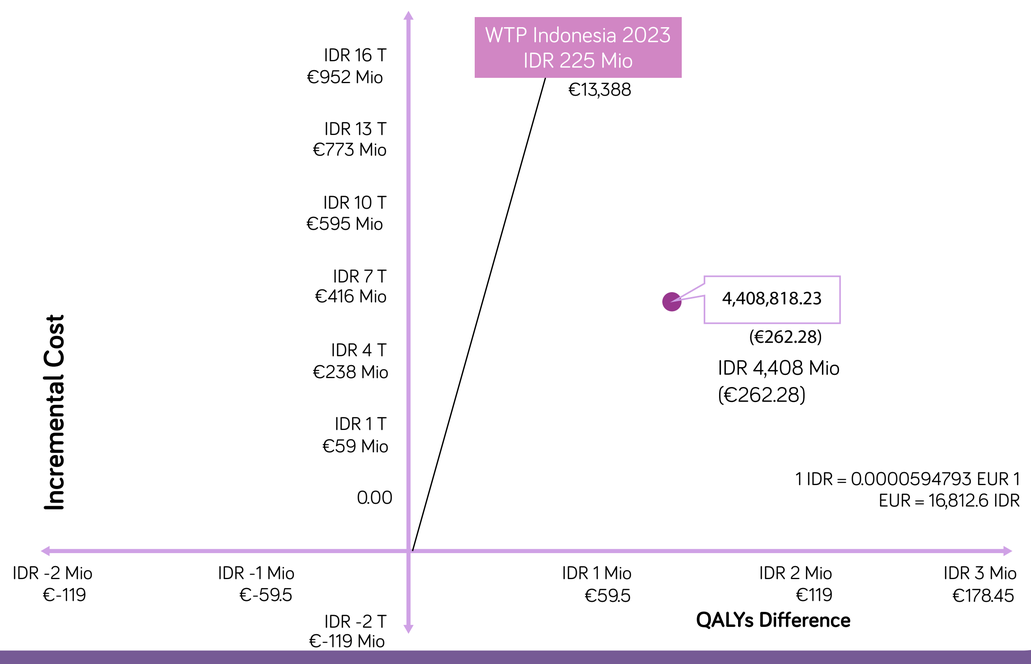
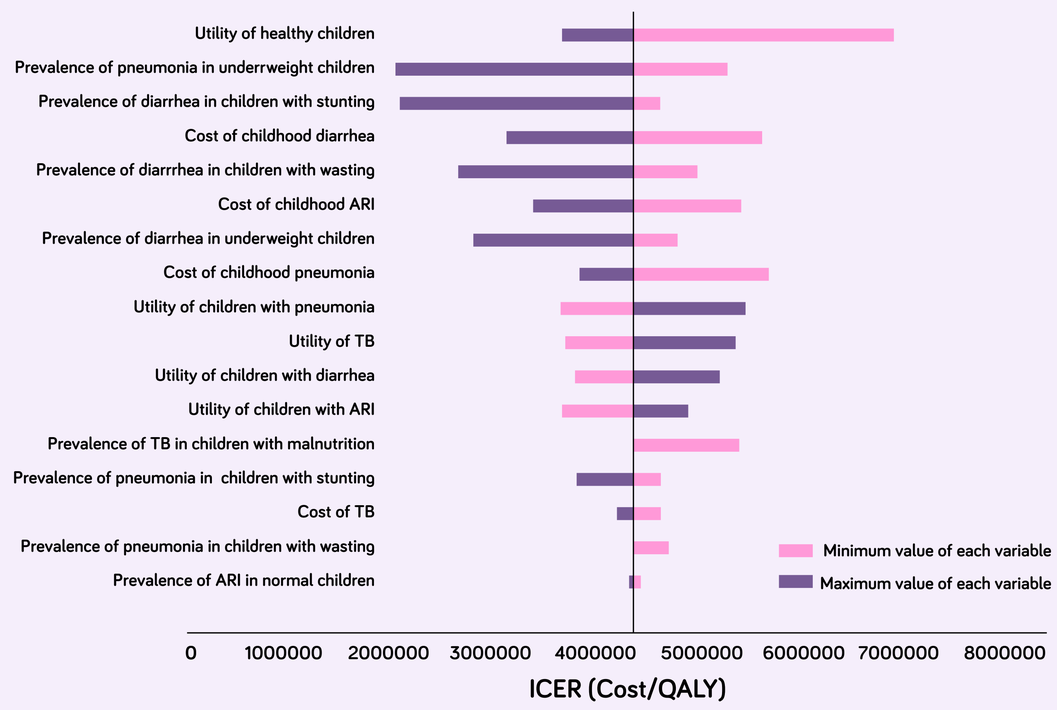


Figure 3. A Univariate Sensitivity Analysis (Tornado Diagram) ICER NDF Supplementation



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

CONCLUSION

Providing NDF to undernourished children is a cost-effective intervention in Indonesia that reduces the prevalence of undernutrition and associated costs of treatment for infectious illnesses such TB, pneumonia, ARI, and diarrhoea, and, thereby, improving public health.

Reference:

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Funding: This study was supported by Danone SN Indonesia.